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**DEFINING AND DELINEATING URBAN NEIGHBOURHOODS: A CASE STUDY
OF HOUSING AREAS IN BRENT, NORTH LONDON**

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Submitted as part of the requirements for the PhD degree

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ABSTRACT

Defining and Delineating Urban Neighbourhoods: a Case Study of Housing Areas in Brent, North London

There is no geographical definition of the neighbourhood despite it being the chosen spatial scale for U.K. government policy tackling social injustice and rebuilding democracy, and the setting for the majority of life's experiences where an individual's lifelong welfare is largely determined. Consequently, resources are targeted sub-optimally with environmental and social dynamics largely undiagnosed. This has fuelled an urgent demand for revealing the nature of neighbourhoods, and how they can be identified on the ground and delineated on maps.

Implementing a positive methodology I build upon the foremost theoretically-supported pedestrian-street network neighbourhood model, harnessing established theory, and present an integrative geographical theory of the neighbourhood and its practical manifestation to address the research problem.

Using Grannis's empirical work as a benchmark I test the transferability of his methodology to the UK and the explanatory power of my housing area neighbourhood model, using correlation analysis, in two London case study areas, with positive results. Housing areas arise from the physical and built environments and are shown to explain social distributions better than other spatial units tested, and compare favourably with applied surrogate neighbourhoods. I then identify the datasets required to roll out the methodology for developing a practical, meaningful and bounded neighbourhood geography. Further analysis confirms the role of wealth as the great social and spatial segregator.

The neighbourhood is re-conceptualised as an holistic and commonly understood entity, whilst the spatial precision introduced facilitates measurement and assessment for optimal service and resource provision, as well as monitoring and intervention. Presenting structural and social homophily as the geneses of social interaction patterns and the explanation for how space is transformed into place is a paradigm shift in our understanding of this fundamental geographical concept which promises to stimulate additional theoretical substantiation and development whilst providing a framework for phenomenological and ethnographical approaches.

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INTRODUCTION

1.1 Introduction

The nature of the central role neighbourhood plays in our society can be traced back to Aristotle, for whom “opportunities for discussion of the common good were likely to engender the creation of the common good” (Little, 2002), in essence that community arises from dialogue and association in place. The association of community, neighbourhoods and place has evolved, in the face of individualisation, globalisation and a retreat from civic participation, from an emphasis on local territorial communities to networks of social ties in places. It remains the case, however, that individuals are embodied in real space and, apart from the increasing numbers of well-connected and well-travelled people with an abundance of virtual networks, most people relate to others face-to-face and social networks remain rooted in the local (Wellman, 1996; Mok, Carrasco, & Wellman, 2010; Johnston & Pattie, 2011). Proximity fosters social interaction (McPherson, Smith-Lovin, & Cook, 2001, p.430) and that is why neighbourhoods – where the individual physically meets others – are regarded as the critical venue for the genesis of society.

However, although we are approaching the centenary of the first seminal presentation of the neighbourhood concept (Park & Burgess, 1967 (1925)) we appear to be little further forward in understanding precisely what a neighbourhood is, what animates it and lies at its heart, and how to identify it on the ground or delineate it on a map (Lupton & Power, 2004; Chisholm & Dench, 2005; Monk, Clarke, & Tang, 2011). Yet neighbourhoods have been the chosen spatial scale for U.K. government policy on tackling social injustice and rebuilding social democracy for some time (Forrest & Kearns, 2001; Wallace, 2001; Blunkett, 2002; Forrest, 2003; Morrison, 2003; HM Treasury, 2007), and they are seen as the critical venue wherein an individual’s lifelong welfare is largely determined as well as being the setting for the majority of life’s experiences (Buck, 2001; Diez Roux, 2001; Kintrea & Atkinson, 2001; Macintyre, Ellaway, & Cummins, 2002; Lupton, 2003; Lupton & Power, 2004). This conceptual and practical imprecision undermines the efficacy of all benevolent and munificent neighbourhood initiatives, rendering them, in some cases, “almost meaningless and possibly misleading” (Lupton, 2003).

This research critically reviews and assesses both theoretical and practical presentations of the neighbourhood with the objective of identifying meaningful, practical neighbourhoods underpinned by theory.

Every now and then events propel neighbourhoods into the headlines, as with the August 2011 riots, reminding us that not all social networks are socially benevolent. Suddenly, neighbourhoods, those hitherto familiar, friendly havens for most people,

were associated with anarchy, deviance and fear. The riots ensured that the nature of neighbourhoods, albeit problem neighbourhoods, was thrust into every home as looters and arsonists - branded as the products of deviant neighbourhoods - shocked TV audiences whilst newspaper headlines declared “Mobs rule as Police Surrender Streets” (The Times, 2011) and “London’s Burning”(Daily Mirror, 2011), ensuring that neighbourhoods became the centre of social and political debate. Troublesome neighbourhoods were labelled as the breeding grounds for social disorder and conflict.

The media reported that looters travelled from known disadvantaged estates and neighbourhoods to raid shopping centres, sometimes in comfortably-off areas. Of course, there is nothing new here in terms of the disparity of wealth and opportunity between adjacent neighbourhoods. The language is modern but the observation that “This crumbling rabbit warren of an estate (*West Ealing’s Copley Court Estate, the residence of a number of the rioters*), with its leaking roofs, and broken windows, is only a 15-minute walk from Ealing Broadway, the prosperous West London suburb whose cafes and organic food shops were looted on Monday night” (The Times, 2011) is simply an updated version of the juxtaposition of wealth and poverty that Engels revealed in 19th century Britain.

The riots led the Prime Minister to call for a major review of all government policies in an attempt to deal with what he termed Britain’s “Broken Society” and to tackle its “moral collapse,” (BBC, 2011) ensuring that these dramatic and traumatic upheavals have figured prominently on the political agenda since then, sharply focusing the need to understand what is happening and why.

But even before the riots the current government had set out its Big Society agenda (Cabinet Office, 2010) which, taken with its Localism Bill (Communities and Local Government, 2011) and reform of local services provision, devolves power to local communities and neighbourhoods: “Neighbourhoods are at the heart of the Government's approach...Our aim is to ensure that neighbourhoods are the building blocks not just for the Department for Communities and Local Government's major policy areas like housing, planning and regeneration, but for public service reform more generally.” (Communities and Local Government, 2010). In particular, all services provision is to be based on neighbourhoods, including reform of the planning system which puts neighbourhood planning at its core. Taken with education reform which emphasises parent power and localism, this is a major thrust of government policy to reform society from the bottom-up.

This drive of government policy is not only an expression of political ideology; it is also founded upon a substantial body of knowledge built up by neighbourhood professionals over decades who have highlighted the increasing polarisation of society (Hamnett, 1999, 2001, 2010), the spatial concentrations of deprivation (Dorling & Rees, 2003) and

the political disengagement by a so-called social ‘underclass’ (Allen & Duncan Smith, 2008) and, in one form or another, successive governments have targeted the neighbourhood as the chosen spatial scale for intervention.

Whilst, at the time of writing, there has been no in-depth analysis and explanation for the riots or their timing, the discourse centres on spatial concentrations of crime, unemployment, poverty, lack of social opportunity, gang membership, family structures, social housing and poor educational deprivation (The Guardian, 2011; The Times, 2011). All of which were, and remain, the subject matter of the urban ecologists, the ‘urban underclass’ and social area analysts, the social disorganisation theorists and all concerned with the spatial distribution of urban social inequality (Sampson & Morenoff, 1997). The neighbourhood is the chosen spatial scale of all these researchers and analysts because it is at this scale that the values of the individual and his family are subjected to the influences of peer groups and the wider society, termed neighbourhood effects, and these geographically concentrated influences form and shape the character of the neighbourhood, seen to be the elemental spatial crucible of society.

Alongside these significant political and social agendas neighbourhoods have an important spatial role in the normal functioning of society. All of us who live in an urban setting live in a neighbourhood, and it should be stated that deviant neighbourhoods are the exception. Whilst the riots and the current government’s agenda have commanded the headlines, in the background neighbourhoods have been and continue to be an important component in the general supply of civic goods and services, such as democratic representation, health provision and neighbourhood policing, and even where the term is not specifically used local public services aim to match functionality with social distributions at a scale associated with neighbourhoods. We are all influenced by our surroundings and considerable academic and public effort is expended in understanding how our neighbourhoods affect all aspects of our individual and social lives, and the role they play in our social structure.

Neighbourhoods are important because they are where most people spend most of their time and the venue for most social interactions. This is where everyday life occurs and where the individual meets other members of society; they are the basic unit of community. These day-to-day events shape our identity and relationships with others and, in this process, both life-long outcomes are forged for the individual, and society is generated. Recent years have witnessed an examination of the relationship between the individual's wellbeing and the characteristics of the neighbourhood, termed Neighbourhood Effects, especially in health (Diez Roux, 2001; Croucher, Myers, Jones, Ellaway, & Beck, 2007; Bamba, et al., 2010; Lindberg, et al., 2010), sociology (Buck, 2001; Bridge, 2002; Friedrichs, Galster, & Musterd, 2003; Atkinson & Kintrea, 2004; Castrignano & Landi, 2013), economics (Ioannides & Loury, 2004; Gobillon, Selod, & Zenou, 2007; Ioannides & Zabel, 2008), politics (MacAllister, et al., 2001; Johnston, et

al., 2005; Johnston & Pattie, 2011), education (Gibbons S. , 2002; Bramley & Karley, 2007), criminology (Kawachi, Kennedy, & Wilkinson, 1999; Sampson, Morenoff, & Gannon-Rowley, 2002) and geography (Jenks & Dempsey, 2007; Flowerdew, Manley, & Sabel, 2008; Campbell, Henly, Elliott, & Irwin, 2009; Minnery, Knight, Byrne, & Spencer, 2009). Scholarly opinion, as to whether or not neighbourhood effects actually exist, varies and a fair summary could be said to be that the jury is still out (Ellen, Mijanovich, & Dillman, 2001; Lupton, 2003; Cheshire, 2010; Galster G. , 2012). Grannis (2005) identifies a broad range of neighbourhood effects studies whilst Galster (2012) presents an updated, international review of empirical studies related to neighbourhood effects mechanisms.

Neighbourhoods are, first and foremost, rooted in territory. Everybody lives somewhere, and the concept of 'home' is important to everybody. Neighbourhoods become personally meaningful because people connect with the area close to their homes; they are intricately part of people's self identity.

Neighbourhoods are coherent socio-spatial units; they reflect the changing nature of society in physical form and they are the basic unit of urban form - a key element of urban planning. As socio-spatial units neighbourhoods are important for the equitable and efficient supply of private and public goods and services, which are a factor of their demographic composition.

Neighbourhoods are seen as the key to true sustainability and social justice (Barton, 1999; Castrignano & Landi, 2013; Foley (Ed), 2013; Smith, 2013). Hence neighbourhoods are the focal socio-spatial scale for future urban planning and tackling the problems associated with the modern world: climate change, globalisation, population growth, rapid increased urbanisation and the social ills associated with it, increased population diversity and mobility, pressure on the natural environment, and so on.

Likewise, the increasing need to understand urban society has highlighted the need to monitor and gather data on the foundational socio-spatial unit, neighbourhoods. Without an accurate appreciation of the neighbourhood it is impossible to build a truthful picture of the urban whole, on the one hand, and the entire nation, on the other. Hence the need for precise and timely neighbourhood data (Cabinet Office, 2000).

It is therefore vital to know what and where the neighbourhood is if we are to be able to understand and measure these fundamentally important processes. For example, in the 1980s and early 1990s the then Conservative government used centrally-driven and private-sector led regeneration projects to tackle neighbourhood decline. On coming to power in 1997 the Blair government declared that nobody should be seriously disadvantaged by where they lived and instituted a programme of centrally-funded

neighbourhood renewal interventions based on targeting particular deprived areas, the rationale for these Area Based Initiatives being that uplifting a deprived neighbourhood would be more cost-effective in improving the residents' individual well-being than specifically targeting deprived individuals in that area because of the 'neighbourhood effect'. Subsequently, policy evolved to concentrate on improving household welfare through a drive on economic growth and jobs in sub-national economies and encouraging those in deprived neighbourhoods to move out to benefit from improved opportunities (Lupton 2003, Tunstall and Lupton 2003, Cox, et al. 2013).

It follows that evidence for or against the existence of neighbourhood effects is critical to government and local authority policies on tackling deprivation and these, in turn, are intricately related to how neighbourhoods are defined and delineated on the ground. The Modifiable Areal Unit Problem does exist and "Using the 'wrong' zonal system may mask real effects or identify spurious ones..." (Flowerdew, Manley, & Sabel, 2008, p. 1254), and render conclusions based on them unreliable and possibly misleading (Lupton, 2003).

To be able to determine if these neighbourhood effects exist it is axiomatic that the defined spatial extent of the neighbourhood captures those factors deemed responsible for their generation. Galster (2012) identified 15 potential causal pathways of neighbourhood effects which he synthesised into 4 broad categories: social-interactive; environmental; geographical; and institutional, and defining the neighbourhoods of this research these factors are taken into account.

However, it is important that neighbourhoods are not only seen as those places generating neighbourhood effects. Whether or not effects exist, neighbourhoods do. This research concerns itself primarily with defining and identifying neighbourhoods on the ground: what differentiates one residential locality from others. Neighbourhoods are meaningfully defined if these differences and their social consequences can be recorded and explained.

Yet, for a long time Geography has shied away from focusing on defining the neighbourhood, perhaps because the material spans many of the discipline's contested ways of viewing issues. Other traditions have not, understandably, emphasised the spatial distributions of their relevant area of interest, with the result that the view hanging in the air is that neighbourhoods are commonly understood entities not usefully defined, indeed many feel that neighbourhoods are too complicated and uncertain ever to be defined. Practical neighbourhoods, based on administrative spatial units and data have been substitutes for neighbourhoods, with the emphasis being on improving the quality and timeliness of the data rather than understanding the nature of the neighbourhood itself. The advances in data availability and quality, allied to a general appreciation that neighbourhoods are coherent areas of social homogeneity, have been

suffice to serve as practical neighbourhoods and to discourage serious theoretical progress, leading to better descriptions rather than meaningful understandings. In this way the entire social dynamic of the neighbourhood and its connection with the environment is under appreciated.

Recently, all this has changed. Better quality data, increasing awareness of spatially concentrated health, social and welfare problems have catapulted neighbourhoods into frontline politics and social research, fuelling the demand for an improved theoretical conceptualisation and understanding of the neighbourhood and precision in their identification on the ground.

Given their pivotal role in government policy and being the target of so much interest, there is an urgent demand for revealing the nature of neighbourhoods, and how they can be identified, for only then can authoritative conclusions be drawn from any investigation and effective policy for them be devised. Most important, in this age of austerity, is the need to effectively target neighbourhood resources and effort which is best achieved by a clear and distinct geographical identification of neighbourhoods.

1.2 Research problem, propositions/research issues and contributions

The problem addressed in this research is:

Is it possible to identify meaningful, practical neighbourhoods underpinned by theory?

I conclude that a neighbourhood paradigm founded on areas of similar housing type and age, delimited by constraints on social interaction positively addresses that problem.

There are a number of themes running throughout the narrative of this research though not necessarily focused upon at any one place. The first of these themes is the poor conceptualisation and definition of the neighbourhood, both in abstract terms as well as practically, and although this is brought out particularly in the first part of Chapter 3 it is a constant theme throughout this research as indeed it has been throughout urban neighbourhood history and scholarship. A second theme is the constant availability of workable practical neighbourhoods, however light on theoretical substantiation. There has always been a need and means, utilising available data and administrative sources, to deliver services at the scale associated with the neighbourhood and this has taken the edge off the urgency to practically define them. To be fair, this needs to be seen against a backdrop of evolving academic disciplines and an ever-shifting landscape of interest within these subjects, and an accelerating pace of societal change. Part of this social evolution has been a greater appreciation of the fact that we are all connected, that, for example, the physical, mental, emotional and spiritual welfare of the individual appears to be partially attributable to the welfare of the primary and secondary social groups of

which they are a member. All of these have played a major role in the prominence or otherwise of neighbourhood definition.

At the same time as these forces mitigated against defining the neighbourhood a number of invariable facts about neighbourhoods can still be seen interwoven with the evolving conceptualisation. The Chicago School first presented the ideas of a neighbourhood being a coherent part of a community - an area which made sense and was identifiable as being an entity in its own right - and this hierarchical structure is largely unchallenged as is its loose presentation of social homogeneity being an identifier. Burgess and colleagues (Park & Burgess, 1967 (1925)) also gave us the urban ecological model with competition for where people lived in the city being based on their ability to afford to live there. The ecological metaphor carries through from the Chicago School to today in the current conceptualisation of the neighbourhood as an holistic whole which cannot be properly understood if not maintained as an entire, undivided entity. Likewise, the original conception of the Chicagoans' natural areas maintains its integrity in the enclosed social network systems and pedestrian street networks of recent neighbourhood analysis, examined in Chapter 3 and throughout this paper. Most of these can be seen in the most popular representations of neighbourhoods - the geodemographic classifications of small areas - which seek to identify areas of social homogeneity at the neighbourhood scale, interpreting them as areas of social connectedness.

The next chapter presents a concise overview of the historical development of the neighbourhood concept. The third chapter looks at the confusion surrounding the neighbourhood concept and examines the prominent neighbourhood paradigms and means of identifying neighbourhoods in practice. Geographers have not propounded any theory about the neighbourhood but have preferred to take the spatial hierarchy model of the Chicago School together with the theories of associated disciplines (such as sociology and economics) and focus on determining their spatial distributions and, consequently, a variety of methods have been employed to identify them. The paradigms examined are, firstly, that where the concept is either so general or not developed that it defies delineation. The second category is the reverse case; it is a planning neighbourhood with specific objectives of community-building or service delivery. The third paradigm is that of individual neighbourhoods, that is, where an individual is at the centre of his/her own neighbourhood; this is a phenomenological and ethnographical view. The fourth model, the most popular, is the model which seeks to identify areas of social homogeneity, but with little, if any, regard to environmental conditions; this model most closely resembles the 'community of place' view. Lastly, social networks are examined, particularly with regard to their physical delimitation.

However, Chapter 3 focuses on one piece of research (Grannis, 2005) which examined the spatial distribution of neighbour networks and found that racial distributions could

best be explained by the patterns of pedestrian streets along which the neighbour networks developed, and this was extended to call these pedestrian street networks neighbourhoods.

This thesis builds upon this research by comparing Grannis's pedestrian street network explanation of social distributions to the classical and traditional explanations for urban social distributions, which is that wealth¹ is the residential filter acting through the mechanism of property prices, and develops a new model integrating elements of both as answering the research question.

A number of issues arise from the literature review, particularly the absence of any geographical neighbourhood theory and a corresponding reliance particularly on work in associated disciplines such as urban sociology, urban economics and planning, which underplays the role of the environment and often conflates community and neighbourhood. Geographers have been more concerned with quantitative techniques of identifying variables associated with neighbourhoods rather than developing theory to explain those distributions.

The information needed to address the research question is: what is the current status of community/neighbourhood theory; how does this match geographical models of neighbourhood; is there a particular paradigm which incorporates both theory and real-world identification of neighbourhoods, and does this paradigm make sense with the corpus of neighbourhood scholarship; can the paradigm be improved and retain its theoretical integrity? These questions are addressed throughout this thesis.

In summary, this research makes several important contributions to neighbourhood scholarship:

- This research presents a working distinction between communities and neighbourhoods.
- It offers a spatial definition of the neighbourhood consistent with the historical thread of wealth being the primary social segregator through the agency of property values, relying upon social interaction theory, political and economic theory and practice, residential purchase evidence and social agency managerialism.
- This research applied the new neighbourhood model in two sample areas of the London Borough of Brent and demonstrated its efficacy in those settings.
- This research establishes *housing areas* and *natural areas* as the basic social interaction spatial units of society, which are the fundamental pattern of social

¹ Wealth is used in this research to mean the value of all the assets possessed by a household. With reference to property, wealth is the stock of the financial assets and services available to a household for purchasing property i.e. property purchasing power.

distributions. Neighbourhoods based on the built and natural environments set the scene for the social distributions, providing the basis for them and the means for their mediation. It is the physical characteristics of the area which shapes the historical development of the built environment which, allied to its locational qualities, appeals to particular socio-demographic groups.

- The definition offers unambiguous, clear and meaningful delineations of neighbourhoods which can be undertaken with confidence and their borders be defended as being stable, reliable and socially significant.
- The built environment is determined as being the prime spatial indicator of neighbourhood and thereby provides a stable unit for measurement and investigation.
- Social capital is presented as a primary social and creative force providing, together with the role of property, a focus for effecting social changes.
- In clearly identifying and enabling neighbourhood delineation this definition allows a more accurate targeting of resources for small area initiatives than can currently be provided.
- The new neighbourhood model incorporates and emphasises the explicit and implicit dependent relationships between neighbours, whether contractual or not.
- This model allows neighbourhood professionals to ‘get-under-the-skin’ of neighbourhoods to examine and study them, thereby influencing collective and individual outcomes.
- Place identity is clearly related to place history of the built environment and it is conjectured that individuals’ affective understandings of their neighbourhoods are related to the built environment and thereby consistent with the model presented here.

1.3 Justification for the research

Research gap. The widespread popularity of geodemographic classification systems, often used as neighbourhoods, emphasizes the demand for social-area analysis. Likewise, wards and other combinations of census statistical reporting units are called neighbourhoods. These de facto ‘neighbourhoods’ have a limited theoretical authority, yet are used because of their convenience, availability and lack of valid alternatives. This research targets this gap to see if it can be closed.

As referred to above, neighbourhoods are the key spatial scale for this government’s political agenda; devolving power to localities is the central politico-philosophical position.

Neighbourhoods are also the spatial scale for the understanding of life-long or long term social behaviours and outcomes, termed 'neighbourhood effects', and identifying these is a priority for health and criminology studies alongside a broader social view taken in regeneration and in understanding society generally, as is likely in enquiring into the causes of, and remedies for, the recent riots.

There is also a gap in geographical conceptualisation, theory & practice. Neighbourhoods seem to straddle a number of important dialogues in geography: the theoretical and practical aspects, the space/place debate, the call for conceptual precision as opposed to a cultural interpretation, the integration of the physical and human elements of geography, the quantitative versus qualitative analytical traditions, the ontological understandings of determinism as opposed to possibilism or probablism, and the epistemological phenomenological and ethnographical approaches as distinct from positivism. It is hoped that this research may make a valuable contribution to these multifarious questions.

Geography has not resolved the question as to whether there is one, holistic neighbourhood in an area resting on a common genesis or whether there is a multiplicity of neighbourhoods either around individuals' residences or experienced by different demographic groups.

Because neighbourhoods embrace every aspect of urban life, physical and social, they are in the vanguard of applying newer knowledge, such as environmentalism, sustainability and globalisation.

1.4 Methodology

This strategic study adopts a limited theoretical research method substantiated by a positivist, quantitative methodology because, firstly, cultural views of neighbourhood have not led to practical neighbourhoods being delineated on the ground. Secondly, this method best reveals the underlying regularities of human behaviour within close proximity of peoples' homes that can be explained by theory and identified by measurement.

The literature review examines a number of neighbourhood models both from a theoretical viewpoint and the techniques used to identify them in practice. The overall conclusion is that neighbourhoods are under-conceptualised and poorly measured.

The most advanced conceptualisation and operationalisation work comes from Grannis (Grannis, 2005) who, using neighbour networks associated with pedestrian streets (termed t-communities), demonstrated that racial distributions could be better explained by pedestrian street networks than by distance or school attendance zones. Grannis used

regression analysis, with data covering Los Angeles, New York and Chicago, to support his conceptualisation and claimed, in addition, that t-communities are effective neighbourhoods.

However, the body of neighbourhood scholarship consistently ascribes socio-spatial patterning to spatial filtering by wealth, as expressed in property values, and this, together with initial empirical work of this research, suggests that neighbourhoods might better be delineated by areas of similar housing than by pedestrian street networks. Attempts to define neighbourhoods according to social criteria doesn't explain the 'why' of that distribution: why are those social patterns there and not elsewhere; why, given the turnover of populations over generations, do neighbourhoods continue to exist in the same locations? Neighbourhoods based on the built and natural environments set the scene for the social distributions. It provides the basis for them and the means for their mediation. It is the physical characteristics of the area which shapes the historical development of the built environment which, allied to its locational qualities, appeals to particular socio-demographic groups.

To test this new model out it was first decided to try and replicate Grannis's work in a U.K. setting to establish its transferability, but this proved problematic. The difficulty lay in not having suitable data sets for such a comparable analysis. Whilst surrogate data sets could be identified they required considerable field work and the co-operation of local authorities for their creation and supply. As a result, rather than utilising extensive data sets covering several U.K. cities, as Grannis had done, a case study approach to empirical work was necessitated.

Data collection. Grannis used U.S. census data and geography for his analysis of Pedestrian street networks which obviously could not be used to replicate his technique in the U.K. Instead, the census geography and data from the 2001 England and Wales Census is used for repeating Grannis's methodology and this is described in detail in the following chapters. The criterion used for identifying circumscribing streets in Brent is the volume of traffic rather than their road network status, and so a data set of traffic flows was obtained from Brent GIS and used to identify the non-pedestrian streets. Added to this, after field work, was a large open space in North Brent (Woodcock Park) through which the Wealdstone Brook ran, both serving to break up social interaction across the open space.

For the original and empirical work of this research customised areas of similar housing are used as the base geography, and data for these has been re-cast from the 2001 Census and used in conjunction with data from the Brent GIS Domestic Property Database, Land Registry and the Valuation Office Agency.

Housing data used for customising the study's housing areas required the classification of the housing stock. A commercial dataset was identified as containing the relevant

information but, on uncovering data errors in the pilot study of the sample dataset examined, it was decided to create a new dataset of housing types and age by visiting every street in the study areas and classifying properties first hand to ensure accuracy. All properties are classified by housing type (detached house; semi-detached house, terraced house and flats) and age (Pre-1914, WWI to WWII, Post-war Regeneration, Sixties and Seventies, and Recent Years).

Similarly, boundaries of the Grannis replication study and boundaries of this study's housing areas were determined first by examining maps of the areas and then by field work. Grannis's methodology used pedestrian street networks using non-pedestrian streets as their delimiters but this could not be copied exactly here in the U.K. for reasons discussed below. Instead, pedestrian street networks are delimited in this study as being any physical features which, it is judged, would prove to be a physical, psychological or any form of obstacle to social interaction generally.

This study uses breaks of housing type or age for its housing area geography.

Other data collections are GIS shape files from Brent Council GIS of Landline data (agreed by Ordnance Survey) on roads, railways and waterways, as well as Regeneration Area, Parks and Cemeteries data.

Another dataset used was part of the Brent GIS Domestic Property database. This required extensive data cleaning to eliminate duplicates, incomplete records, new properties included on the database but not yet built, records without postcodes, and records without a council tax valuation banding. The data set includes details of the property's address, postcode, unique property reference number, British National Grid Reference, freehold ownership, property type (a different classification than field work classes) and council tax valuation band. The data set was forthcoming after considerable correspondence with the Valuation Office and Brent GIS, the problem being over who 'owned' the data and the right to information. This database refers to dwellings, whereas the field work on property type and age is dealing with buildings.

In addition, a unique dataset, called the Talen Index (T6), is created using six census variables to provide an indication of socio-economic welfare, which also serves as an indicator of the presence of 'neighbourhoodness' i.e. that these are variables associated in the literature with neighbourhoods. The proportional presence of each variable was calculated for every output area in the study areas and then standardised for each study area before being added together to create an output area Talen Score.

The above data sets are also complemented by map data from Brent Council's website which provides detailed information on individual residential addresses and statutory information, such as planning areas, school and education areas, democracy and health data (Brent, Brent Intelligent Geography, 2008).

1.5 Outline of the thesis

Having introduced the research problem and the research question, this thesis is concerned with the search for a solution: meaningful, practical neighbourhoods underpinned by theory. Practical neighbourhoods are those which, from theory, can be clearly defined and delineated on the ground using currently available national urban datasets. Such neighbourhoods will be effective, meaningful and useful because they incorporate theoretically-substantiated explanations for socio-spatial distributions in relation to the built environment. This begins with scouring the neighbourhood literature to see if such neighbourhoods exist and if they can be applied to the U.K. This search found that Grannis's 't-community' networks - which he called 'effective neighbourhoods' - appeared to provide practical neighbourhoods supported by theory, particularly on the origin and development of social interactions. However, the explanation put forward for the social distributions found are not consistent with the most central theme of neighbourhood scholarship: that wealth is the primary means by which people segregate themselves in the urban environment.

Building upon the sociological theoretical base introduced by Grannis this study provides a new model of the neighbourhood based upon property costs being the mechanism by which people segregate themselves and be with people similar to themselves. This study proposes a theory of the neighbourhood and provides additional theoretical support for the proposition that similar housing attracts similar people and that similarity facilitates greater social interaction than between dissimilar people, and that this social interaction generates social capital which is the defining characteristic of the social neighbourhood. In this model the built environment mediates social distributions.

Grannis's empirical work produced some correlations between areas of pedestrian connectedness and social distributions. It is hypothesised that Grannis's methodology could be successfully transferred to the U.K. and that the housing area neighbourhood model could provide a better explanation of social distributions than the Grannis model, and the empirical work of this research investigates these hypotheses.

Further analysis is conducted to determine the role of wealth in the results of the empirical work.

The new housing area model of the neighbourhood is implemented for the study areas and is then compared to other spatial units often used as neighbourhood surrogates, and their respective merits and limitations are discussed.

This is followed by a discussion of the research as a whole before presenting conclusions and implications for future work and how this research may impact on theoretical and practical work.

Chapter 1 of this research is the Introduction chapter, briefly setting the scene for the research: its introduction of the research problem and its justification as well as a general overview.

Chapter 2 is a brief history of the neighbourhood concept in academic and practical use, providing the context for this research.

Chapter 3 is a review of neighbourhood literature, investigating current neighbourhood theory, or theory pertinent to the neighbourhood concept, and the various implementations of neighbourhoods. The chapter looks at the contributions and shortcomings of both, summarising the outstanding issues. It identifies the 'best practice' neighbourhood model, noting its shortcomings in relation to the classical themes of neighbourhood studies. The Chapter concludes with the presentation of a new neighbourhood model and neighbourhood theory.

Chapter 4 describes and justifies the adopted methodology of this research to answer the research question, firstly by a review of the development history of the selected sample areas and then outlining the quantitative methodology.

Chapter 5 describes the results of the statistical analysis and concludes by mapping the resultant neighbourhoods of the study areas.

Chapter 6 summarises this research's answer to the research question, and presents the theoretical conclusions and how they translate into practice, as well as outlining the implications of this research for theory, practice and further research.

CHAPTER 2

A HISTORY OF THE NEIGHBOURHOOD CONCEPT.

2.1 Introduction

The neighbourhood as an object of urban planning and study was really crystallised by the Chicago School of sociologists in the early 1920s. The nature of the neighbourhood as a building block of the urban whole encouraged enquiry by sociologists, politicians, economists and geographers all trying to get an understanding of the dynamics of the enormous changes in urban society which had occurred, and were continuing, with the industrial revolution and the mass urbanisation of the western world. Other scholars and practitioners have also contributed to our understanding of the neighbourhood but the most prominent and relevant to this review are those of the overlapping social science disciplines of economics, sociology, geography and politics and their theories on the urban neighbourhood are briefly presented and discussed in this chapter.

2.2 The Urban Geographical view of Neighbourhood

The history of the neighbourhood concept is, in sociological terms, intricately tied up with the ideas about community. Jones (1997) has traced the evolution of the community concept in Britain through several stages, from the Positivism of nineteenth century thought expressed by Tonnies, Marx, Durkheim and Weber, who theorised on the social changes affecting traditional family relationships and the consequent need for intervention to re-build community, to the seminal works of the 1920s Chicago School of sociologists (Timms, 1971; Davies and Herbert, 1993; Knox, 1995; Jones, 1997; Glennerster, Lupton, Noden and Power, 1999; Bridge, 2002; Harris, 1999; Martin, 2003; Morrison, 2003, P.117; Whitehead, 2003). In particular, in this context, was Tonnies' theory of two basic forms of human association, *Gemeinschaft* and *Gesellschaft*, as the extremes of the rural/urban continuum.²

The study of neighbourhood in urban environments became a distinctive academic tradition arising from the work of the Chicago School of sociologists in the 1920s (Davies and Herbert, 1993; Chaskin 1997; Morrison, 2003, P.363; Whitehead, 2003, p.282).

² Rural '*Gemeinschaft*', describing traditional ties of family and a close kinship community with social relationships based on multi-stranded social ties; and urban '*Gesellschaft*' relationships, representing single-stranded social ties or association, resulting in social relations being more calculating and contractual, being based on rationality, efficiency, anonymity and individualism.

2.2.1 Communities and Neighbourhoods in 1920s Chicago

In their seminal work, “The City: Suggestions for Investigation of Human Behaviour in the Urban Environment”, Robert Park, Ernest Burgess and Roderick McKenzie introduced into urban studies several models and concepts, based on empirical research and inductive reasoning, which have formed the groundwork for subsequent generations. The Human Ecologists, as they came to be known, were primarily interested in the processes which created urban society and which were responsible for the distribution of the observed groupings of people within the city of Chicago. In particular, they presented a dynamic model of the city which was partitioned into identifiable communities of people within which neighbourhoods were nested.

“The simplest possible description of a community is this: a collection of people occupying a more or less clearly defined area. But a community is more than that. A community is not only a collection of people, but it is a collection of institutions. Not people, but institutions, are final and decisive in distinguishing the community from other social constellations.”³

The Urban Ecologists of 1920s Chicago sought to uncover the human ecology of the city and to study the problems of the local community through social scientific observation and urban reform and planning. At this time Chicago was in a boom period but with it came numerous social problems: "... its streets were home to a hodgepodge of speculators, jackrollers, hobos, gangs, slum dwellers, immigrants and migrants, political bosses, and so on." (Venkatesh, 2001, p.278). The Chicago sociologists used the city as a human laboratory and were looking to apply the knowledge of the social world to strive for a better society.

"Robert Park viewed the city as a living organism "...a constellation of *natural areas*, each with its own characteristic milieu and each performing its specific function in the urban economy as a whole" (Robert Park, quoted in Smith and White 1929: 9; emphasis added)." (Venkatesh, 2001, p.283) Whilst Ernest Burgess held that physical barriers (such as lakes, rivers, railroad tracks, and industrial property, for example) delimited social interaction and that the first step to understanding the spatial distribution of communities was to map these features, for within the areal units created by these physical features “natural areas or homogenous economic and social units” (Burgess, 1933, p.2) would emerge, an identity would form and a collective responsibility would develop: social patterns of behaviour followed from the physical geography. Even if the residents did not feel an affinity with the boundaries or name of the natural area Burgess believed that they eventually would because the physical features of the built environment provided the constraints within which socially and culturally distinctive communities would develop.

³ Park and Burgess, 1925, p.115

“Burgess sought to create roughly equivalent ecologies which he thought comprised a community because of a complement of characteristics: natural boundaries, a miniature ‘downtown’ for weekly shopping, a population base large enough to supplant this shopping district, and a collection of institutions—schools, churches, social agencies—sufficient to serve this population” (Suttles 1990: 85, quoted in Venkatesh, 2001). In all, Burgess divided Chicago up into 75 community areas - mutually exclusive geographic areas of human settlement, and each “‘a miniature society with its own history and traditions, its individual problems, and its own conception of the city’” (quoted in Bulmer 1984: 119).” (Venkatesh, 2001, p.289). These community areas were themselves composed from 120 sub-community units which, in turn, were formed from 400 neighbourhoods; the sub-communities and neighbourhoods being small zones of distinctive social activity which overlapped and varied in terms of physical size and population. Each neighbourhood was “a locality with sentiments, traditions and a history of its own.” (Park and Burgess, 1925, p.6)

This exposition of the basis for defining the boundaries of communities has clear parallels with Central Place and Urban Hierarchy theory, which were to become widespread some decades later.

Burgess presented his model of urban areas, essentially one of concentric zones around the city centre (Concentric Zone Model), and described the processes shaping its dynamics. Burgess saw the process of urban expansion creating social organization and disorganization which he regarded as analogous to the anabolic and katabolic processes of metabolism in the body. In this context Burgess regarded the large numbers of immigrants into the city as a trigger: “Their invasion of the city has the effect of a tidal wave inundating first the immigrant colonies, the ports of first entry, dislodging thousands of inhabitants who overflow into the next zone, and so on until the momentum of the wave has spent its force on the last urban zone.” (Park and Burgess, 1925, p56).

In addition, Burgess identified mobility as the pulse of the community: “In our studies of the city it is found that areas of mobility are also the regions in which are found juvenile delinquency, boy’s gangs, crime, poverty, wife desertion, divorce, abandoned infants, vice.” (Park and Burgess, 1925, p59)

This corresponds with current ideas about residential stability and the levels of social capital.

McKenzie, in the same volume, presented the concept of Human Ecology and stressed the parallels with plant: “The general effect of the continuous processes of invasions and accommodations is to give to the developed community well-defined areas, each having its own peculiar selective and cultural characteristics. Such units of communal life may be termed “natural areas,” or formations, to use the term of the plant ecologist.

In any case, these areas of selection and function may comprise many subformations or associations which become part of the organic structure of the district or of the community as a whole.” (Park and Burgess, 1925, p77)

The prime characteristic of classical ecology is impersonal competition, and the cause of population segregation is seen as the relative differential of various groups to be able to cope with this impersonal competition, with wealth being the indicator of this ability. The area of dominance is the central business district, the area of highest land values, and, over time, the principle of dominance was seen as being responsible for invasion and succession.

In the 1960s University of Chicago sociologists replicated Burgess's community project, finding that, by and large, the representation of the city's social ecology had stability and stood the test of time. Albert Hunter revised Burgess's socio-spatial geography to produce 90 community areas and 206 neighbourhoods, which they held to more accurately represent the post-war socio-spatial associations of the city's residents (Venkatesh, 2001).

2.2.2 The shoulders of Giants

Underpinning the work of the Chicago School and cited by Louis Wirth, Park & Burgess (Park and Burgess, 1967 (1925), pp.161-231) were the works, amongst many others, of George Simmel, M. Auroousseau, Herbert Fleure, Jean Brunhes, Charles Gide, Lucien Febvre, Lewis Mumford, Clarence Perry, Patrick Geddes and Charles Booth and it is instructive to trace the outline of their contributions to the writings about the urban environment. The significance of the great 19th century sociological studies of Marx, Weber, Durkheim and Tonnies was to chronicle the great social changes of this period and to put them in a theoretical setting as they affected social bonds and community life. The case was made that deliberate intervention was required to rebuild community.

Joseph Rowntree and, particularly, Charles Booth are credited by several academics with being the first to systematically map areas of social condition. In his major study of poverty and wealth in London(Booth, 1902), Charles Booth pioneered social survey methods, mapping techniques and statistical description, and he detailed the geographical description of the social conditions of each building, classifying and mapping them, even drawing attention to the concentric circles of extreme poverty, then reduced poverty, leading to more affluent areas (later to be formalised into the model of concentric urban land use zones by Burgess). Appreciating the enormity of repeating this task, he proposed using census indicators for measuring social conditions, developing a summary ‘index of social condition’ capable of measuring social variation in any city (Davies and Herbert, 1993; Glennerster, et al, 1999; Harris, 1999).

Both Wirth and Park were students of George Simmel (Knox, 1995, p.161) who argued that the over-stimulation of the city and the range of possible social interactions caused people to withdraw into themselves, as a form of protection; people became more insular in their civil relationships, these impersonal and neutral social relationships, it was argued, reflecting the capitalist economy (Bridge, 2002, P.4). This view of the breakdown of community in the city was consistent with Ferdinand Tonnies' thesis of *Gemeinschaft* and *Gesellschaft*. Wirth, continuing the practice of empirical research using the city of Chicago as a sociological laboratory, further developed this line of thinking into his theory of Urbanism (Wirth, 1996 (1938)). The conditioning effects of city life on the psychological and social well-being of residents are attributed to the large numbers of people, the increased density of this population and its heterogeneous nature. The consequences of these effects were pathological for the individual and for society with the individual suffering social isolation and deteriorating mental health, whilst society had to cope with increasing deviant behaviour (Knox, 1993, p.161). The outcome of this reasoning is that

“The city is not conducive to ‘community’, however it might be defined.”

(Knox, 1993, p.205).

The ‘natural areas’ of the city, identified by the Chicago School, have their parallel with the ‘pays’ of the turn-of-the-20th century French School of Geographers, referenced by Wirth (Park & Burgess, 1925) who integrated the human and physical characteristics to identify the particular ‘personality’ of the local region. This approach grew into the ‘regional’ geographic tradition (Davies & Herbert, 1993, p.4), which can be related to modern holistic views of community and sustainability.

2.2.3 Urban Planning

Mumford, Perry and Geddes, also referenced by Wirth in Park and Burgess, 1967 (1925), are notable figures in the realm of urban planning and design. Both Mumford and Geddes are closely identified with another prominent contributor to the neighbourhood concept, Ebenezer Howard, who masterminded the Garden City movement. Geddes shared John Ruskin's belief that spatial form was related to social processes and, therefore, that by changing the spatial form it was possible to also change the social structure. Howard's contribution, in the current context, was to present a plan for creating a healthy community in an urban setting in such a way as to incorporate the perceived benefits of the rural way of life, and, most importantly, to firmly establish the concept of the planned community on the mainstream political agenda. Patrick Geddes worked with Howard and was responsible for subsequently introducing the neighbourhood as a central concept in the development plan for Greater London. Planning for communities arrived in urban policy (Howard, 1965 (1902)).

2.2.4 The Neighbourhood Unit

Clarence Perry has been credited (Davies and Herbert, 1993) with conceiving the Neighbourhood Unit concept⁴. Subject to several of the same influences which inspired the Garden City movement, Perry sought to plan against the anonymity of urban areas and to encourage intra-urban contact. Clarence Perry drew up six principles to enhance community:

Size: variable, but the population should support an elementary school

Local shops: a planned area adjacent to the residential area

Open spaces: ample recreation space

Boundaries: main route ways should form the unit's boundaries

Institutions: area facilities should be grouped centrally

Internal streets: through-traffic was discouraged

2.2.5 The Garden City Movement

Combined, the Garden City movement and the Neighbourhood Unit idea firmly established the principle that communities need not simply be the outcome of the multiplicity of forces at work in the urban setting but could be planned and shaped. In the tradition of the 19th century social reformers such as Robert Owen, Joseph Rowntree and Cadbury, and great civic reforms, such as of sanitation and education, these movements regarded urban planning in the positivist vein: bringing rural qualities into the urban environment would have a civilising effect and thereby bring about a healthy community in all senses: physically, emotionally and morally.

Most of these ideas have resonances in discussions of neighbourhood today and they are foundational to any study of community and neighbourhood.

2.2.6 The Neighbourhood as a Spatial Unit

The great achievement of the Chicago School of sociologists in the 1920s was, from ethnographic observation and quantitative statistical analysis, to map the social composition of Chicago. In doing so they divided the city up into distinct territorial units of 400 neighbourhoods and 120 sub-communities, from which 75 natural communities were derived (Venkatesh, 2001). In addition to identifying these spatial units they produced their morphological concentric zone land use model of the city and their theory of land use competition based upon the price of land.

⁴ Johnson, D. L., assigns formulation of this concept to the architect W. E. Drummond in *Origin of the Neighbourhood Unit*, *Planning Perspectives*, July 2002, Vol. 17, no. 3, pp.227-245.

Subsequently, other models were developed to describe the morphology of cities. In 1939 Hoyt published his model of urban structure based on the detailed study of rental values in 142 U.S. cities. For Hoyt the dominant force in shaping urban residential structure was the desire of the well-off to occupy high land and non-industrial river frontage away from industrial activity. With expansion the high-status groups expanded axially outwards along major routes, combining the advantages of accessibility with suburban living. This model became known as the 'Sector' model. Less than a decade later Harris and Ullman produced their multi-nuclei model which incorporated the concept of a city having several 'sub-centres'.

Since Ebenezer Howard's and Perry's contributions at the beginning of the twentieth century, the neighbourhood unit concept has continued to flourish in urban planning. Having its roots in the desire to offset the worst living conditions of the industrial revolution (Barton, 1999) and to tackle the social problems of slums by relocating slum dwellers in decent housing, planners have sought to bring something of the country to the city (Gans, 1968, p.132). Patrick Abercrombie's Greater London Plan of 1944 incorporated the idea of a ring of satellite towns, essentially the garden cities of Howard, to absorb London's growth. Perry's concept of self-contained neighbourhood units which would promote local social life, or a local community, was integrated into the Abercrombie Plan and became a central building block for all the post-war new towns (Barton, 1999, p.23).

The 1930s and 1940s saw a continuation of 'the decline of traditional social bonds' argument through, for example, the empirical and inductive work of Wirth.

The 1950s was a period of re-assessment of the theory of community. Hillery's review of definitions of the term community revealed the lack of agreement as to its meaning in anything other than a minimalist sense. Hillery, summarising nearly one hundred definitions identified the four components of communities as being: people, territory, common ties and social interaction. The only common denominator being 'people' (Hillery, 1955; Davies and Herbert, 1993).

In the 1960s several major empirical studies confirmed the continuing existence of community life (Gans, 1962, 1968; Young & Wilmott, 2007 (1957)), though some studies were regarded as being about area and locality. Community based on shared traditions came to be understood as a core unit of sociology (Jones, 1997)

The rise of urban geography in the U.K. can be traced through R. E. Dickinson's work on urban functional and formal regions; however, it was only after the Second World War that urban geography became a significant discipline within geography.

Emrys Jones's 'A Social Geography of Belfast' (Jones, 1960) sought to identify urban landscape regions within the city along the lines of the Chicago School, but to set these

within a broader geography which owed much to the ideas of Vidal de la Blache (Smith, 1999, p.163). Jones also applied the Burgess and Hoyt models to Belfast noting the city's general adherence to Hoyt's model though modified by Firey's explanation of urban society as being an outcome of two kinds of human adaptations: values and interests adaptations (Jones, 1960, p.273).

2.2.7 Neighbourhood Decline

In the 1950s and 1960s a number of elements came together to shift the focus within the nascent urban geography away from the concept of neighbourhoods. The first was disillusionment within geography as a whole with traditional regional geography and its emphasis on the uniqueness of individual places. Whereas the work of the urban ecologists had been on unravelling relationships between a large number of urban characteristics, with growing economic and social integration arising from the development of transport and technology the emphasis swung to a search for links between places based upon a comparatively small number of characteristics (Batey & Brown, 1995, p. 77; Johnston, 2001b, p.1396). Such searches were greatly aided by the availability of small area census data which allowed a finer resolution of urban demographic analysis. In the U.K., for example, census data was available for enumeration districts for the first time from the 1951 census onwards (Batey & Brown, 1995, p. 81). This was accompanied by a developing application of statistical techniques to discover patterns and correlations within this data. The models of urban land use, referred to above, and the application of location and central place theory provided a further stimulus to the search for order between and within urban areas.

In the U.S. the natural areas that the urban ecologists had identified in Chicago in the 1920s, and which had formed the bases for their empirical data collecting, were adopted as the basic statistical spatial unit for that city and, subsequently, U.S. census tracts were drawn up to follow permanent, established lines and to contain people with similar racial and economic status, and areas of comparable housing (Batey & Brown, 1995, p. 79; Timms, 1971, p.39)

2.2.8 Social Area Analysis

The 1950s saw the development of social area analysis by Shevky and Bell and it is comprehensively described by Timms,(1971), Batey and Brown (2007), and Davies and Herbert (1993). Social Area Analysis essentially attempted to relate the form of the urban community to the characteristics of the society as a whole. The Social Area model postulated that increasing societal scale was reflected in three trends: changes in the distribution of skills, in the nature of productive activity and in the composition and distribution of the population. Furthermore, it was held that these factors could be measured by three constructs: economic status, family status and ethnic status (Bell, 1955). On the basis of their scores on each of these constructs, measured from groups of

census statistics, social area typologies within cities could be identified. In time, the methodology was extended to include many more census variables and factor analysis was adopted for identifying the underlying dimensions of urban social and spatial structure, coming to be known as Factorial Ecology.

2.2.9 Factorial Ecology

Factorial ecology, which came to the fore in the 1960s, is a summation or synthesising technique which permits the identification of groups of variables with similar patterns of variability. Each factor is a combination of hybrid variables which accounts for a proportion of the total variance of the input data. The objective is to identify those factors which account for the greater proportion of the total variance.

The most significant finding of the factorial ecology studies is that residential differentiation in the cities of the developed world is dominated by a socio-economic dimension, with a secondary dimension of family status/life cycle, and a third dimension of ethnic segregation which relate to concentric, sectoral and clustered patterns respectively, demonstrating that the Burgess, Hoyt and Harris & Ullman classical ecological models were not competitive patterns (Davies and Herbert, 1993, p.48). The paramount achievement of factorial ecology is seen as being the development of a methodology for a quantitatively-based classification for describing social areas in cities (Knox, 2005, p.58; Davies & Herbert, 1993, p.49).

In the U.K. social area analysis and factorial ecology have been developed and applied by local authorities mainly to identify urban areas experiencing social problems.

Census data was sometimes combined with locally held data to provide the inputs for the analyses. The methodology employed and the developers of these methods became the forebears of the geodemographic classifications which have sought to classify small areas using socio-economic and demographic data. The geodemographics industry has pioneered some interesting innovations, introducing, for example, sophisticated clustering techniques and utilising supplementary non-census data, such as the National Readership Survey, the General Household Survey and the Family Expenditure Survey (Batey & Brown, 1995). Though such sources of data lack the integrity of census data they do make positive contributions in terms of time-relevance and by broadening the scope of social data.

Whilst factorial ecology refined its quantitative techniques there grew within the social sciences an increasing unease with the conceptual models used to understand the social processes deemed to be at the heart of the changes within modern society; the emphasis was upon pattern and little attention was paid to the processes which created the mosaic. The quantitative methods failed to deliver the goods in terms of anticipated insights and quantifiable theories and laws (Johnston and Herbert, 1978, p.14). Without an

overarching social theory of the neighbourhood and a lack of confidence in the relevance of techniques to capture social interaction within spatial units, geographers eased away from the concept of the neighbourhood as a social unit of investigation to more reliable ground.

The emphasis shifted to exploring territorial social well-being with a view to explaining the mechanisms and processes behind the territorial differences and, if desirable, to indicate remedial action. These enquiries took the form of 'quality-of-life' studies which aimed to capture an overall assessment of well-being, and a second category which attempted to identify sub-areas which were relatively disadvantaged or deprived.

2.2.10 Social Indicators

These concerns have utilised social indicators as the means of measurement. Social indicators were originally developed for measuring economic performance in the U.S., and their success led to their adoption for measuring social issues in the late 1960s (Sawicki & Flynn, 1996). Whereas factorial ecology relied heavily on census data, the use of social indicators enables a wider range of life experiences to be incorporated into measurements, though it is the selection of which elements to include in the composite measure and their relative weights which are the problematic issues. Indicators utilising non-census data may be more capable of updating quickly rather than waiting for the next, usually decennial, census. Smith (1979, p. 15) noted two approaches within the social indicators movement: first, those concerned with subjective social indicators measured at the level of the individual - such as well-being with respect to income and health; the second type are those based on spatial aggregate data.

2.2.11 Decline of Community

Since the 1970s, following other social sciences, some geographers reacted against the prevailing positivist approach which emphasised a priori theory, empirically measurable evidence, mathematical modelling and statistical analysis (Seamon, 1999). Emphasis was placed on the 'differences' of individual human experience, meaning, interpretation and values.

In the 1970s and 1980s sociologists questioned the validity of the concept of community as its definition became so diffuse with the rise of Individualism and diversity, especially set against the background of the 1980s economic boom and the rise of Thatcherism.

2.2.12 Postmodernism and Poststructuralism

Phenomenology and behaviouralism were manifestations of the reaction against positivism whilst another was a call for a Marxist, conflict, rather than a consensual view of society (Johnston & Herbert, 1978, p.12). In the 1970s and 1980s postmodern

theories came into prominence, mainly through the advocacy of the geographer David Harvey. In essence, postmodern theorising stressed the enormous changes in society brought about by the developments in communications and transport and the resultant expansion of markets. Other postmodernists emphasised the multiplicity of “truths”; people view the world from different perspectives with their own reality; there is no such thing as an “objective truth”. (Turner, 2001; Johnston, 2001c).

In this light the concept of community was seen as an inappropriate epistemology for understanding social structure (Turner, 2001). Though the post structuralism concept of locale, developed by Giddens as the setting for face-to-face interactions did not become a central concept in geography, it calls to mind the neighbourhood as such a locale. Places are important contexts in identity-creation, and are in turn continually recreated. Place is a process. Time-space distancing is the term given to the increasing diffusion of social relations over time and distance as ideas, attitudes and norms are spread by all forms of media. (Johnston, 2001c, p.961).

The impact of this cultural turn in human geography marked a ‘crisis of confidence’ for urban geography as the focus switched from the search for spatial order, to place and spatial specificity. Such processes were neglected by factorial ecology. The epistemological shifts in human geography focused attention on social networks, and the social constructions and meanings of urban places. These placed an emphasis on studying the spatial behaviour of individuals rather than identifying behavioural aggregation patterns.

2.2.13 Territorial Justice

Attention turned away from spatial analysis as a means of identifying neighbourhoods to issues of territorial justice, sparked by Harvey’s work and the rise of a more radical geography, on the one hand, and another school of thought which concentrated on establishing the relationship of the individual to place itself.

In the context of identifying social problem areas in cities, whilst social area analysis was regarded as having contributed little to an understanding of the processes which created these problems, or their incidence, factorial ecology was deemed to have lapsed into “a sterile form of speculative empiricism quite devoid of relevance to social problems, as content became subservient to speculative empiricism” (Smith, 1979, p.20). Others identified the shortcomings of factorial ecology as being related to the limited mix of input variables which did not cover important aspects of urban life, such as accessibility to medical, educational and civic facilities and shopping centres, or to throw light upon the incidence of social pathologies such as mental illness, crime, and drug addiction (Knox, 2005, p. 59).

Since the Chicago School of sociologists first presented the concept of the process of urbanisation as being responsible for reducing the strength of communal ties, urban sociologists have chronicled an increasing placelessness of community: the ‘community without propinquity’ and the ‘liberated community’ theories (Talen, 1999, p.1367). These developments were facilitated by improvements in transport and communications which obviated the need for face-to-face contact for social interaction, and which foreshortened the cost of distance. Nevertheless, nobody has been arguing that territorial communities, and therefore social neighbourhoods, do not exist. The question remains then of the current significance of territorial communities.

2.2.14 A New View of Community and Neighbourhood

Following this turbulence, the 1990s to the present have witnessed the focus of attention within community studies on the durability of the idea of community reacting to concerns arising from increased evidence of fractures in the social fabric, as described by Putnam (1995). Social networks based on spatial and social propinquity are at the heart of this new epistemology of the neighbourhood. Economic theory recognises the filtering process of housing costs which, together with the patterning of housing types, sorts people to live alongside like people (Ioannides & Zabel, 2008). Homophily promotes social interaction and social interaction results in social networks. Social networks are also regarded as the repositories of social capital linking the socio-economic model of neighbourhood to the political-administrative model. Social capital is seen as the fabric of society within which rights and responsibilities have become a central theme, as has the idealistic belief that government can intervene to reconstruct community and democracy. This thrust of policy is executed through housing redevelopment and renovation as well as through social policies to increase general welfare, civic participation and government. As part of this process the U.K. government has restructured data gathering and publication and it is intended that this administrative reform will provide more pertinent and timely data to inform neighbourhood theory and practice. All of the above feeds into planning’s re-focusing on community in redevelopment projects and building sustainable communities; likewise, services provision, such as policing and health, have also been re-oriented to put the local community at their core.

This is just a sketch of the common denominators between the three pillars of neighbourhood models – socio-economic, political-administrative, planning-functional - drawing them together in inter-dependence. It is crucial to be aware that they are all dealing with the identical raw material: society and the environment, which does not change from model to model but only from place to place; they view the same basics from different perspectives, thus there is no multiplicity of neighbourhoods in the same area. To call the spatial distribution of any one variable of interest a neighbourhood is a misnomer and any analysis based solely upon it runs the danger of being misleading in

that it is taken out of a meaningful context and does not acknowledge its interdependence with other vital organs of the neighbourhood body.

Currently, geographical views of the neighbourhood are split between those who view the neighbourhood as a composite of individuals' relationship to space, encapsulated in referring to these socio-spatial entities as *places*, inappropriately and incapable of being bound (Massey, 1993; Galster G. , 2001; Whitehead, 2003), and those engaged in applying geographical knowledge and techniques in the real world, routinely handling the material of neighbourhoods (Butler & Robson, 2001; Cemlyn, Fahmy, Gordon, & Bennett, 2002; Martin D. , 2004; Sampson R. , 2004; Weiss, Ompad, Galea, & Vlahov, 2007; Parenteau, et al., 2008; Robson, Lymperopoulou, & Rae, 2009; Communities and Local Government, 2010). All agree that there is a core of neighbourhood, whilst the latter group seek to define neighbourhood boundaries.

The problem for all is that there is no accepted model of the neighbourhood, nor a theory of it. This is the subject matter of this research.

2.3 Sociological theory and the Neighbourhood.

2.3.1 Introduction

Sociology has been concerned with the spatial divisions of cities since the 19th century when studying the city was seen as studying the major social processes of the era: industrialization, urbanization, alienation (Sassen, 2006). The neighbourhood achieved prominence with the work of the Chicago School of Urban Sociology in the 1920s which published its study of urban growth and how it affected social life in Chicago and introduced the theory of Urban Ecology - of waves of invasion and succession moving through the urban landscape - mapping communities and neighbourhoods in the city and producing their model of urban structure. Neighbourhoods in this model were building blocks of communities in an urban hierarchical structure. This association of neighbourhoods, community and hierarchy has remained until today.

In human ecology and social systems theory community is a ordered system of social units which meet the needs of the resident population. In the urban environment these communities have a territorial dimension.

The social ecologist model centres on the social fabric of neighbourhoods and the way in which neighbourhoods constitute the intricate mix of ethnographic characteristics, neighbouring intensity, spatial propinquity, and residents' sense of community and identity (Davies and Herbert, 1993; Talen, 1999; Whitehead, 2002). There is a substantial body of research concerned with the measurement of these elements, much summarised by Talen (1999), from which the most prominent factors promoting a sense of community have been identified as being:

Resident homogeneity

Degree of social networking

Length of residence

Home ownership

Social control of the neighbourhood

Public ownership of neighbourhood facilities

Politically active residents

Age of the neighbourhood

Shared emotional connection

Place attachment

Sense of membership/belonging

Group conformity

Need satisfaction and positive regard of residents

Sense of Place

And greater social interaction is associated with:

Similarity of residents' socio-economic status

Age of residents

Sex of residents

Stage in residents' life cycle

Labour force participation

Social class and values

Perceived environmental safety

Davies and Herbert (1993) produced a similar list of affective dimensions.

Where data is available for these criteria, such as in census returns, they have been used as the basis for identifying neighbourhoods or social areas, but the cost of gathering qualitative data has been a prohibitive barrier to collecting this information for all but individual area studies.

Since the 1970s social network analysis has made an enormous contribution to the understanding of non-place communities of interest and the appreciation of overlapping communities of different interests. Thus one person may be simultaneously involved in several different communities, perhaps even located at different places. Nevertheless, neighbourhoods are distinctively territorially based and social relationships need not only be at an intense level to be significant (Talen 1999, p.1369; Bridge 2002, p.14; Sastry and Pebley 2003 referencing Sampson et al, 2002; Forrest 2003; Mok, Carrasco, & Wellman, 2010).

In an excellent paper Clark reviews current understanding about Community (Clark, 2007), considering three approaches:

A traditional ‘community as locality’ approach.

‘Social network analysis’ – networks of individuals’ contacts.

Individuals connected through ‘small worlds’ – really, a refinement of social networks.

In these partially competing approaches Clark establishes the link between community and social networks evidential in how spatial, social and technological change has altered the ways in which social relations are ordered from ‘face-to-face’, to ‘place-to-place’, to ‘person-centred’ contacts and relationships, suggesting that the last has had the most impact on social networks and community with some commentators putting forward the view that instantaneous communication technologies have “...facilitated the ‘death of distance’ and enabled individuals to overcome the problem of time when contacting others (Cairncross, 2001).” Though Clark later adds that “...the alleged ‘death of distance’ and freedom from spatial fixity of networked individualism has not eradicated the relevance of the spatial and temporal contexts of social networks.” In Clark’s view space still matters for everyday connectivity of individuals for four reasons:

Even if proximity of individuals is less frequent than in the past, face-to-face meetings and physical travel preserve the benefits of meetings in real time and space.

Not everyone is either physically mobile, close to transport, can afford expensive travel or is connected to the internet.

Even when connected in virtual space, people remain embodied in physical space.

Networks remain ‘placed’ – ‘cyberspace’ has become ‘cyberplace’.

Whilst social network analysis has seemingly revealed a diminishing role of neighbourhoods in terms of significant social relations, brought about by improvements in transport and communications, there has been a commensurate increase in the

importance of local social networks with the development of the idea of social capital and its role in social cohesion, together with the identification of neighbourhood effects.

In particular, recent interest has centred on the nature of community and social dynamics at the neighbourhood level (Chaskin, 1997; Glennerster, Lupton, Noden, & Power, 1999; Forrest & Kearns, 2001; Kearns & Parkinson, 2001; Wallace, 2001; Bridge, 2002; Forrest, 2003; Morrison, 2003; Whitehead, 2003). New concepts, such as social capital, social cohesion and social exclusion have emerged to explain the increasing fragmentation of society brought about by the impact of globalisation and the erosion of the roles of religion, trades unions, the breakdown of Keynesian capitalism, and the decline of the middle classes and the traditional family.

Some of the consequences, noted below, of this breakdown of community-binding institutions have stimulated a renewed interest in the neighbourhood:

the loosening of strong social ties, and an increase in the superficiality of informal contact have created a crisis in social cohesion;

the coincidence of socially excluded people and socially excluded places in concentrations of poverty and;

attempts to stem city centre depopulation and the observed flight of the middle classes from city centres;

Neighbourhood has come to the fore in the localism that is part of the global/local phenomenon.

As a result of this breakdown of social cohesion, “the social cement of existing social societies” (Castells, 1997, quoted in Morrison, 2003, p.119), policy makers have looked to the neighbourhood as the forum for rebuilding community (Forrest & Kearns, 2001; Wallace, 2001; Blunkett, 2002; Forrest, 2003; Morrison, 2003; Blunkett, 2004).

2.3.2 Social Capital.

The key to rebuilding social cohesion and in establishing healthy communities is seen as being social capital – a partner with cultural capital and economic capital (Portes 1998; Bourdieu, (1986, in Winter, 2000)).

Stone (Stone, 2001) characterises the interest in social capital as being based on stemming the perceived decline of communities and the widespread distrust associated with it. Social capital is seen as the positive resource generated by the trusting and mutual interactions of neighbours, citizens and government which promises a resurgence of social and economic benefits with new roles and responsibilities for the partnership of the citizen, the community, markets and government.

2.3.3 Neighbourhood Effects.

Other social researchers are investigating ‘neighbourhood effects’ - the effects of neighbourhoods on individual social and economic outcomes (Lupton, 2003), and a large body of literature has been produced, particularly in the U.S., investigating the effects of neighbourhood on such topics as child development, educational achievement, physical and mental health, crime and delinquency, and employment (Buck, 2001; Kintrea & Atkinson, 2001; Macintyre, Ellaway, & Cummins, 2002; Sastry & Pebley, 2003).

With regard to the existence of neighbourhood effects – defined by Kintrea & Atkinson (2001, p.1) as “the independent, separable effects on social and economic behaviour which arise from living in a particular neighbourhood”, there is, as identified by Lupton (2003, p.4), a weak conception of the neighbourhood which in some cases renders findings “almost meaningless and possibly misleading”. The solution, according to Lupton, is, firstly, that consideration must be given to both physical and social spaces, secondly, that appropriate neighbourhood boundaries are used, thirdly, that consideration is given to reflecting individual differences of social space, and, additionally, that neighbourhood status needs to be incorporated into quantitative models of neighbourhood effects. Indeed, Lupton notes that neighbourhoods are constantly being re-created as residents simultaneously consume and produce them – calling to mind the concept of ‘locale’, a key principle of Giddens’ structuration theory.

2.3.4 Homogeneity, Homophily and Neighbourhood.

Understanding social networks - sets of pairwise connections, such as friendships between adolescents, or patterns of political alliance across social groups - has been central to sociological neighbourhood studies since the 1970s (Fischer, 1975) but their conceptualisation and the techniques of identifying them are much more recent, and mapping social networks has proved to be very complex and resource-intensive (Davies & Herbert, 1993). Today, social networks are understood in terms of types of network ties and Lin has characterised three types of network ties, (i) binding ties – reciprocal and strong ties in a dense network, such as kin and confidants; (ii) bonding ties - typifying most social networks with a mixture of stronger and weaker ties or direct and indirect ties; (iii) belongingness ties - shared membership and identity, even though the members may or may not interact among themselves (Lin, 2008). Granovetter and Sampson similarly reject the idea that neighbourhoods are characterised by dense, intimate, emotional ties and defines neighbourhoods in ecological terms as ‘collective efficacy’: “a neighbourhood’s efficacy exists relative to specific tasks such as maintaining public order.” (Granovetter, 1973; Sampson, 2004, p.160) This is a latent, shared belief in a neighbourhood’s capability for action to achieve an intended effect, which has to be coupled with an active sense of engagement on the part of residents,

emphasising that these are qualities fostered by networks which have to be activated to be meaningful. The consensus here is that weaker ties are sufficient for neighbouring.

The implicit rationale for the identification of homogeneous areas in neighbourhood studies is that similarity indicates social connection, and that social connection equals community. The basis for this is the principle of homophily: that contact between similar people occurs at a higher rate than among dissimilar people (McPherson, Smith-Lovin, & Cook, 2001); in addition, social contact theory suggests that the more contacts the greater the likelihood of acquaintanceship and friendship developing and hence homogeneity encourages social cohesion. Homophily characterizes network systems, and homogeneity characterizes personal networks. In western societies wealth, race and ethnicity are the main social dividers, with sex, age, religion, and education also strongly structuring our relations with others. Occupation, network position, behaviour, and intrapersonal values also show considerable homophily, but they are often offshoots of socio-demographic homophily or relate to specific networks (Talen, 1999; Winter, 2000; McPherson, Smith-Lovin, & Cook, 2001).

Homophily structures network ties of all kinds and it has long been noted that people's personal networks are homogeneous on many socio-demographic, behavioural and intrapersonal characteristics such as in families, marriage, friendships and social organisations (McPherson, Smith-Lovin, & Cook, 2001). Perhaps surprisingly, given the history of the concept within sociological, political and social area analysis, wealth homophily or economic inequality, the basis of social class divisions, has not been clearly distinguished from other socio-economic variables in the academic literature.

The main source of homophily, though, is propinquity: we are more likely to have contact with people physically closer to us than people further away, an everyday reality termed the Law of Distance-Interaction: the "likelihood of interaction or contact of any kind between two social elements is a multiplicatively decreasing function of the distance between them, or of the costs of overcoming that distance." (Mayhew, McPherson, Rotolo, & Smith-Lovin, 1995; Mayhew and Levinger 1977, quoted in Hipp and Perrin 2009) which is a tailored version of what has become known as Tobler's first law of geography: "... everything is related to everything else, but near things are more related than distant things" (Tobler 1969, in Olsson 1970, quoted in Barnes, 2004). Although purely local networks of people tend to contain more contacts they are usually weaker ties and become less important over time as social propinquities assume greater precedence.

Hipp and Perrin (2009) identified 5 key determinants of social distance which could offset the role of spatial propinquity in fostering neighbourhood: (i) economic class, (ii) life course position, (iii) cultural values and attitudes, (iv) gender, and (v) racial/ethnic

differences. Using the idea of ‘costs’ from the law of distance-interaction as ‘energy expended’ the concept of social distance could be likened to that of physical distance, in both cases people endeavour to minimise effort or energy in tie formation, thus a person is more likely to form a tie with a person who speaks the same language than expend energy in trying to form a tie with a somebody who speaks a different language, which requires greater effort. In this manner the researchers were able to measure the effects of both physical and social distances on strength and number of neighbourhood network ties.

In a largely middle-class, white, New Urbanist neighbourhood the researchers reported that increases in physical distance and the difference in the value of homes were robust and substantial measures of inhibiting effects on the development of weak ties; the effect of physical distance was even stronger in inhibiting the formation of strong neighbourhood ties. The authors conclude that these are important findings with implications for neighbourhood cohesion and the formation of social capital, as well in relation to social disorganisation theory which posits that reduced neighbour interaction increases crime rates. Additionally, social distance on age, marital status, and the presence of children all reduce the formation of weak ties. On the other hand, increased length of shared residence increases both weak and strong ties. The actual findings of this research uphold those of the body of neighbourhood and social capital research (Talen, 1999; Winter, 2000; Stone, 2001).

With the caveat that this cross-sectional research was conducted on a single, new, middle-class, white neighbourhood in a mid-sized southern U.S. city with a relatively small sample size and a low response rate, these results are particularly significant should other studies in different neighbourhoods, with varying socio-economic conditions, support them. Irrespective of the results obtained this methodology of measuring and comparing social and physical distances opens the way for a clearer identification of the social dynamics of neighbourhoods.

The explanation for the power of homophily lies in the principle of minimising psychological and social effort or energy when developing contacts with other people, whilst this need to socialise is seen as part of human nature (Maslow, 1968) manifesting itself in the urban setting in neighbourhoods (Mumford, 1954). Schelling and other scholars (Schelling, 1971; Zhang, 2004; Crooks, Castle, & Batty, 2007; Clark & Fossett, 2008) have demonstrated how even a few simple rules of choice can result in dramatic segregation and it is this process of the aggregation of individual choices which produces neighbourhoods of people with distinctive characteristics, irrespective of the segregating power of the housing market and discrimination.

However, these processes alone do not satisfactorily account for (i) the initial distribution of residents, or (ii) the observed persistence of socially distinctive

neighbourhoods over many generations. Residences are either built by developers with a particular market value in mind, or for social housing with a particular client in mind, and so the initial residents will either take up residence on the basis of discrimination (social housing versus private housing) or, through price, be filtered economically. Either way a socio-economically stratified residential pattern results which sets the tone for the future and which is subject to social homophily influences subsequently. 'Replacement' residents will, through social homophily, accord with the characteristics of the existing residents. Except for in-fill housing, the history of the U.K.'s cities has been one of periodic waves of housing development where extensive plots of similar housing were constructed, giving uniformity to local areas related to age of construction and type of housing. This, in turn, leads to uniformity in the profile of residents and there is a relationship between the local structure of the built environment and the characteristics of the residents who live there. Given that the life of the physical built environment usually extends over several generations and that resident turnover is typically a slow process neighbourhood social profiles persist over long periods of time, unless wholesale regeneration occurs. Even where regeneration or gentrification of the local area or neighbourhood built environment takes place it is one that affects a whole area and thus the residents' profiles change synchronously. Whole neighbourhoods (Dorling, Mitchell, Shaw, Orford, & Smith, 2000) cities and regions (Smith, Shaw, Dorling, & Pearce, 2001) retain similar socio-economic profiles over generations which can be explained in part by the local structures of the built environment.

Even more pertinent is a recent study (McCrea, 2009) which examined the relative power of social homophily against structural homophily; that is, do people wish to live in neighbourhoods with similar people, or do people with similar social characteristics find neighbourhoods of similar physical characteristics attractive and therefore move to neighbourhoods with similar people? McCrea found that, in South East Queensland, Australia, an area of low ethnic diversity, structural homophily explained much more variation in spatial socio-economic and ethnic environments than social homophily. In this study the structural considerations were: appearance of dwellings; community size; attractive neighbourhood; recreational opportunities; close to natural areas; spaciousness of area; close to public transport; good housing costs; good schools, and close to work. Of these, 'good housing costs' was given the highest importance rating.

Brent, a London borough and the location of this project's case study, has a very different social profile than South East Queensland in that there are significant ethnic minorities here and it is likely that social homophily plays a more important role in residential patterning, as seems to be evident from the distinct, ethnically-segregated areas within the North and South Brent case study areas. Nevertheless, McCrea's findings highlight the significance of structural characteristics in accounting for residential patterning, particularly the cost of housing. There is also a question of scale

here: having decided, perhaps, to locate in area composed of similar people the precise street or home purchased could well be related simply to cost, yet meet the social homophily criterion; that is, different elements of social and structural homophily may operate within one another. A further consideration which has had a major influence on residential patterning in Brent is the provision of social housing. The supply of housing in Brent is the consequence of both free market forces and social policy. In the whole borough social housing accounts for 25% of all dwellings whereas in North Brent it accounts for just 14%, but in Kilburn, South Brent, the percentage rises to 50%. Kilburn is a much older part of the borough which, as a result, has experienced considerable redevelopment of poor quality housing, such as occurred in the area now known as the South Kilburn Regeneration Area and the Kilburn Square area, as well as in-filling of war damage. North Brent's social housing came from council housing provision post-war and some later estate developments. But, in both areas the provision of social housing has introduced a complicating factor to the idea of social homophily, as the academic literature acknowledges. For some time the allocation of social housing has been on the basis of need and the immigration trend over recent decades has been for a large influx of immigrants whose needs have required prioritising over the resident population's needs, which has resulted in newer immigrant groups being settled in social housing within existing populations of a different social character.

2.4 Political Theory and the Neighbourhood.

The current government has put the neighbourhood centre-stage, declaring it to be at the heart of its entire political agenda, as the Conservative's Big Society policy document declared⁵:

Neighbourhoods will be able to bid to take over the running of community amenities, such as parks and libraries that are under threat.

Neighbourhoods will be given a right of first refusal to buy local state-owned community assets that are for sale or facing closure. This will cover assets owned by central government and quangos, not just town halls.

Neighbourhoods will also have a right of first refusal to take over and run vital commercially-owned community assets when they shut down – for example, those post offices, pubs and shops whose continued survival is of genuine importance to the local community.

We will give neighbourhoods detailed street-by-street crime data, so that they can hold the police to account at local beat meetings.

⁵ This document was modified as part of the coalition arrangement though, in one form or another, all of the agenda here is being enacted.

Neighbourhoods will be able to start their own school, giving them greater control over their children's education.

Neighbourhoods will be given the power to engage in genuine local planning through collaborative democracy – designing a local plan from the “bottom up”.

We will use the Sustainable Communities Act to ensure that neighbourhoods have access to line-by-line information about what is being spent by each central government agency in their area, and the power to influence how that money is spent.

Allow neighbourhoods to create Local Housing Trusts to enable villages and towns to develop the homes that local people want, with strong community backing.

Greater access to funding for neighbourhood groups, for example the neighbourhood element of local tariffs raised from development. (Conservative Party, 2009)

The theoretical foundations for this approach are really twofold: civil society and social capital.

Civil society, in its use here, appears to be a fusion of *civic society* which can be traced back to the Aristotelean tradition of citizens arguing over the great questions of the day to evolve a sense of the *common good* or *public interest*, to the 18th century Western political thought denoting *social mutuality*. In recent decades, the concept has seen a revival associated with the demise of the Soviet Union and the apparent victory of capitalism with the term coming to signify market deregulation and it has come to represent such ideas as the *private sphere*, *free market*, *free society*, *democracy*, and *social capital*. “In short, civil society denotes that desirable zone of activities and associations that is putatively free from state intervention.”(Gidwani, 2009)

In another guise the liberal left, following the influence of Gramsci and the Communitarians, and particularly the ideas of Putnam, saw civil society as an endangered form of democracy. Putnam and colleagues suggested that good government was directly related to civic community which, itself, was related to the stock of social capital in the society, especially the norms of reciprocity and the networks of civic engagement.

The works of Bourdieu, Coleman and Putnam have, respectively, looked at **social capital** in terms of the family, the family and community, and the community and the national setting (Stone, 2001), thus providing the link between individual social behaviour and the state – joined-up social welfare. This provides the theoretical and practical mechanism for social policy intervention (Forrest & Kearns, 2001).

Social inequalities at the neighbourhood level, and often in concentrations of neighbourhoods, expressed in social fragmentation, long-term unemployment and high

crime rates, have been identified as indicators of a polarised and disorganised society. “In essence, neighbourhoods are being seen as the focal point around which to coordinate action and they are increasingly becoming the key spatial scale for policy intervention (Audit Commission, 2001; European Union, 2002).” (Morrison, 2003, p.116).

Voluntary cooperation and coordinated activity was deemed much easier where the structure of social organisations featured trust, reciprocity and networks of civic activity in the shape of neighbourhood associations, cooperatives, sports clubs and political associations. Where these proliferated, citizens were more likely to cooperate to mutual benefit. Putnam explained this behaviour using *game theory* in networks of civil engagement, and has since championed this cause (Smith M. , 2011).

Promoting these ideas of private and civic social engagement, whilst eschewing big government, sits well with liberal and free market advocates and has been taken up in the U.S. and the U.K.

In the U.K. David Willetts developed game theory and extended it into social reciprocity and enforcement of social behaviour, underlying the shift from big government to non-government social institutions and civil engagement (Willetts, 2008), and this has been taken up by the socially progressive think-tank, the RSA, who have developed more theory and introduced practical work furthering social network development (Ormerod, 2010; Rowson, Broome, & Jones, 2010). The RSA runs its own project on social networks seeking to establish bridges between existing social networks and to use key figures in existing networks as hubs for community networks.

2.5 Political economy theory and the Neighbourhood

In addressing why neighbourhoods change or remain stable Pitkin presents the three major schools of thought:

2.5.1 Urbanism.

In this group is the *ecological* model of Park & Burgess, which explains neighbourhood change in terms of structural forces, such that, in the concentric ring model, each inner ring puts pressure on the ring surrounding it as lower income residents move into them as the city grows outward. This is the natural selection process of competition and selection.

Another concentric ring model in this category is the *filtering* model presented by Hoyt which can be seen, in terms of influences at work, as an opposite of the ecological model; in the filtering model families move outwards as they are attracted by the better homes further from the centre and face increasing maintenance costs on their existing properties, and so they are pulled to the periphery rather than pushed. All other things

being equal, properties decline in standard over time as age takes its toll, whilst new property is being added on the edge. This is a life-cycle view of neighbourhood which sees an inevitable downward progression of the neighbourhood in line with its poorer quality property.

The third model in this category covers residential *location decision models*. These models are based on the *Bid rent* concept where there is a trade-off between living in the centre of a city with high rents and smaller properties to moving to the more spacious, cheaper, and healthier outer areas. It is conjectured that as household incomes rise they will move out from the centre availing themselves of a better quality of life (Gibb, 2003). This model encompasses the *border* case where households may be more willing to pay more not to live next to the border of their neighbourhood where it butts up against a neighbourhood of people with less desirable characteristics; in this sense it builds in social and racial segregation.

2.5.2 Subculturists.

The *subculturist* school of thought objected to the deterministic view of the ecologists in seeing neighbourhood change as the outcome of exogenous forces. For *subculturists* neighbourhoods were composed of a variety of households and could remain stable or thrive if the endogenous social culture were strong enough. Support for this view came from in-depth studies of communities celebrating their diversity. Decline is not inevitable and can be fought off by the strength of social networks in the neighbourhood. This viewpoint is behind many of the activist neighbourhood organisations.

2.5.3 Political Economy.

The Political Economy school of thought, like the ecologists, is concerned with exogenous forces shaping social relations of production and accumulation, but, whereas for the ecologists' urban development reflected market equilibrium, for the political economists it is the result of economic, political and social conflict. This has led to two pathways for research: the first looks to identify urban 'growth machines' generating neighbourhood change, held to arise from an urban elite promoting their own vested interests through property and population growth, seeing the neighbourhood as a commodity - either as a source of rent, or, for non-economic reasons, such as use value.

The second pathway examines the urban re-structuring of the past thirty years in the face of globalisation. First, there has been the restructuring of capital, seen in globalisation and corporate concentration; secondly, there has been a general restructuring of labour as the economy has shifted from a manufacturing base to service and hi-technology industries.

The impact of this restructuring process on U.S. neighbourhoods is seen in terms of good blue-collar jobs moving from the inner city to the urban fringe, leading to a two-tier city of professionals participating in the new economy and the disengaged working-poor who are concentrated in low-income neighbourhoods. In these low-income neighbourhoods, housing accounts for a greater proportion of disposable income than in the engaged neighbourhoods thus widening the inequalities gap. At the same time government has retrenched on public housing support. Consequent to all of these things, residents in low-income, minority neighbourhoods become disengaged from political participation as they become detached from social institutions.

However, in all these discussions and theorising about neighbourhoods, no definition of them is offered. On one hand, the neighbourhoods of the Chicago School are implicitly left intact in the absence of any other model, so throughout these discussions there is the backdrop of neighbourhoods being local places, smaller than communities, which have a social coherence. In the face of the subculturist viewpoint it should be said that neighbourhoods need not be socially homogeneous in the make-up of their residents to have a social coherence (as distinct from social cohesiveness); a neighbourhood could, for example, be distinctive because of its diversity of social mix yet, because of that, be regarded as a unique entity. On the other hand, no other model of the physical qualities or dimension of the neighbourhood is presented in this political economy model. What is clear is that the subject matter is a stock of housing, the characteristics of its residents and the relationship between them. Although the wider forces influencing these neighbourhoods are the contentious subject matter of these theories, the reality of neighbourhoods is that they are physically stable entities capable of being operationalised for empirical research.

2.5.4 Gentrification.

One special case of neighbourhood change bucks much of the neighbourhood classification above and illustrates the epistemological struggle, and that is the case of gentrification. Hamnett (Hamnett, 1991) defines gentrification as the transformation of a working-class or twilight area by an invasion of middle class or higher income groups involving the physical renovation or rehabilitation of a deteriorated housing stock, commonly resulting in a shift in tenure from renting to owning. In discussing the reconciliation of the two competing theories, Hamnett characterises them as *cultural* and *structural* epistemological interpretations of production: the production of gentrifiers and the production of the built environment, respectively. In offering an explanation for gentrification Hamnett is clear that the first requirement is “a supply of potentially gentrifiable inner city property.” (Ibid, p.186)

However, in common with all gentrification studies examined, nowhere are these suitable properties identified on the ground. Instead, collections of streets (Butler &

Robson, 2001), boroughs, cities and global reviews have placed gentrification in the urban context by description only rather than mapping out properties potentially suitable for gentrification. Clearly this could be done; areas of gentrified property can be described because they are areas of contiguous, similar-type housing in similar condition. Gentrification can be placed without detracting from examining the influence of cultural and structural forces as they act on areas of substitutable properties.

The necessary, primary key to the neighbourhood is residential property.

2.5.5 Housing sub-markets.

Housing sub-markets, determined by hedonic modelling, are used to estimate property prices from a wide variety of variables, not only of the property itself but also taking into account neighbourhood characteristics and often wider considerations. Housing sub-markets are areas of substitutable properties. The statistical derivations of property sub-markets, such as that advanced by Bourassa, et al, (1999) and Goodman and Thibodeau (1998) has much to offer neighbourhood delineation and some of the techniques they have used, such as principal components analysis and clustering, are incorporated into the empirical element of this research. Real estate agents' assessments of housing area sub-markets are especially powerful being used for the derivation of council tax valuation bands by the Valuation Office Agency, and seen by researchers as essentially defining neighbourhoods (Coulton, 2005; Pacione, 2005; Parenteau, et al., 2008) In the end, deriving housing sub-markets equates to distinguishing areas of housing substitutability (Galster, 1996).

LITERATURE REVIEW

3.1 Introduction

This chapter presents the findings of a review of neighbourhood theory and practice. The focus of the review is centred on those elements of neighbourhood delineation relevant to their governance and the welfare of their residents. The chapter firstly takes a brief look at the parent theories of neighbourhood before reviewing definitions of neighbourhoods and their implementation under the following headings: no definition; functional neighbourhoods; neighbourhoods of individuals; aggregate neighbourhoods; social networks; the environment; recent developments combining social networks and the environment. This last category introduces a new model of the neighbourhood based upon the findings of this review.

One of the U.S. models reviewed has received considerable acclaim from leading academic professionals for its theoretical exposition and empirical verification in the field, and this model provides a firm foundation for this research's conceptualisation and development of an enhanced model suitable for testing in a U.K. setting. Chapter 3 presents the methodological approach taken in evaluating the new model, with Chapter 4 presenting and discussing the results of empirical work, and Chapter 5 providing an overall assessment.

3.2 A brief look at the parent theories of the urban neighbourhood

Geographical Theory. There is no geographical theory of the neighbourhood as such, though two distinct approaches can be identified. Since the 1970s social science and geography have experienced the "spatialisation of social theory" (Massey, 1998 quoted in Sailer and McCulloh, 2012) which centred on how *space* becomes endowed with meaning and is transformed into *place*, as distinct from the 1960s quantitative era where space was the predominant object of the spatial scientist. In the 1980s Marxism, feminism and post-structuralism pointed to the construction of places, such that now the working assumption is that places are social constructions and are outcomes of human activity. (Staeheli, 2003) identifies place as (i) a physical location or site; (ii) as a cultural and/or social location; (iii) as context; (iv) as constructed over time; and (v) as process. Understanding place as a physical location is a common approach where place is "material, grounded and bounded" (Staeheli, 2003, p. 159). Place is often contrasted with space, the material of spatial science, which is abstracted from the particular. Another approach to understanding place is as context, where place is not only seen in the particular but also in the broader context in relation to other places. In this approach the characteristics of places are represented by variables for a statistical or spatial analysis. Unfortunately, these cultural perspectives on neighbourhood have not

produced any means of characterising or identifying neighbourhoods on the ground, nor, other than by highlighting the inherent conceptual difficulties, have they contributed to refining the scale of neighbourhood. “The most pressing issues remain connected to the theorisation of spatial human behaviour... in terms of the measurement and definition of place...”(Tita & Radil, 2010), a view echoed by O’Campo (2003), Cummins, Curtis, et al. (2007), Riva, Gauvin and Barnett (2007), Grannis (2009), and Cutchin, Eschbach, et al. (2011). Grannis (1998), provided both theoretical and empirical support for the idea that neighbourhoods are shaped by street networks, combining urban morphology and internal characteristics. Grannis and Sampson promote the incorporation of social theory into the geographical dimensions of the neighbourhood, bringing together the social and spatial. The uniqueness of each neighbourhood is a product of the interaction of the social and spatial which reflexively influence each other. The neighbourhood is a reflexively socio-spatial concept (Soja 1980, quoted in Cutchin, Eschbach, et al. 2011). This duality is represented in social networks in the concept of distance: social distance and physical distance on the one hand, and social interactions constituting the social network and the physical delimiting of social networks (the areas of social interaction), on the other (Grannis 2009). “Usually, the response to these issues is to ignore them by using available data collected and coded within pre-determined (pre-bounded) geographical units. Research on neighbourhoods and health is dominated by the use of secondary data generated in this manner...” (Cutchin, Eschbach, Mair, Ju, & Goodwin, 2011, P. 1115), and this is the case in the U.K.

Currently, geographical views of the neighbourhood are split between those who view the neighbourhood as a composite of individuals’ relationships to space, encapsulated in referring to these socio-spatial entities as *places*, inappropriately and incapably of being bound (Massey, 1993; Galster G. , 2001; Whitehead, 2003), and those engaged in applying geographical knowledge and techniques in the real world, routinely handling the material of neighbourhoods (Butler & Robson, 2001; Cemlyn, Fahmy, Gordon, & Bennett, 2002; Martin D. , 2004; Sampson R. , 2004; Weiss, Ompad, Galea, & Vlahov, 2007; Parenteau, et al., 2008; Robson, Lymperopoulou, & Rae, 2009; Communities and Local Government, 2010). All agree that there is a core of neighbourhood, whilst the latter group seek to define neighbourhood boundaries.

Economic Theory. Economic theory concerning the neighbourhood focuses on the relationships between the stock of housing and residents, whether through the political economy concepts of neighbourhood growth machines – the products of competing interests in the stock of property – or as a result of urban residential reorganization in

response to labour market changes and the re-structuring of economies consequential to globalisation and technological innovation; or else through analysis of urban housing sub-markets.

Political Theory. The neighbourhood has been declared to be the key spatial scale of domestic political activity to re-build democracy and society, based on the concepts of developing and enhancing civil society, and the perceived need to develop neighbourhood social capital, the crucial ingredient for community. This policy is at the heart of the current government's Localism Bill and Big Society initiative.

Planning Theory. Neighbourhood theory here centres around two planning functions: the need to plan for the efficient and fair distribution of services amongst households. In this regard planning is concerned with the just equality of services and access to them, and the rational civic administrative geography of the nation. In addition, planning is concerned with the neighbourhood as a unit in urban design and structure, having its roots in the planned neighbourhoods of utopian visionaries, the Garden City and Neighbourhood Unit movements. Today, this latter function is manifested in the drive for sustainable neighbourhoods.

Sociological Theory. The sociological view of the neighbourhood is the bedrock of all others and the first to be encapsulated in theory, the theory of Urbanism. Urbanism posited that large, dense, and heterogeneous populations endangered community. The influence of this theory is imbued in much sociological work to this day. Since the 1970s social networks have increasingly been seen to hold the key to understanding group dynamics and social interaction. Recent interest in social capital formation and neighbourhood effects have encouraged a more scientific approach to neighbourhood studies which has revealed a direct relationship between the physical and built environments which provides closure to social network systems of social interactions.

3.3 Neighbourhoods in Practice

3.3.1 Introduction

There is a considerable lack of agreement on the definition of neighbourhood and the complexity of measuring even those elements of society and territory on which there is some agreement, and it is not, therefore, surprising that attempts to map neighbourhoods have been controversial and difficult. "McKenzie: 'probably no other term is used so loosely or with such changing content as the term neighborhood, and very few concepts are more difficult to define'." (Matthews, 2008, p257) Reviewing the academic literature it is helpful to put these attempts to delineate neighbourhoods into five main categories. Often, though, these categories inter-relate and there are no hard and fast boundaries between them. The first of these categories is where no clear definition of a neighbourhood is offered and hence no delineation is made. The second category can be referred to as 'planned or functional neighbourhoods'. The third category is that which encompasses definitions of neighbourhood based upon the individual's relationship to his/her neighbourhood. The fourth category comprises those studies which use

aggregate data or are based on groups of people. The fifth category examines networks of people who create the social fabric of neighbourhoods. The last two categories look at the environment and then the integration of social networks with the environment.

The emphasis here is on the methods employed in defining and delineating neighbourhoods and, whilst there is inevitably a sequential element to this, it is important to be aware that this approach has privileged methodology over an evolutionary or disciplinary model approach, though these are introduced periodically. As with the caveat of the previous paragraph, there is an abundance of common subject matter between these models (indeed a sound case could be made for a finer classification of models to crystallise these areas), and progress is often made on several fronts, any one of which may prove ultimately to be a wrong turn, dead end and only rarely a straight path.

The purpose of this review is to ascertain the state of current theorising and implementation of neighbourhoods, to identify the possibility of progressing both of these and to establish the direction/s of future neighbourhood research.

3.3.2 No Definition

It may seem strange to include in a categorisation of neighbourhood delineation an approach which specifically resists defining a concept of neighbourhood and which therefore cannot map them. The justification for such a category comes from its overwhelming popularity and its long-standing, pervasive influence on the direction of neighbourhood scholarship and realisation, such that it requires further examination. As an example of its prevalence, in a comprehensive literature review of community identity for the U.K. Electoral Commission (Chisholm & Dench, 2005), the authors reviewed 76 studies noting that the use of the terms ‘community’ and ‘neighbourhood’ were often used synonymously. Other than four case studies (and a further handful which considered techniques of partitioning urban areas by census statistical reporting units, by wards or by specific government Small Area Initiative areas, discussed below) none of the reviewed studies attempted to define community or neighbourhood. The four exceptions were a study of the Jewish community in a part of Manchester (Valins, 2003), the creation of neighbourhoods in Doncaster for the local health authority (Doncaster NHS Public Health Intelligence Unit, 2003) and two works concerned with trade catchment areas, loosely regarded as consumer-behavioural communities.⁶ This left over sixty of the reviewed studies preferring not to define or map the subject communities. The reviewers’ explanation for this is that sociologists, in particular, “are reluctant to try to put spatial boundaries to communities, preferring to concentrate on

⁶ Clarke G., H. Eyre and C. Guy (2002) “Deriving indicators of access to food retail provision in British cities: studies of Cardiff, Leeds and Bradford”. *Urban Studies* 39, pp 2,041-60; Thomas, C. J. (1976), “Sociospatial differentiation and the use of services”, in D. T. Herbert and R. J. Johnston (eds) *Social Areas in Cities Vol. II Spatial Perspectives on Problems and Policies*, 17-63. London: Wiley, both quoted in Chisholm and Dench, 2005.

how they function” because communities consist of complex patterns of personal inter-relationships, much of which lies in the ‘private realm’ and hence is invisible to the ‘public realm’ (Chisholm & Dench, 2005, p.4). Consequently, the conclusion was drawn that “There is no general agreement regarding what a community is and hence the manner in which a map of local community boundaries could be drawn.” (Op cit, p.23) or as Mann put it: “Attempts to define the boundaries of the physical neighbourhoods may be sterile in that they bear so little relationship to social relationships. It is more useful to consider the social relationships themselves rather than to worry about where neighbourhoods begin and end.” (Mann, 1965, quoted in Lee, 1968, who rejected this view) What there does seem to be agreement on, however, is that there are no objective ‘natural’ communities out there waiting to be discovered.

Such a set of diverse views of what a neighbourhood/community is, as portrayed in the review, suggests that the concept is inadequately defined and understood. For example, several of the studies reviewed refer to the importance of schools as being at the heart of communities and the importance of residential stability for the development of neighbourly relations but beyond the general applicability of Giddens’ concept of the locale as the setting for social interaction and interaction with the environment, each re-shaping and modifying the other (Johnston, 2001a; Stones, 2005), there has been little theoretical advance of what constitutes a neighbourhood and how it functions. Why is the school so important; how does it foster neighbourhood development; why is residential stability and duration important and what are the mechanisms by which it promotes neighbouring; how do the social networks of parents and neighbours express themselves geographically? None of the studies reviewed got to grips with these and other fundamental questions and as a result each study had its own emphasis of what was deemed to form a neighbourhood/community, hence the diverse and confusing conceptual presentations. Rather than get bogged down in unpicking the nature of the neighbourhood most studies preferred to start from an acceptance of a general understanding of the term and highlight a particular aspect of it. Some of the reviewed studies actually emphasised the mercurial nature of the concept suggesting perhaps that by its nature it would always be elusive:

“There is no definitive set of factors or features which can be applied across all areas in defining neighbourhoods and communities.” (Nicholson et al, quoted in Chisholm and Dench, p.28)

“The analysis shows that the concept of community has different meanings, and hence different uses, for different people.” Chisholm and Dench p. 29, reviewing Strathern, M. (1982)

“There is no exact definition of a neighbourhood.” Chisholm and Dench p. 32, reviewing Cabinet Office (2001)

“Several of the contributors discuss the meaning of ‘community’ but the varying concepts leave the reader unclear as to what ‘community’ means in operational terms.” Chisholm and Dench p.34, reviewing Imrie and Raco (2003)

“There is no single definition of a poor neighbourhood, and there never will be.” Chisholm and Dench p. 37, reviewing Social Exclusion Office (1998)

“...the focus of people’s day-to-day activities may not be reflected in feelings of community identity, interest and loyalty.” Chisholm and Dench p. 38, reviewing Young et al (1996)

One consequence of not defining neighbourhood is that its size remains unclear and contentious. Most scholars would consider a neighbourhood to be a smaller entity than a community, in correspondence with the hierarchical structure first presented by the Chicago School, yet the reviewed researches covered neighbourhoods ranging from a few streets (Butler & Robson, 2001) to studies using neighbourhoods of populations in the region of 20,000 people (Doncaster NHS Public Health Intelligence Unit, 2003; Lupton, 2003; Mumford and Power 2003, quoted in Chisholm and Dench, p.35), which are considerably larger than wards (average population 9-13,000), themselves regarded as de facto neighbourhoods (Harris & Johnston, 2003) and communities. On the other hand Kingston upon Thames has divided its borough up into neighbourhoods with each neighbourhood consisting of several wards (The Royal Borough of Kingston upon Thames, 2006). In fact, the entire relationship, if any, between neighbourhood and community is particularly unclear.

In common with all approaches to neighbourhood delineation the absence of environmental considerations is particularly notable amongst all of the studies examined in the Chisholm and Dench review. To a large extent this is because the review was specifically interested in community electoral representation so had a social emphasis, but it is also an outcome of the history of neighbourhood and community studies which originated in the 19th century socio-political discourse arising from the consequences of the industrial revolution. Today, environmentalism is firmly on the political and academic agendas and closer attention is being paid to the effects of the natural and built environments on individual and community health and welfare. Geographical and spatial determinism were discredited as crude academic traditions lacking convincing theory but it would seem that along with their side-lining, all environmental considerations were discounted as valid contributors to neighbourhood theory, as exemplified by those papers included in the Chisholm-Dench review. As described below, some headway has been made in this regard and environmental factors have insinuated themselves into more recent neighbourhood work.

This prevalence of case-study and single-theme research on neighbourhoods can be partially explained by the disaffection with community studies in the social sciences in

the 1970s and 1980s resulting from the prevalence of post-modernism, individualism, the centralisation of decision-making and the cultural turn, all emphasising place-specificity rather than spatial order. As a consequence, neighbourhood theory stalled as geographical communities were viewed as casualties of modern life.

A sub-group of this category is, paradoxically, one which consists of definitions of neighbourhoods which are either too complicated, insufficiently well-developed or conceptually against the territorialisation of neighbourhood that they are unable to be delineated at this time. Such definitions are those of Galster, Webster and those academics who argue against the conceptualisation of neighbourhood as a ‘spatial container’.

Galster defines neighbourhood as “...the bundle of spatially based attributes associated with clusters of residences, sometimes in conjunction with other land uses.” (Galster, 2001, p. 2112) which he then lists as:

Environmental characteristics – e.g. degree of pollution, topographical features, etc.

Proximity characteristics – access as influenced by distance and transport infrastructure

Buildings characteristics e.g. design, type, materials, state of repair etc

Infrastructure characteristics: roads, utilities etc.

Local service provision in relation to local taxes

Demographic characteristics of residents: age, race, ethnicity, religion etc.

Class characteristics of residents: income, occupation, education etc.

Political characteristics: political networks, resident involvement etc.

Social-interactive characteristics: friend and family networks, residents’ commonality etc.

Sentimental characteristics: Residents’ identification with place, historical significance etc.

Not all of these attributes will be present, or present to the same degree, in each neighbourhood, thus there are “degree(s) of presence of neighbourhood” (Galster 2001, p.2113, attributed to Ade Kearns).

As it stands, this is a comprehensive list of characteristics which no study has attempted to research and it may be too comprehensive to serve any practical purpose for delineating neighbourhoods. In a sense this definition is akin to stating that each

neighbourhood is unique (which undoubtedly they are) rather as the French School of Geographers regarded each 'pays' as unique, but, to date, nobody has employed the resources necessary to describe each neighbourhood in a given area in these terms. Galster saw the difficulty of delineating neighbourhoods resulting from his definition as a problem of data representation because attributes vary by degree and scale without consonant borders, and so he suggested that investigators would select their attributes of interest and produce their neighbourhood typologies accordingly. Geographic Information Systems Analysis provides a technical means of synthesising data relating to different scales and different extents to provide data values over a set area which overcomes Galster's difficulties. However, the reasons why Galster's definition "does not lead to the Holy Grail sought by much neighbourhood analysis of the 20th century: a means of unambiguously, meaningfully bounding urban neighbourhoods" (Op cit, p.2113) is not because of technical difficulties but because there is no agreement on which characteristics animate neighbourhood. Unfortunately, Galster's observation that investigators "would select a different parsing of urban space, depending on the particular neighbourhood attributes...of interest" is just what is happening; the confusion arises because investigators often regard the distribution of the attribute of their interest as actual neighbourhoods. For example, environmentalists would perhaps use the term neighbourhood to distinguish one area of environmental quality from another, by, perhaps, calling one small area a healthy neighbourhood or a polluted neighbourhood, but even here it is suggested that this would only be done with one eye on the fact that people are affected by different environmental qualities; in other words it is only when a social element is introduced that 'neighbourhood' becomes a meaningful term. So, the definitional problem becomes one of narrowing down the vital characteristics of neighbourhood.

Galster's paper emphasised that neighbourhoods were essentially clusters of residences in association with spatially based attributes; that neighbourhood is rooted in these residences which link the physical and built environment characteristics of the area to the social dimension; and that the presence of neighbourhood varies across the urban landscape and over time.

No examples of inventorying an area's spatially based attributes were revealed in the literature search. Nevertheless, this paper is often cited (Lupton, 2003; Ross, Tremblay, & Graham, 2004; Gauvin, et al., 2007; Lebel, Pampalon, & Villeneuve, 2007) as the most comprehensive and ideal approach to neighbourhood definition and therefore informs most practical approaches to delineating neighbourhoods.

Another approach to neighbourhood definition, which has not been operationalised, is provided by Webster (2003). Webster introduces the idea of ties between neighbours, and between residents and civic authorities, based on contracts: contracts of behaviour and common interests, integrating facets of classical economic land theory. According

to Webster, urban economic theory views a neighbourhood as “a spatially defined, usually contiguous, set of land users jointly consuming a set of local public goods. These include access to jobs, services, amenities and other neighbours’ personal characteristics. Defining a neighbourhood as a consumption-sharing arrangement is close to defining it physically since most local public goods are, by nature, conspicuous. Only in the extremely unlikely case where occupants have been forcibly located and are quite indifferent to both local amenities and to each other’s attributes, might it be incorrect to assume a correlation between physical, social and economic (consumption-sharing) definitions of neighbourhood” (Webster, 2003, p.2592). The economic models that contribute to this view of the neighbourhood are drawn from central place theory, urban bid-rent theory, hedonic price theory, local public goods theory, club theory and hybrid theories. Webster cites the work of Hochman, et al⁷, as a particularly important synthesis of these theories, being highly pertinent to neighbourhood viability and highlighting the neighbourhood as an important level of urban governance. Webster presents the neighbourhood as “a nexus of contracts that assign property rights over local goods and private goods” (Webster, 2003, p.2591), echoing Galster’s “bundle of spatially based attributes”.

The relevance of this theory to defining neighbourhoods is that it emphasises the binding relationships between individuals with one another, and individuals and institutions sharing rights over neighbourhood resources whether in law or in fact. A household’s welfare is dependent on the action of others who become co-residual claimants/victims even though there may be no social contact or relationship between the parties.

Although there is no easy way to delineate different neighbourhoods using this theory, it does suggest a weightier emphasis on residency and type of tenure as a means of discriminating between the qualities of contractual relationship associated with each type of resident. This analysis reinforces the significance of home ownership and type of tenancy, as well as the socio-economic status of residents, in an understanding of the involvement and attachment of residents to their neighbourhood (Dietz & Haurin, 2003).

Webster presents the neighbourhood in a structure which corresponds with Galster’s. First is the conceptualisation of the neighbourhood as a set of attributes “the shared attributes of a location – a set of local public goods – together with the formal and informal contracts (agreements or institutions) that emerge to govern the production and consumption of those attributes.” (Webster, 2003, p.2591). Such a definition almost precisely tallies with that of Galster, “Neighbourhood is the bundle of spatially based

⁷ Hochman, O., D. Pines, and J.F. Thisse, 1995, *On the optimal structure of local governments*, The American Economic Review, 85(5), pp.1224-1240

attributes associated with clusters of residences, sometimes in conjunction with other land uses.” (Galster, 2001, p.2112). Webster also noted that the neighbourhood could be physically defined by identifying those residents or institutions which consume the local public goods.

Secondly, Webster notes that it is the attributes of land, property, inhabitants and shared goods and services that give neighbourhoods their distinctiveness, and he classifies 5 different orders of attributes which characterise the joint production-consumption organisation that makes up the neighbourhood. Webster indicates that some of these attributes operate at different scales: the micro (small numbers of adjacent properties), the meso (street level), the macro (district and local service centre level), and Central (jurisdictional or city-wide). These scales are markedly similar to those identified by Suttles (who modified those of Jane Jacobs (Jacobs, 1996 (1961)); Matthews, 2008): the block face (the area over which children could play unsupervised), the defended neighbourhood (the smallest area possessing a corporate identity), the community of limited liability (typically a local government district), and the expanded community of limited liability (an entire sector of a city) (Suttles, 1972; Galster, 2001), which were modified by Kearns and Parkinson to create the Home Area (5-10 minutes' walk from home), Locality (sub-district, such as a public housing estate) and Urban District or Region (Kearns & Parkinson, 2001, p. 2104).

The coincidence of the similar scales between prominent neighbourhood researchers across the decades suggests that the social and economic attributes may relate to common spatial denominators.

The observation of Webster that “it is the attributes of land, property, inhabitants and shared goods and services that give a neighbourhood its distinctiveness” (Webster, 2003, p. 2594) again corresponds with that of Galster presented in his 10 characteristics of neighbourhood.

Other scholars are not concerned with the neighbourhood as a fixed spatial entity but are interested in the spatial configurations of social relationships, which are best understood as flows. Massey et al conceive neighbourhoods as dense networks of social interactions, as time-spaces where “the daily rhythms and movements of cities routinely code and divide city space” (Massey, Allen and Pill, 1999, p.160). The emphasis is on movement, fluidity and mixity, where space is not anchored to place but where we live is a “space of flows” (ibid, p.166).

Whitehead (2003), after tracing the development of the neighbourhood concept from its physical role in the urban morphology, as a planning unit, as a social and then socio-cultural manifestation, to a politically contested space, identifies theoretical shortcomings in that these ‘traditional’ accounts only understand the formation of neighbourhoods by reference to the internal dynamics of the neighbourhoods

themselves. Whitehead argues for neighbourhood at a variety of scales and is critical of the idea that it is the scale of the traditional neighbourhood itself which produces certain cultural and social outcomes; he argues that it is the flows of economic and political power flowing through the neighbourhood which, through their energy, produce and shape neighbourhoods. Such a view corresponds with those of political economic models of place-making, which views neighbourhoods as material forms of the flows of economic and political power resulting from decisions of banks, property investors, entrepreneurs, City Hall and political parties (Savage & Warde, 1996; Gieryn, 2000; Dorling, 2004) as well as by social transformation brought about by technological developments and globalisation (Harvey, 1989; Castells, 1996; Beaverstock, Smith, & Taylor, 2000). By their very nature these views of neighbourhood do not lend themselves to territorial delineation and certainly no studies were revealed using this theoretical approach to delineating urban neighbourhoods.

Unsurprisingly, this category is unhelpful in spatially defining neighbourhoods. Referring to Galster's seminal work, it should be noted that he bases his definition around "a cluster of houses"; however, it is the issue of scale which is the paper's Achilles heel: GIS enables elements operating at different scales to be accurately related to any territorially defined space, removing it as a barrier to delimiting a given neighbourhood. This research also challenges the idea, which Galster re-iterates, that neighbourhood is perceived by residents to operate at several scales: reason suggests that different social dynamics will operate at different scales and, if this is the case, each scale should be distinctively categorised and named. It is confusing not to challenge a view of neighbourhood which embraces the block face at one end of the neighbourhood spectrum to an entire city section at the other end, especially as such perceptions have been called into question in recent research (Chaix, Merlo, Evans, Leal, & Havard, 2009). By its nature this category is unhelpful in indicating the means of producing practical and meaningful neighbourhoods.

3.3.3 Functional and Planning Neighbourhoods

By the end of the 19th century the intellectual groundwork had been set by people such as Tonnies, Marx, Durkheim, Weber, Howard and Geddes (Geddes, 1996 (1915); Howard, 1996 (1898); Gidley, 2000) for the need to intervene to re-build, literally, community. Planning residential neighbourhoods was seen as the both the solution to urban social problems and the mechanism for bringing about social change.

The thread of planning for welfare reform in the U.K. emerged through the Garden City movement, which, in tandem with the Neighbourhood Unit concept prevalent in the U.S. (Rasmussen, 1957; Treasure Coast Regional Planning Council, 2004), promoted the neighbourhood as both an entity in its own right as well as being a constituent unit forming part of the whole, the city (Stein, 1949; Pacione, 2005). Later, these planning

concepts were incorporated with the neighbourhood unit principles into the Dudley Report of 1944 and Abercrombie's Greater London Plan setting the planning scene for post-war Britain.

"The neighbourhood was a basic assumption in Abercrombie's Plan for the County of London (1943). The idea of neighbourhood is simple but fundamental, namely that one is planning for society and not for an aggregate of houses. It is assumed that when a group of people reaches a certain size it will need a certain minimum of shops, a school, a church, and so on. The unit on which these ideas were centred was the school. Children should be able to walk to school without crossing a major road; the smallest residential neighbourhood should support a primary school; large units should contain smaller ones and be able to support a secondary school. Consequently, the neighbourhood is an inward-looking structure, focusing on the needs of the community...neighbourhoods lie between major roads. Somewhere near the centre are the school and a shopping parade, together with playing fields, church, public house, post office, and community hall. The latter often houses the clinic and the branch library. About 5,000 was suggested as the ideal population, but some neighbourhoods are as big as 12,000...Neighbourhood means different things to different people: to the planner it is a tributary area for which he must supply certain services, to the sociologist, an area in which people develop face-to-face relationships" (Jones, 1966)

However, the implementation of the neighbourhood unit principles in the post-war New Towns was less than ideal: the target population was too large for one elementary school and the 2 or 3 schools needed made them multi-centred. Shops replaced schools at the centre, whilst open space was confined to the edges. Often, financial and economic constraints meant that social facilities did not materialise whilst there was constant pressure to increase the housing catchment area per facility, so that, whilst the New Towns were a quality improvement over pre-war conditions, they were an inadequate application of the neighbourhood unit theory in terms of building community. Whilst some saw the Neighbourhood Unit as the means of breathing community life back into urban areas, others regarded them as being essentially anti-urban in that the attempts to re-create village life was a refusal to face up to the modern structure of urban life (Goss, 1961).

In the U.S. Clarence Perry's neighbourhood unit planning design came to prominence in the late 1920s emanating from the same social reform pressures that motivated the Garden City movement. Perry's ideal neighbourhood would "embrace all the public facilities and conditions required by the average family for its comfort and proper development within the vicinity of its dwelling" (C. A. Perry, 1929, p. 50 quoted in Rohe, 2009, p. 211) and was based on six principles:

1. Each neighborhood should be large enough to support an elementary school.
2. Neighborhood boundaries should be composed of arterial streets to discourage cut-through traffic.
3. Each neighborhood should have a central gathering place and small scattered parks.

4. Schools and other institutions serving the neighborhood should be located at the center of the neighborhood.
5. Local shops should be located at the periphery of the neighborhood.
6. The internal neighborhood street system should be designed to discourage through traffic. (Rohe, 2009)

Building upon the ideas of Burgess, here was a means of ordering and organising the city into sub-areas that appeared to meet a number of social, administrative and service functions for satisfactory urban living. The neighbourhood unit incorporated social values into a comprehensible physical plan by which planners could advance environmental design (Bannerjee & Baer, 1984).

Since these first attempts at neighbourhood planning, various schemes have been introduced to improve neighbourhoods, each addressing the need to foster social, political and economic development in the quest for social equity. The experience of the U.S. with Perry's neighbourhood unit formula, the Urban renewal programmes, community action plans, community economic development schemes, Municipal neighbourhood planning and the Planned Unit Development/Traditional Neighbourhood Development/Transit Oriented Development concepts (Rohe, 2009) have had their counterparts in the U.K., particularly with Neighbourhood Renewal and Small Area Initiatives programmes (Tunstall & Lupton, 2003). This school-centeredness as a key factor in neighbourhood planning and thought has been a constant since its inception and continues into current practice, for example it is at the heart of the construction of the Scottish Neighbourhood Statistics Data Zone Geography which uses the boundaries of non-denominational primary school catchment areas as the starting point for their design (Flowerdew, Graham, & Feng, 2004).

In only a slightly modified form the principles of the neighbourhood unit have enjoyed a renaissance in planning practice, particularly in the U.S. but increasingly in the U.K., under the heading of New Urbanism (Schubert, 2000; Silver, 2004). This re-awakening of the Neighbourhood Unit concept has come after a turbulent history of the application of neighbourhood planning in the U.K. since WWII.

Thus the neighbourhood has been seen as a basic building block, bridging the single house to the urban whole. The neighbourhood is viewed as the human scale for urban areas where personal contacts are generated whilst at the same time being a unit which facilitates the economic and political processes.

A number of scholars have identified a further objective of neighbourhood planning, other than to foster and maintain social interaction and local co-operation among people in residential areas, and that is to distribute facilities and services according to socially-

meaningful sub-units (Mumford, 1954; Buttimer, 1971; Kallus & Law-Yone, 2000). This duality of purpose has been the material of modern neighbourhood planning. However, new-build planning requires an holistic view of neighbourhood based on theory, whilst the efficient distribution of services and facilities is being super-imposed on an existing social landscape and, indeed, usually in compliance with pre-existing geographies. The role of civic planners with regard to the neighbourhood therefore extends wider than community physical planning to encompass the meaningful division of space for the purposes of administration and government. This is not unrelated to the neighbourhood as a social unit because the nearer the fit between the social identity of an area and its definition as a functional unit the greater the legitimacy it has. Thus the partitioning of space for civic administration should align with socio-demographic distributions as far as possible whilst meeting the particular criteria of any given function.

Another view of the neighbourhood is in terms of service delivery, a functional unit (Davies & Herbert, 1993; Chaskin, 1997; Martin, 2003). Citing Castells (1977), Martin describes the argument that the main function of urban neighbourhoods is the social reproduction of the workforce with it being the state's responsibility to provide the necessary services to sustain urban living, defining neighbourhoods by the collective consumption of such services.

Utilities and local and central government civic services have a duty to provide the nation with a specified level of service delivery. To this end, each has derived its own geography for this service provision, often not in any consultation with other service providers or with particular regard to the social composition of the target population other than its size. As the neighbourhood unit concept has illustrated, it is usually the case that a certain threshold population is required before a particular level of service is deemed socially and economically viable: for example, 7,000–15,000 population for a secondary school, 2,500–3,000 for a doctor's surgery, 25,000–40,000 for a sports centre, and so on (Barton, 2000).

However, in recent times the sharp variation in, for example, health care over small areas has been influential in developing locally-based initiatives in service provision on the basis that community involvement facilitates a better health (Bullen, et al, 1996).

Designing the service provision to meet the needs of the community, or neighbourhood, makes for a more targeted, relevant and economical service. The recipients of these services have been encouraged to regard themselves as consumers in an endeavour to

introduce a more consumer-led ethos within the service industries and to thereby better synchronise service provision to service demand. Such trends can be identified in health care services, in the state school system, in higher education provision, in greater community accountability of the police services and in the breakup of the utilities monopolies in favour of multi-supplier industries. In many cases this has resulted in the service providers tailoring their services to the nature of the constituent populations, which has involved them in trying to identify communities and neighbourhoods within their areas. Increasingly, small area analysis in conjunction with GIS has been used to define neighbourhoods in terms of the service provision (Kivell, Turton, & Dawson, 1990; Moon, 1990; Longley & Clarke, 1995; Bullen, Moon, & Jones, 1996). Rather than the service providers each having their own geographies, it is the case that, dealing with a common population base, the consumer-led services will bring the structure of their service provision to reflect the nature of the local communities.

In order to apportion responsibility for service provision the boundaries of the various service providers have to be precise and delineated on maps, though in practice they are more in the nature of frontiers than boundary lines (Bullen, Moon, & Jones, 1996). Particularly in the social services the inter-connection between services in areas has been recognised and is behind the government's programme to tackle social exclusion on an area basis through Local Strategic Partnerships between agencies, local authorities and business.

There is a growing literature on identifying the characteristics of places in addition to the characteristics of people in an effort to identify and isolate area effects, in the sense of the physical attributes of place and also in socio-cultural terms (Macintyre, et al, 1993; Powell, Boyne, & Ashworth, 2001; Stafford, Bartley, Mitchell, & M, 2001).

An example of partitioning space equitably and socially is that for political representation which, by definition, is required to reflect the views of constituents in a fair and impartial manner which means that it should capture, as far as possible, whole communities rather than split them across constituencies and thereby dilute their voices. This, of course, is only one requirement amongst others and a balance and fair compromise needs to be reached where they conflict. In the U.K. local authority boundaries are set by the Boundary Committee, an independent organisation set up by parliament to, amongst other things, set fair boundaries for local government elections. The Committee is concerned with three primary criteria: equality of representation, providing for convenient and effective local government and reflecting community identities and interests. An important element of this process is the identification of

communities and the setting of boundaries whilst at the same time endeavouring to provide electoral equality, in the sense of each elector having a vote of equal weight, which is a fundamental democratic principle. In practice, the Boundary Committee consults with all interested parties and also visits the area being reviewed. Recognising that each area has a different geography and resident population the Boundary Committee tries to set boundaries which are co-terminus with other relevant electoral geographies where the electoral unit under consideration is part of an electoral unit hierarchy. In this area the Committee follows the general guidance on Community Identity furnished to them by Chisholm and Dench (2005) which concluded that communities were best defined on the ground by their cores and that boundaries between them should be set such that they caused least injury to the distribution of local communities but in accordance with understood boundaries, that is, main roads, rivers, railways and open spaces where these divided people as distinct from unifying them. In the end, having consulted widely, the Committee makes a judgement on what it regards as the best fit of boundaries to community identity within the size constraint. There is an implicit assumption that the present wards have a community-identity validity that, in fact, may not be deserved in that each local authority has its own view of what community identity means for them which may have no theoretical basis and could exist more from inertia than any reality. Having regard to the above, clearly the existing boundaries are extremely important and good reason and advocacy is required to change them. In this regard the units become self-reinforcing through use in that the administration of areas is tied to wards, which gives them a reality because of this fact, over and above any underlying differences in community identity. In support of this view, it can be noted that the population of London has radically changed in its demographic nature over the last forty decades – for example, in the London Borough of Brent the percentage of the population of BME (Black and Minority Ethnic) groups make up 55% of the population, 2001 census, whereas in the 1960s BMEs formed only a small minority, yet the boundaries of the local authority area and constituent wards has not changed radically, suggesting that the newer immigrants fitted into the existing community geography, or that the current administrative geography is inappropriate, both conclusions being interesting in their own right: the idea that new immigrants slotted in to the existing community geography suggest that the built environment greatly influences community geography, whilst the second explanation suggests a high degree of administrative inertia in re-assessing community geography. However, it is important to note that nowhere is community identity defined.

Communities and Administration. This vagueness over community identity becomes far-reaching as a consequence of its encapsulation in the make-up of wards, because many administrative divisions are based on wards. Wards have historically been the spatial unit most widely used for organising and managing services in a socially-oriented way, largely because their design has been based on capturing communities, a

large amount of statistical information is available at this geographic level and the entire U.K. is covered. However, for some time there has been dissatisfaction at the coarseness of this statistical information and the inadequacies of wards to capture smaller scale communities, particularly with regard to deprived areas (Doncaster NHS Public Health Intelligence Unit, 2003; Harris & Johnston, 2003), resulting in the establishment of Neighbourhood Statistics providing a greater range of data at a finer scale than the ward. The most robust and freely available data is at the Census output area scale and this data has been extensively used for the identification of neighbourhoods and communities, often without the rationale for accepting the suitability of these data unit boundaries, as representing the delimitations of neighbourhoods, being explained (Sampson, Morenoff, & Gannon-Rowley, 2002; Tunstall, Lupton, Kneale, & Jenkins, 2011). It is often the case that combinations of output areas, based on their homogeneity on some criteria, are adopted as representing neighbourhoods and socially-meaningful spatial units (Martin, 2004). It should be noted here that output areas nest within wards. More frequently, nowadays, geodemographic classifications of postcode data are utilised for services provision. Whichever of these methods guides services provision the important point to note is that they are based on some criteria of social homogeneity and size. Size is a critical factor in management and service provision. Some services need a threshold population to warrant the provision of their service and this requirement may not fit well with social patterning on the ground.

Sampson, Morenoff, & Gannon-Rowley (2002) and Lupton (2003)(Lupton R. , 2003) recognise the 1987 seminal work of W.J. Wilson, who identified the existence of a ghetto underclass disadvantaged by living in poor neighbourhoods, as spawning the study of the structural dimensions of neighbourhood disadvantage, especially the geographic isolation of the poor (Sampson & Wilson, 2005). From this time a large number of works have investigated neighbourhood effects (Leventhal & Brooks-Gunn, 2000; Pickett & Pearl, 2001; Rajaratnama, Burkeb, & O'Campo, 2006) and, in the U.K., neighbourhood deprivation and social exclusion (Kleinman, 1998; Smith G. , 1999; Atkinson & Kintrea, 2001).

The U.K. neighbourhoods of area based programmes established to tackle these geographic inequalities were initiative specific in terms of numbers of households/properties/people covered. In general the neighbourhood definitions used for these programmes owe their origin to the neighbourhood unit model and the definition of Jones described above. For example, the size of areas of area based programmes, as determined by Tunstall and Lupton ranged from neighbourhoods of 1,000 households (New Deal for Communities) to whole Districts, such as Leeds with over 300,000 households (Neighbourhood Renewal Fund) (Tunstall & Lupton, 2003, p. 3). In these area initiatives neighbourhoods have been defined not only by size but also by some form of deprivation eligibility criteria. The Social Exclusion unit's definition

(Social Exclusion Task Force, 2001), as with the definition of neighbourhoods presented in regard to the government's neighbourhood management programme under the auspices of the Neighbourhood Renewal Unit, are general in nature, utilising some of the characteristics of the neighbourhood unit, but shy away from presenting any theory or clear definition. For example, the latter presentation, which concerns itself with deprived neighbourhoods, embraces defining neighbourhood physically, defining them in regard to individuals' identity with the area, also in terms of social composition, social relationships, social contracts, colloquial reputation, disposition of services and facilities, physical size and constituent population, and is so all inclusive that almost any small area would qualify:

“A neighbourhood is a delineated area within physical boundaries where people identify their home and where they live out and organise their private lives. However different residents and organisations will not always agree on the actual boundaries, as neighbourhoods are fluid, reaching out as well as in. However, the boundaries of urban neighbourhoods are often clear, if unwritten. There are both physical and psychological barriers between neighbourhoods such as a road or the tenure of the housing, or the social composition of residents. Some neighbourhoods, particularly near urban cores, with good transport links, are mixed socially and in property values. But most neighbourhoods are recognised either as ‘better off’ or ‘poorer’. More mixed neighbourhoods are often ‘going up’ or ‘down’, rarely static. Neighbourhoods share many characteristics with an onion. The inner core is tightly drawn. In this core the home, immediate neighbours and security are paramount. Around this core, are the neighbourhood environment, shops and schools. The outermost layers can reach into adjacent neighbourhoods, the city centre or city rim for jobs, friends, relatives and wider services such as leisure. A recognisable urban neighbourhood for social and management purposes is rarely more than 5000 households (the size of a large ward) and often much smaller with around 1000-2000 households, up to 6000 people. According to Peter Hall, it should be possible to walk across a neighbourhood in fifteen minutes or less – about three-quarters of a mile⁸. There is no absolute size of urban neighbourhoods. But neighbourhoods are complex, ill-defined areas that require clear definition and boundaries if their management is to be effective. There is a strong social component to neighbourhoods. People connect with their neighbours in many, often unspoken ways – security, cleanliness, the environment, social behaviour, networks and conditions, access to basic services such as schools, doctors, transport and shops. Neighbourhoods provide important supports, particularly to families with children and more elderly residents. They can therefore also undermine that support if conditions are not maintained. The quality of a neighbourhood's physical and social environment

⁸ Professor Sir Peter Hall – Evidence on Urban Neighbourhoods presented to the Urban Task Force, 1999.

determines its value and status, the competition to access homes within it, the quality of services provided and how much people are willing and able to pay to live within it. Who lives in any area is a powerful determinant of both neighbourhood quality and property values. Therefore it is a circular process, with conditions influencing behaviour and behaviour influencing conditions. Poorer neighbourhoods invariably experience poorer conditions and lower property values. The quality of services tends to reflect this, but also helps determine it.” (Power, 2004, p. 2)

This is not to deny the individual relevance or validity of any of these qualities but to reveal the lack of robustness in the definition and the absence of theory, leaving the areas so defined open to the question as what, precisely, it is about them that constitutes a neighbourhood. It is this lack of precision in the theory and methodology of delineation that prompted another member of the same research body to declare that the validity of findings and results coming from neighbourhoods defined in this way may be misleading (Lupton, 2003).

Nevertheless, services need to be provided spatially but where these services do not involve a social component they should be regarded as implying small territories rather than neighbourhoods which, at minimum involve both space and society. Where service provision and administrative management involve both territory and society, yet have a size or eligibility criterion, the neighbourhood or community should be built up from the basic building blocks of neighbourhoods i.e. qualifying residences.

Currently, there are two observable themes within neighbourhood planning, seemingly polarised. The first is what has come to be called the New Urbanist movement which sets out unapologetically to create social neighbourhoods through architecture and neighbourhood planning using the Neighbourhood Unit concept as its inspiration. With this emphasis on design and planning these developments are associated with comfortably-off purchasers who buy into the concept of neighbourhood and, perhaps, in so doing bring it about (Talen, 1999).

The second is what can be called ‘smart growth’ which is informed by social justice, the experience of spatial social problems, such as the race riots in northern Britain in the 1990s, the need to accommodate a growing population and make efficient use of the existing infrastructure, and sustainability ambitions. The most explicit example of this type of planning is to be seen in the London Plan which identifies areas of high growth and population density around nodes of good public transportation whilst simultaneously protecting the historical areas and maintaining appropriate population densities in accordance with the status of the various parts of the city (London, 2008). In this view community is still centred on the idea of the village, with London being called a ‘City of Villages’, a homely, cosy description.

Within cities new neighbourhoods fall into two categories: high density private developments and social housing developments. The former seeks to create a protective environment for residents, as personal safety warrants a premium price, and one way of doing this is to create an exclusive development which, in practice, means a white, middle class entity with some statutory social housing. The social housing is kept physically separate and, as Butler and Robson found (Butler & Robson, 2001), the two social groups have minimal interaction, thus the developments, whilst built in physical proximity nevertheless result in social distance. The second category within cities is that of social housing development; here the objective is socially integrative housing but with a socially distinctive clientele. Thus, in London for example, there is a significant social divide between social housing and private, and within private housing social stratification is achieved through cost of property. Neighbourhoods emerge and evolve from the original location and style of housing and also according to planning policies. For example, Hampstead Garden Suburb was designed by Parker and Unwin as the foremost example in Britain of the implementation of the principles of the Garden City movement: beautiful architecture, low density housing, social diversity and neighbourhood planning (Hampstead Garden Suburb Trust, 2006). However, over time it has become an enclave of the privileged as leasehold reform removed the control over ownership which had assured some degree of social diversity, and the whole became subject to the freedom of the property market. What was designed as a social experiment has transformed into an exclusive area where property cost and physical isolation has created a protected, closed society. This is a very distinctive neighbourhood with many of the qualities which are deemed laudable: good quality housing, beautiful architecture, low density housing, abundant open space, conservation area status with many historically listed buildings, a Trust which oversees the protection of the area, and an active and engaged residents association. It is also an area of wealthy residents with a distinctive social profile contrasting with surrounding areas, such as Barnet, Cricklewood and Golders Green.

This filtering of people into socially distinctive neighbourhoods is based on housing and its location. Hampstead Garden Suburb, although a prime example, is not unique. In this paper's study areas there are also examples: Queen's Park in south Brent and Northwick Circle in north Brent are two areas which have followed the pattern of Hampstead Garden Suburb though they were not built according to any grand plan of the Garden City movement. Both Queen's Park and Northwick Circle are conservation areas of good quality housing, physically remote from busy transportation and shopping nodes. As a result they are neighbourhoods of expensive housing relative to the surrounding areas, again with socially distinctive residents. These neighbourhoods are one end of the social spectrum, with planned social housing communities towards the other end, as exemplified by the South Kilburn Regeneration Area (in south Brent) where the 1960s housing was built as part of the 'slum' clearance of poor quality mass Victorian housing

and which has itself fallen into disrepair with attendant social problems arising from the high density housing of low socio-economic status families. Thus the status of property quality, ownership and tenancies are often distinctive on the ground, as noted by Webster, and consequently different neighbourhoods can be distinguished on this basis, though no examples of this approach of identifying neighbourhoods were identified.

On a national scale planning policy seeks to counter economic filtering to encourage balanced communities and neighbourhoods and to discourage the squeezing out of the middle class from inner cities. At the local level planning decisions such as assigning an area conservation status, or Home Zone status – indeed any unifying initiative fostering common identity - encourages cohesiveness in an area, so forming the basis for residents to act as a social force – the latent neighbourhood network of Sampson, discussed below.

Though no examples of defining neighbourhoods by property type and ownership were revealed the distinction between areas on these criteria is just about the most salient feature lying at the heart of different neighbourhoods. All gentrification studies, for example, have property as their core material though usually the research focuses on social dynamics. A practical example is that of Marsh Farm in Luton, a regeneration area based on a 1960s estate on the edge of the town, which was embroiled in political controversy as residents organised themselves into an active political unit based on their common residency, forming a social pressure group to realise local aspirations which gives life to the neighbourhood concept in all its various aspects (The Guardian, 2008). Others see neighbourhood as the natural political unit which should control its own destiny (Social Ecology, 2009). Perhaps the discrediting of spatial determinism in the past has discouraged a thorough examination of the impact of planning policies on social outcomes, though the deliberate housing policy of creating mixed social environments by mixing housing types, discussed in more detail below, the popularity of New Urbanism and the creation of ‘common interest developments’ illustrate the practical realities of planning measures and their contribution to the social constitution of neighbourhoods.

The provision of services, the administrative aspect of planning, often obfuscates the definition of neighbourhood by assigning the colloquial understanding of the word to any small area which administrators want to convey as having a warm, friendly connotation, thus we have neighbourhood policing, neighbourhood consultation, neighbourhood cultural activities, and so on. This is not to invalidate this vocabulary but simply to illustrate the confusion introduced, where the neighbourhood in question may not relate to any clear understanding of neighbourhood and where, for example, the neighbourhood of police administration bears little resemblance to the neighbourhood of resident consultation although they are both applied in the same locality.

Until there is a clear conceptualisation of neighbourhood and neighbourhood policy it can be expected that planning will not co-ordinate the impacts and consequences of various planning measures at the neighbourhood level and, as a result, policies will be less efficient and less than optimally targeted. Planning puts the theory of neighbourhood into practice and it is surprising that local authorities, as the main consumers of neighbourhood planning, have mostly shied away from defining neighbourhoods in their jurisdiction.

One local authority, Plymouth, has defined its own 'natural' neighbourhoods as part of its Local Strategic Partnership strategy, the nearest planning concept to neighbourhoods, utilising natural features such as roads, parks, rivers, etc., as the neighbourhood boundaries, a size constraint of 2,000-2,500 households, and existing regeneration initiatives and consultation, even producing its own index of deprivation using these neighbourhoods (City of Plymouth, 2008). Unfortunately, the available documentation is unclear as to precisely how these neighbourhoods were constructed. It would appear that lower level super output areas were used as the basis for them, though how the boundaries of the natural areas were reconciled with the census geography is not presented, nor how the size constraint relates to local communities, or who was consulted in their determination. The rationale presented for the construction of the neighbourhood map is that the census geography is mainly for the benefit of central government, and that super output areas do not reflect natural neighbourhoods, though the latter are undefined save by their boundaries. Curiously, there appears to be no reconciliation between the neighbourhood geography and census/statistical geography and statistics for neighbourhoods are apparently approximated from 'best fit' census geography to the local neighbourhood map (SERIO, 2008; City of Plymouth, 2009). This example illustrates the difficulties of 'squaring the circle' between the boundaries of neighbourhoods as understood on the ground with the boundaries of statistical reporting units, in this case Census lower super output areas.

Functional and planning neighbourhoods are by their nature practical neighbourhoods; the favouring of practical convenience and statistical data over developing theoretically informed neighbourhoods renders them less efficient and effective than they could be.

3.3.4 Neighbourhoods and the Individual

The third category of neighbourhood definitions is that based on the individual's view of neighbourhood. These are referred to as the cognitive and affective dimensions of neighbourhood and are concerned with two broad areas: the individual's perception of his/her neighbourhood and sense of place and, secondly, the individual's identification with their neighbourhood. This category covers many facets of human perception, cognition, attitudes and motivation – Davies and Herbert, for example, identified 15 dimensions with several subdivisions (Davies & Herbert, 1993, p. 36) – which itself

causes immediate problems for trying to delineate neighbourhoods as there appears to be no consensus on which are the most important, or the relative weights of them in a mix of variables. Indeed, some human geographers have emphasised the need to consider all of these elements together: “Places are not abstractions of concepts, but are directly experienced phenomena of the lived world and hence are full of meanings, with real objects, and with ongoing activities.” (Relph 1976, quoted in Davies and Herbert, 1993, p. 101).

For the geographer trying to map neighbourhoods on the basis of the strength of any of the affective or cognitive dimensions there are several practical difficulties, over and above the conceptual difficulties. As already referred to, there is the difficulty of deciding which dimension to select as the defining criterion for neighbourhood: is it territorial marking, cognitive mapping, safety, sentiment, for example, or a combination of these and many others? Having decided the metric for defining neighbourhood there is the practicality of collecting a sufficiently large and representative sample of individuals to enable an appropriate area to be covered and to enable the researcher to meaningfully answer the question: ‘whose neighbourhood – the housewife’s, the adolescent’s, the elderly persons, the young professional’s or some other group’s?’. The experience has been that these studies are very partial in that they do not comprehensively cover all parts of the environment nor do they adopt an holistic view of those parts which are included. Because they are composites of individuals’ responses they are data-intensive and are invariably idiosyncratic in methodological terms; consequently, they are case studies possessing considerable complexities for generalising to other areas or other social groups. By their very nature they are representing peoples’ responses to their environments rather than the environments themselves. Accordingly, much may be learnt about the human elements but there is little component of neighbourhood in respect of the physical environment, or of the interplay between the two. Arising from this assessment of individuals’ perceptions of, and response to, place is the lack of insight into the meaning of neighbourhood for the target individuals – their phenomenological interpretations of the concept – and also a composite picture of what a neighbourhood is. To illustrate these issues four studies are examined; the first dates from 1968 and was a study of the urban neighbourhood unit relating housewives’ perceptions of their neighbourhoods and their behaviour to the local environment (Lee, 1968); the second dates from 2002 and is an extensive investigation of neighbourhoods and families in the Los Angeles area (Rand Corporation, 2009), the last two studies are from Israel and relate peoples’ perceptions of their neighbourhoods to racial segregation (Omer & Benenson, 2002; Schnell, Benjamini, & Pash, 2005).

Lee (1968) produced an interesting study endeavouring to join the social elements of the neighbourhood with the physical elements by a phenomenological approach.

Housewives were asked to draw a map of their own neighbourhood and to describe in detail their behaviour in the immediate environment. The mental representation of the physical-social space was termed a 'schema' and Lee showed that the size and composition of the schemata were a function of the physical environment and the characteristics of the person.

Lee's conclusions were that the neighbourhood schemata were always smaller than the ½ mile radius locality, this being a function of perceptions of the socio-spatial schema as an organized whole – the analogy was drawn with memory-span. Lee's particular interest was the neighbourhood as a planning unit and he presented one of the first attempts at bridging the planning duality of neighbourhood by investigating social behaviour and the physical qualities of the local area. This was a pioneering piece of work in investigating personal neighbourhoods. Above all else, perhaps, it demonstrated that personal neighbourhoods could be mapped, with qualifications and limitations. However, Lee's paper also highlights the difficulties of this approach to neighbourhood research: it is extremely resource-intensive and the results may not be portable to other geographic areas or generalisable. The results are for a specific sampled population at a certain time in a particular location and once that sampled population changes in demographic characteristics then the neighbourhoods derived no longer apply. Similarly, there is doubt whether the same housewives would have drawn the same boundaries for their neighbourhoods if they had been re-interviewed a few months later, for nobody knows how fluid or set are peoples' neighbourhood boundaries. Inevitably, neighbourhoods determined by this methodology are particularly unstable over the long period in response to socio-demographic changes and this is one of the prime difficulties in defending the integrity of such neighbourhoods, although Pacione's study of a part of Glasgow showed consistency of perceived boundaries over a 5 year period (Pacione, 1983). This qualification applies to any neighbourhoods based upon the characteristics of the population, whether constructed individually or in aggregate. By definition this approach to neighbourhood delineation precludes incorporating aspects of the physical environment as part of the defining process in anything other than the pioneering light touch manner of Lynch and Lee. Although Lynch's work in particular has had a significant impact on urban design, such that 'legibility', 'sense of place', and 'place identity' are central to U.K. urban design guidelines, no neighbourhoods have been delineated using these criteria for their definition.

Though Lee noted some common areas to a number of housewives' neighbourhoods, which he termed 'consentaneity', he did not develop this idea to create commonly-agreed neighbourhoods. In fact, he cast doubt on the very nature of 'neighbourhood' being anything more than a "cognitive organization" by which individuals make sense of their surroundings. (Lee, 1968, p. 248) The suggestion here is that 'cognitive organisation' neighbourhoods would, presumably, be of a relatively uniform size

dependant on the ability of each individual to ‘make sense’ of the physical environment, which would tie into Lynch’s work on legibility. This is an interesting and pertinent speculation that appears in subsequent neighbourhood studies, as in the following two Israeli studies, and in the concept of *sliding* or ego-centric neighbourhoods – an area around each residence – but no theory supporting the size or shape of the respondent-defined contextual neighbourhoods has been advanced and they may well be inherently unreliable: “resident-perceived boundaries (what individuals want them to be), and to a greater extent resident-reported boundaries (expressed to others, e.g., during a survey), may not reflect true local exposure areas.”(Chaix, Merlo, Evans, Leal, & Havard, 2009)

In contrast to Lee’s asking respondents to draw their neighbourhood boundaries on a map, a large-scale investigation of neighbourhood effects in Los Angeles, the L.A. FANS project obtained respondents’ conception of their neighbourhoods by selecting a geographical size and location from a set menu of 4 choices (Rand Corporation, 2009).

The L.A.FANS approach to defining neighbourhood for their study was to take the census tract as the basic unit for statistical information and for determining the sampling framework. The survey interviewed 3250 respondents from 65 neighbourhood census tracts (from a population of 1600 eligible tracts in the Los Angeles County), the number of sampled tracts being determined by the requirement of 50 interviews per sampled tract for statistical rigour of the survey design. The 65 census tracts were put into 3 strata based on the percentage of the tract’s population in poverty (Very Poor, Poor and Non-Poor), with a 20: 20: 25 census tract interview split between them. The probability for sampling of both the selection of the tracts, and the selection of block groups within the tracts, were weighted: by size to determine the number of blocks in the tract to be sampled, and by population for which blocks within the tracts. (Sastry, Ghosh-Dastidar, & Adams, 2006)

Neighbourhood social capital data from respondents was supplemented by Systematic Social Observation (SSO) of block faces where respondents lived and a comprehensive GIS database of area vital statistics. The objective is to permit researchers “to study the determinants of neighborhood social, physical, demographic, economic, and service environments as well as their effects on a variety of individual behaviors and outcomes.” (Sastry et al, p.1004)

Based on theoretical models of the social environment influencing individuals’ lives in terms of the family and home, child care, school, peer environment, work community and volunteer groups the study also investigated the effects of the residential neighbourhood. L.A. FANS builds on social disorganisation theory and related ideas from the social ecology of urban areas developed in Chicago in the early 20th century. Several models underpin the approach adopted: the Collective Efficacy model, whereby the common values of the residents are realised and expressed to maintain social control

through the mechanisms of trust and solidarity; the Collective Socialisation model– the monitoring of children by role model adults; and the Social Capital model, based on dense and overlapping social ties amongst neighbourhood residents who not only hold one another to account for actions but also provide a support network.

The theoretical framework of the L.A.FANS project drove the collection of data. Extensive information was collected on both family and neighbourhood environments. In addition, data was collected on neighbourhood change, residential mobility and the potential impact of neighbourhood characteristics on individual outcomes. With regard to the neighbourhood itself the study took “an open-ended approach to neighbourhood definition” (Sastry, et al, P1004), using census blocks and tracts as the basis for the sampling frame and utilising the census data from these units, as well as collecting data on respondents’ perceptions of neighbourhood size, characteristics and key places visited. The census tract and block units are regarded as building blocks for researchers to reconfigure neighbourhoods according to their own definition.

In terms of the neighbourhood this project makes several important contributions. Firstly, the study has been conducted on an unprecedentedly large scale: the whole of Los Angeles County was the study area, covering over 4000 square miles and a population of about 9.5 million in 2000. No neighbourhoods in Los Angeles County were excluded. Secondly, the study has been conducted in two waves, providing important snapshots of neighbourhood environment characteristics themselves as well as the perceptions of respondents about their neighbourhoods, thus enabling comparisons to be made. Thirdly, it is a stratified random sample of census tract and block groups designed to ensure that results are statistically meaningful and representative. Fourthly, that the study was designed to answer accepted, theoretically-informed questions about family and neighbourhood effects. Fifthly, that the study was undertaken in Los Angeles County, an area regarded as representative of urban sprawl in general and of the postmodern city.

Ambitious as the project undoubtedly is, from a geographical point of view there are some questions about the understanding and definition of the neighbourhood which warrant closer examination. The use of census tracts and census blocks for the design framework and for providing data raises the question as to what is the fundamental theoretical understanding of the neighbourhood. The study’s authors say “We used census tracts for purposes of sampling because they were developed to represent neighborhoods (with no cross-cutting natural or man-made boundaries) and have approximately the average population size that other research suggests residents include in urban neighborhood definitions” (Sastry, Pebley, & Zonta, 2002, p. 4). The history of the development of U.S. Census geography (Batey & Brown, 1995; U.S. Census Bureau, 2009) supports the general picture that census tracts were designed to encapsulate neighbourhoods on socio-economic criteria but it is an unknown whether or

not this historical association was ever a strong association and if it is still valid today. To an unknown extent then the rationale for the sampling framework is in question in that the selection of census block groups within the stratification of census tracts, on the basis of poverty, may have produced a different selection of block groups if the poverty ranking was not first ordered by census tract. In addition, the theoretical justification for accepting the supposed socio-economic homogeneity of census tracts as being neighbourhoods is not presented nor is there an exposition describing the social processes generating this socio-economic homogeneity which surely have direct and fundamental relevance to neighbourhood effects. It is a central thesis of this paper that economic filtering of the population via cost of housing is the main explanatory variable determining residential patterning and that this underlies spatial socio-economic homogeneity. Whilst the L.A.FANS study acknowledges the significance of residential neighbourhoods (p.1003), the residences themselves are not identified as being a prime explanatory factor of spatial patterning. To what extent the type of housing coincides with blocks, block groups and census tracts in Los Angeles County is unknown.

The study's investigation of respondents' definitions and use of neighbourhood also raises some interesting queries. Question B2, the question to respondents asking them to define their neighbourhood, was: "When you are talking to someone about your neighborhood, what do you mean? Is it (1) the block or street you live on, (2) several blocks and streets in each direction, (3) the area within a 15-minute walk from your house, or (4) an area larger than a 15-minute walk from your house." (Rand Corporation, 2000)

The authors recognise that this question "has significant limitations" in that respondents are not asked to describe their neighbourhoods' boundaries in words or draw them on a map, in addition to the question itself not specifying clear-cut boundaries and therefore being open to interpretation. Particular confusion must exist between option 2 and options 3 and 4 which, given that an average block can easily be 0.3 Km in length, suggests that there must be extensive overlap here. The justification for using the 4-level definition of neighbourhood is that "the question is much simpler for respondents to answer, does not require map-reading skills or extensive spatial memory, and has been included in a number of other large scale surveys, presumably because it provides an idea of the respondent's idea of neighborhood size without taking much interview time" (Sastry, Pebley, Zonta, 2002, p.5). The authors do not specify the pedigree of the question, though it is likely that the origin is (Suttles, 1972), though it is clear that Suttles' descriptions are of social units whereas the L.A.FANS question is distance based. A 15 minutes walk has been regularly used in sociology as a rough and ready means of defining 'local' (Lock 1948, quoted in Lee, 1968; Sampson & Groves, 1989). However, postmodern Los Angeles is a distinctly different city from cities like Chicago - which was an important rationale for closely examining respondents' views on, and

behaviour in, the neighbourhood - and asking such a leading question and shoe-horning answers into the pre-determined four scales could be seen as a missed opportunity to discover possible differences arising from the nature of postmodern neighbourhood life. Similarly, side-stepping the difficulties of obtaining respondents' spatial definitions of neighbourhood and substituting this process with a cafeteria-style option of responses calls into question the validity of those responses and any conclusions arising from them. This approach is in contrast to that suggested by some of their supporting references: Guest and Lee found that size of respondents' neighbourhoods was related to whether they viewed the neighbourhood in question as being a social unit or an institutional unit (Guest & Lee, 1984), whilst Lee and Campbell recommended researchers to investigate what their interviewees understood by the term 'neighbourhood'; they found that their respondents understood neighbourhood in the following categories: i).demographic, ii) symbolic iii) physical with over 90% describing neighbourhood in territorial terms (Lee & Campbell, 1997).

The authors view the neighbourhood, from a resident's perspective as "best described as a relatively close area with fuzzy boundaries that may expand or shrink depending on context and personal experience." P.1004. Consequently, despite the abundant statistical analyses, the results presented must be treated as being imperilled by the uncertainty surrounding precisely what respondents meant by the use of the term 'neighbourhood'. Given that this study was carried out in two waves the problems of neighbourhood definition are greatly compounded when one set of imprecise definitions are compared to another set of imprecise definitions and results drawn from this comparison.

The most serious limitation of this study, in terms of the neighbourhood, lies with the poor conceptualisation of the neighbourhood. The design of the study really treats the understanding of neighbourhood as little more than a vague idea that it is the immediate area of daily living space. Even if this limited concept is taken, the authors fail to bring out what guides or shapes these daily spaces: are they housing projects, street patterns, racial patterning, gang territories, school zones, authority controls, transport facilities, shopping areas or physical barriers to movement? These factors are important, for what underlies these influences on daily spaces and movements are likely to be instrumental in impacting on an individual's life and quality of life i.e. neighbourhood effect.

Ego-centric Neighbourhoods. In recent years the Department of Geography and Human Environment, Tel Aviv University, has conducted three studies of particular relevance to defining neighbourhoods according to individuals' perceptions of them (Omer and Benenson, 2002; Schnell and Benjamini, 2004; Schnell, Benjamini & Pash, 2005). The first study, published in 2002, compares segregation between Arabs and Jews at the scale of house, home area and residential area. The 'home area' and 'residential area' are defined by interviewees, respectively being the areas where they have a sense of "being at home (area)" and "...the area around your house which you

had considered when you looked for an apartment.”, the latter serving as a surrogate for ‘neighbourhood’. Having determined the average size of these areas for the sampled population, individual and customised statistical units were created by merging, firstly, houses adjacent to the target house as the first-order unit, then houses adjacent to the first order unit (including the first order houses) to create the second order unit, and so on until a unit of comparable dimension to the average Home Area has been created and then, subsequently, a unit of comparable size to the Residential Area. The authors used Local Indicators of Segregation to overcome the Modifiable Areal Unit Problem.

Firstly, they identify the Modifiable Areal Unit Problem (MAUP) which can significantly distort conclusions reached with one set of data when the same data are considered at a different scale. Secondly, the authors note the 'ecological problem' where, based on aggregated data, any description of constituent individuals means an 'average representative' of that aggregation. Thirdly, they identify the difficulties of comparing aggregate data with that collected from individual surveys. Omer and Benenson suggest that aggregate and individual sources of data are responsible, in part, for the dichotomy between the humanist-structuralist and positivist approaches in human geography and describe the difficulties of co-ordinating aggregate data with individual data, and even of utilising individual data which has been geo-referenced to an administrative unit. They suggest that aggregated data is of virtually no use for studying individual affective considerations such as sense of place, attachment and home area - data which is collected by individual survey. Clearly, this methodology can only be applied to neighbourhood studies where appropriate individual-level data is available to create aggregate aggregations.

Undoubtedly this is an innovative approach to overcoming the MAUP, for creating aggregate spatial units, and for relating “high-resolution census data, the built-up environment, and residents’ subjective knowledge of the social and physical environment in the vicinity of their homes.” (Omer & Benenson, 2002, p. 44), but there are attendant difficulties: the determination of average neighbourhood sizes for the Home Area and Residential Area has no theoretical underpinning, unless it relies on Lee’s socio-spatial schema which itself was undeveloped; it also assumed that the neighbourhoods would conform to a regular growth by adjacencies of property, which seems an unsafe assumption; there is the questionable reliance of mapping neighbourhoods based on verbal guidance and this is questioned further when observing that the mapped neighbourhoods (Omer & Benenson, 2002, p. 58) appear remarkably spherical when reason would suggest that interviewees would describe their neighbourhood boundaries in terms of streets and blocks which are rectilinear. As the authors acknowledge, this statistical approach to neighbourhood analysis is very data intensive even though only a small number (36) of interviews were conducted covering a small area of Tel Aviv.

This research points to a means of marrying individual data with aggregate data without encountering the MAUP or the *ecological fallacy*, and thereby incorporating subjective data with objective aggregate data and bridging the gap between the humanist-structuralist and positivist approaches to neighbourhood studies. However, this technique is only possible where comprehensive detailed and relevant data is available for all dwellings in a study area and therefore its application is restricted to those territories where such data is collected and made available.

For all of the difficulties mentioned above no studies have been conducted taking a whole town or city, save that conducted by Schnell, et al, in Tel Aviv-Jaffa in 2001 (Schnell, Benjamini, & Pash, 2005), the second study. Building on earlier work which defined neighbourhoods based on resident perceptions of boundaries, main routes and major landmarks, after Lynch, this study used a sample of 992 telephone interviews across the 30 sub-quarters of Tel Aviv-Jaffa to construct over 500 polygons (54%) representing respondent neighbourhoods. By a graduated process of merging common spaces between the polygons the authors were able to distinguish the average percentage levels of common spaces between the participant merging polygons and they constructed a map of Individual's Sense of Neighbourhood at 0%, 40% 70% and 100%. The overall conclusions that the authors drew were that the local media shaped people's perception of their neighbourhood and that there were no significant socio-demographic characteristics distinguishing those groups who either did not regard themselves as living in bounded neighbourhoods (46%) or, of those perceiving themselves as living within a neighbourhood, for whom the relevance of their neighbourhood was unimportant in their daily lives (29%) or was seen in terms of as a place for shopping (23%), residential status (12%), community (9%) or a combination of them all (27%). The research concluded that even in areas of high ethnic diversity, in which formal definitions of neighbourhood names are widely recognised, all neighbourhoods are only marginally perceived as cohesive territorial units.

This study is interesting in its application of Lee's methodology of asking people to mark-out their perceived neighbourhood boundaries within an entire city – the only study discovered so to do - and for its use of a gradation of respondents' common-neighbourhood perceptions, a technique which matches the 'degree of presence of neighbourhood' introduced by Galster in his discourse (Galster, 2001, p. 2113). However, a serious limitation of this exercise has to be the practice of establishing residents' delineation of neighbourhood boundaries via a telephone questionnaire, which requires the respondent to have an extensive knowledge of the locality to be able to name features and streets (Pacione, 1983, p. 70). How were hesitant respondents handled; did the interviewer prompt, make suggestions or 'clarify' matters? There surely is a real skill in accurately transferring a verbal description of boundaries onto a map where the respondent is anything other than crystal clear in precisely naming the

boundary. Like the L.A. FANS study, this research seems to be relying on the open-ended nature of the concept of neighbourhood to produce meaningful and reliable results, whereas others have encouraged fellow researchers "...not to abandon the practice of building clarifications of key geographical terms into questionnaires or interview schedules." (Lee & Campbell, 1997, p. 934).

The paper does not provide detailed information on the interview questionnaire to be able to comment on the suitability or otherwise of the portability of this methodology to other areas but, even so, the conclusions reached are interesting and far-reaching; for example, does the general absence of a sense of neighbourhood indicate that neighbourhoods have more relevance for planners and administrators than for residents, and what does it say about community? (Winter, 2000)

Surprisingly, defining neighbourhood by investigating individuals' conceptualisation of it has not yielded universally satisfactory results, mainly because there is no common agreement as to which measure should be used to capture the diversity of interpretations of neighbourhood and how that can be translated into a technique for mapping it or, indeed, who is representative of the residential population. At the same time very few studies have investigated whether the common areas of individuals' neighbourhoods in the same area constitute a neighbourhood as it is generally understood, and what it is about this common neighbourhood that makes it a neighbourhood; in other words what is it about neighbourhood that individuals perceive as its nature? Similarly, there has been no evidence comparing neighbourhoods defined from composites of individuals' perceptions compared to statistically homogeneous neighbourhoods; are they the same?

Methodology is only slowly advancing from Lee's approach of asking people to indicate what they understand to be the extent of their neighbourhood with the most recent study of adolescents' and parents' subjective neighbourhoods using analysis of qualitative interviews (Campbell, Henly, Elliott, & Irwin, 2009). There does appear to be agreement as to the spatial order of urban society: dwelling (home), building, block, neighbourhood, district, town/city (Suttles, 1972; Galster, 2001; Webster, 2003; Lewicka, 2009) as well as considerable agreement as to the indicators of neighbourhood: residential duration, age, home ownership and family status (Guest & Lee, 1984; Talen, 1999; Winter, 2000; Galster, 2001; Grannis, 2005; Lewicka, 2009); yet there is a dearth of research on the spatial behaviour of these groups (Chisholm & Dench, 2005). Given the availability of GPS systems, remote sensor devices, location-based monitors and numerous tracking devices it is now possible to investigate in detail peoples' use of local facilities, their spatial movement and time spent at various locations and whilst this development of Hagerstrand's time-space geography (or 'geo-ethnography', as its application to the study of people in the urban environment is termed) has begun it is still in its infancy, but over time it should provide a wealth of data for neighbourhood delineation (Foley, 1950; Mei-Po, 2002; Matthews, Detwiler, &

Burton, 2005; Cummins, 2007; Wiehe, et al, 2008). To date though this methodology of delineating neighbourhoods has yet to convincingly demonstrate that the resultant neighbourhoods are the product of residents' personal knowledge and use of the local area rather than simply reflect the presentation of the neighbourhood by local media and local agents of property and administrative services, and therefore warrant the commitment of resources needed to determine them. The limited evidence at hand suggests that this is not as fruitful a route for investigating the nature of neighbourhoods than those presented below.

The literature on neighbourhood delineation revealed two basic approaches. The first is to determine the spatial extent of individual neighbourhoods. The second approach is to try to establish the geographical area of a common or natural neighbourhood for a group of people. Ultimately, the two approaches could, theoretically, be reconciled by aggregating the neighbourhoods of individuals which should accord with the neighbourhood of the group to which the individual belongs.

This category of neighbourhoods appears to be poised for significant advances in the near future as a result of increased research into neighbourhood influences on individual health outcomes, and technological developments in monitoring peoples' movements and use of the neighbourhood.

3.3.5 Aggregate Neighbourhoods

Chisholm and Dench's review of neighbourhood literature noted that the idea of a local community implies that it has a sense of shared identity and that it is more than simply the population of an area. The authors note that because communities are social constructs, their boundaries are often imprecise (Chisholm & Dench, 2005). Shared values, reciprocity and mutual obligations are characteristics of a well-functioning community, which begins in the home and spreads to the wider community through neighbourhood networks of support and care and community is, therefore, stronger amongst women than men. The review also picks up that younger people, who in some cases live in identifiable parts of cities, may have a lower sense of community. Another characteristic of community brought out by the reviewers is that communities are reasonably permanent and are most in evidence where there has been a reasonable degree of stability and continuity; areas experiencing large migrations, in or out, have weaker community ties. Population stability and duration of residence in an area were characteristics of a community which most of the studies reviewed brought out, many overtly but more tacitly.

Stability of residential patterns over time is necessary for the formation of ties to develop, as are the public institutions which facilitate individuals and families sharing their 'private' lives. It is at such places that networks of reciprocity become linked up,

anchoring these ties to locality. Community is what links these ‘private’ and ‘public’ lives.

The authors note the general conflation of the terms ‘community’ and ‘neighbourhood’, neither of which is distinctly defined. Nor is there any agreement on the size of a community. For the purposes of the review the authors were particularly interested in studies which suggested that communities or neighbourhoods were smaller than wards (5,000 was deemed the most useful size). Wards, typically, have a population of between 9,000 and 14,000. Overall, the review noted the paucity of studies demarcating communities on maps.

The report concluded that there were two useful approaches which may be suitable for identifying communities for warding purposes: “The first approach is that of the ‘statistical’ community, using OA data and perhaps other information, to identify approximations to the *boundaries* of communities - subject to the problems inherent in the shapes of the OA units. The second is to focus on the *cores* of communities, as identified by certain facilities...although such identification will be approximate”, and these two methods were found to be the only ones in use in the U.K. for identifying neighbourhoods.

Surprisingly, this review did not consider studies undertaken in countries other than the U.K. and so did not consider research which endeavoured to incorporate behavioural with statistical evidence, such as the PHDCN and L.A.FANS projects in the U.S. Nor did the study investigate the utility of geodemographics which also tries to incorporate behavioural and statistical data (Longley & Harris, 1999), subsequently developed further (Singleton, 2007; Longley & Singleton, 2008). Likewise, the review made no reference to bottom-up approaches to identifying specific areas of interest, as in the case of identifying urban deprivation (Harris & Frost, 2002) or the development of individual and household geodemographic classifications. (Webber & Farr, 2001)

By far the more popular of the two approaches presented is the production of statistical neighbourhoods as all reviewers of neighbourhoods have noted (Chaskin, 1997; Leventhal & Brooks-Gunn, 2000; Pickett & Pearl, 2001; Sampson, Morenoff, & Gannon-Rowley, 2002; Chisholm & Dench, 2005; Lebel, Pampalon, & Villeneuve, 2007; Weden, Bird, Escarce, & Lurie, 2011)

However, as (Chisholm & Dench, 2005) noted both of these methods produce approximations of neighbourhood boundaries. Statistical neighbourhoods are usually created from a combination of measures such as factor analysis and clustering, but these techniques do not aid understanding the spatial patterning of social dimensions nor explain what these dimensions are or the sources of their variations (Lebel, Pampalon, & Villeneuve, 2007). “Researchers have either been vague about the units that constitute the community or have relied on arbitrary statistical definitions that do not

represent the importance of place. These ambiguities have undermined the authenticity and statistical power of community studies and biased downward the estimates of community effects.” (Coulton, 2005)

In the U.K the defining factor of neighbourhoods is homogeneity but this is a rather one dimensional view of the neighbourhood; it does not offer any explanation for its origins or dynamics; it simply indicates its presence. To account for and understand the outcomes and natures of neighbourhoods – the social bonds between people, and between people and their environment (Kallus & Law-Yone, 2000) - they have to be measured. (Coulton, 2005) presented a powerful case for more scientific methodology and techniques in neighbourhood research, particularly in integrating geography into community studies; two areas where this could be achieved are in defining community and neighbourhood boundaries, and assessing spatial and geographic processes: “Community research has been essentially divorced from where communities are actually located, and the processes within or between them are fostered or impeded by space or distance. Geography has been virtually unaccounted for in most studies of community intervention, and researchers have overlooked the influences of proximity and distance in community and individual wellbeing. However, many of the social processes that confer disadvantage on particular groups are arguably tied to spatial concentrations of deficits and limitations in which space is an explicit dimension of the analysis.” (Coulton, 2005, p. 75)

Relying on cores of neighbourhoods means that they cannot be measured properly, whilst using statistical approximation introduces the modifiable areal unit problem (MAUP) and jeopardises the statistical validity of any measurements made (Omer & Benenson, 2002; Grannis, 2009; Foster & Hipp, 2011), though this assertion is challenged (Haynes, Daras, Reading, & Jones, 2007; Stafford, Duke-Williams, & Shelton, 2008; Flowerdew, 2011). It is important to accurately determine neighbourhood boundaries because neighbourhoods are ecological contexts with psychological and social meaning within geospatial boundaries. Also, in measuring neighbourhoods and distinguishing one from another the axiom is to maximise external variance and minimise internal variance which can only be achieved with accurate measurement. Therefore, if reliable results are to be obtained then a clear and accurate specification of the focal contextualised neighbourhood is required, and *core* and *statistical* neighbourhoods do not match up to this standard.

The evidence of U.K. neighbourhood studies indicates that researchers here have opted out of this debate, with geographers and social scientists seeming to come together in adopting aggregations of the census geography or geodemographic neighbourhoods (Doncaster NHS Public Health Intelligence Unit, 2003; Ashby & Longley, 2005; Chisholm & Dench, 2005; Batey & Brown, 2007; City of Plymouth, 2009; Robson,

Lymperopoulou, & Rae, 2009 *Communities and Local Government*, 2010; Lupton, Fenton, Tunstall, & Harris, 2011).

Booth is credited with pioneering the integration of social survey methodology, mapping techniques and statistical description of census data to measure the distribution of poverty in London using streets as the unit of classification (Davies & Herbert, 1993, p. 39; Gidley, 2000; Orford, Dorling, Mitchell, & Shaw, 2002). This, in turn, informed the University of Chicago's study of Chicago itself (Westergaard, 1969) which was the first to explicitly define and map the natural area neighbourhoods of the city, in addition to producing a generalisation of its urban form, and an explanation of the processes creating this structure. The city was envisaged twofold: on the one hand as a cultured entity expressed in its society, distinct from, on the other hand, the subsocial forces of ecological competitiveness and succession which characterised the patterning of residential areas (Longley, 2005). The mosaic of subareas, each with a distinct socio-economic, demographic and built form were termed 'natural areas' and 'neighbourhoods' and the Chicago School's terminology and epistemology has dominated urban studies ever since. These natural areas of the Chicago sociologists were "homogeneous economic and social units" (Burgess, quoted in Venkatesh 2001, p. 281) and, subsequently, the search was on for similar units in other urban areas.

Whatever the theoretical foundation, since the 1920s aggregate census data has been the primary source of information for identifying neighbourhoods, mainly because of its comprehensive coverage, the integrity of the data and ready availability at minimal cost. Of course, during the almost 100 years which have passed since the Chicago School presented its seminal work, society itself has changed enormously, with many of these changes instrumental in driving forward neighbourhood research. Amongst these social developments has been the increasing urbanisation of the western world, the increasing migrations of peoples between countries and within them, the awareness of urban social problems and their generators, an increasing appreciation of racial and other forms of discrimination as expressed spatially, postmodern time-space distancing, technological developments especially in relation to data handling and processing, and the growth of location-based commercial activity and the geo-referencing of data; all of these happening at a seemingly ever-faster pace. Such has been the accelerating speed of change that theory has played Cinderella to practical utility.

There is a large range of statistical techniques employed in determining the extent and boundaries of neighbourhoods, including clustering, principal components analysis, social area analysis, indices and indicators, local indicators of spatial association and continuous surfaces.

Three broad themes can be identified with respect to aggregate data and neighbourhood definition, all inter-related and cross-fertilising. The first theme is the selection of

variables indicating neighbourhood, the second is the quality of the basic raw data, and the third is the development of a variety of techniques for identifying areas of homogeneity.

All of the reviewers referred to above point to the lack of theory behind the neighbourhood concept. Homogeneity is presented as the summary indicator but no explanations are offered for the forces creating it or the mechanism by which it comes about, save the ecological theory of the 1920s Chicago School.

The statistical reporting units used are the national census units, the most comprehensive and reliable data available. As well as asking whether or not socially and economically homogeneous areas are adequate descriptions of neighbourhoods, the nature of census data presents its own problems for those mapping neighbourhoods. In particular, it is the census statistical reporting unit which is central to these challenges. In the U.S., and particularly in Chicago, the census geography was built upon the physical divisions of residences: contiguous houses forming a street block and a number of blocks creating the Block Group, the smallest census statistical reporting unit. These block groups were usually delineated by local people (U.S.Census Bureau, 2008) and they were designed to be socially meaningful, consequently there is a close correspondence between the boundaries of socially homogeneous areas and those of the census blocks (Grannis, 2005). In the U.K. this close relationship between socio-demographic distributions and census geography did not exist prior to the 2001 census when output areas were introduced. Whereas social homogeneity was at the heart of U.S. census geography, in the U.K. it has only been introduced well after the entrenchment of the electoral, postcode and administrative geographical structures and it has had to be retro-fitted to them, thus it does not assume the same primacy. The rationale of the census unit's design is important, as is its size and the statistical reporting hierarchy. Likewise, the frequency and timeliness of the census and its reporting is relevant to the determination of neighbourhoods, as discussed below. But, perhaps, the most critical element of any census in relation to the identification of neighbourhoods is the information elicited and how that matches the conception of neighbourhood.

U.K. Neighbourhood Data. As part of its National Strategy for Neighbourhood Renewal the government established 18 Policy Action Teams (PATs) to make recommendations on difficult issues affecting poor neighbourhoods. PAT 18 made recommendations for the publication of detailed datasets at the neighbourhood level (Cabinet Office, 2000) and these are now available at the OA and ward scale upwards (www.nationalstatistics.gov.uk). The objective is to enable anyone to get accurate data for neighbourhoods, particularly with regard to deprivation. In time, this data will be made available at several scales: OAs, the Super Output Areas and local authority districts. Clearly then other, non-census government-sourced data will be available, via

Neighbourhood Statistics, to provide further socio-economic datasets of reliable provenance, in accordance with PAT18. The 2001 Census for England and Wales heralded the production of “a national coverage of small, evenly-sized and socially homogeneous statistical units for publication of census area statistics.” (Martin, 2004). The production of the census output areas has been seen as central to the government’s emphasis on evidence-based policy for neighbourhoods, setting the limits to what is analytically possible: “there is the very real sense in which it is the statistical reporting units that set the practical limits to understanding neighbourhoods.” (Op cit, p.137).

In the U.K. the main source of aggregate data has always been the decennial census but this is ever-changing in line with information requirements from the private as well as public sector and now Census data is not the only source of information being used for neighbourhood purposes. One of the most widespread sources of data for neighbourhood purposes is the Indices of Deprivation, which does not use census data but is reliant on data from a wide variety of sources so that it can be regularly updated (McLennan, et al., 2011), for example, this decade the Indices have been published in 2000, 2004, 2007 and 2010 for England. Other sources of data being utilised for the delineation of neighbourhoods include publicly available information from statutory bodies, such as Land Registry, County Courts, Electoral Rolls, the NHS and Companies House, as well as data from private sources, such as consumer purchase, insurance claims, banking and mortgage data. Progress in this area is aimed at developing the widespread practice of address-tagging behaviour and attitudes with the ambition to be able to build up detailed information on individuals and households without falling foul of data protection legislation, such that customised and meaningful aggregations can be created, including neighbourhoods.

The 2001 Census output area. The output areas (OAs) aimed at a household target size of 125 households and were designed to be compact and socially homogeneous. The shape of the OAs was constructed by firstly creating Thiessen polygons around each ADDRESS-POINT location, then dissolving these polygons with other polygons with the same unit postcode, clipped to ward boundaries, road centre-lines, railways and water courses where these formed appropriate boundaries. After this, postcode building blocks were created from aggregated census counts as the input layer for the automated zoning procedure. An urban/rural classification was then introduced and the boundaries aligned with low water mark rather than mean high water mark. This was followed by aggregation of small number units to protect confidentiality. Then an iterative process was implemented from a random clustering of postcodes to generate output areas matching the target household size whilst maximising the compactness (by minimization of squared perimeter divided by area), and social homogeneity (by using the census variables of dwelling type and tenure).

Martin emphasises that “OA design constraints (do) not constitute an attempt to construct ‘neighbourhoods’ and OAs should be seen as building blocks for purpose-specific aggregation” (Martin, 2004). Given that OAs have not been designed to be neighbourhoods they nevertheless have a social homogeneity component to capture some elements of the relationship between census geography and socio-demographic patterns. The construct of social homogeneity in the output areas rests on similarity of dwelling type and dwelling tenancy: “...we identify dwelling type and tenure as the two variables which tend to experience the greatest degree of homogeneity – because of the structure of the built environment and its indirect reflection in property-ownership patterns.” (Martin, Nolan, & Tranmere, 2001) There is an unstated and undeveloped assumption, or understood given, that similar dwelling type and tenancies organise or filter the residents into socially homogeneous patterns, though the mechanism by which this is brought about is not made explicit. Reason suggests that the underlying driver of homogeneity is wealth and that people of similar economic status group together. This is not to suggest that other variables, such as race, are not important; they may well be very important in some instances but Martin et al suggest that they are not as universally useful for revealing homogeneity.

In addition to the output areas several sets of aggregations of output areas have been released by the Office of National Statistics (ONS) to facilitate the provision of more data from a variety of non-census sources at larger scales, as well as enabling comparison and research of units of a larger size with a compact shape and social homogeneity. The targeted mean levels of these Super Output Areas have been set at 1,500 households for the lower level and 7,500 for the middle level. The 34,378 Lower Layer SOAs in England and Wales were generated automatically. The 7,193 Middle Layer SOAs were defined in a two-stage process: an initial set was generated automatically but the boundaries were then modified in consultation with local authorities and other local bodies. All of these output areas are aimed at being durable and stable.

These aggregations of output areas do not build into their structure any additional social components to aid the construction of social neighbourhoods. The Lower Super Output Areas (LSOAs) of the England and Wales census were created using the same grouping and clustering methodology as for the creation of OAs but with different a different household threshold – a minimum of 1,000 people. Middle Super Output Areas (MSOAs) have a minimum of 5,000 people (the Scottish equivalent are called Intermediate Geography), but their boundaries were first created using automated zone design and then modified in consultation with local authorities and interested parties. (National Statistics, 2007; ONS, 2009) At this scale we could expect then that the MSOA design more aligns with perceived socio-demographic distributions (perceived, that is, by local managers of service delivery steeped in administrative history and

interest) than the raw boundaries from the statistical exercise. “Any output design represents a trade-off between each of the conflicting criteria outlined here. Equalizing population sizes will tend to produce more irregular shapes, and so on...Each of the population, shape, and homogeneity statistics are weighted equally, and the net proportional improvement or deterioration in the scores is combined to produce an overall mean proportional change, beginning from an initial random aggregation.” (Martin, Nolan, & Tranmere, 2001)

In practical terms these design considerations - the population threshold, compact shape, social homogeneity, postcode groupings of dwellings, and the need to nest the OAs within electoral ward geography - are generalisations about data handling and when implemented in the field inevitably produce anomalies. For example in the current study areas there are several instances of the OA geography clearly contravening the understood neighbourhood geography on the ground. Figure 1 shows two OAs which straddle a railway line running east to west. The properties in the northern sections of these 2 OAs have nothing in common with the properties in the southern sections; they are of different ages, style and house different tenancies but, most of all, the northern sections are totally isolated from the southern sections, there being no nearby roads providing a north-south link across the railway lines. In addition, the southern sections form part of the South Kilburn Regeneration Area, an actively and officially defined regeneration neighbourhood. Figure 2 shows the location of new social housing estate in North Brent which is apportioned between 3 output areas although it is clearly an estate built as a single entity, served by one road only, common to all properties on the estate, and is physically isolated from the surrounding properties.

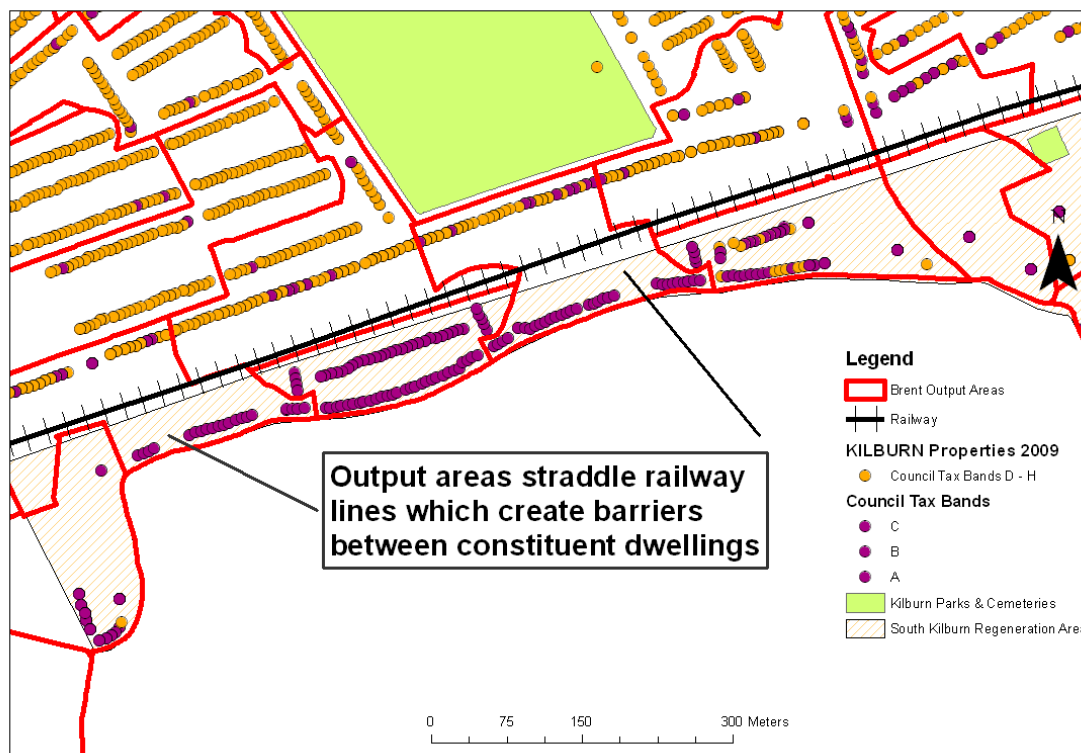


Figure 1. South Kilburn: Properties divided by railway lines are included in same Output Areas

Figure 2. North Brent: New Housing Area split by OAs

Homogeneity of property ownership and tenure is the quality of the census data seen as legitimising them as markers of social interaction, though it is accepted by its constructors that “no statistical or administrative geography can adequately capture the neighbourhood concept.” (Martin, 2003, p143)

In the U.K. the census is conducted decennially with the publication of actual results of the census becoming available usually two years after the census date and for several years subsequently. For many this delay in the data becoming available and the long time gap between full censuses is problematic and has encouraged the growth of geodemographics.

Geodemographics. Geodemographics is the name given to the classification systems which class the population of small areas by clustering a number of census variables to produce statistically different groups. Usually other, more timely data from additional sources is added into the computation to broaden the profiles of the areas to make them more relevant; for example, consumer purchasing behaviour data, obtained from surveys and geo-referenced by postcode, is added to census data in order to enhance the appeal of the geodemographic classification to potential purchasers of the system. The characteristics of the groups are then examined and a generalised profile of each cluster is produced to aid understanding and to facilitate application (Harris, Sleight, & Webber, 2005). The classifications identify ‘socially homogeneous areas’ and the theoretical foundation for their application to neighbourhoods is social homophily, sometimes referred to as ‘birds of a feather flock together’ (McPherson, Smith-Lovin, & Cook, 2001; Singleton & Longley, 2008) or, as ACORN (acronym of A Classification Of Residential Neighbourhoods), one of the leading brands of geodemographic classifications, puts it: “People in similar areas have the same needs and lifestyles.” (CACI, 2009). Whilst the ACORN brochure itself does not use the term ‘neighbourhood’ it does feature photographs of lifestyle properties to be associated with the clusters identified and described. The MOSAIC classification system is not so shy, generously describing its profiles as different types of neighbourhoods (Experian, 2003), as too do academics specialising in geodemographic systems (Batey & Brown, 1995; Debenham, 2001; Webber & Farr, 2001; Webber, 2004b). The general premise is that the more similar people are the more they will interact, and this brings about community. Geodemographics does not go beyond this observation to enquire how or why people come together or how it is that once in the same area they form a neighbourhood, nor is it interested in determining the strength of the supposed links that people have to one another, although this is changing with geodemographic products being aimed at public services and incorporating the results of behavioural surveys (Webber, 2004c; Longley, 2005; Singleton & Longley, 2008). Longley in particular decries the dislocation between theory and the representation and measurement of social constructs which underpin neighbourhood classifications, drawing the parallel between

the criticisms of social area analysis and geodemographics, though acknowledging that progress has been made recently in incorporating Coleman's and Putnam's concepts of human and social capital.

Geodemographic classifications, like the census statistical units on which they are partly constructed, are simple descriptors of data. Their claim to represent neighbourhoods assumes that areas of social homogeneity equate to areas of social interaction; that social identity is highly correlated with consumption behaviour. However, there is real concern that, as with Social Area Analysis, there is a superficial and weak theoretical foundation for geodemographics and there has been a call for clear theoretical constructs for individual domains forming parts of the geodemographic classifications, citing the sound theoretical basis for the socio-economic classification as an exemplar (Singleton & Longley, 2008). What geodemographic classifications do not do is identify those elements of social homogeneity which give rise to social interaction and neighbourhood, nor do they consider the physical environment or, except in a limited manner, the built environment.

Nevertheless, the presentation and packaging of geodemographic classifications makes the data generally understandable and therefore usable in a variety of ways and this area of geo-statistics has grown tremendously in recent decades such that their profiles have a widespread commercial application and increasingly a public service application which could well mean that they vie with Super Output Areas as *de facto* neighbourhoods (Martin, 2004). The 'defence' of geodemographics is, primarily, their extensive use in practice (Harris, Sleight, & Webber, 2005, p. 225).

General purpose geodemographic classifications have been challenged as to whether or not they can ever be satisfactory (Harris, Voas and Williamson, 2001; Voas and Williamson, 2001) as well as being questioned about their methods of computation and their failure to be spatially variable by small area, but all appear to agree that purpose-specific classifications, and particularly those built from the bottom up, from individual or household data, will be increasingly important in classifying small areas (Webber & Farr, 2001; Webber, 2004b; Longley & Singleton, 2008), especially if social characteristics can be linked with theory, behaviour and attitudes (Parker, Uprichard & Burrows, 2007). There is little application of the classifications outside of commercial use and therefore the systems should be seen in this light: they are neighbourhood classifications of socio-demographic and consumer behaviour and, as yet, have not been re-oriented to capture a modern ecological interpretation of neighbourhood incorporating environmental domains.

A recent development has been the development by the U.K. Communities and Local Government department of a typology of neighbourhoods (Lupton, Fenton, Tunstall &

Harris, 2011), wherein they explain the uses and limitations of area typologies and the different types in use, and especially the compromises made between theory and data. The Report classifies Lower Super Output Areas but does not present any theory for their adoption as neighbourhoods. It does, though, present details of choices and compromises made in developing what the authors see as a general-purpose neighbourhood classification. An indication of the compromises made can be judged from a comparison of the adoption of LSOA neighbourhoods of this classification with a previous definition offered by the institution leading this project (Power, 2004), page 40, this report)

In the end geodemographic classifications are almost exclusively based on socio-economic data geo-referenced by where people live and, given that in some practitioners' views " ...these so-called 'general purpose' classifications are in reality dressed-up indicators of affluence" (Voas & Williamson, 2001)⁹, there is the suggestion of a direct relationship between the affluence underlying homogeneous clusters of the geodemographic classifications and the manifestation of that affluence, as filtered by the housing market, represented by the subject population's dwellings.

Measuring Neighbourhood Boundaries. Elsewhere, neighbourhood effects research, particularly in the fields of health and criminology, has been advancing Coulton's scientific agenda, especially in trying to define the boundaries of neighbourhoods. Two themes can be detected: The first tries to establish better means of defining the neighbourhood unit by better selection of aggregate variables and additional data. The second theme is a bottom-up attempt, to build the neighbourhood by circumscribing the extent of residents' social networks.

Developing global neighbourhood definitions and boundaries. (Leventhal & Brooks-Gunn, 2000) made the distinction between structural aspects of neighbourhoods and neighbourhood social organisation. Census data assesses neighbourhood structural elements, such as income, employment rates and household composition, but this data cannot evaluate the social organisational aspects of neighbourhood, such as social control and social cohesion. Social organisational characteristics of neighbourhoods rely upon data from community surveys, systematic social observation, expert surveys or other administrative data, such as health and crime statistics (Leventhal & Brooks-Gunn, 2000).

One study, the Project for Human Development in Chicago Neighborhoods, the largest and most comprehensive of its type, set out to incorporate both of these elements using clustering in conjunction with systematic social observation and consultation with local leading public service figures to inform their definition of the project's neighbourhoods.

⁹ Likewise, Richard Webber - regarded as the originator of geodemographic systems - describes neighbourhood typologies as evolving to become "a tool for differentiating between different categories of rich people." (Webber, 2004a)

Project on Human Development in Chicago Neighbourhoods (PHDCN) This study, conducted in 1995 (Sampson, Raudenbush, & Earls, 1997), was an endeavour to uncover the social processes which might explain or mediate the long-recognised relationship between crime and communities, particularly addressing the associations between violence, low socio-economic status and residential instability of neighbourhoods. The basic premise of the authors was that social and organisational characteristics of neighbourhoods explain variations in crime rates which cannot be solely attributed to the aggregated demographic characteristics of the resident population. The thesis was that social control, i.e. collective regulation by the neighbourhood group, as distinct from institutional or authority enforcement, accounted for the differential in neighbourhood violence.

This project, set in Chicago and led by Chicago researchers, should be seen in the light of the Urbanism tradition for which the Chicago School is renowned. Continuing the tradition of Wirth and Park the researchers used the city of Chicago as their laboratory for the investigation of deviance, one of the theoretically assumed consequences of urbanisation. The Chicago School emerged out of the response to the 19th century sociological theories of the Great Transformation: how could the moral order of society be maintained, and members be integrated in it, whilst experiencing a highly differentiated and technical social structure – the problem of maintaining Community. The theorised problems of moral order and personality have been summarised as a Rural-Urban continuum with urbanisation inducing anomie and estrangement, as opposed to rural solidarity and integration. This involved two elements: the first, that the theorised impacts on society – physical, demographic, social and psychological – varied together; secondly, that the explanation for these modernisation processes was to be found in changes in settlements: scale, dynamic density and differentiation (Fischer, 1975).

The study was based on social disorganisation theory which postulates that low economic status, ethnic heterogeneity and residential mobility lead to the disruption of community social organisations which bring about local variations in crime and delinquency (Sampson & Groves, 1989). These characteristics were represented by census variables reflecting neighbourhood differences in concentrated disadvantage, immigrant concentration and residential stability which were then linked to collective efficacy – a development of social capital.

The PHDCN project applied “a spatial definition of neighbourhood – a collection of people and institutions occupying a subsection of a larger community” by combining 847 census tracts in the city of Chicago to create 343 neighbourhood clusters. The neighbourhood clusters (NCs) were designed to be “as ecologically meaningful as possible, composed of geographically contiguous census tracts, and internally homogeneous on key census indicators...of about 8000 people...Geographic boundaries

(for example, railroad tracks, parks, and freeways) and knowledge of Chicago's neighbourhoods guided this process." (Sampson, Raudenbush, & Earls, 1997) 8782 interviews were conducted in these NCs as part of a Community Survey, designed to yield a representative sample of households within each NC and also large enough to provide reliable NC measures. The second source of data was the systematic social observation (SSO) of 23,000 street segments using the principles of *ecometrics* developed by Raudenbush and Sampson (Raudenbush & Sampson, 1999; Sampson & Raudenbush, 1999). Thirdly, the project interviewed 2,800 leaders in business, community organisations, law enforcement, education, politics and religion. Each of these methods was pioneered by the Chicago School in the 1920s.

Sampson and Raudenbush claim to have integrated social, demographic, economic and geographical dimensions in defining their neighbourhoods: "Grounded in a systemic theory of the local community in modern society, we defined neighborhoods ecologically. When formulated in this way, social organizational processes, attachment, and identity are variable and not confounded with the definition and operationalization of the units of analysis. Chicago's 865 census tracts were combined to create 343 "neighborhood clusters." These clusters are composed of geographically contiguous and socially similar census tracts. Major geographic boundaries (e.g., railroad tracks, parks, freeways), knowledge of Chicago's local neighborhoods, and cluster analyses of census data guided the construction of the neighborhood clusters so that they are relatively homogeneous with respect to racial/ethnic mix, SES, density, and family structure." (Sampson, 2003) The authors then state that they settled on an ecological unit of about 8000 people "which is smaller than the 77 established community areas in Chicago (the average size is almost 40,000 people) but large enough to approximate local neighbourhoods." Setting a size condition for clustering requires a rationale for choosing this level. To say that it approximates local neighbourhoods suggests that a comparison is being drawn with the original 400 Chicago neighbourhoods distinguished by Burgess and colleagues in the 1920s – areas still in existence today - whose average size (assuming the same number of neighbourhoods, same city boundary, and pro rata growth in line with the city of Chicago population growth) is now 7,700 (city of Chicago population, Census 2000, was 2,896,016), yet no foundation for this is offered. The original 400 neighbourhoods of the Local Community Research Committee that Burgess headed up chose their neighbourhoods because "Due to their size, the neighborhood and subcommunity captured small zones of distinctive social activity, and so they were both helpful to LCRC researchers who conducted targeted field studies or who wrote small articles on group activity and social organization." (Venkatesh, 2001) In this sense, the neighbourhoods identified by the human ecologists were not miniature versions of the natural areas which were the ecological units of Burgess, Park and colleagues, subject to the processes of competition, invasion, succession and domination. The PDHCN researchers use the term 'ecological' in a different sense to

the human ecologists, but their conceptualisation of the neighbourhood unit corresponds.

Yet there is no explanation or justification here for a size of 8000 people unless the NCs coincided with the delineation of the neighbourhoods of the 1920s and even then it presupposes that these neighbourhoods are still valid according to the original selection criteria and also that they remain pertinent to the PHDCN's study criteria. There is always a trade-off between selecting neighbourhoods of a certain size and selecting neighbourhoods according to any other criteria. For the project's NCs to both meet the size requirement and to be ecological units, by which is understood to mean units that make sense according to the other pertinent criteria described above, there would need to be some compromises over unit boundaries and associated adjustments to census data. Quite what these adjustments were and how radical they needed to be is unknown and this could jeopardise the integrity of the data presented. It is difficult to see how a spatial unit could meet such a diverse range of design requirements without seriously compromising its integrity.

Notwithstanding this problem, the project design maintains its theoretical pedigree in referring to the Rural-Urban Continuum in that the neighbourhoods are based on density, and 'density', 'scale' and 'differentiation', are the attributes which relate community to aspects of moral order which the project is primarily concerned with. Fischer relates Wirth's Theory of Urbanism to the Great Transformation debate suggesting that it is these transforming processes of society – particularly density and scale, or population concentration - which are of primary interest to sociologists and which distinguish rural areas from urban areas; urban sociologists merely study these processes within the urban environment. Fischer suggested that "theories of the rural-urban continuum are best understood as empirical hypotheses about and explanations for the correlates of population concentration" and that though some urban-rural differences have been declining, others, such as deviance, persist (Fischer, 1975). It is in this tradition that the PHDCN places itself.

However, like the L.A.FANS study, the PDHCN project neglects to address the underlying factor/s facilitating homogeneity or social coherence. In a project concerned with identifying area effects on crime this study limits itself to population variables without considering variables of the built environment itself (as distinct from the visual condition of the street environment), which would greatly aid a more rational and clearer identification of neighbourhood. Cheap housing enables poor people to inhabit an area; likewise, dense housing projects permit dense population areas. One recent study, conducted in Chicago (Noonan, 2005), highlights the divisive effects of barriers on population distributions and neighbourhood choice, and the application of such analyses, whilst suggested as a consideration by the authors, has not been clearly presented, yet it should be included in any analysis of area effects. In the PHDCN

project it was hypothesised that concentrated disadvantage, immigrant concentration and residential stability were related to collective efficacy, yet each of these can be directly associated with concentrations of housing type and, perhaps, housing tenure – variables not taken into account - which could well be the underlying drivers of how many people live in an area and what their socio-economic status may be.

The strength of this project was that it built upon a long and distinguished tradition of Chicago University's urban sociology theorising about the relationship between transformations in urban social structure and their consequences on the moral order of that society and the place of the individual within it.

Other, recent work, especially in Canada, has advanced this approach. After having examined extant neighbourhood definitions Gauvin and colleagues (Gauvin, et al., 2007) set out to delineate small territorial units to operationalise the concept of neighbourhood. They aggregated smaller statistical units to create larger territories that were more homogeneous in terms of characteristics related to material and social conditions. They selected 17 census variables indicative of these characteristics and used principal component analysis to reduce the data to three composite indices of deprivation: (i) social isolation, (ii) material deprivation, and (iii) social deprivation. Six classes of material deprivation were created and adjacent or contiguous census tracts were aggregated if they were in the same class, but not if a major road separated them. The aggregate exercise was capped with a maximum population limit of 15,000. It appears then that the researchers verified the optimisation of aggregation by estimating the intra-class correlation coefficients, which provided an index of the proportion of total variance in material deprivation which can be ascribed to between rather than within area variation, though they do not describe the outcome of this exercise. There is the suggestion that the population size limit facilitated the investigation of social dynamics and the existence of a subjective sense of place, as well as regrouping the populations with similar socio-economic characteristics, though no detail was provided.

Having set out in sympathy with Galster's ten-fold classification of neighbourhood characteristics (Galster, 2001) the researchers restricted their spatial definition of neighbourhood as being represented by spatial homogeneity of material deprivation. Whilst the researchers employed the statistical technique of principal components analysis and suggested the application of clustering techniques, in addition to acknowledging the yet unresolved modifiable areal unit problem introduced by re-aggregating data, the author did not present their rationale for identifying neighbourhoods on the basis of socio-economic homogeneity, nor how the resultant neighbourhood boundaries made sense in terms of the researchers declared aims of respecting (1) geographic barriers (railroads, highways) and population size, (2) subjective sense of place according to past survey, (3) history of the neighbourhood, and (4) social dynamics of the neighbourhood. In the end it could be said that the

practicalities of available aggregated data and sophisticated statistical techniques overwhelmed the theoretical and qualitative aspects of neighbourhood definition, which the researchers recognised would be " a daunting challenge."(Gauvin, et al., 2007, p. S18)

Another Canadian team (Parenteau, et al., 2008) tackled the problem of neighbourhood definition for health research, using the city of Ottawa, suggesting that their findings are transferable to other settings. This team set out four objectives: (i) to develop a methodology for defining natural neighbourhoods, (ii) to produce a databank of neighbourhood social and physical resources and amenities - a communal inventory - and measure accessibility to them, (iii) to map relationships between socio-economic status and the distribution of resources necessary for the for health, and (iv) to obtain subjective comment on these findings from community decision-makers and organisations. The researchers quoted Sampson (Sampson, Morenoff, & Gannon-Rowley, 2002) as finding, in a survey of social processes in neighbourhoods, that 35 out of 40 studies operationalised neighbourhoods using political or statistical units. The Ottawa team determined their natural neighbourhoods by using a functional approach, a physical approach and by incorporating Multiple Listing Service real estate board and neighbourhood maps. The functional approach is rooted in the Chicago School of Sociology's work and was used to identify the selection of socio-economic and demographic variables from the census dissemination area data which was clustered with a spatial contiguity constraint and then wombled (wombling is a statistical techniques for identifying homogeneous regions or discovering important barriers) (Lu & Carlin, 2005). The physical approach involved identifying barriers to movement and economic and social vitality, as identified by Ottawa municipality, which were then fed into the functional results by adjusting problem boundaries but constraining them to follow census dissemination area boundaries or a natural or imposed feature. Following consultation with health officials some of these natural neighbourhood units were aggregated to meet the minimum 4,000 population required for health analysis sampling, and 89 neighbourhoods were distinguished, with an average neighbourhood population of 9,500 (Ottawa population 2006 Census: 846,802). Using Maslow's hierarchy of needs (Maslow, 1968) a set of health indicators were determined and sources of data for each indicator either taken from existing datasets or original fieldwork was undertaken. In all, 44 indicators were defined and tried and, using GIS, an index of accessibility was developed using census data and principal components analysis to produce an overall index of socio-economic advantage; similar composite indexes, such as healthy/unhealthy food index, recreation index, were also produced.

Data from Ottawa Public Health were used to produce four health outcome measures to assess health profiles in each of the neighbourhoods and continuing research is being conducted on assessing the relationship between neighbourhood quality and health disparities.

Critics of the approach would likely focus on their lack of theoretical explanation for the selection of input data for the physical/social homogeneity index as the basis for defining their neighbourhoods and the parameters of the subsequent clustering exercise, as well as a lack of clarification as to how the border adjustments, brought about by wombling, affected the statistical data used; was re-casting used or was centroid inclusion/exclusion the basis for adjusting statistical data, or some other method? Particularly in health studies it is important to ascertain what underlies homogeneity, as it is likely that these drivers directly impact on health outcomes.

What the Ottawa study adds to neighbourhood research is the multiple application of statistical techniques and GIS to neighbourhood definition and health analysis, as well as the incorporation of qualitative data from involved professionals in the tradition of Chicago. It is a central theme of this paper that housing areas are an important causal factor underlying the patterning of socio-economic neighbourhood variables and whilst the Ottawa research give prominence to housing, more should perhaps have been made of this.

Another study which utilised a number of statistical techniques in neighbourhood analysis was conducted in Hamilton, Canada, again associated with health outcomes (Luginaah I. , et al., 2001; Veenstra, et al., 2005). In this study Local Moran's *I* statistic was employed, based on the socio-economic determinants of health, to identify clusters of neighbourhoods subsequent to the application of principal components analysis to identify components which may represent an underlying process. This application of LISA together with PCA is seen as an extension of Davies's work (Davies & Herbert, 1993) which used factor analysis and clustering for the study of social structures and patterns in urban areas.

What these examples of aggregate neighbourhoods illustrate is that researchers are uncomfortable simply relying on socio-economic homogeneity as the measure of neighbourhood, so they have added other measures as a means of validating the resultant neighbourhoods. What degree of homogeneity, which are the important variables to measure and what weights to assign to each variable are some of the issues that are not answered by current theory as applied to aggregate measures of neighbourhoods, though very recent research, discussed below, is providing some answers. More research into thresholds of some variables which tip neighbourhoods from one class to another (such as percentage of racial minorities triggering 'white flight', or middle class flight to the suburbs) is required, as is some indication of the

quality of the data which composes the variables if they are from a variety of sources. Some other contentious issues for which there are no hard and fast rules are: size of a neighbourhood, the concept of 'sliding' neighbourhoods in vast areas of similar housing and socio-economic composition; incorporating social connection and meaningfulness of neighbourhood to unveil the reality of neighbourhood. Most important, though, is the need to relate social distributions to the physical and built environments and to illuminate the relationships between them.

The difficulties of incorporating affective dimensions have encouraged several of the studies to consult decision-makers familiar with the area to get their input of suitable boundaries for neighbourhoods as proxies for gathering and integrating individuals' views of neighbourhood, though it is noted that none of these actually turned out to be residents or residents' representatives. Another idea borrowed from the Chicago School has been the integration of long-standing, local functional boundaries in the belief that they represent some authentic division of the urban landscape. The Ottawa study included wombling as a way of blending the borders of the homogeneous areas with the natural barriers to social movement which, though more sophisticated a method, is what the 1920s Chicago researchers did. The Israeli studies described above re-introduced individuals' ideas of neighbourhood and used novel ways of relating these to aggregate data, which pointed to some new approaches to defining neighbourhood. In addition, the Ottawa study used real estate maps to introduce economics into the consideration of neighbourhoods. In fact this last study, more than other, involved the managers of the local housing economy: civic officials, service provision managers and the real estate community. However, whichever statistical technique was used to identify areas of homogeneity, the end result is that these methods rely upon homogeneity as the theoretical basis for defining neighbourhoods, and leave themselves open to the similar criticism and limitations that Longley identified for geodemographics, that it is theoretically and conceptually weak. Social area analysis and factor analysis were, as Longley noted ultimately sidelined because their theoretical constructs were deemed unsafe and because they lacked the convincing explanations for the patterns revealed, but neighbourhood theory has not really developed since then. Fischer decried the lack of theory explaining urban socio-demographic behaviour in the 1970s, arguing that nothing had advanced urban sociology since the Theory of Urbanism and Longley's echoing of that view applies to neighbourhood theory in general and not just to geodemographics (Fischer, 1975; Longley, 2005; Longley & Singleton, 2008; Singleton, 2007; Singleton & Longley, 2008a; Singleton & Longley, 2008b). The urgency of Longley's call reflects the greater appreciation of spatial distributions impacting on all aspects of neighbourhoods, from increased urbanisation and the need for planning to provide order, to the developments of market segmentation within the commercial world, to the identification and remedying of social and health inequalities. The need to understand the dynamics of the urban area has intensified the

number and variety of investigations into neighbourhoods, necessitating the need to develop a more comprehensive and informative theoretical framework than just socio-economic homogeneity. Fischer believed that social networks were the explanation for relating the individual to the urban scale and providing the epistemology for developing urban sociological theory.

The valuable contribution of the spatial aggregation element of neighbourhood identification has been the consistent highlighting of the socio-economic dimension as the primary means of distinction: from the competitive dynamic of the classical ecologists who held wealth to be the indicator of the ability to cope with the impersonal competition, to the economic status construct of social area analysis and socio-economic dimension of factorial ecology, to the modern-day deprivation indices and the recognition of the significance of housing area sub-markets of the Ottawa study. Given that the residence is invariably the largest asset for most households or, for non homeowners, it is usually the largest item of household expenditure, all indicators are that housing must play a significant part in the shaping of the socio-economic patterning of households and therefore people.

Aggregate neighbourhoods are the work-horse of neighbourhood studies and practical use. To date they have been poorly conceptualised and defined. Recent advances, discussed below, aim to remedy these shortcomings.

3.3.6 Social Networks

Over recent decades social network analysis theory and methods have been applied to communities, defining them as networks of strong, primary relationships between people, with a key issue being the role of space: whether geographical proximity is necessary for their formation and continuance.

Social networks are one-to-one links between individuals, such as an individual may have with several other people, and they are also links between groups of connected individuals with a common bond, with other groups of individuals.

Festinger and colleagues (Festinger, Schachter and Black, 1950, quoted in Grannis, 2007) brought out the association between physical distance and friendship formation, or social contact/interaction – the propinquity effect (Daraganova, et al., 2012). With advances in transportation and communication it was argued that social relationships were not bound within local borders, yet it was also shown that two thirds of frequent contacts were local, that phone calls and face-to-face contacts diminished with distance, as did real support coming from social networks (Wellman & Leighton, 1979; Wellman, 1996; Bridge, 2002; Mok, Carrasco, & Wellman, 2010). Communities, then, were characterised as personalised networks existing in both physical and virtual places.

Proximity was also interpreted as being not only physical distance, but also social distance, that is, the more similar people are the more likely they are to engage in social interaction, as less ‘cost’ is involved in overcoming the psycho-social distance between them (Mayhew and Levinger 1977, quoted in Hipp and Perrin 2009; Mayhew, McPherson, Rotolo, & Smith-Lovin, 1995). Choosing to be with similar people, termed *homophily*, then becomes a powerful binding force creating social groups.

Other work in the field of social group formation demonstrated that a few, simple rules of choice by individuals can cause marked segregation – by race or income, for example - and the aggregation of individuals’ residential choices produces neighbourhoods with unique characteristics (Schelling, 1971; Zhang, 2004; Crooks, Castle, & Batty, 2007; Clark & Fossett, 2008).

In addition, recent research has presented another view on homophily, termed *structural homophily*, which is where property with similar physical characteristics is attractive to similar-type households, resulting in these properties becoming the residences of people with similar social characteristics (McCrea, 2009).

These two powerful forces of structural and social homophily are manifested, in the real world, into similar housing areas being home to households with similar social characteristics, which generate neighbourhood social ties/networks.

Neighbourhood effects¹⁰ research has been a developing area of interest, particularly in the social areas of health, education and criminology. Sampson, Morenoff, & Gannon-Rowley (2002), recognised four features and processes distinguishing small residential areas: social ties/interactions; social norms and collective efficacy; institutional resources; and routine use of area. These were the theoretical foundations for the PHDCN and subsequent studies (Sampson, 2003, 2004). Sampson, Morenoff, & Gannon-Rowley (2002), also endorsed the approach of Grannis (1998, 2001) to defining the boundaries of “social networks of neighbours” - neighbourhood boundaries.

From the Ground Up. Other researchers approach the definition of the spatial extent of neighbourhoods by trying to circumscribe the natural pattern of residents’ social interactions (Grigsby, Baratz, Galster, & MacLennan, 1987, Grannis, 2009; Hipp, 2010; Foster & Hipp, 2011; Hipp, Faris, & Boessen, 2012). Following in the tradition of Coulton (2005) and Sampson, Morenoff, & Gannon-Rowley (2002) this approach believes “It is a fallacy to posit that ecological social systems lack geospatial boundaries.”(Foster & Hipp, 2011, p. 27) and cite Grannis's t-communities as geospatial boundaries that respect the logic of social interaction. The thesis is that geography and the built environment provide social closure to the social system of structures and

¹⁰ Neighbourhood effects: “whereby the characteristics of people’s local social milieu influence the ways in which they think and act”(Johnston, Gregory, Pratt, & Watts, 2000)

processes in the overall system of social connectedness. Closure fosters a shared sense of community wherein residents share a set of norms and reciprocity to maintain equilibrium (Coleman, 1988). This develops social capital, which generates neighbourhood effects.

Grannis offered both theoretical and empirical support for neighbourhoods being pedestrian street networks with their boundaries formed by non-pedestrian streets, linking social distributions with urban morphology, thus reinforcing the socio-spatial conception of neighbourhood (Grannis, 1998, 2001, 2005, 2009). Grannis's neighbourhood model is discussed below.

(Hipp, Faris, & Boessen, 2012), in an exploratory study, develop the theory that network ties are characteristic of neighbourhoods, which they hold as being implicit in many existing definitions of neighbourhoods, and they incorporate them into defining neighbourhoods on the grounds that social ties can, firstly, affect residents' perceptions of neighbourhood cohesion; secondly, social ties allow residents to exchange information; thirdly, social ties help provide various forms of collective action. Previous work by (Hipp & Perrin, 2009) developed the concept of distance to embrace not only geographical distance but also social distance, and neighbourhood boundaries are created on the basis of being break points in the social landscape which are assumed to represent break points in the social relations amongst residents. Boundaries were created by first clustering the networks of valued relations into groups (neighbourhoods), mapping them spatially, and creating boundaries between them. As yet, this methodology is too immature for practically defining neighbourhoods.

This category holds much promise for future delineations of neighbourhoods, but it is still new and social network analysis is complicated and problematic (Clark 2007, Lin 2008).

3.3.7 The Physical Environment

One aspect of neighbourhood delineation which has received comparatively little attention is the identification of distinctive patterning within the physical environment and how it may relate to social neighbourhoods. The close association drawn between the pollution of the "dark, Satanic mills" and the poor living conditions of people in the 18th and 19th centuries, which drove the great socio-political discourse and welfare movements of the 19th and 20th centuries, has been eclipsed by the awareness and development of urban social relationships and behaviour since the human ecologists concisely presented their ideas in the 1920s. The preference of the wealthy to locate in the western side of cities, upwind of the consequences of industry, is a legacy which can still be seen in Britain's cities; likewise, they have also historically located on high ground and surrounding parks. The reason is clear: these locations were perceived as healthier, more desirable locations. Over time, with the increasing availability of masses

of social data and the improved means of collecting and handling this information the physical aspects of neighbourhoods have receded in prominence so that few neighbourhood studies accounted for the physical properties of different neighbourhoods or considered this aspect of territory when determining neighbourhood characteristics. Problems of lack of awareness, a changing industrial landscape, increased urbanisation, scale and measurement all played their part in assigning area physical features Cinderella status. However, this is fast changing for a number of reasons: firstly, because of the awareness of the role of the built environment in neighbourhood definition and delineation; secondly, because of the recent explosion in neighbourhood health studies and, thirdly, because of the greater awareness of environmental, ecological and sustainability issues affecting small areas.

The Human Ecologists identified segregation, scale and density as the continuums along which urban areas were distinguished from rural areas, making them also the measures of the social anomie, or disorder, that the Urbanists saw as the inevitable outcome. One line of neighbourhood enquiry, definition and delineation has pursued this Urbanist view and has closely examined the built environment as a way of measuring social disorder as revealed in the physical fabric of the neighbourhood (Sampson & Groves, 1989; Sampson, Raudenbush, & Earls, 1997; Sampson, Morenoff, & Gannon-Rowley, 2002; Coulton, 2005), naming this approach 'Ecometrics' (Raudenbush & Sampson, 1999). This focus on the built environment also received great impetus from the identification of 'neighbourhood effects', that is, the measurable effect of a variable of interest on the individual over and above that which can be accounted for by the individual's characteristics, which is therefore accounted by local 'environmental' effects (Johnston & Pattie, 2011). These neighbourhood effects have been identified in behavioural and educational outcomes as well as with a multiplicity of health outcomes, and an assessment of the built environment features in many large scale neighbourhood projects, such as L.A.FANS and PHDCN, reviewed above (Brooks-Gunn, et al, 1993; Diez Roux, 2001; Sampson, Morenoff, & Gannon-Rowley, 2002; Lupton, 2003). Health studies in particular have encouraged scrutiny of the physical and built environments and the impacts these have on health, though there is no agreed standard of measurement in either case despite the development of various schemes. A recent editorial and commentary on measuring Place provided several examples of different measures currently in use: the Townsend Index of Socioeconomic Deprivation; the 'broken windows' index measuring graffiti, damage to homes, trash and building code violations; the Perceived Neighborhood Disorder Scale, which combines physical and social disorder; neighbourhood walkability; environmental psychological aspects of neighbourhood legibility, coherence, complexity and mystery; degree of contact with nature and the Neighborhood Psychosocial Hazards scale (Frumkin, 2006). There are many others, such as the Indices of Deprivation (which has an environmental dimension); the Social Fragmentation Index (Congdon, 1996); Quality of Life measures

and so on, the latter developing out of an increasing awareness of the blend of social and environmental qualities contributing to our welfare. However, it remains the case that most neighbourhood studies do not routinely account for environmental factors even though their influence is increasingly being revealed and appreciated. The forces of global-local developments, climate change, resources management, population increases and urban administration have already put sustainability at the heart of U.K. planning policies (“Sustainable development is the core principle underpinning planning” (ODPM, 2005)) and their impacts at the neighbourhood scale are an area of enquiry which will receive much more attention in the immediate future as these issues become mainstream (e.g. walkability (Leslie, et al, 2007); greenery index sustainability behaviour (Williams & Dair, 2006)).

Other recent work on health and neighbourhoods, and healthy neighbourhoods, are relating physical conditions of local areas to the welfare of residents, but theory has not progressed beyond defining a sustainable neighbourhood as a walkable area surrounding a residence.

3.3.8 Grannis's Neighbour Networks.

Only one researcher, Grannis, appears to have based his definition and delineation of neighbourhoods on a ‘bottom-up’ methodology: the geographical extent of social networks, social homogeneity/homophily and environmental considerations.

In a series of articles and book Grannis (1998, 2001, 2005, 2009) outlines his research on defining the nature and geographic extent of the neighbourhood and, in so doing, has addressed several of the problems associated with neighbourhoods. From research initially conducted in Los Angeles and San Francisco Grannis extended his statistical methodology to Chicago and New York and obtained similar results, suggesting that his methodology may have universal applicability for the major U.S. metropolitan centres. Grannis essentially presents two models of neighbourhood: the geodemographic model and the network neighbourhood model. He presents the geodemographic model of neighbourhood as one where urbanites define their neighbourhoods according to several dimensions, including the physical characteristics of its size, landmarks and boundaries, as well as a demographic dimension taking account of the visible distinctions of race and income. These characteristics were noted in the work of Lynch, who highlighted the role of landmarks (Lynch, 1996 (1960)), the studies of Lee and Omer & Berenson, who brought out the physical dimensions of the neighbourhood, and the human ecologists’ emphasis on neighbourhood boundaries. These neighbourhoods are spatial entities which share similar access to facilities such as employment, schools, stores, churches, as well as political representation and obligations, such as taxes. They are spatially proximate, demographically similar, and similarly resourced people, but not neighbours.

To complement this model Grannis introduces network neighbourhoods. Network neighbourhoods are places where social networks evolve in an ecological context, where people meet and choose to interact with selected others, where they agree to live next to one another, rear their children together and share their economic, consumer and social needs together. Grannis's central theme is that people choose who their neighbours will be when they select their home. The decision to locate is made by a judgement of what is happening and who lives "at the block face" (one side of the street of a residential block). Choosing where to live according to who lives down the street means that people select their residential location to be amongst people similar to themselves, which facilitates enhanced social interaction (social homophily). In explaining the development of these neighbour networks Grannis introduces complexity theory and network theory and utilises social distance theory, social disorganisation theory, and social influence network theory, in addition to relying upon homophily.

These patterns of interaction are mediated, shaped and constrained by the physical layout and connection of pedestrian streets and delimited by their discontinuity which channels passive contacts or unintentional encounters providing the opportunity for people to observe one another and converse. These networks of connected pedestrian streets, delimited by non-pedestrian streets which provide "the social closure necessary for community formation" (Grannis, 2005, p. 314), are called tertiary communities (t-communities). The greater the number of passive contacts the greater the likelihood of social interaction and subsequent friendship. Grannis refers to the classic study by Festinger and colleagues which established that there was an over 40% likelihood of being friends with one's next door neighbour, but only a 6% chance of being friends with a neighbour four houses away (Festinger, Schachter and Black, 1950, quoted in Grannis, 2007). Other researchers have also indicated that such passive contacts are usually limited to the walking arena.

In his most recent paper Grannis established a significant correlation between networks of pedestrian streets and the patterning of racial groups (Grannis, 2005); in so doing, he presented an explanation as to why different neighbourhoods are racially segregated. Grannis relates the social networks of neighbours to the networks of streets in a much more direct way than any previous work: pedestrian streets facilitate neighbour-to-neighbour-to-neighbour contacts which, it is shown, are delimited by non-pedestrian streets. Individual residential location decisions are made on the basis of the profile of immediate neighbours and it is this easy contact with neighbours which, when the chains of neighbourly contacts are examined, results in similar demographic profiles of residents in the same network of pedestrian streets. Grannis concluded that pedestrian street networks accounted for a large amount of the variation in racial populations and explained the distribution of homogeneous ethnic populations better than either distance

or school attendance zones, and they fulfil the neighbourhood measurement criterion of reducing within-group variance whilst increasing between group variability.

Relationships with neighbours make up much of the social capital people use in their daily lives to seize opportunities and to reduce uncertainties (Wellman & Wortley 1990), neighbourhoods are friendly, the places where people co-operate, have a sense of belonging and create/draw upon social capital. Grannis suggests that the processes, forces, and structures at work within neighbourhoods that make them matter are neighbourhood effects, and neighbourhood effects are caused by neighbouring, which is the fabric of neighbourhood communities. Through proximity and regular opportunities for social contact friendships develop which produce social capital and neighbourhood effects, forming a close-knit neighbourhood community. The bounding non-pedestrian streets delimit the natural area of the social network, respect the logic of social interaction, and provide closure to the social system. This natural social network is not subject to the MAUP because its boundaries are the appropriate neighbourhood boundaries and not subject to change, enabling proper measurement.

Neighbourhood effects, Grannis argues (Grannis, 2007), is evidence that a social entity exists in a locality, which he terms a 'neighbourhood community', and neighbourhood effects are the product of these neighbourhood communities "...neighborhood effects are generated by the community aspect of neighborhoods which is composed of a network of neighborly relations. Neighboring is properly understood as an effect-generating relation. A neighbor network is not composed of the subset of one's relations that live in one's neighborhood; it is composed of one's neighbors. Neighboring is a distinct relation, emerging in a distinct fashion, and forming distinct networks, which have distinct effects. Neighboring must be understood for what it does for neighborhoods and their effects, not for what it does for residents directly." (Grannis, 2007) For Grannis neighbourhood and neighbouring are essentially about families with children, which he regards as the quintessence of neighbourhood life.

Grannis's unique contribution has been to make the direct association between socio-spatial patterning with the layout and structure of the built environment, thus directly relating society to territory, and he provides a sound explanation as to how socio-demographic distributions of the population are moulded and conditioned by the structure of the underlying built environment. In identifying this relationship Grannis directly relates the physical environment to the creation of community, suggesting that pedestrian street networks are the ecological contexts where people meet and choose to interact with certain others and it is these interactions which form neighbourhood communities. "A neighborhood community is a social network evolving in an ecological context. It is geographically oriented because the relations and interactions comprising it are, by definition, geographically constrained. It is demographically identifiable because homophily guides the choices people make in forming these

relations. These geographically constrained, often homophilous neighbor networks are the fabric of neighborhood communities. Neighborhood effects are generated by a network of neighborly relations.” (Grannis, 2007)

Grannis refers in his conclusion to this analysis also producing similar results where socio-economic homogeneity is tested instead of racial homogeneity, concluding that these pedestrian-street networks (t-communities) ‘can serve as an effective geographic marker for network neighborhoods.’ (Grannis, 2005)

Grannis's work is alone in presenting a clear, and theoretically supported, picture of why similar people come together in proximate residences; how this proximity, in conjunction with pedestrian street networks, mediates the potential for passive contacts primarily between parents with children; how these passive contacts can develop into neighbourly networks responsible for neighbourhood effects; and he demonstrates that these neighbour networks can be identified geographically because they are the products of pedestrian street networks delimited by non-pedestrian streets. Grannis is clear in saying that geography forces people to share lives, to become potential neighbours, and excludes most other people in the world.

Whilst other researchers have incorporated the built environment into their conceptualisation of neighbourhoods (Sampson, Raudenbush, & Earls, 1997; Sastry, Ghosh-Dastidar, & Adams, 2006) they have not attempted to use their measures of the condition of the built environment as a means of their identification. In this manner Grannis explains and substantiates the boundaries of neighbourhoods as being barriers to social interaction.

Grannis carefully defines his concepts – such as homophily, neighbourly relations and their stages of development, and social and geographical neighbourhoods – and in so doing avoids much of the confusion surrounding these often differently defined and conceptually-loose terms both within academic circles and with the wider general public. Grannis's strength of analysis lies in its commonality of experience, statistical evidence and referenced theory. No one else has produced a cradle-to-grave exposition as to how neighbourhoods are formed and how they evidence themselves both socially and geographically. Grannis's research links the physical and social environments.

Limitations. Grannis's t-communities offer the most comprehensive model of neighbourhood to date. However, despite being a dramatic advance in theorising and describing geographical neighbourhoods, there are some difficulties with Grannis's t-communities which are discussed below and, subsequently, in the context of all the neighbourhood models reviewed.

Firstly, Grannis makes no reference to the role of the physical or built environment, other than the street network, and any role they may play in social distributions, and this

raises a conundrum: either, each t-community has similar-type housing, in which case structural homophily can be held responsible for similar people living near one another (as distinct from people locating according to who lives a few doors away), or, t-communities have non-similar, mixed-value properties, and in this case Grannis's explanation of the location decisions of incoming residents is more powerful than filtering as a result of property prices, which runs counter to accepted knowledge. In either case, Grannis does not account for the initial, core, homogeneous resident population. Housing sub-markets do not feature in Grannis's pedestrian street t-community neighbourhoods.

Secondly, Grannis's t-community neighbourhoods rely upon concatenations of neighbour-to-neighbour relations without any consideration of distance, yet Grannis acknowledges that in very large t-communities (which account for some 20% of all households) distance is a better explanation of social distributions than pedestrian street networks, which indicates that distance is a salient, and unaccounted-for, variable in these neighbour networks. The very large t-communities present Grannis's thesis with a significant, unresolved difficulty, especially in regard to housing sub-markets. It may be that the large t-communities do not provide the social closure necessary for a community to develop.

An important query over Grannis's explanation of households' location decisions is that pedestrian street networks, on their own, have been shown not to be the only explanation for the observed social patterning and a more supported explanation is that it is the cost of housing, within the pedestrian street networks, which sifts and patterns the distribution of socio-economically homogeneous people. Also, given the background of neighbourhood research and experience, Grannis appears to be on shakier ground when he defines neighbourhoods as being the product of social interaction between mothers with children, and adolescents. Other research suggests that there are a number of factors associated with neighbourhoods which appear to be more important than the interaction of mothers with one another, such as property ownership (Yamamura, 2011), length of residence and age, and it could be suggested that Grannis has not given sufficient attention to the significance of these other factors in the creation of neighbourhood (Talen, 1999). Grannis has a narrower view of neighbouring and the evolution of social capital and collective efficacy than the majority of neighbourhood effects literature presents.

Another weakness is that Grannis does not acknowledge that some people have a very limited choice of who their potential neighbours might be. Evidence from residential location literature suggests that the cost of a dwelling is the most important criterion in deciding what and where to buy. In addition, Grannis does not discuss the significance of situations where people have little or no choice over where they live in that they are assigned a dwelling by some housing authority. However, such situations do not appear,

theoretically, to invalidate the process of neighbourhood development once people are in situ unless the social distance between neighbours is severe.

Grannis does not introduce any affective element in his neighbourhood model, though it could be inferred that because people have chosen to raise their children together (a critical element of Grannis's neighbourhoods) they identify with the area. In this sense it could be reasoned that affective neighbourhoods may well bear a close relationship with the neighbourhoods of neighbourly relations of Grannis's model. Cutchin, Eschbach, et al. (2011), seeking to add substance to the model, produced an interesting cross between Grannis's t-communities approach and asking residents for their perceptions of their neighbourhoods, but acknowledged that the subjective component was too general and introduced error.

This review of Grannis's presentation of the neighbourhood – the most complete, theoretically substantiated, empirically tested and recent - brings the review of extant neighbourhood models to a close. However, the review does leave a number of loose ends and the following sections of this chapter deal with the most prominent outstanding issues and suggests an improved model to address them.

3.4 Issues arising from the Review of Neighbourhood Delineation Literature.

A number of important issues arise from the neighbourhood literature examined and, whilst not exhaustive, the following highlights those judged to be most relevant and salient.

There is too much imprecision in the definition of neighbourhood. Few academics and practitioners of neighbourhood go beyond accepting the colloquial understanding of neighbourhood and most avoid any definition at all. Socio-demographic homogeneity is taken at face value as being the key variable for identifying neighbourhoods. Only Grannis has ventured a clear and precise definition of the neighbourhood which, furthermore, has the additional and substantial virtues of being supported by theory and verified in the field.

Techniques of identifying areas of socio-economic homogeneity, without identifying the processes bringing it about, and statistical units provide the spatial definitions of neighbourhoods in the absence of more robust conceptions of neighbourhood.

The scale of neighbourhood, even amongst prominent neighbourhood academics, ranges from that of the front step to a regional scale without, seemingly, any distinction being made between the social interaction dynamics operating at these various scales.

Allied to the above and the following point is the persistence of the hierarchical model of urban form, such that neighbourhood is deemed to be composed of coherent sub-

areas at the level of the front step, street, block, etc. whilst, in turn, being a component of sub-communities and communities.

Neighbourhood and community are often conflated leading to even more confusion over the definition of neighbourhood.

Affective criteria have not yet provided any accepted means of defining neighbourhoods.

‘Aggregate’ neighbourhoods dominate the literature, whilst the relationship between them and individuals’ neighbourhoods is undetermined, as is that between aggregate neighbourhoods and the aggregations of individuals’ neighbourhoods.

The role of the environment has not been given sufficient acknowledgement in neighbourhood literature to date.

The legitimacy and reality of spatial neighbourhoods appears to be widely accepted, but their relationship to social networks is less clear.

In any spatially defined neighbourhood is there one underlying, interrelated and holistic social interaction network which requires being considered as an indivisible body or can the component social networks be legitimately analysed as ‘stand-alone’ entities?

The classical role of wealth as the primary socio-spatial discriminator is underestimated. Competition based on wealth was the foundation for the Chicago School's model of urban form and residential segregation but seems to have lost its primacy with subsequent neighbourhood models.

No explanation has been forthcoming for the longevity of neighbourhoods.

No reviewed models attempt to place neighbourhoods in their historical and geographic contexts, particularly in regard to the development of the built environment.

Emphasis in identifying neighbourhoods has been placed on socio-demographic considerations and, consequently, the built environment and its relationship to social distributions has received scant attention.

Social distributions have not been related to the varying character of the built environment. Individual household residential location decisions are not taken against a uniform and homogeneous residential landscape, but rather against a variable pattern of housing type and housing cost.

In spite of these difficulties the solutions to many of these issues can be found within the body of current neighbourhood literature, as is demonstrated below.

3.5 A new Neighbourhood Model emerges

This section considers both the issues identified in Chapter 1 as fundamental to understanding what a neighbourhood is and those outstanding from the literature review, presenting a new neighbourhood model which best addresses them.

Other research into home purchase decisions indicates that who one's neighbours might be is not the most important consideration when deciding where to live, which Grannis's model rests upon: 'Affordability' tops the list with 'Location' - which incorporates the social mix of the area - second. (Newton, 2002; Mills, 2003; Palm & Danis, 2003; Kockelman K, 2008; Energy Saving Trust, 2009)

The spatial differentiation of social groups has long been recognised and appears to apply to all cultures¹¹. In the western world the explanations given for this patterning have consistently highlighted the role of wealth and rich descriptions of the spatial polarising of this wealth have been with us since the mass urbanisation of the industrial revolution. Engels' description of Manchester¹² in the 1840s is a classic of its type describing the socially distinct residential districts of Manchester noting that their pattern could be found in any of the great towns of England and Scotland, and it was echoed by other researchers concerned with poverty and the disparity of living conditions.

For example, Booth, in his mapping of poverty in London at the opening of the 20th century also recorded the distinctly poor and well-off residential areas, drawing attention to the concentric pattern they formed (Westergaard J. H., 1969), a pattern that was to be identified in Chicago in the 1920s and incorporated into the Human Ecologist's concentric ring model of urban form (Park & Burgess, 1967 (1925); Pacione, 2005, p. 142).

¹¹ "Not even centrally planned Russia or China could prevent socio-spatial segregation in cities." (Webster & LeGoix, 2005, p.5)

¹² "The whole assemblage of buildings is commonly called Manchester, and contains about four hundred thousand inhabitants, rather more than less. The town itself is peculiarly built, so that a person may live in it for years, and go in and out daily without coming into contact with a working-people's quarter or even with workers, that is, so long as he confines himself to his business or to pleasure walks. This arises chiefly from the fact, that by unconscious tacit agreement, as well as with outspoken conscious determination, the working-people's quarters are sharply separated from the sections of the city reserved for the middle- class; or, if this does not succeed, they are concealed with the cloak of charity. Manchester contains, at its heart, a rather extended commercial district... With the exception of this commercial district, all Manchester proper, all Salford and Hulme, a great part of Pendleton and Chorlton, two-thirds of Ardwick, and single stretches of Cheetham Hill and Broughton are all unmixed working-people's quarters, stretching like a girdle, averaging a mile and a half in breadth, around the commercial district. Outside, beyond this girdle, lives the upper and middle bourgeoisie, the middle bourgeoisie in regularly laid out streets in the vicinity of the working quarters, especially in Chorlton and the lower lying portions of Cheetham Hill; the upper bourgeoisie in remoter villas with gardens in Chorlton and Ardwick, or on the breezy heights of Cheetham Hill, Broughton, and Pendleton, in free, wholesome country air, in fine, comfortable homes, passed once every half or quarter hour by omnibuses going into the city." (Engels, 2002 (1845))

For the great politico-economic thinkers of the 19th century society could be divided along class lines which aligned with ownership of wealth, and the evident expression of these class differences lay in peoples' living conditions, primarily housing. The pioneers of welfare reform, in documenting the plight of the poor, first described where and how they lived. Where poor people lived was a function of where cheap accommodation was available, and the poorest lived in the worst conditions. Poor people live in poor quality housing and rich people live in expensive property and this is the basic formula of geographic socio-economic distributions: "Market driven cities tend to filter people into well defined housing market areas by income." (Webster & LeGoix, 2005).

Throughout the 20th century urban residential studies highlighted differences in household wealth as the prime cause of residential differentiation. From the neo-classicist, Hawley, who identified the distribution of community as being a factor of residential rent and the cost of access to the Central Business District, to social area analysis and factorial analysis, which held economic status to be the primary key dimension, wealth differences have filtered who lives where "The least desirable housing tends to go to people on lower incomes, living in worse conditions; the more desirable housing goes to people on higher incomes, living in better conditions, who are better able to wait until they get what they want (Clapham and Kintrea, 1986)" (Spicker, 2003). This theme runs through all studies looking at residential and social distributions. Even those who view neighbourhood more as a product of flows of power and finance, such as Harvey (2007) and Castells (1996) take their world view as a class struggle over wealth and in this sense the epistemology of urban space has come full circle from the 19th century discourse. Today, we have arrived at a position where it is generally accepted that it is the socio-economic dimension which establishes where people live: "Residential differentiation on the grounds of socio-economic status is a defining characteristic of cities." (Pacione, 2005, p. 379), and this is echoed by scholars of geodemographics: "...these so-called 'general purpose' classifications are in reality dressed-up indicators of affluence." (Voas & Williamson, 2001).

The mechanism of how this powerful force of economic filtering creates distinct geographic areas has not been carefully presented. Until recently the theory behind it was simply presented as 'birds of a feather flock together' (McPherson, Smith-Lovin, & Cook, 2001; Flowerdew and Leventhal, 1998, quoted in Harris, Sleight and Webber 2005, p.16) without a coherent explanation of how that worked and brought about concentrations of homogeneous socio-economic residential areas.

Grannis's unique contribution has been to introduce two new elements into neighbourhood research which have not received due attention. Firstly, having accepted the role of social homophily, Grannis describes the process by which people create neighbourly relationships and it is this process which transforms simple distributions into a neighbourhood. Secondly, Grannis has recognised the role of the built

environment in how pedestrian street networks shape, constrain and delimit the neighbourly process and in so doing bring about the necessary conditions which foster social interaction and bring closure to the neighbour-to-neighbour chain of interactions, thus creating neighbourhood. Grannis relies upon social homophily to explain why similar people locate near to similar others, but it is suggested here that Grannis's analysis does not go far enough. In particular, Grannis does not account for how the concentration of homogeneous people occurs where it does. Pedestrian street networks, of themselves, do not attract any particular group of people and hence an explanation for the profile of the initial settlers is absent. At the same time, Grannis's exposition does not incorporate the role of economic filtering which has been revealed as the primary spatial differentiating force. Elsewhere, other research points to the type of housing as the explanation for diverse population distributions.

McCrea demonstrated the role of structural homophily in accounting for similar people locating near other similar (McCrea, 2009) and this research, together with that of Hipp and Perrin (Hipp & Perrin, 2009), present the theoretical basis for similar people choosing to settle in the same neighbourhood. This direct link between type of property and status of occupants has been incorporated into social policy here in the U.K. as well as elsewhere in Europe and the U.S.A. (Martin & Watkinson, 2003; Kleinmans, 2004; Holmes, 2006; Galster, 2007). It is deliberate policy to develop mixed housing in a neighbourhood as a means of creating a mixed, and more socially balanced, population: "The policy of urban restructuring is intended to diversify the housing stock in order to change the social composition of neighbourhoods." (Ostendorf, Musterd, & De Vos, 2001, p. 373). Similarly: "Other studies likewise confirm the relation between residential segregation and house architectural type in mixed cities in Israel (Ben Artzi 1980, Portugali 1991) and abroad (Boal 1982, Woods 1980)." (Omer & Benenson, 2002).

3.5.1 Housing Areas.

Another aspect of this housing development by plots of similar housing type is the characterisation of the housing area as a unit, with the constituent houses passing through the buildings life cycle together, meaning that at all times it remains an identifiable entity such that even if gentrification or redevelopment occurs it happens to the housing area as a whole and the integrity of the area, whilst being transformed, is retained. All the while the resident population may change in character, perhaps covering several generations or successive populations flowing in or out. This is the 'container' view of neighbourhood (Robson, Lympelopoulou, & Rae, 2009) and whilst it is not ideal in the sense that it does not capture the dynamics of the flows of political and economic powers acting upon the neighbourhood, its strengths are that it clearly defines neighbourhood permitting these forces to be observed and studied (which otherwise they are not), as well as facilitating an understanding of the formation and

development of social networks and those elements of neighbourhood which clearly manifest themselves spatially on the ground "... through neighbourhood networks flows the full spectrum of life's realities, whether despair, criminal knowledge, friendship or social control." (Sampson, 2004, p. 11)

Another line of research has investigated the relationship between health and type of housing. It is accepted in architectural and town planning circles that the layout of streets and buildings has an impact on such things as feelings of safety (Poyner, 2005), sense of identity and social interaction (Festinger, et al, 1950, quoted in Gieryn, 2000) and now there is an intense interest in the impact of building design, facilities, style and location on health (van Kamp, Leidelmeijer, Marsmana, & de Hollander, 2003; Howden-Chapman, 2004). In this sense urban health has returned to the initial welfare concerns of the post-industrial revolution era when housing conditions were of paramount concern. Weich et al, noting the extensive literature on the associations between poor housing and worse mental and physical health, conducted research on the connection between housing type and depression in two London wards, carrying out a classification of type of property to associate with depression (Weich, Blanchard, Prince, Burton, Erens, & Sproston, 2002). In other studies Council Tax Valuation Band, which itself can be related to type of property (Longley, 1994), has been used as a proxy for socio-economic status (Beale, Taylor, & Straker-Cook, 2001; Fone, et al., 2006), and in this way type of property can be related to value of property, council tax band and social and health outcomes. In fact, the title of Macintyre and colleagues' research paper on health and housing summarises the relationship between housing type, tenure and cost, as well as, yet again, pointing to the role of income and wealth in peoples' welfare: "Do housing tenure and car access predict health because they are simply markers of income or self esteem? A Scottish study". (Macintyre, Ellaway, Der, Ford, & Hunt, 1998) This question addresses social homophily and also introduces a psychosocial dimension powerfully driving social differentiation: self-esteem or ambition - the fact that where we live influences the image we present to the world, "Housing is a private space with a public face, which can be seen as a symbolic extension of self. Housing is both a material asset and a psychosocial symbol of achieved status. It affects how people see themselves and are seen by others." (Howden-Chapman, 2004, p.164) All of this scholarship points to housing itself as a defining characteristic of the nature of the built environment and the distribution of the population, so combining people and territory, the essence of neighbourhood.

Housing Areas, those plots of substitutable housing, offer themselves as meaningful social units directly related to the environment but can they legitimately be regarded as neighbourhoods addressing the shortcomings of other models?

3.6 The Housing Area neighbourhood

Defined as '*an area of contiguous substitutable housing, whose boundaries are formed by obstacles to social interaction*', is offered by this research as addressing the research question and redressing the shortcomings of reviewed models.

The framework of the model is first presented in relation to the issues surrounding the neighbourhood described in Chapter 1 and then to the issues arising from the literature review.

3.6.1 The Environment

Housing areas firmly root the neighbourhood in the environment, that is, in both the physical and built environments; the latter necessarily referencing the former. The location and nature of the greenfield site constrains and shapes the development of the built environment and infrastructure; importantly, it also imparts the development with an historical and forthcoming context.

Housing development, in the UK, has largely been characterised by relatively small scale plot development of similar housing built to meet the demands of specific consumer markets, either private or social (Whitehand, 2001). Different housing plots contain different housing types and these parcels of housing form their own housing areas if they are sufficiently distinctive from adjacent housing plots. Theory supports these housing areas as housing sub-markets, and these housing sub-markets are distinguished by different classes of property values "submarkets can be referred to as groups that are homogenous within and heterogeneous with respect to other groups...Patterns of substitutability are linked to price, location, structural attributes of the property, and neighborhood quality." (Wu & Sharma, 2012). Even with large plot developments either subtle environmental or socially-induced discriminations develop in accordance with peoples' desires to assert their social status. Following Grannis, these housing areas, delimited by social and physical obstacles provide the closure necessary for the formation of neighbourhoods by providing natural constraints on the geographical extent of social relationships. Mok, Carrasco and Wellman (2010) found that distance still mattered for telecommunications and reason suggests that this distance factor applies to all forms of communications, especially face-to-face interactions, as physical movement is naturally constrained by barriers.

3.6.2 The relation of the built environment to social distributions

In the same location, similar housing translates into substitutable housing with regard to the residential location decisions of incoming residents, for whom cost of housing is the primary consideration in their decision-making (Mills, 2003). With social housing, prospective tenants are selected according to set criteria, which themselves serve as a

filter of an already pre-selected population in need of supported housing. Similar housing appeals to similar people and through this process of structural homophily the housing area acquires its social homogeneity. There is, therefore, both structural and social homogeneity. Through proximate structural and social homophily, social interaction develops because both physical and social distances are minimised, and use of the area affords the opportunity to socialise, facilitating social ties to develop which, in turn, feeds back into characterising the neighbourhood. It is this process of structural homophily which connects the patterns of the built environment to the social distributions of residents. It is this structural and social homophily which produces the social homogeneity used by existing models for identifying neighbourhoods. This model accounts for the similarity of the initial 'settler' residents, for whom the housing was developed, who then become the host population for social homophily. The cohesiveness of the housing area is retained throughout its life-cycle because of its homogeneous housing, with perhaps different demographic groups flowing through the housing over generations. Over time, the nature of the environment, both physical and built, and the host populations give this housing area its own history and character, serving to add to its uniqueness.

To be effective, structural homophily, which this study's neighbourhood model is built upon, does not have to rely upon property purchasers having a complete freedom of choice in who their prospective neighbours will be, unlike Grannis's model. In considering those in a position to own their property, purchasers will have a price bracket which they are willing to pay and properties falling within this price bracket may be located in a variety of places; in this sense only is choice restricted. Within their price bracket purchasers have complete freedom of choice as to who their neighbours will be. Indeed, structural homophily is based on similar properties (and therefore similar cost properties) appealing to similar people, and this is the basis for a greater propensity for social interaction than amongst dissimilar people.

For renters, the same principal applies, except that instead of purchasing the property they rent. Given that renters are judged to be less attached to their neighbourhood they are generally probably less concerned about who their neighbours are. However, areas of similar housing, suitable for renting, are likely to appeal to people with similar needs to be fulfilled, who are attracted by the common qualities of the locality and housing.

With social housing tenants the situation is slightly different but, like owners and private renters, a general socio-economic filtering has already occurred for people to be in this category: social housing is generally for the poorer-off in society. Whilst it is the case that social tenants cannot choose freely who they reside next to, it is also the case that social housing agencies place people in their properties according to their family status, needs and available property (Brown & King, 2005; King, 2006, Brent, 2014) which means that similar status people are often placed with similar others in properties

which, in any case, form a recognisable social entity. So, although there is a restricted choice as to where to reside for all groups of residents, within each category evidence of socio-economic stratification can be seen. The big distinction though is between-groups segregation.

The housing area neighbourhood perfectly fits with Galster's settings for the possible development of neighbourhood effects. Galster (2012) identified 4 potential causal pathways between neighbourhood context and individual behavioural and health outcomes, which he classified as being: social-interactive, environmental, geographical and institutional. The housing area neighbourhood model integrates these elements: the housing area is presented as one of structural and social homophily, inducing social interaction; its location, physical and built qualities are a product of its setting and local and developmental histories so incorporating geography and environment; and as a planning, investment and development unit it admirably lends itself to being considered as an entity in its own right or as a component of a greater whole, but still retaining its physical and social identity. What is especially meaningful for the potential relationship between neighbourhood effects and housing area neighbourhoods is that not only can each individual classification be clearly seen as applicable to housing areas but, most powerfully, combined, they cumulatively present a powerful case for housing areas as the natural venues for the development of social capital and neighbourhood effects.

The social interaction theory presented by Grannis for t-communities equally applies to housing areas neighbourhoods.

3.6.3 Boundaries

The boundaries of the neighbourhood are formed by social interaction barriers, either in the form of physical barriers such as open space, pedestrian-unfriendly roads, rivers and railways, or in the form of psycho-social barriers such as disparities of wealth and lifestyle, or race. These boundaries provide the closure to the internal social network system deemed necessary for the formation of the neighbourhood. Where social and physical distance creates a social barrier this forms the boundary of the neighbourhood. If the distinctions between two adjacent housing areas is not sufficient to create a barrier but is some deterrent to social interaction, then this boundary may be represented by a *soft* boundary. Soft boundaries can be built into clustering of housing areas through *wombling* .

This is the simple structure of the housing area neighbourhood, but it underplays the substantial historical and theoretical foundations of this model, discussed below.

3.7 Housing Areas and tackling the shortcomings of the reviewed neighbourhood models.

Dealing with 'No-definition' neighbourhoods. The literature review first introduced conceptions of neighbourhoods which conflated neighbourhoods and communities or had no set definition, or whose definitions were so broad that they defied delineation. Housing area neighbourhoods deal with this subject by being a practical example of a neighbourhood, being rooted in territory, and by presenting the neighbourhood as the place where neighbourhood effects are generated. Communities, in contrast, need not be locally proximate. Neighbourhood effects are the outcome of the norms and social interactions between people in place which bring about neighbourhood (Grannis, 2007). The primary setting for the generation of neighbourhood effects is the homogeneous housing area, for it is here that social interactions most easily occur. Structural homophily unites social distributions to the environment. Extending McCrea's reasoning, if the boundaries of the housing area are severe barriers to social interactions then the endogenous neighbourhood will develop a distinctive personality because of its isolation from adjacent neighbourhoods. Conversely, if the boundaries are weaker and permit some cross-boundary social interaction then the neighbourhood effects will 'spill' across them. The similarity or substitutability of the neighbourhood housing permits or encourages the development of social contracts of the nature described by Webster as there is an inherent common interest between adjacent and proximate residences whether formally acknowledged or not. Similarly, exogenous agents and forces act upon this housing sub-market as a single entity, giving it greater cohesion. This is a clear geographical statement of the territorial extent of the neighbourhood.

Size. Related to the above and a critical feature in the design of surrogate or statistical neighbourhoods, is the size of the neighbourhood. Housing areas are the building blocks of housing area neighbourhoods, but the neighbourhood may be a compound of several housing areas. For example, a housing area may be a small block of social-housing flats located in an area of privately-owned family houses; on its own it is an area of substitutable residences inhabited by socio-demographically similar people, perhaps radically different socially from the inhabitants of the surrounding housing. How big would this block have to be to qualify as a neighbourhood? At the moment this remains an unresolved question: perhaps all would agree that a large block containing a sizable number of children of an ethnic minority population would be sufficiently different in social norms and cultural background to warrant being regarded as a separate entity or neighbourhood, but probably most would also agree that a small block of flats with only a small number of children, not so socially distinct from the surrounding population, would not qualify as a separate neighbourhood and should be subsumed into the dominant housing area. The important element here is that neighbourhoods are

composed of whole housing areas, and the extent of the neighbourhood is determined by the reach of the neighbourhood effects within it; barriers to social interaction curtail the extent of the social interactions generating neighbourhood effects and are the neighbourhood's boundaries. This means that there is no 'one-size-fits-all' for the neighbourhood.

Statistical neighbourhoods. Consequent to the above conclusion is the reality that statistical representations of neighbourhoods centred on a pre-determined population or spatial size will not capture the true nature of the neighbourhood which is founded on areas of distinctive social interactions.

More on Size. Reason suggests that inner-city areas will tend to have smaller spatial housing area neighbourhoods than suburban areas. This results from the nature of early residential development in city centres which was more piecemeal than the broader and more extensive suburban residential developments of the inter war years. It is also the case that railways and major roads have carved up inner-city areas more intensely than outer-city areas forming smaller territorial housing areas although, because of higher density residential development, these areas may have a greater population than suburban neighbourhoods. Inner-cities are also characterised by greater contrasts between adjacent areas, a consequence of in-fill developments and a more extensive period of varied development than the expansive and more uniform suburban developments of the early and mid-20th century.

Scale. Following on from this geographical definition of the neighbourhood, it is clear that the neighbourhood is not multi-dimensional in terms of scale, as suggested by Suttles, et al. Whilst neighbourhood size may vary considerably, from the smallest housing area to a large estate of substitutable housing, drawing comparisons with the populations and physical dimensions of the face block, street, locality, part of town, etc. these are different elements from neighbourhoods, possessing their own environmental and social characteristics (Howitt, 1998)

Hierarchy. Whilst housing areas form the building blocks of neighbourhoods, with regard to the hierarchical model of the Chicago School, where neighbourhoods were the building blocks for communities, only a clear definition of the community concept and its relation to neighbourhoods may be able to validate this model.

The beating heart of the neighbourhood. The animation of the housing area neighbourhood arises from the network of social interactions which generate neighbourly relations and thus neighbourhood effects. It is the geography of the homogeneous housing area which sets the physical scene for these relations to develop between socio-demographically homogeneous people, and it is this rootedness in the physical and built environment which gives neighbourhoods their longevity and

coherence. This brings the role of the environment centre-stage in neighbourhood conception. As a corollary of this the neighbourhood must be regarded as an holistic entity which cannot be appropriately sub-divided because neighbourhood effects are the outcome of the interplay of all social and environmental factors, not just one or two or even a handful. There is no multiplicity of neighbourhoods occupying the same territory depending on one's area of interest, as Galster suggested; the neighbourhood is an indivisible whole, rather as an individual is a person, and ceases to be a neighbourhood if sub-divided, each component assuming its own identity.

Individuals' neighbourhoods. The housing area neighbourhood model does not explicitly account for individuals' definitions of the neighbourhood. In short, this is because of the conceptual and practical difficulties of determining these, discussed extensively in Chapters 3 and 5. However, research discussed above indicates that individuals' social networks will be constrained by the neighbourhood boundaries to social interactions and subject to the structural and social homophilous forces shaping the aggregate picture and it is reasonable to conclude that the environmental geography will shape and provide the vocabulary of individuals' manifestations of neighbourhood, ensuring a consonance with housing area neighbourhoods.

Thus the housing area neighbourhood is put forward as the best model, supported by accepted theory, for addressing both the shortcomings of reviewed models and as the means for their practical delineation.

The structure of the Housing Area model is illustrated in Table 1, and its relationship to the parent theories of the neighbourhood are shown in Figure 3.

Table 1. Structures of t-community and Housing Area Neighbourhood Models







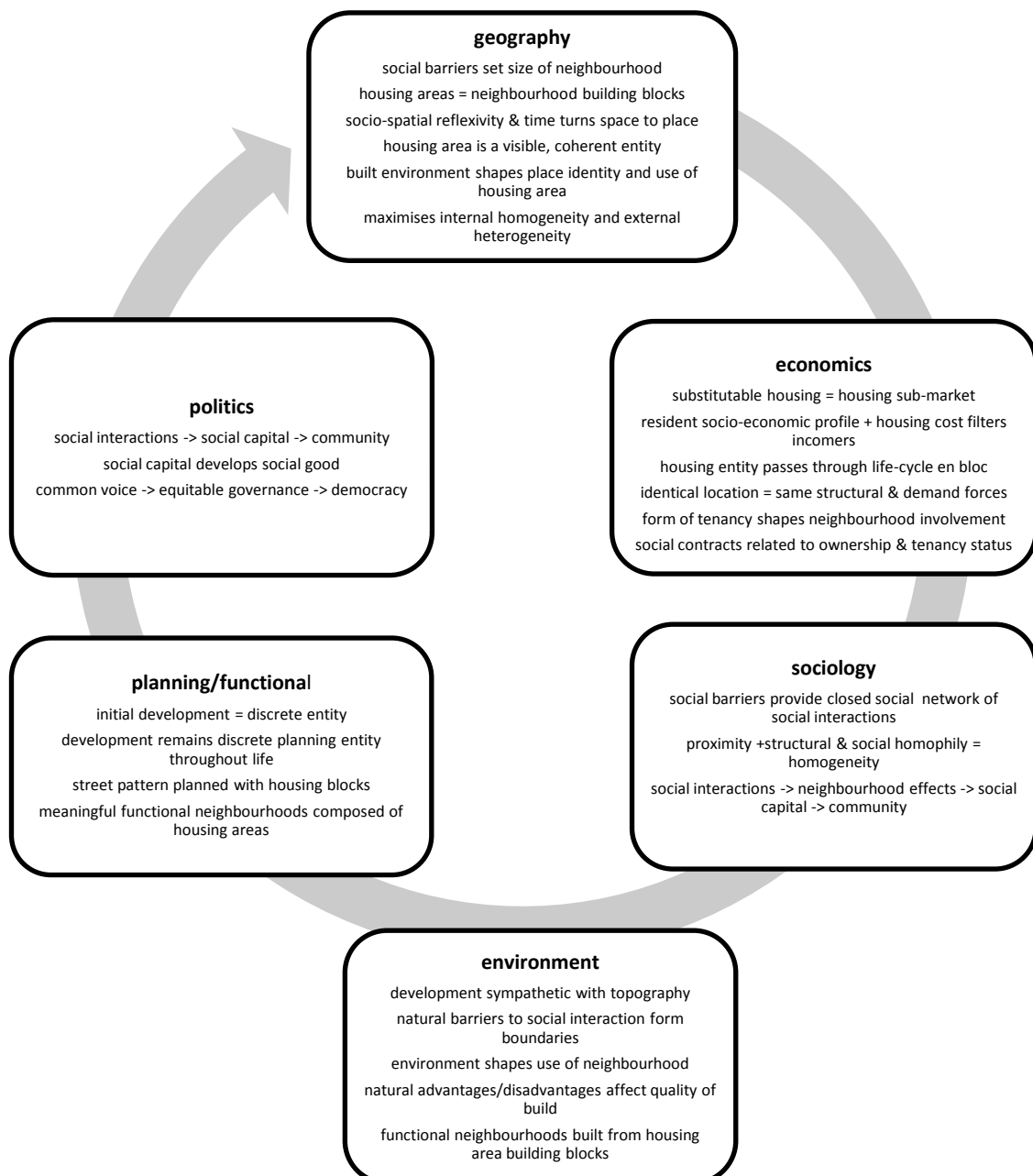
	T-COMMUNITY MODEL	HOUSING AREA MODEL
Seed population	Unaccounted for	Housing plot developed to meet particular market in area, leading to similar housing being built. This similar housing appeals to people of similar characteristics, and plot occupied by homogeneous residents.
Subsequent residents	Locate because of who lives a few doors away	Location determined by i). Type and cost of housing ; ii). Similar people
Neighbourhood development	Chains of neighbourly relations concatenate within pedestrian network of streets, constrained by non-pedestrian streets	Proximal structural and social homophily encourage social interaction, constrained by barriers to social interaction
Environmental factors	Pedestrian street network sets pattern of social networks	Housing type sets parameters of neighbourhood which experiences housing life-stages
Difficulties	Doesn't account for initial, core homogeneous population	
	Doesn't work for very large t-communities, which accounted for approx. 25% of all households in Chicago, Los Angeles and New York	
	Relies upon concatenations of chains of connections with no distance factor	
	Doesn't appear to acknowledge housing sub-markets	
	Doesn't give primacy to housing cost in residential location decision as literature favours	
	Must assume fading from one housing sub-market into adjacent ones or else it contradicts structural and social homophily	

Figure 3. The Housing Area Neighbourhood in relation to Parent Theories



3.8 Summary

This chapter briefly outlined the parent theories of the neighbourhood feeding into the geographical concept of the neighbourhood, and this set the context for reviewing practical neighbourhoods.

The first category considered was where no definition of the neighbourhood is provided or where a definition is provided but, because of its complexity or scope, cannot be operationalised; this is the dominant paradigm and is especially prevalent in the U.K. The second category looked at functional and planning neighbourhoods, the popular conceptions of neighbourhood, which are in great demand, usually composed from existing administrative geography or are customised small areas; these are essentially designed to discharge a given service and are often customised small areas. The next category was an examination of individuals' neighbourhoods; this revealed a lack of agreement as to how these neighbourhoods should be defined or measured. The developing interest in ethnographic studies and advances in technological monitoring of peoples' use of their neighbourhoods promises significant advances in operationalising these neighbourhoods in the near future. Then followed an investigation of aggregate neighbourhoods, which noted their overwhelming use of census geography. Recently, theoretical developments have facilitated the integration of environmental and social factors, establishing neighbourhoods as socio-spatial entities whose social interaction networks can be physically circumscribed. Grannis's pioneering work in this area was closely examined.

The way forward. Although Grannis's t-community neighbourhood model represents the foremost theoretically supported model for neighbourhood social processes and the best explanation for the physical dimensions of the neighbourhood to date, its shortcomings were noted, together with a broader view of the limitations of other examined models. Arising from this examination, by process of synthesis, reasoning and observation, the *housing area neighbourhood* is presented as a superior model for defining and delineating practical urban neighbourhoods.

METHODOLOGY

4.1 Introduction

This chapter takes from the literature review the emerging new model of neighbourhood which has the potential to produce meaningful, practical neighbourhoods supported by theory. To establish the suitability of this model a scheme of empirical research is presented and its methodology described. A number of interim research questions and objectives are set out as tests for establishing the model's efficacy. The chapter is structured around five major topics: Epistemology, Paradigm and Methodology; the Research Model; the Case Study; Reconceptualising the Model; further data collection.

4.2 Epistemology, Paradigm and Methodology

The research question being addressed in this thesis is: *Is it possible to produce meaningful, practical neighbourhoods under-pinned by theory?*

The leading candidate model of neighbourhood emerging from the literature review is that of a modified version of Grannis's model identifying *housing areas* as ordering the distribution of distinct social groups. This is a container view of neighbourhoods which has long been their principal practical paradigm (Jones, 1966; Park & Burgess, 1967 (1925); Robson, Lympelopoulou, & Rae, 2009) but this model also relies upon the most recent developments in social grouping, social influence and social disorganisation theory and their application to their relationship with the physical environment (Fischer, 1975; Grannis, 2001; McPherson, Smith-Lovin, & Cook, 2001; Sampson, 2004; Hipp & Perrin, 2009; McCrea, 2009; Hipp, 2010; Hipp, Faris, & Boessena, 2012).

Any research into the practical identification of such a neighbourhood model naturally lends itself to a positivist epistemology and a predominantly quantitative methodology, particularly given the model's provenance, and this is the methodological approach taken in this research. The theoretical objective is to improve our understanding of spatial processes, and, subsequently, to make generalisations from them, by identifying and explaining the relationships between the physical and human geographies found in those discernible and coherent sub-communities first recognized by the Chicago urban ecologists (Fotheringham, 2006).

This model is a new view of the physical dimensions of neighbourhood and the genesis of neighbourly relationships, though it is theoretically grounded and supported by empirical research. It is, of course, a positivist and deterministic approach to conceiving the neighbourhood which fell out of favour in geographical analysis in the 1970s, giving way to a variety of waves of epistemologies: individualism, behaviouralism, humanism, structuralism, managerialism, Marxism, feminism, postmodernism and post

structuralism. (Pacione, 2005; Aitken & Valentine, 2006; Marshall, 2006) Each of these epistemologies has contributed to the current view of neighbourhood: the humanistic epistemology emphasising the role of the individual in choosing where to live and with whom; behaviouralism has emphasised the daily 'rubbing shoulders' between neighbours and how this leads to social group formation, whilst structuralism, managerialism and Marxism have highlighted the 'behind the scenes' forces guiding and shaping peoples' choices; at the same time postmodernism has posed the query 'For whom does neighbourhood matter?' (Forrest & Kearns, 2001, p. 2136), that of the elderly, families or some other demographic group's? Each of these approaches focuses on a particular aspect of neighbourhood but in endeavouring to delineate neighbourhoods on the ground, the epistemology favoured here is that of positivism.

It is important to note that the method adopted in this paper is not a refutation of the contribution of other epistemological approaches but rather it is an attempt to refocus the rather defrayed definition of neighbourhood and it is also a re-statement of its physical reality. A consequence of the favouring of the post-positivist era epistemologies has been a looseness and diffusion of the definition of neighbourhood such that the identified and valid contributions of these epistemologies remain unmeasured and, consequently, there is a stress between the observed patterning of social distributions on the ground and the theorised explanations for them. The revealed understanding of neighbourhood presented here goes some way to addressing these concerns in that a clear physical explanation and definition of neighbourhood is presented in addition to a clear elucidation of the production of the social characterisation of the neighbourhood, together offering themselves as a model for measurement, revision and for refinement.

The phenomenological and ethnographical approaches were alternative, considered epistemologies – how individuals conceive and experience neighbourhood – but were deemed to be distinct and considerable areas of research, certainly highly worthy of investigation, but were not pursued because the published investigations undertaken to date have yielded little to further an understanding of neighbourhood and both fields appears to be poised to benefit from new and significant methods of data collection which, it is believed, will produce considerable data likely to pose fundamental questions about the nature of neighbourhood and new theory which cannot be addressed with our current knowledge (Mei-Po, 2002; Matthews, Detwiler, & Burton, 2005; Wiehe, Carroll, Liu, Haberkorn, Wilson, & Fortenberry, 2008). It is also the case that other methodologies have failed to deliver neighbourhoods conceptually, theoretically or practically beyond informal understandings.

Nevertheless, extensive consideration was given to surveying residents for boundaries of their neighbourhoods but it was concluded that such a survey was beyond the scope of this work for a number of reasons.

The first set of reasons relates to the dearth of phenomenological and ethnographical understanding of what residents' neighbourhoods are. What, precisely, is being measured when residents are asked to territorially define their neighbourhood i.e. what do residents understand a neighbourhood to be? It appears that this is far too general a question and is likely to result in a confusion of interpretations of the term 'neighbourhood': Is it an area with which they identify or which they can distinguish from any other; the walkable area around their homes or the area wherein their daily needs are met; one which gives them a sense of place or one which they are familiar with through use? Not bringing out the distinction runs the danger of equating apples with pears or, if they are each of equal significance, should equal weight be given, for example, to residents' neighbourhoods based on actual physical use and residents' neighbourhoods determined by personal identification with the area, or is the difference between them insignificant and without practical consequences?

Even before this stage is reached, there is the phenomenological question raised by Lee (1968), and subsequently by others (Bannerjee and Bauer, 1984; Guest and Lee, 1984; Lee and Campbell, 1997; Coulton, Korbin, Chan, & Su, 2001), to be addressed: Are neighbourhoods a psychological schema of a seemingly fixed areal dimension around each home, adjusted, perhaps, by physical barriers; or are they functions of socio-cultural phenomena, as described above? In other words, are neighbourhoods of a certain size, or have a minimum size?

In addition, there is the difficulty of determining whether or not resident-perceived neighbourhoods have boundaries at all. Perhaps, residents see boundaries as 'hard' or 'soft' boundaries or no boundaries but rather frontiers. In a similar vein, it is more than just possible that residents provide boundaries only when asked to do so; in other words, perhaps neighbourhoods are only vague concepts for residents (though none-the-less real) with one neighbourhood merging into another, at least in part: the work of Pacione (1983), Schell & Benjamini (2004), Schnell, Benjamini, & Pash (2005), Dalton (2007) and Parenteau, et al., (2008) would suggest something along these lines.

Then there is the question of which residents should be surveyed, for different demographic groups view neighbourhood differently (Guest and Lee, 1984; Chaskin, 1997; Coulton, Korbin, Chan, & Su, 2001; Sastry, Pebley, Zonta, 2002; Nicotera, 2007; Weiss, Ompad, Galea, & Vlahov, 2007; Pebley & Sastry, 2009). For example, an old person may understand their neighbourhood to be the walkable area surrounding their home which they use to obtain their daily goods and services; for a young mother it may be a larger territory embracing the local schools and shopping services easily accessible by car; for a youth the neighbourhood may have meaning only in the context of the school catchment area and where their friends live; for a particular cultural group the neighbourhood may be centred on a religious institution or shops catering for the group's needs; and it has been shown that the economic status and ethnicity of residents

is associated with their view of the size of their neighbourhoods (Pebley & Sastry, 2009); and so on.

Whilst it is possible that there is a coincidence of neighbourhood boundaries for each of these socio-demographic groups and for differences of attitudinal, cognitive, perceptual and practical-usage neighbourhoods this could only be determined by considerable qualitative research and structured sampling of these pertinent groups, themselves requiring prior identification (Coulton, Cook, & Irwin, 2004). However, there is considerable evidence that perceived neighbourhood boundaries vary considerably from person to person and from group to group within the same local area (Lee and Campbell, 1997; Coulton, Korbin, Chan, & Su, 2001; Pebley & Sastry, 2009; Coulton, Chan, & Mikelbank, 2011). Reference has been made above to the nascent Geo-ethnography which promises to revolutionise our knowledge and understanding of people's use of their locality, arising from which might be new ideas on neighbourhoods.

Not least, when the above queries have been satisfactorily addressed, is the question of the importance to be given to residents' neighbourhoods. For example, it is likely that most residents of a borough are not too conscious of the administrative structure of civic service provision, ward and electoral boundaries, health and emergency services organisation, and other territorial divisions which can have a real practical impact on their lives, yet have a tangible awareness of the physical and cultural nature of their immediate locality. At the moment there is no means or theory to reconcile the significance of resident-determined neighbourhoods in relation to either surrogate neighbourhoods or the theorised neighbourhoods of this study, except, as argued in this thesis, through the mediation of the built environment which, for residents, provides the visual and experiential spatial vocabulary of what their neighbourhood is and, at the same time, forms the spatial means for the practical division of the urban area. Absent of this commonality of the built environment, the place within the body of neighbourhood studies and actual significance of resident-defined neighbourhoods, in relation to the neighbourhoods of service provision and those theorised in this study, has not been resolved.

This introduces the second set of difficulties associated with determining residents' neighbourhoods, the actual survey itself. To address the queries raised above would require a very significant qualitative research programme larger, it is suggested, than this current study but certainly one which would not be adequately addressed by a simple undertaking asking residents to map their neighbourhoods. An ideal programme would likely involve open-ended group discussion work, or focus groups, to elicit residents' understanding of what the neighbourhood means to them, introducing the variety of cognitive concepts of neighbourhoods for evaluation. This work would need to be combined with theoretical conclusions arising from the research to formulate

hypotheses for testing by sampling the resident population of a given area. The sampling framework would be guided by the qualitative research but, even from current knowledge, would require embracing different age and cultural groups across both study areas, suggesting a large-scale sample. In addition, previous research has highlighted other practical difficulties.

To date, in Britain, attempts to determine the geographical extent of resident-perceived neighbourhoods have been few in number and have relied on simply asking residents to describe or draw the boundaries of their neighbourhoods, each of which has considerable practical difficulties, assuming that it is a valid question to ask. The 'success' of this technique varies from the 97% of interviewees (378 people) able to demarcate 'roughly where you think this neighbourhood in Ipswich begins and ends', helped – significantly, it is suggested here, given the inconsistent boundaries produced in the vast majority of resident-neighbourhood research – by the interviewees (Shankland-Cox, 1968, p. 110), to the 4% (12 respondents) who returned a mailed questionnaire regarding the boundaries of Hampstead Garden Suburb. It is instructive to note that in the case of Hampstead Garden Suburb which is very clearly defined by statute, name, reputation and on maps, with a widely-known Trust to manage it, contrary to the author's assertion no resident correctly identified the boundaries of Hampstead Garden Suburb and most people identified only 60 - 70% of its area correctly (Dalton, 2007). This dramatic discrepancy of different survey responses and results indicates just how important practical methodology may be to such a survey. The (Omer & Benenson, 2002) Israeli study, obtained the boundaries of resident perceived neighbourhoods by telephone questioning which this study suggests introduces significant opportunity for error. Further problems arise when considering whether maps should be introduced. Perhaps the extent of resident perceived neighbourhoods might be more successfully determined by detailed discussion amongst a set of residents rather than individual questioning. However, if maps are to be used then more questions are posed: What should the map look like; what scale should the map be and what should it be centred on? (Coulton, Chan, & Mikelbank, 2011) These are just an example of problematic questions to be addressed. Most readily available maps are 2 dimensional and emphasise transport infrastructure and buildings, yet residents see reality in 3 dimensions and the look of the built environment or the 'feel' of an area and the presence of people and what they look like may place a different emphasis on the understood boundaries of a neighbourhood than that suggested by roads and railways on a map. Presenting the interviewee with a particular scale of map may prompt a related scale of neighbourhood and, likewise, centring a map on a particular feature or orientation can also suggest what the centre of a neighbourhood should be.

A further unresolved issue is whether residents' neighbourhoods should only be viewed from the perspective of individuals and their own neighbourhood, however defined.

There is evidence that residents of an area may be able to distinguish neighbourhoods ‘over there’ which differ from those of the residents of that ‘over there’ neighbourhood, i.e. that there is a distinction between the neighbourhoods of endogenous residents (who, evidence suggests, have individual perceptions of their neighbourhood which often vary considerably from those of nearby neighbours) and those of neighbours in the general area who have an exogenous view (Webster, 2003; Nicotera, 2007; Pebley & Sastry, 2009).

The practical problems of elucidating residents’ neighbourhoods have not been satisfactorily addressed and generally accepted.

The question arising from this consideration of residents’ neighbourhoods is whether or not, putting aside the difficulties referred to, a simplified, snapshot sample survey of residents would provide a useful indication of residents’ perceptions of neighbourhood boundaries which could be compared to those arising from this study. However, whilst tantalisingly appealing, on reflection such a methodologically limited survey would not produce any reliable conclusions whether or not it produced neighbourhood boundaries congruent with those of this study.

As already indicated, the decision was made not to conduct such a survey. The sheer scale of a meaningful sample survey, together with the “lack of consensus on perceptions of neighbourhood size (which) is consistent with previous research and appears to be robust to widely varying questions about neighbourhood size asked in several studies...” (Coulton, Chan, & Mikelbank, 2011, p. 23) mitigated against anything less than an extremely well-structured and methodologically sound exercise, deemed to be beyond the scope of this work. Furthermore, the value of residents’ perceptions themselves have been called into question (Chaix, Merlo, Evans, Leal, & Havard, 2009), adding to their limitations.

The decision was based not only on the questionable utility of determining subjective and inconsistent resident neighbourhoods, in relation to the intensive resources required for such an exercise (Diez Roux, 2001; Weiss, Ompad, Galea, & Vlahov, 2007; Pebley & Sastry, 2009), but also on two other important considerations.

The first is the temporal value of even a methodologically sound survey, given the ‘churn’ of population determined to be 25% across the borough over a 2 year period (Mayhew, 2006). Neighbourhoods based on residents’ perceptions, attitudes and usage are therefore of a somewhat temporary nature unless they have their substance rooted in the nature of the built environment. The evidence discovered during this study is that neighbourhoods endure over many generations indicating that neighbourhoods are primarily a function of social and structural homophily and their boundaries are related to the nature of the built environment and pedestrian street network. The stability of neighbourhoods suggests that sequential residents have similar understandings of their

neighbourhoods suggesting that they are each compliant with the built and physical environments.

The second is the fact that this study's proposed methodology already incorporates a measure of resident-compliant boundaries insofar as it is based on Grannis's pedestrian t-communities, determined by him to demarcate the extent of neighbour networks, interpreted as resident neighbourhoods in practice as distinct from resident perceived neighbourhoods. These neighbourhoods also comply with the traditional and time-tested view of neighbourhoods as well as being supported by the practical research results obtained to date, notwithstanding their methodological limitations (Shankland-Cox, 1968; Pacione, 1983; Dalton, 2007); and the working hypothesis is that we could reasonably expect resident perceived neighbourhoods to produce similar results (Pebley & Sastry, 2009). On the other hand, if any resident survey produced neighbourhoods 'at odds' with this study's neighbourhoods (and how could that be measured?) it would be extremely difficult to interpret the significance of this and what it means.

In conclusion, it was decided that there is sufficient evidence that investigating resident-perceived neighbourhoods would introduce enormous uncertainty and confusion. Other than adding to the literature of methodologically-limited research on resident-perceived neighbourhoods such a survey's results would not improve the subject's knowledge base.

It is also the case that other methodologies have failed to deliver neighbourhoods conceptually, theoretically or practically beyond informal understandings.

Neighbourhoods in practice. Whilst other practical or surrogate neighbourhoods (such as administrative units, census geography and various means of homogenic aggregation) were considered as models for investigation, none of these met the research requirement of having the necessary, rigorous theoretical validation or mature epistemologies. Likewise, identifying cores of homogeneity with fuzzy boundaries, suggested by Chisholm (Chisholm & Dench, 2005) lacks both theoretical substantiation and practicality as no concept of neighbourhood, distinct from community (also not defined), was offered.

This strategic study adopts a limited theoretical research method substantiated by a positivist, quantitative methodology because it is felt that there are underlying regularities of human behaviour within close proximity of peoples' homes that can be explained by theory and identified by measurement. There is no single, robust test which can establish this and whose results could not be challenged as producing either a false positive or a false negative. Consequently, this thesis relies upon statistical analysis, and the associated theoretical and empirical explanations of its results, to validate its central argument.

The literature review indicated theory to hold that social homophily underlies social homogeneity (McPherson, Smith-Lovin, & Cook, 2001) and that this need to form social groups is a fundamental part of the human condition (Mumford, 1954; Maslow, 1968; van Kamp, Leidelmeijer, Marsmana, & de Hollander, 2003). Grannis holds that step-by-step passive contacts transform into neighbourly networks which he regards as being responsible for neighbourhood effects (Grannis, 2007). Grannis demonstrated that people choose where they live according to who lives a few doors away and that chains of neighbour-to-neighbour networks develop along pedestrian streets, which encourage social interaction, and that these are geographically bounded by non-pedestrian streets which delimit these networks. The theoretical development of this study is to introduce another element of the literature review which highlights the role of structural homophily, i.e. that similar environments attract similar people, with the prime variable of this relationship being cost of property (McCrea, 2009). This role of structural homophily in filtering geographical proximity of similar people also proves to be a commonly adopted social engineering policy by various western governments who use housing diversity to introduce social diversity into areas on the basis that mixed housing creates mixed social groupings (Martin & Watkinson, 2003; Kleinhaus, 2004; Holmes, 2006; Pawson, Davidson, Morgan, Smith, & Edwards, 2009). This study is not concerned with the theorised mechanism by which it is suggested that structural homophily brings about social homophily or how social homophily brings about neighbouring, but it is primarily concerned with the geographical patterning of this neighbouring, i.e. the neighbourhood.

4.3 Research Design

Given the absence of a theoretically sound definition of the neighbourhood in the U.K. and the weak rationale of those delineated – natural dividers or census geographies as borders, encompassing areas of homogeneity - this study investigates the validity of applying the new model of neighbourhood.

The Grannis model has been accepted by leading neighbourhood scholars as being in the vanguard of identifying meaningful, practical neighbourhoods underpinned by theory (Gieryn, 2000; Sampson, Morenoff, & Gannon-Rowley, 2002; Coulton, 2005; Lee, Firebaugh, Matthews, Reardon, Farrell, & O'Sullivan, 2008; Hipp & Perrin, 2009; Tita & Radil, 2010; Omer & Goldblatt, 2011), and this research aims, as a first step, to apply Grannis's research methodology to a U.K. setting. This would set a benchmark for comparison with the U.S. situation and for any subsequent modifications to the model.

Grannis argued that the significant correlations he found between the distribution of racial groups and census block groups associated with pedestrian street networks were evidence validating his theory that homophily arose from residents choosing their residential location according to who their neighbours would be. This process, he

reasoned and demonstrated, was a better explanation of racial distributions than either distance or school attendance zones. Grannis called his socially homogeneous pedestrian street networks *neighbourhoods*.

Replicating Grannis's research in the U.K. required a quantitative analysis of large datasets covering, ideally, several of the largest cities in the U.K. The datasets required would be U.K equivalents of Grannis's datasets:

National digital dataset of road hierarchy, identifying separately roads which would serve as non-pedestrian streets delimiting pedestrian-friendly streets.

Census datasets covering ethnicity by census geography and school catchment areas.

Computer programming would then be required to automatically identify the pedestrian street networks.

Unfortunately, there is currently no digital dataset of the U.K. road hierarchy which, in its raw state, could be used to provide suitable pedestrian street delimiters (the familiar 'A', 'B', 'C', Unclassified and Motorway/Trunk road U.K. hierarchy data set does not meet the requirements)(Marshall, 2004); nor is there a census dataset of ethnic populations by school catchment area. Furthermore, the neat coincidence of Grannis's pedestrian street networks with census block groups was found not to exist when a small area was sampled, and does not have an equivalent in any of the U.K. census geographies, therefore deriving statistics from census datasets for pedestrian street networks would require considerable labour-intensive data re-casting. In addition, Grannis's identification of his t-communities was unclear, necessitating additional analysis not practicable on a large scale. However, it was determined that much of Grannis's methodology could be applied to a U.K. setting (by intensive data re-casting and by utilising a local authority road dataset as a surrogate for a pedestrian street network delimiter dataset), but this would necessitate abandoning a large-scale quantitative analysis.

Instead, a case study approach was deemed more appropriate for a number of reasons: firstly, that the labour-intensive re-casting needed to obtain data for housing areas necessitated a small study area; secondly, given the non-availability of a reliable housing-type data set, a detailed housing survey would need to be conducted; thirdly, the co-operation of local authorities would be needed for ownership, road hierarchy and council tax data sets which would be easier with a single local authority than with a multiple of them; following on from this, the requirement to identify social interaction obstacles or barriers required field judgement in the absence of any such data set; in addition, the qualitative research on the historical development of the housing areas would only be viable for this research with a limited geographical area; likewise, small study areas enable all streets to be covered by field work and this adds a

phenomenological dimension, albeit of personal impressions and judgements by the author, in assessing the individual characters and personalities of the study areas and the housing areas within; lastly, an holistic familiarity with the study area was necessary to make appropriate decisions over, for example, classifying different housing types and assessing the suitability of applying other techniques, such as Systematic Social Observation. (Sampson & Raudenbush, 1999; Sastry, Ghosh-Dastidar, & Adams, 2006; Yin, 2009)

Although data availability forced the adoption of a case study research methodology and the utilisation of different datasets to those used by Grannis, it is argued that these differences are immaterial as far as casting doubt on the integrity of the data outcome and their validity for comparative purposes and, if anything, are more rigorous in identifying pedestrian network barriers. On the other hand, it cannot be denied that the significant amount of data re-casting required does introduce an opportunity for processing error. To reduce the incidence of error, data was iteratively re-checked.

The case study and reproducibility. Whilst a case study method may appear to be a retreat from Grannis's analysis of sizeable data sets covering the largest cities in the U.S., in fact this is not the case. The case study areas selected are well known to the author and were deliberately chosen as test beds for developing a reproducible methodology which might be able to be rolled out for general use. This intimate knowledge of the case study areas provides a sound basis to test and interpret the results of field work against the objective of identifying coherent and practical neighbourhoods supported by theory. In conducting the field work an eye was kept on developing an approach using conventional data sets for wider implementation without needing expensive detailed personal surveys which would, additionally, introduce a lack of clarity into the results. The author's familiarity with the study areas also served as a quality check on the datasets used and their suitability for the task. Certainly, in one case this meant the suspension of using one large mapping dataset because of the author's personal insight into data errors, referred to below, and the customising of others.

This topic is discussed further in Chapter 5 'Conclusions'.

Another advantage of adopting a case study approach was the opportunity to extend the data analysis to cover:

Other geographies, such as natural areas, census geography and Housing Areas

Additional datasets, such as council tax banding values, housing type, housing age, and property values.

Additional census datasets covering variables traditionally associated with neighbourhoods.

Several of these datasets were only available at a local authority level (council tax banding, housing type, location and age) whilst labour-intensive property value calculation and mapping could not have been conducted on a large scale.

The initial pilot investigations of a familiar area of London to evaluate the appropriateness of the Grannis approach prompted a re-conceptualisation of the neighbourhood model being examined. Unease with Grannis's theorised mechanism by which neighbours sorted themselves was added to by the apparent dislocation between this mechanism and the weight of historical neighbourhood scholarship which suggested that wealth is the great residential discriminator – that is, property values. It is also evident to anyone assessing residential social distributions in London that the most noticeable discriminator is between social housing and private housing, again related to cost in part and housing agency policies. Furthermore, street and road patterns appeared to be associated with housing developments of a certain age and type, which suggested an historical component in housing, and thereby, social distributions.

This observational and reasoned qualitative information suggested a re-conceptualisation of the Grannis neighbourhood model to incorporate an historical development dimension setting the housing type and age pattern, often related to social or private ownership, which, in turn, can be related to individual and collective property values, deemed to be the driving force behind residential patterning. This reasoning is consistent with both everyday experience and neighbourhood scholarship from the Chicago ecologists through to the present-day social and structural homophiles.

The revised neighbourhood model puts property values and ownership as the wealth filters primarily determining all social residential distributions.

The research progresses through several stages: firstly, a suitable selection of case study areas was made, followed by a review of both the historical residential and social compositions and developments of the areas; secondly, it transfers Grannis's methodology to the U.K. and uses the results as a benchmark to establish the success of the transfer and as a reference to help evaluate results when additional geographies and variables are introduced; thirdly, arising from field experience, Grannis's analysis was applied to other spatial units – natural areas, Housing Areas, LSOAs, - to test whether or not *housing areas* explain social distributions better than t-communities and other spatial units in the case study areas; property values were then introduced into the analysis, via council tax valuation banding, as a means of ascertaining the role of wealth in social patterning; following this, the strengths of the relationships of other socio-economic variables, traditionally associated with neighbourhoods, were measured across the variety of spatial units to test Grannis's assertion that his t-communities were

effective neighbourhoods. Lastly, an assessment was made on the generalisability of the methodology.

4.4 Study areas, analytical units, data, and variables

Selecting the case study areas. Two contrasting case-study areas in the London Borough of Brent were selected for analysis: North Brent (Kenton-Preston area) and South Brent (Kilburn area). These two areas are true to the general pattern of urban form and were taken to possess characteristics typical of U.K. urban areas in general. London itself has similar characteristics to Grannis's U.S. cities in terms of its culture, size and ethnic mix enabling direct and meaningful comparisons to be made. Brent straddles the acknowledged divide between outer suburban London and inner urban London and was chosen because it is true to the general pattern of urban form and possesses characteristics typical of U.K. urban areas in general. The two study areas themselves were selected because they provide contrasting development histories resulting in different housing structures and tenures. Kilburn, in south east Brent, is the closest part of Brent to central London, being only 3 miles from Marble Arch and the West End. Kilburn was, up until the middle of the 19th century, a village situated on one of the main northerly routes out of London but by the end of the first decade of the 20th century Kilburn had been completely developed. In contrast, Kenton-Preston, in north Brent (about 12 miles from Marble Arch), was wholly developed in the 1920s and 1930s. It is now a typical London suburb. (Brent Heritage, 2002) Consequently, the buildings and histories of residential occupation are in contrast to one another and the two areas correspond to the urban/suburban divide. Likewise, selecting two study areas from the north and south of the borough presents the opportunity to examine how the large-scale immigration into London since WWII is expressed in residential patterning.

Additionally and importantly, the author is familiar with the two areas and was able to obtain the co-operation of the London Borough of Brent's GIS team in particular and the council officers in general.

By and large the socio-economic data shown in Table 2 shows that Brent is a typical London borough except that it has a significantly higher percentage of its population being non-White than the average. This can be explained mainly by its inner London location and it being a borough long favoured as a home for new immigrants with suitable stocks of cheap housing close to sources of employment in central London, local industrial estates (such as at Willesden and Wembley) and Heathrow. Of course, compared to the rest of England, London exhibits a socio-demographic profile of a more ethnically diverse, educated and mobile population. South Brent's population is even more mobile and, consistent with this, fewer people own their own homes and there are many fewer families with children than London as a whole and especially with regard to North Brent. This picture suggests a less settled, working population able to

sustain the higher property prices which families with children would find more difficult to afford. Interestingly, for London, South Brent's population is predominantly White. On the other hand North Brent's socio-economic profile is much more aligned with what is normally presented as being a typical suburban picture: many more home-owning, stable families with children.

The two study areas were juxtaposed at the northern and southern extremities of Brent to catch this contrast between inner, older built environment and the younger, suburban London. South Brent is, by and large a clearly defined area bordered on the north by a railway, on the east and west by main roads with only its southern border not being an on-the-ground, obvious break in the built environment; here the border is formed by the edge of the borough as it butts up against the London Borough of Westminster. North Brent is a roughly triangular area enclosed by railway lines to the south west and south east and a main road to the north, which is also the borough boundary. The boundaries for both areas are mainly pedestrian barriers supplemented by administrative boundaries, both being very real in how they impact on the borough's population in terms of local cohesion and mobility.

Table 2. Comparative socio-demographic data for study areas and administrative spatial hierarchy

	POPULATION	OWN HOME	ECONOMICALLY ACTIVE	ABC1	MARRIED + CHILDREN	RESIDENTIALLY STABLE 1 YEAR	WHITE
ENGLAND	49,138,831	69%	67%	52%	18%	86%	91%
LONDON	7,172,091	57%	68%	59%	15%	77%	71%
BRENT	263,464	56%	65%	56%	20%	76%	45%
NORTH BRENT	14,716	72%	65%	67%	27%	79%	44%
SOUTH BRENT	19,961	36%	68%	57%	11%	72%	61%

Quantitative work. The quantitative methodology and analysis is a replication of the techniques described in Grannis's paper measuring pedestrian street networks and racial segregation in 3 major U.S. cities (Grannis 2005, 301-303). The spatial units being used are: tertiary networks and tertiary natural areas (as interpretations of Grannis's t-communities), housing areas, and Lower Super Output Areas of the England and Wales 2001 census geography. The data sets employed are:

2001 census data sets: Ethnic Group (UV09), Household Type (UV68), Migration (UV52), Economic Activity (UV28), Tenure-Households (UV63), Approximated Social Grade (UV50);

London Borough of Brent: part of Brent Domestic Property Database 2005; Brent Traffic Flows 2001

Brent Domestic Property Council Tax Valuations from the Valuation Office Agency, via Brent Council;

Sales values of properties in sample areas 2000-2005, downloaded from NetHousePrices website (nethouseprices, 2009) and average property prices for each property type from UpMyStreet website (Zoopla, 2009) both sources using data originally from Land Registry (Land Registry, 2009).

Geographies used: 2001 Census output and super output geography supplied on disk from Office of National Statistics. Brent Local Authority, Landline buildings & roads, conservation areas, wards, transport, schools, regeneration areas shapefiles from Brent GIS.

The analytic variables used were: Ethnic origin, Households with dependant children, Economically Active, Households at same address 1 year prior to census, Property Ownership status, Persons' social grade, Property modelled values; Property Council Tax Valuation Bands; Property Age, Property Type, Property Freehold Ownership.

Computer programs used were: ArcGIS, Access, Excel, SPSS.

4.5 Research Procedure Overview

Transferring Grannis's methodology to the U.K. A measure of the successful transfer of Grannis's methodology to the U.K. was reasoned to be if this study's implementation of his methods produced correlations comparable to those he achieved in his U.S. research. Reference has already been made to the unavailability of the precise datasets Grannis used but substitutes were available. Instead of the U.S. TIGER DLG CFCC A-41 definition for pedestrian streets used by Grannis (others being non-pedestrian streets) this study used the unclassified class of roads to represent pedestrian streets, and non-pedestrian streets were those identified as 'high' traffic flow from a Brent Traffic Flow GIS 2001 dataset supplied by the Brent Council.

In addition, this study used railway lines, large open spaces and river courses as pedestrian delimiters where they were judged to act as such. These differences would have a negligible impact on the statistical analyses and they are in keeping with Grannis's central thesis that neighbourhoods are created from pedestrian street networks. Replicating the t-community analysis proved complicated because Grannis's definition was not at all clear and this was an additional factor preventing a national analysis; in the event, both interpretations of t-communities were implemented, one being termed tertiary networks and the other being called tertiary natural areas.

Other Spatial Units. Analysis was also conducted for two other spatial scales: housing areas and LSOAs. Housing areas are areas of distinctly different residences as characterised by age, type and freehold ownership. These variables are related to property value (as represented by council tax valuation band) which reflects the residential filtering process by wealth, postulated here as underlying the new model of

neighbourhood. LSOAs are the Lower Super Output Areas of the England and Wales census geography and have been included in the analysis because of their popularity as surrogate neighbourhoods. The statistical analysis is to ascertain which spatial units demonstrate the most significant correlations with both ethnic and socio-economic variables. Spatial units showing higher and significant correlations than t-communities or natural areas are taken to provide a better explanation of ethnic and socio-economic distributions and can therefore more justifiably be termed neighbourhoods, or the building blocks of neighbourhoods, depending on the degree of difference between adjacent units.

Neighbourhood indicator variables. A number of census 2001 socio-economic variables (Ethnic Group, Household Type, Migration, Economic Activity, Tenure - Households, Approximated Social Grade), selected for their historical associations with neighbourhood in the academic literature, were analysed in the same manner as ethnic groups to see if their distributions could also be explained in the same way as ethnic patterns. Such positive associations would re-inforce the validity of calling the spatial units neighbourhoods.

Correlating social and environmental factors. In further analysis, these variables were combined into an index and this socio-economic index was then correlated with housing type and council tax banding to establish the relationship between the built environment and the social environment.

Data validity. The differences in data sets used in Grannis's U.S. research and this U.K. case study are not considered material in regard to the conclusions derived from any statistical analysis. The quality of the census data of this study is unimpeachable. However, the use of Brent traffic flow data to define non-pedestrian roads introduces an untested factor into the data, though, in principle, this would not jeopardise the conclusions drawn though possibly influencing the strength of any relationships.

A more serious consideration is the re-casting of census data into different spatial units from the supplied output area data supplied. The assumption that each household/person represents the average qualities of the output data introduces the ecological fallacy, but this is unavoidable and is unlikely to undermine the conclusions drawn from the data.(Robson, Lympelopoulou, & Rae, 2009) Where re-cast data resulted in whole or part output areas being assigned data relating to fewer than 25 persons or 10 households, the data was ignored, to reduce data distortion and unreliability.

All data sets were 'cleaned' where necessary and in the case of the Brent Property data set this was quite extensive, with duplicates, unreferenced entries, missing record data, records inconsistent with other data sets, and records for as-yet-unbuilt properties, needing to be weeded out.

Sadly, in this context, there is no data set of social barriers for the research area and so they were reasonably devised by the author. Such judgements were called for several times (as, for instance, determining housing type classes and classifying property; selection of census socio-economic variables for analysis; study area selection; housing price classes) which potentially introduces author bias; however, awareness of this, considered judgments and their flagging should help minimise their impact.

Care was taken that data complied with the normal assumptions of each statistical technique employed.

4.6 Implementing the Research Procedure

4.6.1 The Brent Study: The Two Sample Areas

Two contrasting case-study areas in the London Borough of Brent were selected for analysis: North Brent (Kenton-Preston area) and South Brent (Kilburn area). These two areas are true to the general pattern of urban form and were taken to possess typical characteristics of U.K. urban areas in general. They were selected because of the author's familiarity with the two areas and because of the co-operation of the London Borough of Brent's GIS team in particular and the council officers in general.

Brent straddles the acknowledged divide between outer suburban London and inner urban London with the two selected areas respectively being representative of them.

Kilburn, in south east Brent, is the closest part of Brent to central London, being only 3 miles from Marble Arch and the West End. Kilburn was, up until the middle of the 19th century, a village situated on one of the main northerly routes out of London but by the end of the first decade of the 20th century Kilburn had been completely developed

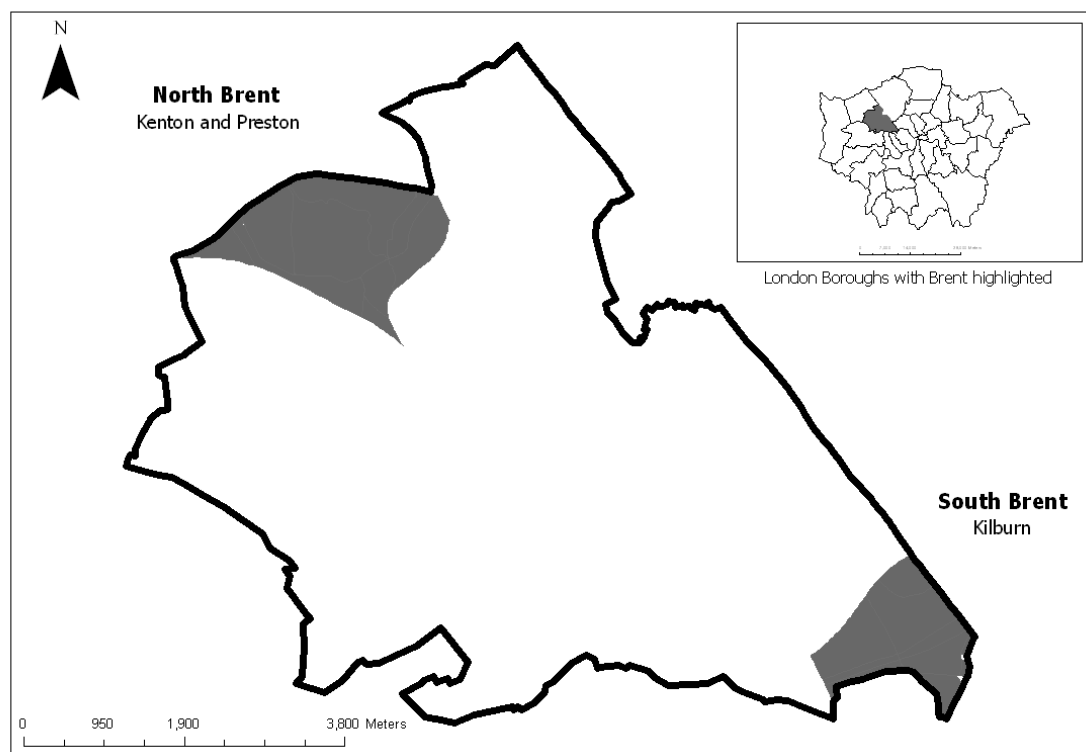


Figure 4. Location of two Study Areas within Brent and Greater London

In contrast, Kenton-Preston, in north Brent (about 12 miles from Marble Arch), was wholly developed in the 1920s and 1930s. It is now a typical London suburb. (Brent Heritage, 2002)

The Kilburn study area is smaller than the North Brent study area, yet has a larger population and the two respectively exhibit the typical characteristics of dense urban and sparser suburban areas of U.K. cities.

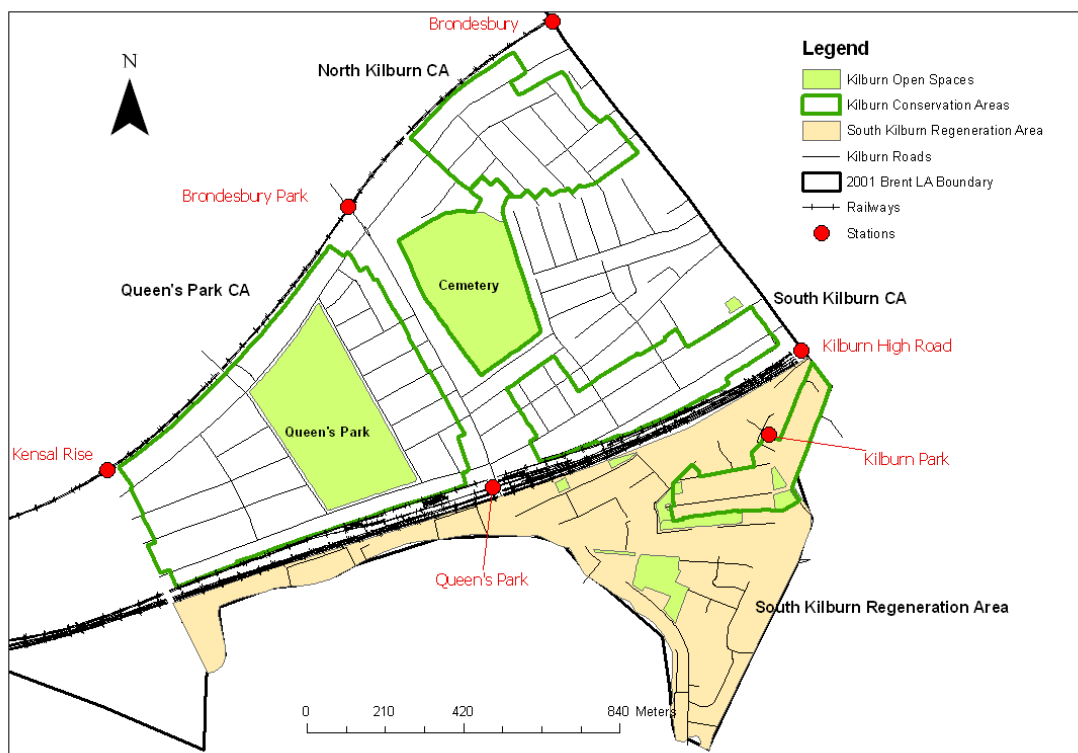
Table 3. Population Density: North Brent and South Brent (Kilburn)

	North Brent	South Brent
Population (Census 2001)	16,936	19,751
People/Km²	5,457	10,630

Housing Development and Street Networks. Unlike the U.S. cities the London Borough of Brent is not the product of large-scale grid street and city block growth, and house building in both North Brent and Kilburn has been characterised by small-scale development of farmland as estates were sold off.

Of the two study areas, Kilburn has a longer history of wholesale housing development. The existing main route out of London, the A5 (old Watling Street), now Kilburn High Road (as this part of the Edgware Road is named) and the coming of the railways to Kilburn in the mid-19th century led to development spreading north and west from the old centres along the Edgware Road and the new rail stations along it. By the early 20th century, all of the Kilburn study area had been built over. The largest single piece of development was in the western section of the study area now forming the Queen's Park Conservation Area (Brent Borough Council), which was developed between 1870 and 1900. Queens Park, like the adjacent Kilburn Conservation Area, was developed wholesale and has a grid street development, though not on the model or scale of the U.S. cities. In the 1960s a major re-development of the Carlton Ward, South Kilburn (now a Regeneration Area), led to the demolition of all the Victorian housing which was replaced by a large Council estate of mainly high-rise flats with a new street pattern.

Figure 5. Kilburn streets and Conservation Areas 2008



North Brent was developed later, mainly in the 1920s, 1930s and 1960s (Brent Borough Council, 2006). The development history of these two areas set the pre-dominant street pattern and housing styles which, except for the wholesale re-development of South Kilburn, exist today.

Figure 6. North Brent Development map

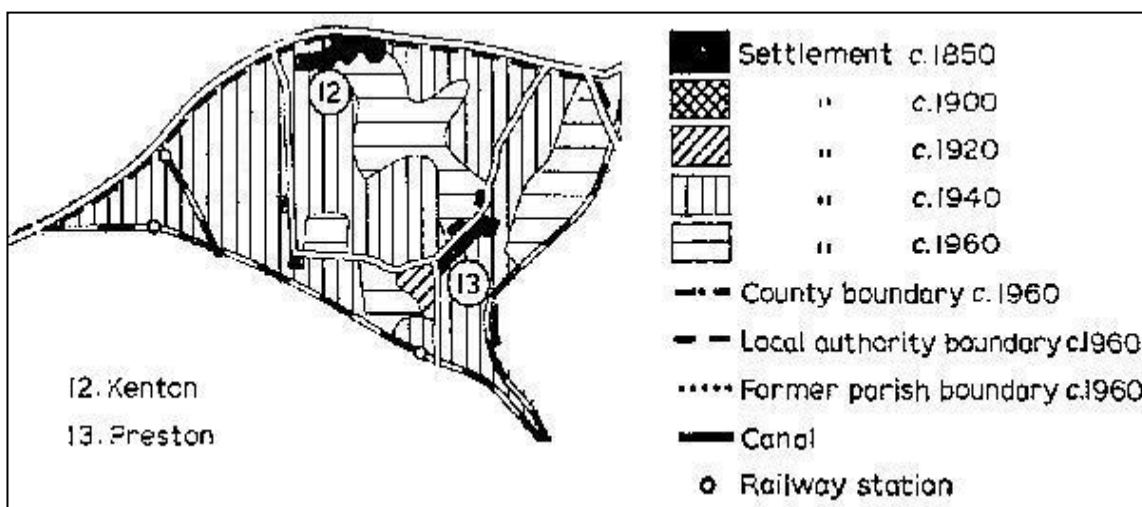
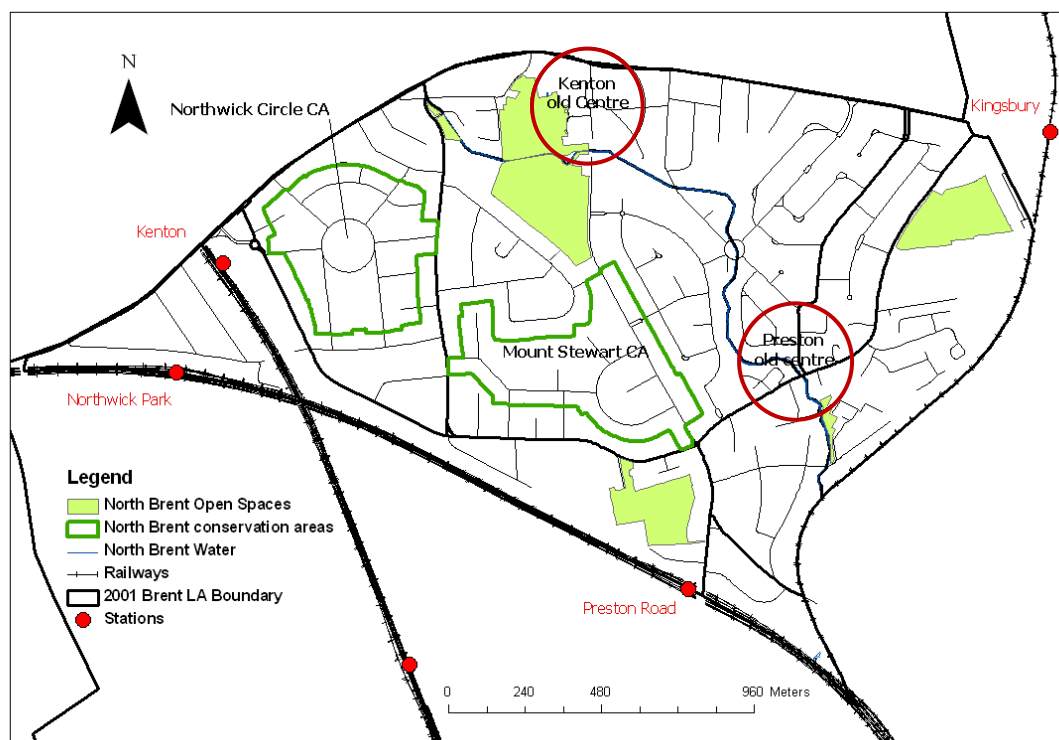


Figure 7. North Brent Streets and Conservation Areas 2008

4.6.2 Study Area Profiles

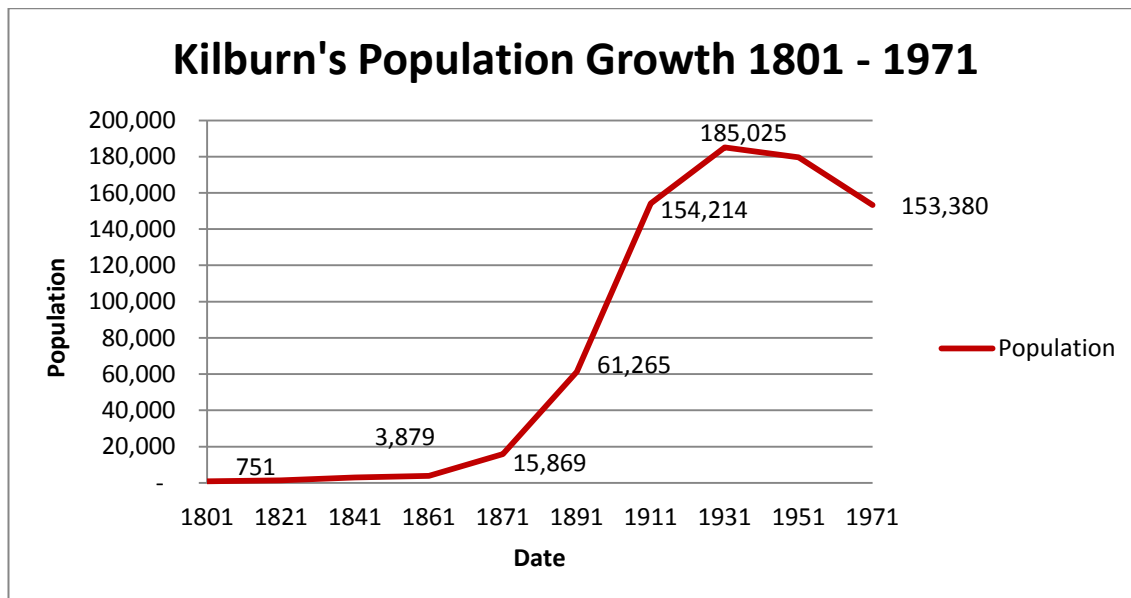
Kilburn

Up until the early part of the 19th century, Kilburn mainly consisted of a number of manor houses on the Edgware Road. These were on the demesne estates of the Ecclesiastical Commissioners, which were largely farmland. Kilburn's early wholesale residential development came in the 1850s and 1860s for south Kilburn and in the 1870s and 1880s in north Kilburn as London expanded. Two railways crossed Kilburn: the L. & N.E.R. line was built in 1837 with a station at Kilburn in 1852 in the southern part of the area and the Hampstead Junction Railway with a station at Edgware Road (Brondesbury) in 1860. "The railways however played little part in the growth of Kilburn, serving less to connect the area with others than to divide it into sections." (Baker & Elrington, 1982). This division of Kilburn was compounded by the prebendal estate pattern which saw north Kilburn as part of the Mapesbury estate and the area south of Willesden Lane as the inextricably mixed Bounds and Brondesbury estates, with the Kilburn Park estate in the southern part of the study area (see Willesden Development map, Figure 9).

The earliest properties built were for professionals and wealthy businessmen in the style of large detached and semi-detached villas along the Edgware Road, Willesden Lane, Brondesbury Road and Villas as developers tried to copy the residential development pattern established on the Hampstead side of Kilburn, east of the Edgware Road. However, Kilburn, mostly part of Willesden, fell just outside of the metropolis with its strict building regulations and by the middle of the 19th century land companies and small builders competed to buy up estates and to cram them with cheap houses. The land companies usually leased to builders who, in turn, sub-leased to smaller builders with little or no capital. The Ecclesiastical Commissioners did not keep a tight control on development and some of the worst mistakes were made on their property with inappropriate buildings being developed by speculative builders. The Kilburn Park estate was particularly a victim of this piecemeal and poorly planned development. The Commissioners did set an overall road pattern and commissioned better quality housing along the Hampstead junction railway and along Willesden Lane and Salusbury Road, but the overwhelming demand was for lower middle class and working class housing that characterised most of Kilburn.

“In 1871 Kilburn was socially mixed, not as high class as the builders had hoped but still including a few large houses like Kilburn House and streets like (Princess) Street where more than half the houses employed servants...There was still a strong middle-class, mainly professional and commercial, element in the population, especially of north Kilburn, in the early 20th century...From early on, however, the working classes predominated and contemporaries noted the horrifying conditions in which many of Kilburn’s inhabitants lived...Sickness was rife, and in 1875 Kilburn was castigated for its chronic pauperism, negligence, ignorance, and lack of cleanliness. The people usually came from similar conditions in Paddington and Marylebone and included, already in 1871 but increasingly during the 20th century, recent Irish immigrants. They included a shifting population of the temporarily employed, often bachelors working in the building industry and living in overcrowded lodging houses. Social life centred around the public houses, said in 1949 to average one for every 424 people in south Kilburn compared with one to every 2,618 for the rest of Willesden. In the 19th century churches and chapels of all denominations offered an alternative social focus...” (Baker & Elrington, 1982)

Right from the start Kilburn saw many of the individual properties subdivided amongst families and was subject to successive waves of immigrants and transient workers as those who prospered moved on out to the suburbs of London and, later, to the New Towns as part of civic policy, drawing in the newer arrivals. So, the practice of renting property was inherent in the Kilburn property market right from the beginning and has continued ever since with the nature of the sub-divided property attracting footloose residents and sustaining the nature of the area as unappealing to families or lifetime residency.

Figure 8. Kilburn's Population Growth 1801 - 1971

Source: british-history.ac.uk

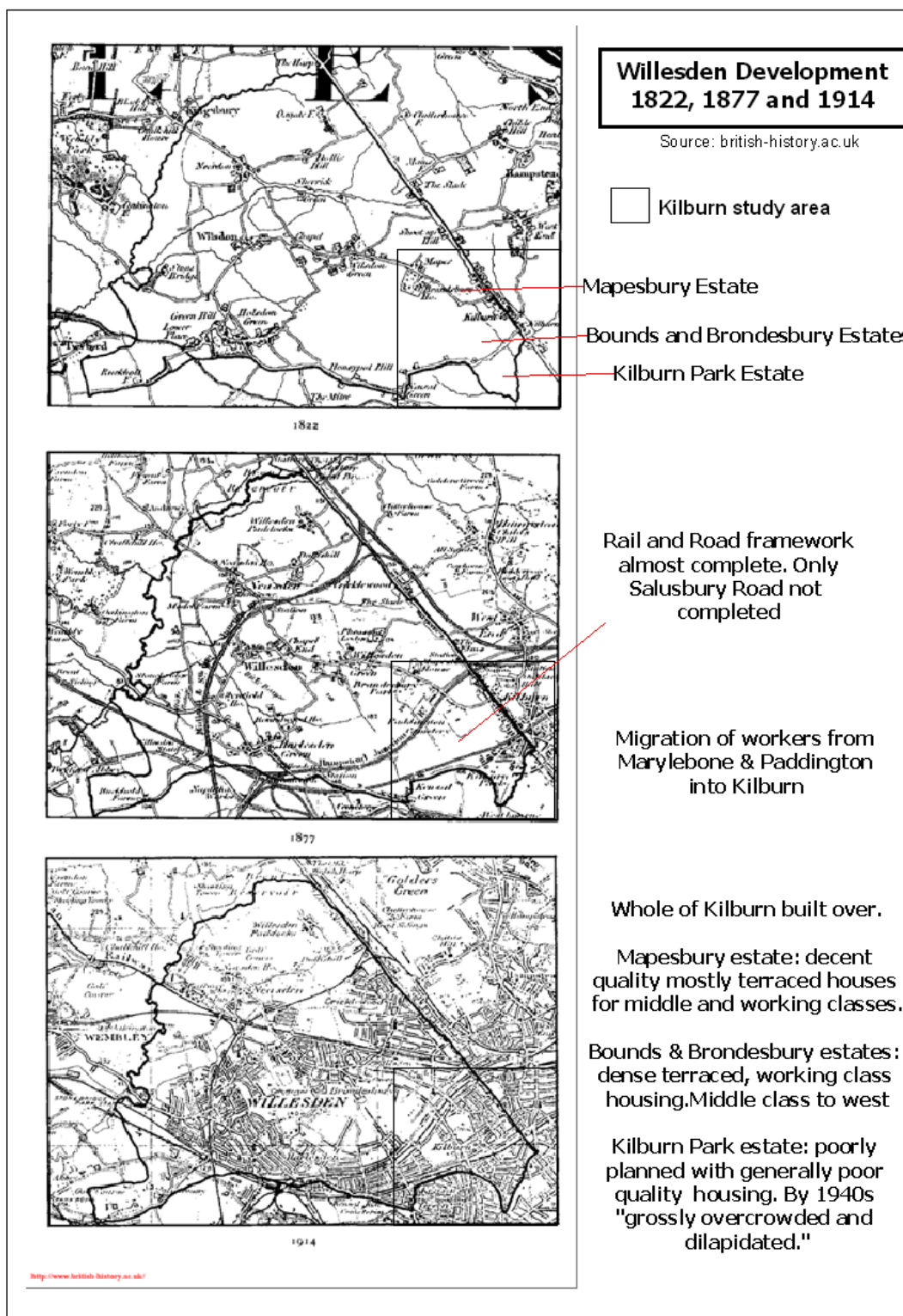


Figure 9. Willesden Development 1822 - 1914

“Surveys of the Church Commissioners’ estates in 1944 and of the whole borough in 1948 showed that south Kilburn was grossly overcrowded and dilapidated.” (Baker & Elrington, 1982) Slum clearance had begun in south Kilburn in 1938 but was halted by the war. War damage added to the push for slum clearance and the council started rebuilding the whole of south Kilburn and Kilburn Square with other developments at the northern end of the study area part of Willesden Lane and other smaller sites in the 1950s and 1960s. Increasing rebuilding costs and a greater appreciation of conservation led to concerted efforts at preserving some suitable Victorian buildings. However, in the past few decades there has been very little new council building in the area and only a handful of small private housing developments.

In terms of the neighbourhood patterning of Kilburn the road and rail networks are the primary social dividers. The Edgware Road, Willesden and Kilburn Lanes are ancient roads whilst the subsequent road pattern was set by the Ecclesiastical Commissioners’ plan for the area; the railways completed the network and thus the communications framework was in place by the middle of the 19th century. Infilling of this framework by residential development occurred with the selling off of the church’s estates or by specific planning by the Commissioners, resulting in a commonality of residential development within the estate lands sold. The management of these developments - or lack of it - together with the business models of the land developers themselves, determined the quality of properties built. In addition, and no less significant for neighbourhood analysis, is the inheritance of local area names which have preserved the historical mark of the old estates and provided a means of identity to areas otherwise without any coherence save the type of property built.

The following maps of Property Age, Freehold Ownership, Property type and Dwelling Type detail the current status of Kilburn property. The picture that emerges is one of distinctive property types differentiated by age and type of property, in association with the immediate environment, and ownership of freehold i.e. social or private ownership. These distinctions are summarised by the market values of the properties.



Figure 10. Kilburn: Age of Property



Figure 11. Kilburn: Freehold Ownership



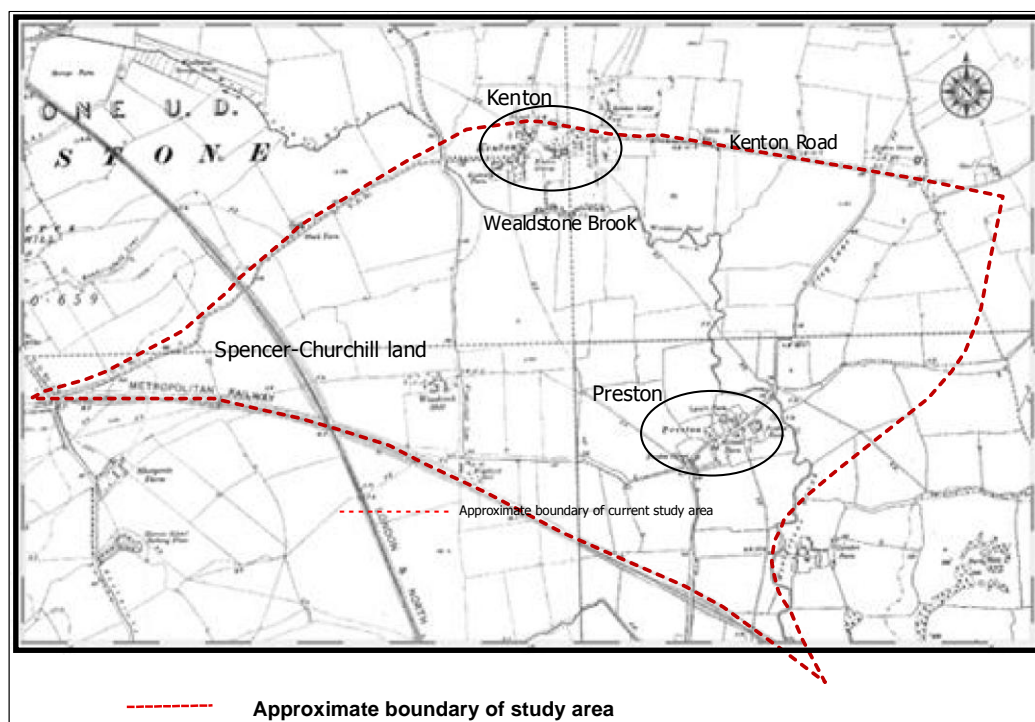
Figure 12. Kilburn: Property Type

North Brent

Like Kilburn the road and rail framework for the natural areas of this study were in place well before any significant residential development occurred, as shown on the map of Kenton and Preston 1895.

Figure 13. North Brent – Kenton & Preston – 1895

Source: Ordnance Survey



As can be seen from the above almost all of the roads and railways which form the present day natural area boundaries existed prior to the residential development of the area; only the overland section of the current Jubilee Underground line forming the eastern border of the study area is missing, as is the present-day Draycott Avenue, which is parallel with the L. & N.E.R. line on its eastern side. The old roads linked hamlets and divided estates. Land was mainly in the hands of New College and Harrow School with Capt. Spencer-Churchill owning the western part of the study area (referred to as Kenton and Northwick natural areas in this study). Spencer-Churchill aimed to create a high-class residential area on his lands and began work prior to the First World War which halted its development; subsequently, the project was watered down with Northwick Circle (Northwick natural area) being its offspring – now a conservation area. The other estates sold off their lands to developers in the inter-War period in

response to demand for brighter and more self-contained housing from the army of white-collar workers in London. Residential development came to north Brent some 80 years after Kilburn and was made possible only by the road and rail networks which enabled easy access to central London and the surrounding, developing industrial areas, such as Wembley. As a result Kenton's population rose from 268 in 1921 to 6,171 in 1931 and to 27,680 in 1951.

The housing was mainly detached and semi-detached housing of good quality, built by reputable companies – Costin and Nash were the main builders – with a few streets of terraced houses being built in the north of the study area prior to its wholesale development. Subsequent and substantial war damage to the Wembley borough, which the study area formed part of, resulted in post-War council housing being built on land bordering the Wealdstone Brook running through the area and on open spaces to the east. Later estates of social housing were built near to Kingsbury Station and on sites of pre-1920s buildings, thus removing any trace of earlier settlement. A handful of private flat developments are the most recent changes to the residential picture responding to the demand for cheaper accommodation for single and younger people willing to travel into London. Other than these recent developments the North Brent study area is characterised by single-family houses.

The history of Brent has been one of a continuously shifting population as people have moved out from the central parts of London into Brent and then, encouraged by local policy, moving on out further as prosperity increased. This has enabled newer waves of immigrants (which have always formed a significant proportion of Brent's population) to populate the area. Many Irish settled here originally, associated with the building of the Guinness Brewery in nearby Park Royal and they established the Masonic Temple which forms the central building of Northwick Circle. The 1950s saw the arrival of Indian immigrants and they now form the largest minority ethnic group. Northwick Circle, which contains the most expensive property in the North Brent study area (Figure 7), remains an enclave of Whites which indicates the role of wealth in filtering the ability of ethnic groups to populate certain areas.



Figure 14. North Brent: Age of Property

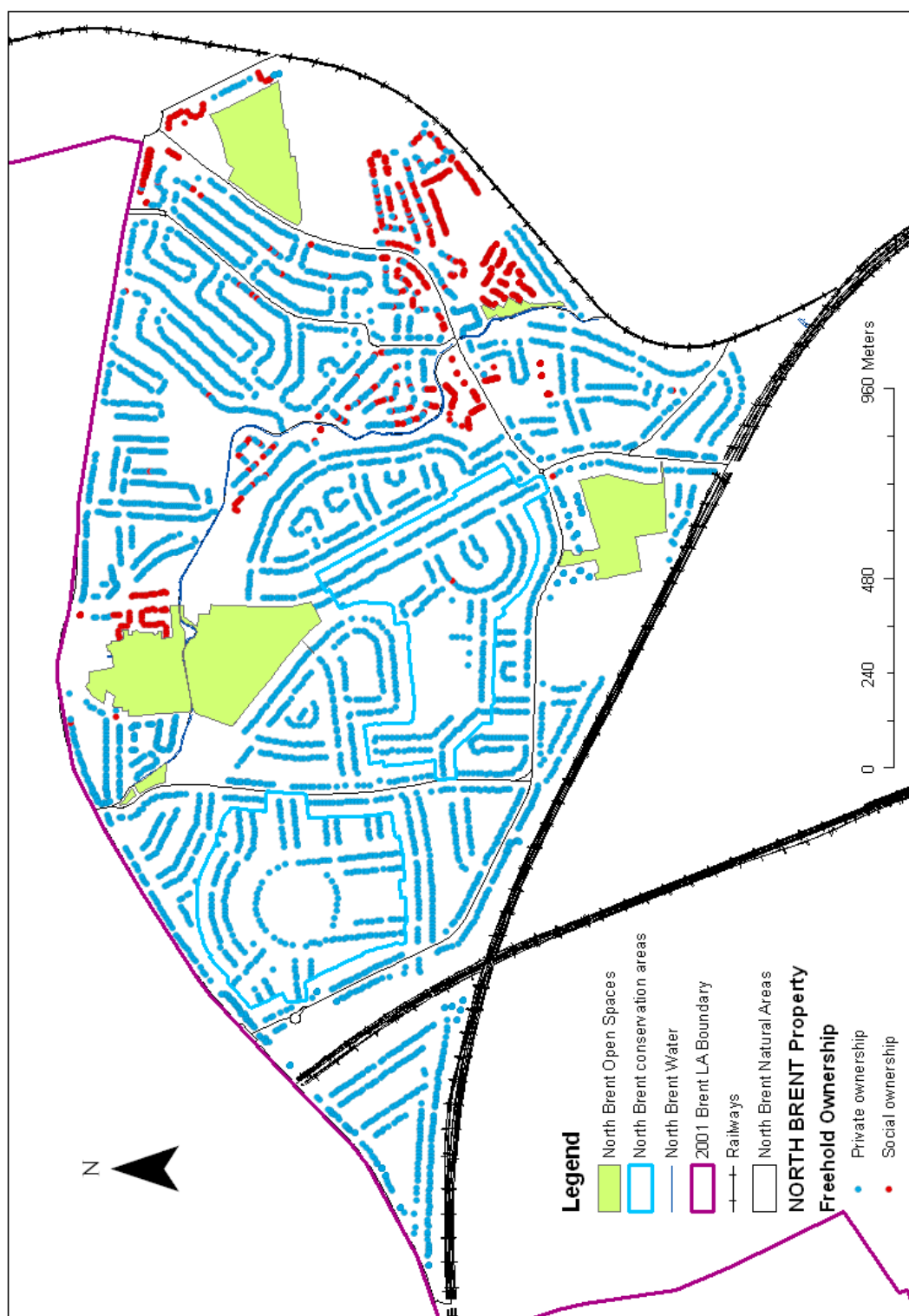


Figure 15. North Brent: Freehold Ownership



Figure 16. North Brent: Property Type

Within the street frameworks set out by the original developers various housing styles were adopted by the individual builders and therefore quality, type and size of housing were set by this parcel development rather than by any overall neighbourhood, town or city plan. There were one or two exceptions: Northwick Circle was conceived as a planned suburban neighbourhood (Brent Borough Council, 2006) and the South Kilburn re-development scheme of the 1960s was planned to foster a sense of community in its structure (Brent Borough Council, 2009).

The composition of Kilburn's dwellings is significantly different from that in North Brent with the overwhelming majority of residences being flats, typical of urban living, Figure 17. The percentage of properties in the different Council Tax Bands also shows a marked difference to that of North Brent, with Kilburn properties falling mainly into Bands B, C and D (81%), Figure 18.

Whilst North Brent is more suburban, Kilburn, with its proximity and excellent transport links to the West End and Central London, is definitely urban in character. The story of housing development in Kilburn since World War II is one of private conversion of older housing stock into flats together with large-scale council estates of blocks of flats during the 1960s. Houses have remained one-family homes only in the more exclusive Queen's Park area, in the west, unlike North Brent where single-family homes predominate.

In terms of demographic composition, there is a marked difference in the racial group percentages of the two areas. Kilburn is the whiter of the two areas with Whites in an overall majority (61%). In North Brent Whites are marginally the largest racial group (44%) with Asians almost equally numerous; Blacks form less than 10% of the population. In Kilburn it is the Asians who are the smallest racial group, whilst Blacks make up almost a quarter of the population, Figure 19.

Another contrast between the two areas is the ownership of property. North Brent is characterised by private semi-detached and detached housing with recent small-scale private flats development and more extensive social housing development, whilst Kilburn has several significant 1960s estates of social housing, Figure 20.

The fact that the housing stock of North Brent is much younger in age and is, on average, well built, contrasts with the general picture of the properties in Kilburn.

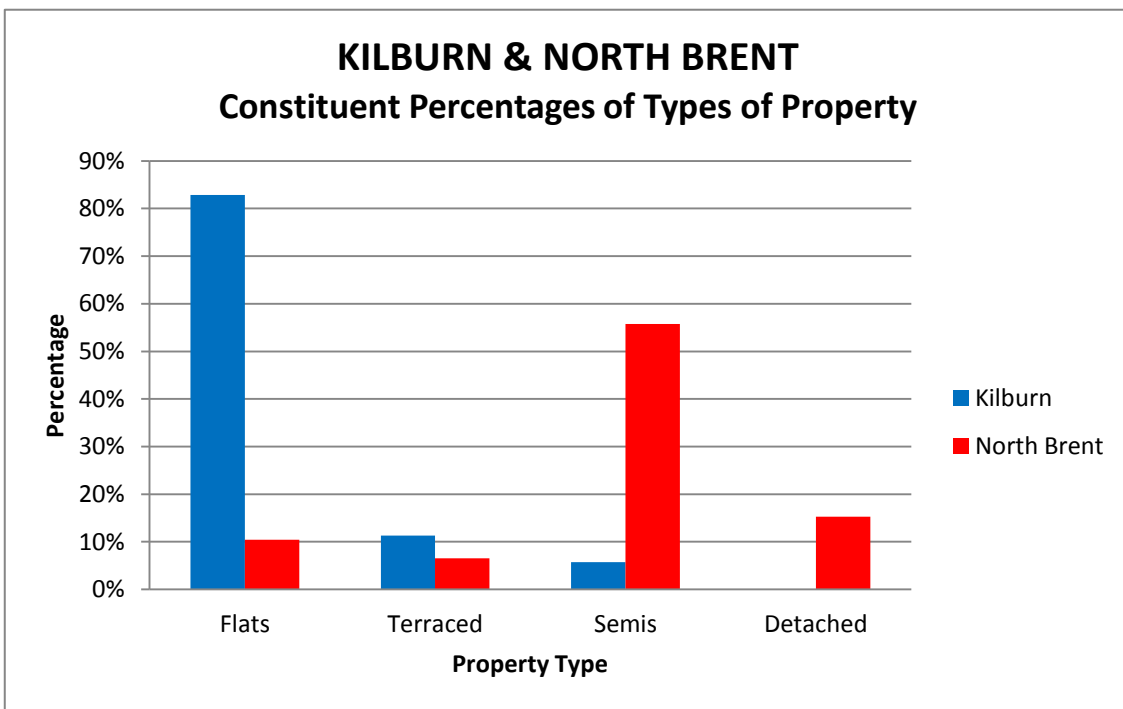


Figure 17. Proportion of Types of Residences by Area

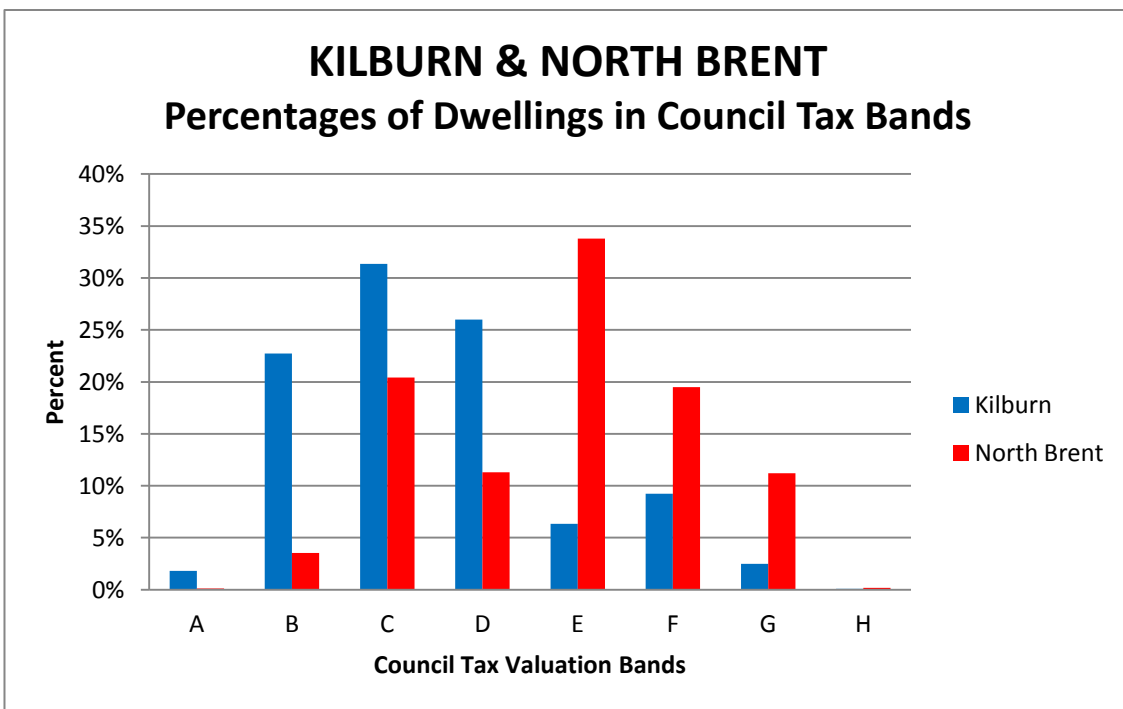


Figure 18. Proportion of Residences by Council Tax Band

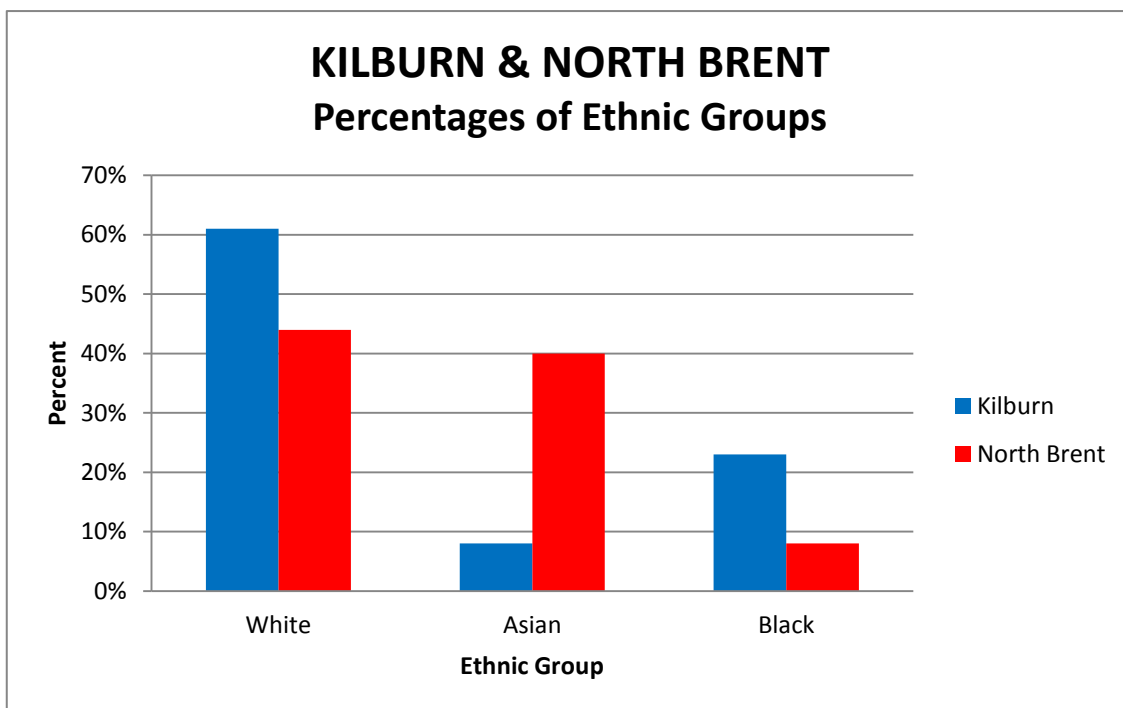


Figure 19. Membership of Main Ethnic Groups (%)

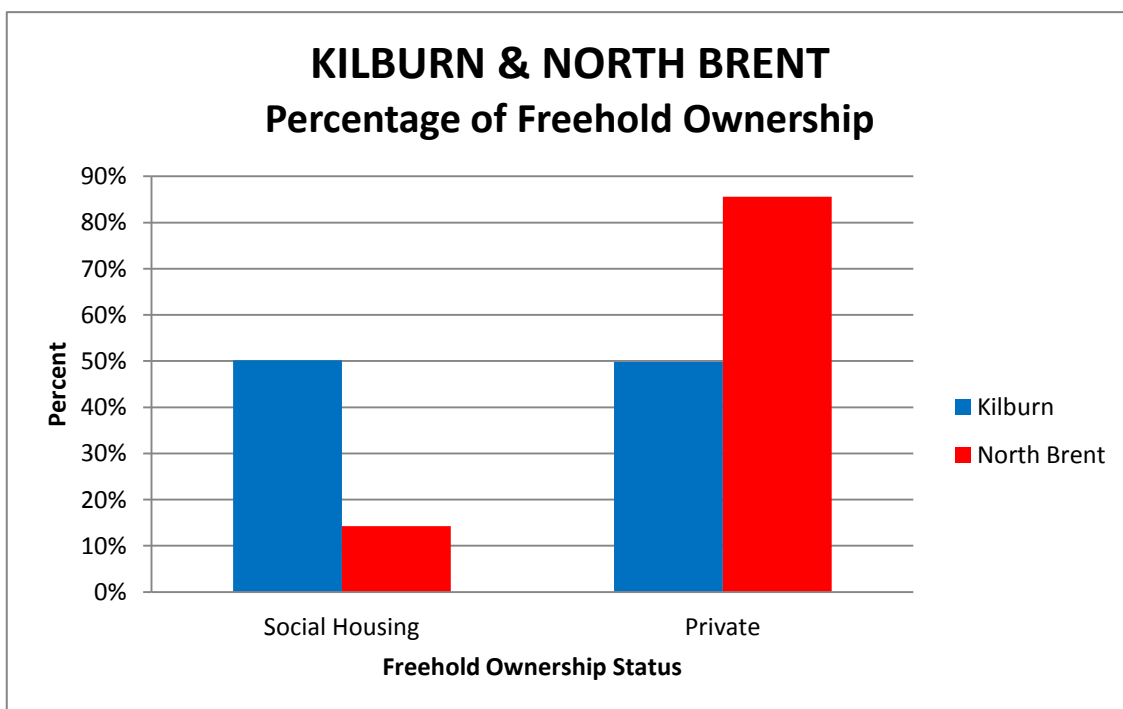


Figure 20. Percentage of Residences in Private/Social ownership

It should be noted here that the housing stock profiles differ significantly from those of household dwellings. Whereas in Kilburn 5,520 flats (56% of all dwellings) are in converted houses, the number in North Brent is only 454 (8% of all dwellings). This shared housing in Kilburn was established when the older houses to the east were first built and is in contrast to North Brent where the normal accommodation has always been single-family housing. The further west in Kilburn the less frequent is shared housing.

What emerges from these brief histories of residential development in the two study areas is the indelible and lasting role that the original quality of housing plays in the subsequent environmental and demographic patterning of these areas. It is notable, as Figures 21 & 22 show, that the relative relationships of housing areas, as distinguished originally, still hold good today: the poor areas are still poor and the well-off areas remain the most desirable areas even, in the case of Kilburn, well over a hundred years after the original housing was built¹³. There appears to be several explanations for this:

The original locations of expensive residential areas were in the best locations: on higher ground, such as in Brondesbury in the north of Kilburn. The more substantial the property the more expensive it is, and where there is a development of expensive properties it acquires a reputation as an expensive area which it is the interests of residents and the local authority to maintain and promote. In the case of Kilburn, the older and better maintained properties have been given conservation area status which enhances their value and prolongs their lives, whilst also distinguishing the area from the adjacent non-conservation properties.

The sub-standard original housing in Kilburn which attracted the poor fell into disrepair and was cleared by the council in the 1950s and 1960s under the slum clearance plans of the Greater London Plan and general post-War development. Whilst this produced much better quality dwellings, it was mass council housing – mostly blocks of flats - for the poorer people and thus entrenched the redeveloped locations as those for poorer people. In the case of Kilburn Park in the South Kilburn and Chippenham natural areas even the post war redevelopments have now been deemed in need of renovation and the area has been designated as the South Kilburn Regeneration Area as the limited building quality and planning of the area, together with the social problems associated with the residents – an ever increasing proportion of whom are recent immigrants - has necessitated a multi-agency approach to addressing these problems. The area therefore remains the province of the poor. Overall, Kilburn, with its much older, less substantial

¹³ The property prices are absolute sale prices, not price per square metre. Per square metre, the cost of a house is likely to be higher in the crowded, 'poorer' part of Kilburn as it is nearer shopping, transport and central London, but poorer people cannot afford the higher capital cost of houses and can only purchase flats even though the cost *per square metre* is higher.

property, and a much greater proportion of poorer people, currently has almost double the percentage of its households living in social housing than North Brent.

Private developers do not go in for wholesale redevelopment of areas, except for on a gentrification basis, which occurs on a property-by-property basis, slowly transforming an area. Gentrification only takes place where the properties suit the prospective purchasers in terms of their requirements, usually, in London, being small terraced houses suitable for conversion into bijoux single-family dwellings in good locations, or larger houses into flats. In Kilburn such a gentrification process has taken place in the Queens Park area stretching across Salusbury Road into the western part of the Kilburn natural area – both areas now given conservation area status.

There are subtleties to this picture: for example, main roads attract ribbon development along them because of their easy access to and from other areas. Consequently, these locations are often occupied by shops with flats above and, because they are often pioneering properties or village centres, they tend to be older than surrounding properties, and often cheaper, presumably because of their business, dual purpose and bothersome access to the property. This can be in contrast to newer, surrounding properties. The main road developments are usually the first to see redevelopment because of their age and prime commercial locations. Examples of these locations can be identified in Kilburn Lane, Salusbury Road, Kilburn High road (Edgware Road) and Kenton Road and Preston Road in North Brent.

The cost of property in London and the shortage of land has encouraged private property developers to build complexes of flats – sometimes, because of the shortage of available building plots, in areas socially different from the intended purchasers of the flats and in these cases the developers virtually make a self-contained neighbourhood of the new development, with protected access and underground car parking, such that residents need have the minimum contact or involvement with the surroundings residents. One example of such a development is at the western end of Kilburn Lane – a new development of flats in a generally socially troubled area.

It is important to note that the determinant of these changes is the location and quality of the property. Areas of broadly uniform property change or transform or are redeveloped together because they are subject to the same forces generating the changes, and so the essential cohesiveness and character, or reputation, of the area is maintained. Over time the quality of the property and the nature of the people it attracts give the neighbourhood its identity.

What is so remarkable about the maps of average property sale prices (Figures 21 & 22) is the discrimination revealed – discrimination along the lines of quality of property and ownership. In all cases the red shading of the property prices Kilburn map highlights areas of social housing property and, with the exception of Kilburn Lane, all of these

properties were built post-WWII. At the other end of the spectrum, the deep blue shading, representing the most expensive quartile, highlights the areas of overwhelmingly pre-WWII property in private ownership.

In conclusion, the residential development of both areas was set within the framework of land estates and established roads together with the more recent rail network. The road, rail and rivers set the framework for residential development of both areas, though on the western portion of Kilburn with its more extensive land the land owners set the road pattern. Within these given frameworks residential infilling created the largely pedestrian streets though the vastly increased number of vehicles using roads generally since the development of both areas has seen a subsequent carving up of some of the residential areas as originally pedestrian roads have served as through-roads for non-local traffic e.g. Draycott Avenue which serves now as a convenient link between Preston and Harrow.

The history of the two study areas substantiates the traditional use of natural barriers as borders of neighbourhoods and verifies Grannis's concept of non-pedestrian streets delimiting pedestrian street networks. Importantly for this study this framework also set the borders of the original residential development plots. Given the coincidence of these elements of the physical environment this study now investigates whether it is the patterning of the natural areas, the pedestrian street network or the pattern of housing development which, in trying to establish what delimits neighbourhoods, best explains the socio-demographic patterning of these areas.

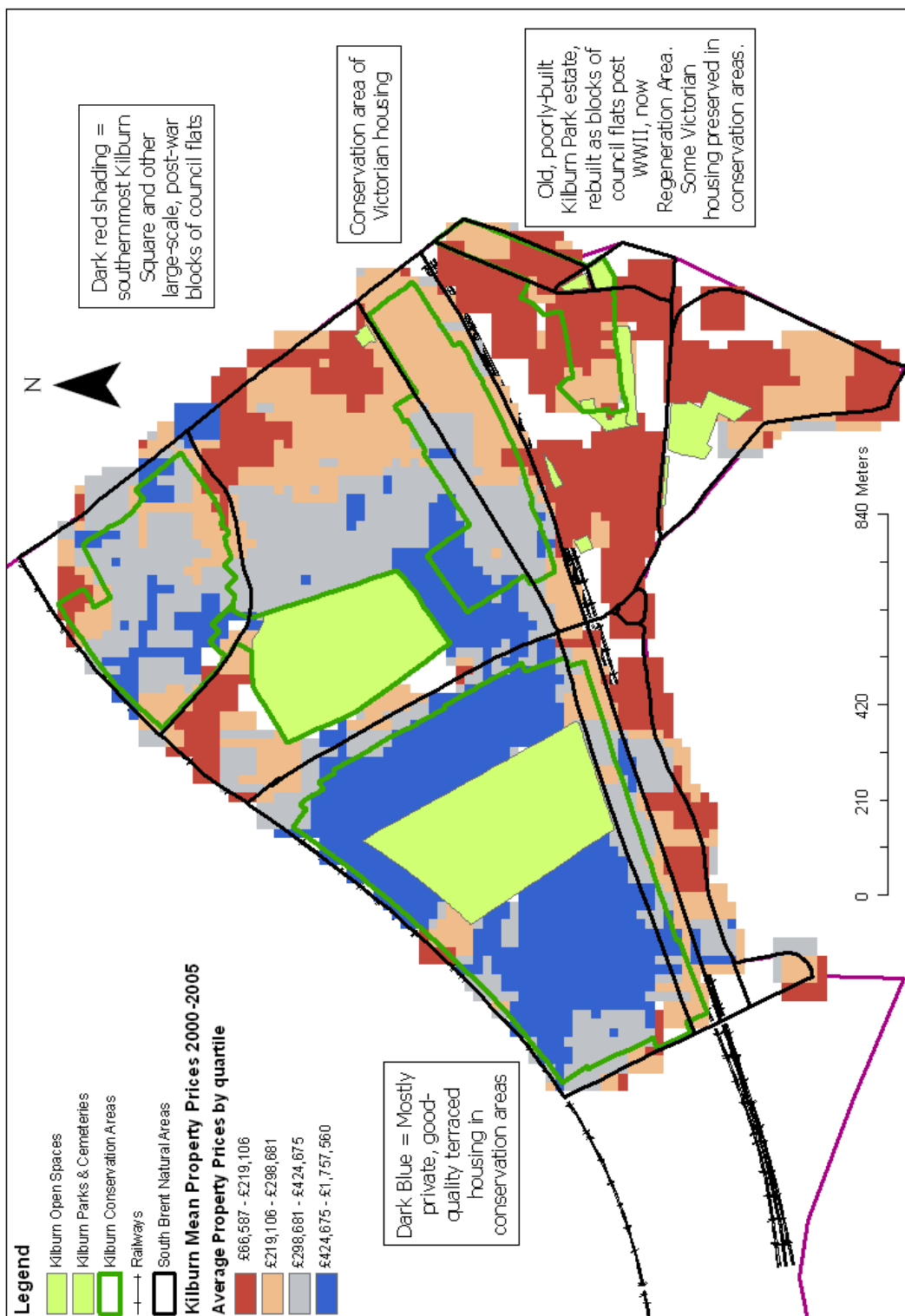


Figure 21. Kilburn: Property Values

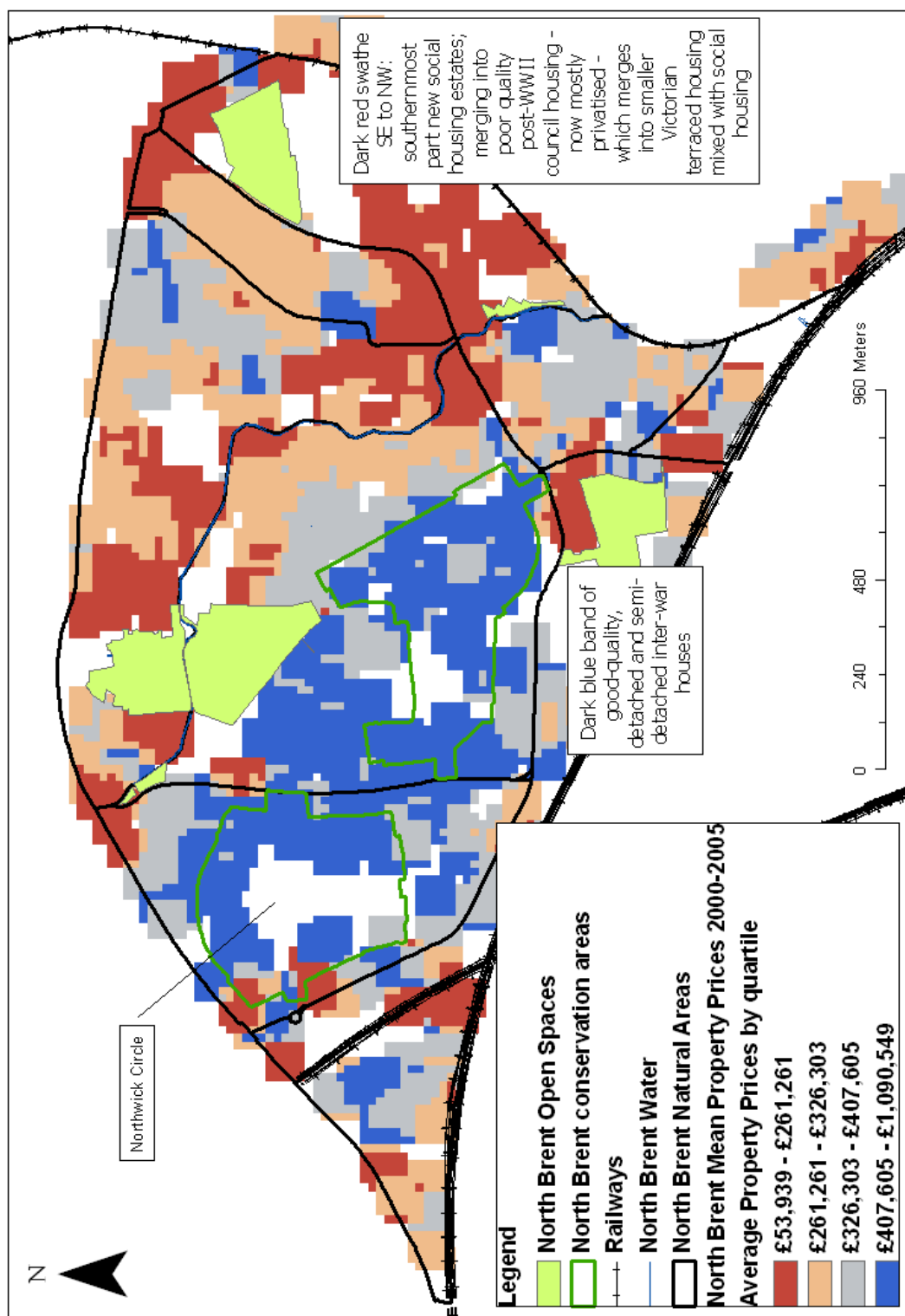


Figure 22. North Brent: Property Values

The approach adopted here is to apply Grannis's analysis (essentially that it is the pedestrian street networks which best explains social distributions) to the two study areas, adding in further analysis which covers natural areas (the traditional approach), together with an analysis of areas of different types of housing which, utilising the findings of the literature review, was reasoned to be a better explanation of socio-demographic spatial patterning than any other.

Grannis provided a reference point for assessing the explanatory efficacy of any neighbourhood model and this research endeavours to replicate Grannis's U.S. empirical work on t-communities in a U.K. setting as a benchmark and to initiate empirical work on housing areas for a comparative evaluation of the two models.

EMPIRICAL ANALYSIS

5.1 Replicating Grannis in Brent

5.1.1 Introduction

This chapter is concerned with applying Grannis's methodology in the 2 sample study areas. The chapter opens with an assessment of the differences between the U.S. study datasets and those available for the Brent study, and the impact of these on replicating Grannis's study. Grannis's methodology is then applied to the 2 study areas, reproducing his approach rather than his formula, and the results evaluated. Following this, the analysis is extended to Lower Super Output Areas and Housing Areas to see if these spatial units are better explanations of ethnic distributions than t-communities. The rationale and construction of housing areas is described here. Grannis presented his t-communities as 'effective neighbourhoods' and the Brent analysis is further developed to include a number of variables which test this assertion.

The chapter concludes with a discussion of the results obtained.

5.1.2 Ethnic and Socio-economic distributions: Hypotheses & Correlations

The foregoing research highlights several factors creating the geographic patterning of socio-demographic variables within a small residential area:

Structural homophily – expressed by housing type. Physical proximity together with size and, thereby, cost of residence filters local society.

Social Homophily – the desire of people to live near to people like themselves.

Ownership – socially-owned property tenants have limited choice of who their neighbours are.

Tenancy – private renters can only choose those residences available for renting.

Where property is privately owned or privately rented we can expect a greater degree of 'free choice' for neighbours to locate next to like neighbours where such tenancies are widespread in the immediate area, and this proves to be a fundamental social distinction.

To establish the validity of this theoretical analysis and to determine the significance of relationships this study, using Grannis's work as a foundation, firstly hypothesises that Grannis's findings – that racial distributions are better explained by delimited pedestrian street networks than distance - can be replicated in a sample of London areas. In effect Grannis's U.S. work become a reference for assessing the success of the transfer of his methodology to the Brent setting.

It is further hypothesised that similar results are obtained when this analysis is broadened to alternative geographies: the lower super output areas of the census, often used as neighbourhood equivalents, and the housing areas of this research.

Developing the role of housing this analysis then hypothesises that variability in the geographic patterning of both racial groups and socio-economic variables can be better explained by areas of similar housing than by any other spatial units considered.

U.K. Spatial Units and Boundaries

The basic spatial unit from which all study areas spatial statistics are derived is the 2001 Census output area. All of the spatial units used in analysis are compounds of output areas and/or parts of output areas. Where statistics for parts of output areas are used, they are computed by re-casting data on the basis of proportions of households or people.

4 spatial units are used in the ensuing analysis: Lower Super Output Areas (LSOAs); Tertiary Natural Areas; Tertiary Networks and Housing Areas. Only the first of these is part of the census geography and LSOAs are clusters of whole output areas on the basis of size, homogeneity and conformity with ward and local authority boundaries; the others are customised spatial units whose boundaries often cut across those of output areas.

Lower Super Output Areas

LSOAs are aggregations of output areas with a targeted mean level of 1,500 households. The LSOAs were generated automatically using the same grouping and clustering methodology as for OAs but with a different household threshold of 1,000. They were included in the analysis because of their popularity as surrogate neighbourhoods (City of Plymouth, 2008; Lupton, Fenton, Tunstall & Harris, 2011).

Grannis's Tertiary¹⁴ communities (t-communities)

Grannis was unclear about precisely how he defined his t-communities. Although he states that "T-communities are defined in two ways: non-pedestrian streets bound them and they are delimited by discontinuities in the pedestrian street network...every household within a t-community is reachable from every other household by only using pedestrian streets..." (Grannis, 2005, p.297), this, unfortunately, does not indicate how

¹⁴ Tertiary streets - small residential streets - are presented as "a CFCC (Census Feature Classification Code) A-41, which are defined as streets that have one lane on each side with no divider and that do not pass through a tunnel or under a freeway...this class of streets is meaningful because they are designed, built, maintained and "renewed" specifically to promote local and pedestrian traffic and to discourage "through" automobile traffic." (Grannis, 2005, p.118)

residents who live on the delimiting non-pedestrian streets should be treated and this complicates matters.

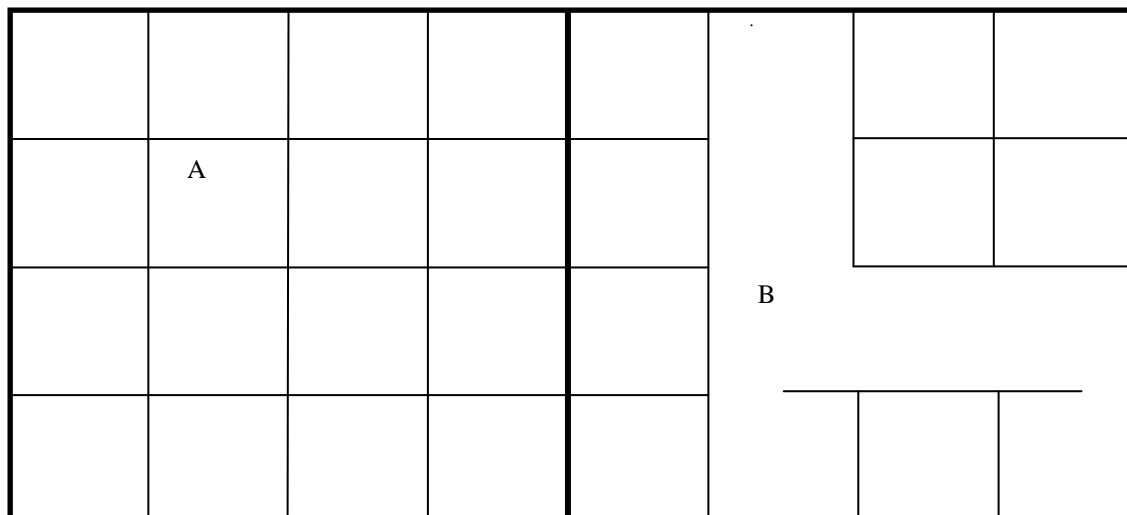


Figure 23. T-Community: bold lines represent non-pedestrian streets. Non-bold lines represent Pedestrian streets. (From Grannis, 2005, p298)

Grannis (2005, P297) states that there are four t-communities represented in the above diagram – one in area A and three in area B. But how are the circumscribing, non-pedestrian, ‘edge’ streets to be treated? Grannis's study used city blocks as the basic statistical unit and 2000 Census Tiger files for boundary information (U.S. Census Bureau, 2000). The Census boundary files run down the middle of the streets and thus it can be seen that the ‘edge’ t-community streets could be viewed as pedestrian streets in that residents of a t-community can use this edge street without having to cross a non-pedestrian street. In such a case this edge street actually links up the three t-communities in Grannis's illustration (Figure 23) making them just one t-community. If, as Grannis presents, there are 3 t-communities in area B to which t-community is the statistical information relating to the edge street assigned?

For this study the edge streets of a t-community were treated in 2 different ways:

Method 1: The edge streets were treated as pedestrian streets which linked any t-communities which they formed the boundaries for. Thus in Fig 23 area B would be treated as one area.

Method 2: The edge streets were put into a group of their own and treated as a separate t-community. Thus in Figure 23 area B would have 4 areas: the three Grannis identified and a further, separate t-community comprising the 4 encompassing streets.

Natural Areas and Networks. In fact, the first treatment creates ‘natural areas’ in the traditional sense where rivers, railways and main roads (non-pedestrian roads) form the boundaries, with the addition for this study of busy roads also regarded as pedestrian barriers, so the areas are called ‘tertiary natural areas’. The second treatment, where the edge roads of a ‘natural area’ are treated as forming their own group (or street network, using Grannis’s terminology), also has its own logic in so far as the edge streets have a different culture of their own which distinguishes them from internal pedestrian streets. The two possible interpretations have been termed Tertiary Natural Areas and Tertiary Networks (t-communities) for the Brent study.

Natural Areas, as presented by the Chicago Social Ecologists of the 1920s, are watersheds of internal free-movement bounded by physical barriers. “Burgess wrote that since physical barriers—lakes, rivers, railroad tracks, and industrial property, for example—delimited social interaction, the first step toward understanding the organization of community boundaries was to create a general portrait of the city based on the spatial placement of these features. Within these areal units created by the *physical* boundaries would then develop “natural areas or homogenous economic and social units” (Burgess 1933: 2).” (Venkatesh, 2001, p.287) This study’s tertiary natural areas use busy roads (as defined by Brent GIS Team) as an additional barrier to free movement of pedestrians. Consequently, they are much more local than the Social Ecologist’s natural areas and whilst they will not capture whole communities they may capture areas of marked social homogeneity.

Tertiary networks are pedestrian street networks where every street is connected to every other street in the network only by tertiary streets and crossings; properties on the network side of delimiting streets are included but are counted as a separate network. Grannis used a dataset of tertiary streets to define his pedestrian street networks: “If one represents tertiary streets as lines on a graph and connects their endpoints if and only if they meet at a tertiary intersection, then one can define a tertiary street community, (hereafter referred to as a t-community) to be the maximal subgraph of lines and points that are mutually reachable. Thus, every household within a t-community is reachable from every other household by only using tertiary streets. By this definition, therefore, a t-community is a place designed by cities primarily for pedestrian, rather than automobile, traffic and where “close-knit communities” with permeable “boundaries between house and street space” can emerge (Appleyard and Lintell 1986, pp. 106, 109).” (Grannis, 1998, p.1530).

Whilst Grannis was able to use a defined class of street from the U.S. Census geography as the boundary set for t-communities no counterpart was discovered in the U.K. and this research took a broader view of what constitutes a barrier to social interaction - busy roads, railways, waterways and open spaces - and uses these, after field assessment, as boundaries.

The U.K. current road hierarchy outside of the motorway system is:

A road

B road

C road

U road

Where U roads are local access roads, the nearest equivalent rank to Grannis's selected 'pedestrian' streets. In London the issue is not only the classification assigned to the road but also the amount of traffic it carries, and for the purposes of the Brent study it was decided to use the U road classification as representing pedestrian-friendly roads, equivalent to Grannis's pedestrian streets, and non-pedestrian-friendly roads were those identified as 'high' traffic flows by Brent council's 2001 Traffic Flow monitoring exercise, irrespective of road classification (Brent Traffic Flow GIS data supplied by Brent borough council 2005).

In a similar way, the internally-connected streets of the t-community were not identified by analysing a street network dataset but by map analysis and field visits which takes into account the fact that apparently unconnected streets, as seen in a street network analysis, are often connected by pedestrian paths, as was the case with many roads in the north east sector of the North Brent study area.

Re-Casting U.K. Census Geography

A discussion of the difference between the inherent qualities of the U.S. Census block and the 2001 England and Wales Census output areas features in the literature review (p.88). In practical terms for the Brent Study the use of Census output areas as the smallest statistical unit meant that, unlike Grannis's research, there is a significant mismatch between the borders of the output areas and the borders of the tertiary natural areas and the other spatial geographies used. Whereas Grannis found that fewer than 8% of his t-communities were not exact combinations of census blocks, excepting Lower Super Output Areas, none of the custom spatial units of this study was an exact combination of output areas, and therefore considerable re-casting of data was required for analysing non-Census geographical units. Two methods of assigning output area data to the non-census spatial units were considered:

The first method is best-fitting, presented by the Office for National Statistics for building 2011 Census estimates from Output Areas (ONS, 2012). Adapting this technique to this research, non-census geography spatial units are assigned the values of OA centroids that fall within them or, where no OA centroids fall within them, take on the values of the nearest OA centroid. Double counting is endemic to this method.

The second method is to re-cast data on the basis of numbers of households, so where a customised spatial area contains portions of OAs (Figure 2), the proportion of households from any given OA which fall within that area forms the basis for re-assigning the OA census data to the target area in the same proportion. The presence of a geo-referenced layer of households provides a reliable reference to which variables can be attributed. In the absence of individual household-level data concerning the variables no distance weights were applied to the apportionment of the aggregated data and households were assigned values of variables pro rata (Goodchild, Anselin, & Deichmann, 1993; Davies Withers, 2001; Downey, 2006; CACI, 2013).

This second method was adopted because it retains the integrity of the customised area, retaining its boundaries. Using the best-fit method, it was judged, would favour statistical technique over a focus on the relationship between the built environment and social distributions which is the essence of both Grannis's and this research's spatial definition of the neighbourhood. In addition, double counting would be considerable. Therefore, it was concluded that reallocating data on the basis of household counts would produce data in context with the picture on the ground.

Martin (2006) discusses the problems of matching local authority address databases with those of the ONS but, necessarily, this research had to rely on the Brent Domestic Property database 2003 for household postcodes, National Grid references and household counts. 2001 census data was reallocated to customised areas whose boundaries did not coincide with those of OAs on the basis of the proportion of an OA's households falling inside a particular customised spatial area as determined from the Brent database. This research found very little difference between household counts produced from the Brent database and those of the 2001 census and because the statistical analysis was only concerned with proportions this minimised the significance of differences where they did occur.

Table 4. The calculation of racial percentages for the North Brent Housing Area 17 (Figure 2):

OA	OA_Hhlds	HA17_Hhlds	%OAs	OA_Totpop	OA_White	OA_Asian	OA_Black	HA17_Totpop	HA17_White	HA17_Asian	HA17_Black	HA17_%W	HA17_%A	HA17_%B
00AEGK0002	92	48	52.17	307	116	83	75	160.17	60.52	43.30	39.13	37.79	27.04	24.43
00AEGK0006	99	70	70.71	310	81	90	112	219.19	57.27	63.64	79.19	26.13	29.03	36.13
00AEGK0036	145	21	14.48	353	145	96	84	51.12	21.00	13.90	12.17	41.08	27.20	23.80
								430.49	138.79	120.84	130.49			

Housing areas with fewer households than 10, or fewer than 25 people, were excluded as being unreliable. These differences are expected to moderate the correlation results

found in Brent because re-casting data introduces data from outside of the hypothesised homogeneous t-community.

Lastly, in terms of raw data, there are differences in the census data provision which required a modification of Grannis's methodology. School Attendance Zones are a U.S. spatial geography and whilst the U.K. has school catchment areas as equivalents, unlike the U.S. Census the England and Wales Census does not provide data for these spatial units or in the demographic form Grannis used and this analysis was therefore not undertaken.

The effect of the census geography differences on the statistical analysis, based on Grannis's findings, is to diminish the correlation results found in Brent because re-casting data from an outside source reduces the homogeneity of the t-community.

5.1.3 Grannis's Racial correlations.

To measure the racial variations within t-communities (networks) Grannis conducted OLS regression with the independent variable being the average racial proportions of census blocks making up the network (minus the target block), and the dependent variable being the racial proportion of the target census block. This is a test of whether a particular block group is racially similar to the other block groups in its t-community (network), and is a measure of how well the make-up of constituent parts of the area matches the entire pedestrian-street network – a measure of racial homogeneity (Grannis, 2002).

Grannis extended this analysis to account for spatial proximity between block groups, and this was effected by weighting the averages of the racial proportions of all the other block groups in the same geographic unit by their inverse distance from the centroid of the focal block group (Grannis, 2002). This same methodology was applied in the Brent study to both interpretations of t-communities, i.e. Natural Areas and Networks.

" Using the distribution of black populations as an example, we have,

$$Y_i = \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \epsilon,$$

where i indexes block groups and Y_i represents the black proportion of block group i . X_{1i} represents the average black proportion of block groups in the same t-community as block group i (excluding block group i itself) and tests whether block group i is racially similar to the other block groups in its t-community. The typical t-community contains only a few block groups, therefore each block group was compared to the average of the "other" block groups (not including itself) in its t-community to avoid creating a built-in statistical dependency. X_{2i} represents the average black proportion of block groups that are spatially proximal to block group i . There are countless ways to approximate the effects of spatial proximity. The method reported here is the average of all "other" block

groups, weighted by their inverse distance from the centroid of the focal block group. X_{3i} represents the average black proportion of block groups in the same elementary school attendance zone as block group i . Again, each block group was compared to the average of the "other" block groups (not including itself) in its elementary school attendance zone." (Grannis, 2005, p. 303)

School attendance zone data was not available and therefore is omitted from this statistical exercise.

The results of applying Grannis's methodology follow.

5.1.4 Ethnic segregation in the 2 study areas.

Grannis's analysis concerned racial distributions in New York, Chicago and Los Angeles, and he revealed the association between the distributions of racial groups and t-communities, which he explained as being the result of location decisions being taken on the basis of 'who lives down the street'; racial groups tend to settle down the street from similar people.

North Brent. Prior to the 1960s, when large-scale immigration affected Brent, the entire area of North Brent was overwhelmingly occupied by Whites. Since this time Indian immigrants have settled in large numbers in west and north west London and North Brent is a part of that larger picture. Generally speaking, Asians are associated with occupying single family homes and, in Brent as a whole, there is a strong correlation between the proportions of Asians and the proportions of Home Ownership ($r = 0.8, p < .01$). Asians have settled in the western part of the study area which is composed of reasonable to good quality semi-detached properties, and in the north and north east of the area where terraced housing and semis dominate. Whites are concentrated in the heartland of good quality detached and semi-detached, expensive houses around Northwick Circle and Woodcock Park which is an area notably more remote from public transport. Blacks are fewer in number and are associated with social housing in the area, as is the case across Brent as a whole, perhaps reflecting their status of newer immigrants of higher need.

Kilburn. Whites dominate in Kilburn (65%) with Blacks being the next largest ethnic group. Asians are small in number. Kilburn's residential stock is overwhelmingly flats, split between those in social housing, mainly in post-WWII blocks, and flats in private property. The Whites population dominate in the single-family, expensive dwellings in the west of the area around Queen's Park and in the main body of Kilburn north of the railway line separating it from South Kilburn. South Kilburn is a Regeneration Area of blocks of social housing and is where the majority of the Black population lives, reflecting the social and economic status of this group largely unable to afford the private rents and property prices of Kilburn across the tracks.

The results of conducting Grannis's analysis for the first of these two spatial scales - Natural Areas are shown in Table 5.

Table 5. OLS Coefficients of Regression of the Proportion of an Output Area's Population: Tertiary Natural Areas, North Brent and Kilburn, 2006

<i>Independent Variables</i>	<i>Proportion White</i>		<i>Proportion Asian</i>		<i>Proportion Black</i>		
	Area	North Brent	Kilburn	North Brent	Kilburn	North Brent	Kilburn
TERTIARY NATURAL AREAS							
Unstandardised Coefficient		.667**	.951***	.625**	.638**	.801***	.937***
Standardised Coefficient		(0.368)	(0.830)	(0.366)	(0.277)	(0.611)	(0.835)
Constant		0.148	3.215	0.152	2.805	0.015	1.453
Adjusted R ²		.122**	.685***	.121**	.067**	.364***	.694***
Number of Networks		67	94	67	94	67	94
<i>Dependent Variable:</i>		<i>Proportion of an OA's Population</i>					
<i>Independent Variable:</i>		<i>Average Proportion of an Area's OAs excluding focal OA</i>					
<i>All variables are proportions</i>							
<i>Numbers in brackets are standardized coefficients</i>							
<i>*p<.05; **p<.01; ***p<.001 (two-tailed tests)</i>							

The results for Brent Natural Areas show that only Kilburn data is of a dimension comparable to the findings of the Grannis study. North Brent data indicates that the ethnic proportions of the populations in Natural Areas are a relatively poor guide in predicting the variations of the constituent output areas' ethnic mix.

For Kilburn Whites and Blacks, Natural Areas account for the majority of the variance in the geographic patterning. Grannis accounts for this by suggesting that residents have settled in racially segregated t-communities because of who their immediate neighbours are.

The results for the alternative model of t-communities, Networks, are presented in Table 6.

Table 6. OLS Coefficients of Regression of the Proportion of an Output Area's Population: Tertiary Networks, North Brent and Kilburn, 2006

Independent Variables	Proportion White		Proportion Asian		Proportion Black		
	Area	North Brent	Kilburn	North Brent	Kilburn	North Brent	Kilburn
NETWORKS (t-communités)							
Unstandardised Coefficient		.692***	.919***	.688***	.600**	1.023***	.918***
Standardised Coefficient		(0.514)	(0.808)	(0.529)	(0.277)	(0.630)	(0.825)
Constant		13.789**	4.994	12.604**	3.155*	1.25	1.965
Adjusted R ²		.258***	.650***	.274***	.068**	.392***	.678***
Number of Networks		116	115	116	115	116	115
Dependent Variable:	Proportion of an OA's Population						
Independent Variable:	Average Proportion of an Area's OAs excluding focal OA						
All variables are proportions							
Numbers in brackets are standardized coefficients							
*p<.05; **p<.01; ***p<.001 (two-tailed tests)							

Like tertiary natural areas, tertiary networks' correlations are not quite as strong as Grannis found in Chicago and Los Angeles. Kilburn correlations compare favourably to Grannis's findings in all his U.S. cities, whereas North Brent correlations are only of a comparable dimension to those of New York.

The Networks variable accounts for the majority of Kilburn Whites and Kilburn Blacks at almost the same level as obtained with the Natural Areas variable, whilst in North Brent the Networks variable accounts for the majority of the variation in the geographic patterning of Whites, an increased explanation of the patterning of Asians but a decreased explanation of the distribution of Blacks, compared to Natural Areas. Overall, Networks are a poor explanatory variable for the geographic patterning of North Brent Asians and Blacks and particularly for Kilburn Asians.

In North Brent an examination of the different racial groups' geographic distributions revealed that they are not uniform nor simply only related to street networks as the regression model highlighted. Further examination of residuals, together with field research, suggested that, *in addition to* street network, property type and ownership were likely to be associated with racial groups. This is not a surprising finding as the history of housing development in these study areas has been one of piecemeal plot development where each plot's housing age, style and groupings was independent of that of other plots leading to a choice of properties at different values appealing to different groups at different times.

Other factors also account for the differences which Grannis observed and the findings of the current study. For example, the re-development of South Kilburn resulted in an entire sub-area being populated by council tenants who had little or no choice of who

their neighbours might be. Both areas have also been subject to other, smaller-scale, social housing projects.

Another factor is the history of immigration. The indigenous white population has had the opportunity to concentrate in the most desirable type of housing simply because they had original occupation and are probably better able to afford the more expensive, more desirable properties. This becomes racial patterning by price filtration. As a generalisation, immigrant groups need time to settle into the resident culture before they can compete financially for the most desirable properties. Recent immigrant groups have tended to be housed in post-war social housing which is concentrated geographically and often not related to the underlying street pattern. The nature of the immigrant groups' individual cultures and experiences have also expressed themselves geographically: there is a higher association of Blacks with social housing ($r=0.7$, $p<.01$) as there is with Asians and home ownership across the borough ($r=0.8$, $p<.01$) – hence the Black population is more concentrated and is closely associated with social housing development.

Cost of housing has proved to be a filter of population and, because of the history of immigration, this has been expressed in racial patterning. Similarly, social housing provision has complicated Grannis's explanation for racial patterning: freedom of choice of neighbour.

A more technical reason offering an explanation for the differences of results between the U.S. and Brent studies is the lack of co-incidence between the spatial statistical units of the respective areas. In the U.S. the city block group was often the unit of planning development and is also the chosen unit of the U.S. census spatial reporting unit. Hence there is a close correspondence between the physical environment and the collation and dissemination of socio-demographic data about it. In Brent, there is far less coincidence of street pattern boundaries and census reporting geography. The output area was only partially designed with an eye to socio-demographic homogeneity. As a result, there has been much re-casting of data to obtain racial and socio-demographic data for output areas to match Natural Areas and Networks and this contributes to a disruption of homogeneity.

All of the above pointed to the nature of the housing itself as being a prime consideration in understanding racial patterning. This is really only a refinement and extension of Grannis's work.

Overall, the correlations found in Brent are of a comparable dimension to those which Grannis found (Grannis, 2005) and this is taken as the successful transfer of Grannis's methodology to a U.K. setting.

5.2 Extending Grannis's Analysis: Spatial units, Ethnic and Socio-economic Distributions.

5.2.1 Lower Super Output Areas.

Given that Census output areas were partially designed to capture socio-economic homogeneity and Martin's speculation that Super output areas would likely become de facto neighbourhoods (Martin, 2004), it was decided to extend the analysis to Lower Super Output Areas to establish their value as indicators of neighbourhoods using the same logic as Grannis's research and long-standing reasoning: that areas of homogeneity indicate social interaction and neighbouring. If Martin's conjecture proves to be correct it was reasoned that it would be valuable to have a comparison of Census geography against Grannis's t-communities to provide another measure of their efficacy.

5.2.2 Housing Areas.

The view emerging from recent neighbourhood research puts the status of the individual residence and its relationship to those residences surrounding it at the heart of neighbourhood (Leslie, Coffee, Frank, Owen, Bauman, & Hugo, 2007; Clark & Fossett, 2008; Grannis, 2009; McCrea, 2009; Foster & Hipp, 2011; Omer & Goldblatt, 2011; Hipp, Faris, & Boessena, 2012). This suggests that housing areas could be a more meaningful geography in explaining social homogeneity, and to investigate this new view this study developed Housing Areas – areas of similarly aged, and similar type residences – and looked at their degree of homogeneity in comparison to residences in the pedestrian street networks as a whole and those portrayed by census geography. In effect this compares the homogeneity of housing type areas with Grannis's t-communities as well as with census geography, often the neighbourhoods in practice.

To facilitate this analysis a new dataset of *housing type* was introduced, enabling the production of *housing areas*.

Brent GIS made available a database of Brent property which held records of dwellings rather than building type. Brent uses a proprietary dataset, Cities Revealed (Geoinformation, 2010), for data on individual buildings such as Age, Height and Type. This data set is ideal for delineating housing areas and could form the basis for rolling out widespread and practical identification of housing areas. Unfortunately, the Cities Revealed dataset, when examined, was determined by this author to be flawed in that information on several significant buildings were missing in the sample data and all age data was miss-classified, for example, the post-WWII re-development of South Kilburn was categorised by the National Building Class database as being 'WWI to WWII'. The source of the data error was not determined, be it in the original dataset or the transfer of data from source to the author. Given the requirement to purchase the data if full coverage was required, and that the data was of questionable quality and not in an ideal

form, it was decided that the best way forward was to carry out a field survey of housing in both study areas. As a result all roads in the two study areas were visited and all properties categorised.

To delineate housing areas, properties were identified within each tertiary natural area on the basis of their age and type. Each distinctive, contiguous group of similar-age and similar-type properties was designated as a Housing Area. Shape files of the housing area boundaries were digitised in ESRI's ArcView 9.2.

In North Brent 61 Housing Areas were identified ranging in number of properties from 1 property (5 Housing Areas contained just 1 property) to the largest Housing Area with 1087 properties. In all there were 5396 properties in the North Brent study area.

Kilburn was composed of 9855 properties falling into 136 Housing Areas.

In both study areas almost a half of all Housing Areas (45% North Brent; 46% Kilburn) contained 50 properties or fewer.

5.2.3 Housing Type

All properties in both study areas were surveyed first hand and classified into 4 property types and 5 age groups. They were then mapped according to Age, Type and Freehold Ownership status. Judgement was required as to which of these criteria assumed primacy though, usually, the most significant distinction was between private and social housing, which is a crude division of the non-poor and the poorer.

5.2.4 Property vs. Dwelling.

It is important at this stage to be reminded that there is a distinction between housing, as represented by the actual building, and housing also being the residence of a household with, perhaps, several dwellings in one building¹⁵. The distinction is important and is made because the building itself directly relates to the time of construction and the history of that development as well as its subsequent history of use and occupation. It also is a very visible means of distinguishing one area from another. However, whilst two houses may look the same, visually it is not always easy to know whether a house is being used as a one-family dwelling or contains several flats, and this can be important with regard to the nature of the area. There is evidence to support the idea that there is a hierarchy of tenancies in relation to neighbourhood (Gibbons, 2001; Propertyfinder, 2005; Canwest News Service, 2008): owner occupiers in single-family dwellings are likely to be more committed to the welfare of a neighbourhood than renters because they have made a large investment in the property and thereby in the neighbourhood.

¹⁵ The Brent Domestic Property database used extensively in this research actually identifies 'dwellings', and dwellings are properties valued by the VOA for council tax purposes (VOA, 2011). A dwelling is an accommodation space occupied by one household (ONS, 2011). In this research the terms 'dwelling' and 'residence' are used interchangeably.

“...it is evident that type of residential living unit is the major discriminator among levels of being physically rooted in the neighbourhood. Persons highly rooted are more likely to live in single-family houses, while those less rooted are more likely to live in multiunit buildings.” (Riger & Lavaskas, 1985, p. 61)¹⁶ In neighbourhood literature this is generally taken as the most indicative single variable of neighbourhood. There is also the conjecture that private renters are more likely to adhere to codes of behaviour and terms of tenancies than social housing tenants, if only because they pay more for their residences and have less security than social tenants, in addition to being less likely to reside in multiple-tenanted property on estates which, it is suggested, distances people from personal responsibility for the welfare of the building, immediate environment and neighbourhood. There is also the consideration that social housing has historically had a poor record in past years in the quality of management and maintenance of properties. Students, for obvious reasons, are regarded as being low down on the list of those committed to enhancing neighbourhood.

Of itself, Housing Type does not usually distinguish between private and socially-owned housing, nor does it distinguish between private or public renters and these are important data for differentiating housing areas. Another problem with Housing Type is that the category ‘flats’ covers such a wide spectrum of size and quality of property: from a privately owned large penthouse flat to a studio flat in a council owned high-rise block of flats. Houses, on the other hand, are much more uniform in nature. These limitations lessen the utility of Housing Type as a hierarchical classification system (Crooks, 2008).

Therefore, in terms of distinguishing housing areas, a combination of unstructured visual evidence of property presentation¹⁷, property sales evidence, Census and local authority data provided valuable supporting references for determining property status.

5.2.5 Mapping Housing Areas

The literature review of this research identified housing areas as the appropriate spatial geography for neighbourhoods on the basis that wealth (i.e. the ability to afford property cost) is the great social and residential segregator. Market value is the true assessment of a property's value taking into account all considerations and by mapping these values it should be possible to group contiguous, similar-value properties and use these as the

¹⁶ Riger & Lavaskas determined 4 integration categories:

Young mobiles: low-bonded, low-rooted. Young, no family, well educated.

Young participants: high-bonded, low rooted. Young, with family, less well-educated.

Isolates: low-bonded, high-rooted.

Established participants: high-bonded, low-rooted. Older with children.

¹⁷ The environmental assessments used in U.S. neighbourhood research proved inappropriate for the Brent study (Coulton, 1996; Barnes McGuire, 1997; Raudenbush & Sampson, 1999; Caughy, 2001; Weich, 2001), the property environment distinctions here being far subtler than the U.S. surveys dealt with. One recent study (Dunstan, et al., 2005) promises to be a more useful tool, but even here the problem of defining the area of interest and scale has not been resolved.

building blocks of neighbourhoods. Logic suggests that mapping residences by value would equate to mapping neighbourhoods, given appropriate boundaries, and this research looked carefully at doing this. Unfortunately, too little data rendered this impractical (see below).

As alternatives, professionals have developed automatic valuation models (AVMs) (Rightmove, 2012; Zoopla, 2012) though their valuations are unavailable except on a property-by-property basis and their constructions are 'black box'. The most authoritative reference valuations are those of the Valuation Office Agency in producing Council Tax Valuations (CTVB) for every residential property. The VOA uses a Valuation Model which "laid down the identification of discrete value-significant locations and the main property types occurring in those locations. For these main property types, key properties were identified, fully described and valued to provide a basis for the banding of other properties." (Valuation Office Agency, 2000, p. 2.2). Unfortunately, the VOA would not release details of these discrete value-significant locations. However, via Brent Council, the VOA did agree to supply the council tax valuation banding for each residence in Brent and this is used in this research.

Of themselves, mapping the CTVBs or property values are too crude a means of delineating housing areas, as the same banding can cover a variety of types and age of property as well as different ownership and tenancy status, although it is a general guide, and the understandably close relationship between sold property prices and CTVB can be noted in Figures 30 & 31, and so, in this study, they were substituted by contiguous areas of similar housing type within the same tertiary natural area, taken as substitutable housing, which underlie price or tax classes.

The rationale supporting this approach is that if like people live in like residences, as suggested by structural homophily, then it is reasonable to expect that broader areas of contiguous similar housing will also be areas of socio-demographic homogeneity. It was hypothesised that identifying these areas of similar housing type, within natural areas, would provide a better explanation for the geographic patterning of racial and socio-economic variables than pedestrian street networks alone.

Housing Areas were created by grouping contiguous properties which made sense on the ground. For example, the modern social housing estate of Wilson Drive in North Brent, composed of different types of housing, is clearly a distinct housing area by virtue of being a self-contained estate, as is the North Brent, post-war semi-detached former council housing of Belvedere Way, even though much of this is now in private ownership. The former is given its character by the combination of ownership status, age and site location, whereas the latter is characterised by similar property type and age, although the area and environment retains the imprint of its origin. The results of adding the correlations of LSOAs and Housing Areas are set out in Table 7.

Table 7. Adjusted R Square values of the Proportion of an Output Area's Population: All geographies, North Brent and Kilburn, 2006

	ETHNICS					
	<i>Proportion White</i>		<i>Proportion Asian</i>		<i>Proportion Black</i>	
Independent Variables						
Area	North Brent	Kilburn	North Brent	Kilburn	North Brent	Kilburn
NATURAL AREAS	.122**	.685***	.121**	.067**	.364***	.694***
NETWORKS	.258***	.650***	.274***	.068**	.392***	.678***
HOUSING AREAS	.451***	.710***	.520***	.156***	.636***	.747***
LSOAs	.327***	.607***	.244***	-0.009	.392***	.613***
*p<.05; **p<.01; ***p<.001 (two-tailed tests)						

This table shows that, from all the evidence which has gone before, Housing Areas appear to provide a better explanation for the variability of racial patterning than any of the other spatial units examined and are comparable to the correlations of Grannis's t-communities.

5.2.6 Socio-economic distributions.

Drawing upon Grannis's observation that the noted ethnic segregation along street networks also applied to socio-economic distributions (Grannis, 2005, p. 316), this current analysis was extended and applied to a number of 2001 Census variables positively associated with neighbourhoods.

Five new census variables were introduced as indicators of the presence of social capital and as a measure of socio-economic status, which are later combined with ethnic data into what is termed the Talen Index, described in detail below. They are the proportion of an area's population deemed to be Stable, Home Owning, Married with Children, Economically Active, and of ABC1 Status. A summary of the Regression Coefficients is presented in Table 8.

Independent Variables	ETHNICS						SOCIO-ECONOMIC VARIABLES (T6)												
	Proportion White		Proportion Asian		Proportion Black		Proportion Owned		Proportion Same		Proportion Married with Children		Proportion Economically Active		Proportion ABC1		Proportion White		
	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	
Area																			
NATURAL AREAS	.122*	.685***	.121**	.067**	.364***	.694***	0.185***	.418***	0.094**	.116***	0.139***	.150***	-0.015	.265***	.190***	.418***	.122*	.685***	
NETWORKS (T-COMMUNITIES)	.258***	.650***	.274***	.068**	.392***	.678***	.438***	.421***	.228***	.091***	.419***	.231***	.155***	.366***	.456***	.323***	.258***	.650***	
HOUSING AREAS	.451***	.710***	.520***	.156***	.636***	.747***	.558***	.606***	.360***	.308***	.506***	.439***	.363***	.400***	.473***	.648***	.451***	.710***	
LSOAs	.327***	.607***	.244***	-0.009	.392***	.613***	.375***	.474***	.080*	.050*	.104*	.108**	-0.02	.288***	.294***	.426***	.327***	.607***	

*p<.05; **p<.01; ***p<.001 (two-tailed tests)

Table 8. OLS Coefficients of Regression of the Proportion of an Output Area's Population: North Brent and Kilburn, 2006

Broadly speaking the results bear out Grannis's observations that street networks are a valid explanatory instrument for spatial segregation. The extension of the analysis to Housing Areas shows that the distribution of Census variables is better explained by Housing Areas rather than tertiary Networks, though Networks are a better explanatory spatial unit than census Lower Super Output Areas, and all were better than tertiary Natural Areas.

Across all variables, in both study areas, housing areas are a better explanation of their geographical distributions than any other spatial unit.

Grannis also conducted OLS Regression using as independent variables both the t-community variable and the racial proportion of all other block groups weighted by their inverse distance from the focal block group to account for distance. This analysis was replicated in the two Brent study areas for both Networks and Housing Areas (Mitchell, 2005) and the results obtained are as in Table 9.

As Grannis found, for both areas, including distance in the model only increases the amount of variation accounted for by, on average, about 10% and does not substantially increase the explanatory power (Kilburn Asians excepted, which increased twofold – see below). There are, though, exceptions to this generalisation: the Economically Active variable was virtually unchanged by including distance (distance actually, but marginally, decreasing the explanatory power in North Brent) but the distance coefficients were not significant and are not reliable.

For all variables, with one exception, Housing Areas are a better predictor of geographic patterning than distance, and are usually at least twice as powerful a predictor and sometimes several factors greater. The exception is the Kilburn Asian variable where distance is a more powerful predictor than Housing Area; this reflects their small numbers which tend to be concentrated in a small number of areas.

The spatial distributions of two of the selected socio-economic variables appear to be only moderately explained by Housing Areas: the proportion of the population living at the same address as 12 months earlier, and the proportion of the population economically active.

Independent Variables	ETHNICS						SELECTED CENSUS VARIABLES												
	Proportion White		Proportion Asian		Proportion Black		Proportion Owned		Proportion Same		Proportion Married with Children		Proportion Economically Active		Proportion ABC1		Proportion White		
	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	North	Brent Kilburn	
NETWORKS (T-COMMUNITIES)																			
Unstandardized Coefficient	.69***	.92***	.69***	.60**	1.02***	.92***	.79***	.86***	.67***	.57***	.81***	.77***	.54***	.84***	.82***	.73***	.69***	.92***	
Standardized Coefficient	(-0.510)	(-0.810)	(-0.530)	(-0.280)	(-0.630)	(-0.820)	(-0.670)	(-0.650)	(-0.480)	(-0.310)	(-0.650)	(-0.490)	(-0.400)	(-0.610)	(-0.680)	(-0.570)	(-0.510)	(-0.800)	
Inverse-distance																			
Unstandardized Coefficient	.048***	.017*	.079***	.109***	.130***	0.055***	.071***	.118***	.016**	.022***	.101***	.116***	0.001	0.004	.031***	.032***	.048***	.017*	
Standardized Coefficient	(-0.300)	(-0.130)	(-0.420)	(-0.680)	(-0.720)	(-0.420)	(-0.360)	(-0.530)	(-0.230)	(-0.410)	(-0.420)	(-0.620)	(-0.010)	(-0.070)	(-0.240)	(-0.260)	(-0.300)	(-0.130)	
Constant	5.33	2.32	6.2	2.60*	2.10***	3.02*	4.82	-4.26	19.56*	24.80*	0.72	-0.97	29.66***	9.22	6.92	7.47	5.33	2.32	
Adj. R ²	.34***	.66*	.45***	.50***	.77***	.78***	.56***	.67***	.27**	.26***	.58***	.60***	0.15	0.36	.51***	.39***	.34***	.66*	
HOUSING AREAS																			
Unstandardized Coefficient	.84***	.90***	.89***	.49***	.90***	.92***	.90***	0.84***	.78***	.66***	.86***	.77***	.74***	.73***	.85***	.89***	.84***	.90***	
Standardized Coefficient	(-0.680)	(-0.840)	(-0.720)	(-0.400)	(-0.800)	(-0.860)	(-0.750)	(-0.780)	(-0.600)	(-0.560)	(-0.720)	(-0.670)	(-0.610)	(-0.640)	(-0.690)	(-0.810)	(-0.680)	(-0.840)	
Inverse-distance																			
Unstandardized Coefficient	.04**	.01*	.07***	.06***	.08***	.03***	.08***	.05***	0.02	.01***	.11***	.06***	0	0	.03**	.01*	.04**	.00*	
Standardized Coefficient	(-0.240)	(-0.110)	(-0.370)	(-0.520)	(-0.400)	(-0.240)	(-0.360)	(-0.330)	(-0.270)	(-0.250)	(-0.440)	(-0.440)	(0.000)	(-0.070)	(-0.240)	(-0.110)	(-0.240)	(-0.110)	
Constant	-0.68	.06*	5.09	.03***	1.16	.02*	5.37	0.04	16.13*	2.3***	2.89	.02*	16.92*	.18***	4.89	0.05	-0.68	.06*	
Adj. R ²	.50**	.72*	.63***	.42***	.74***	.79***	.67***	.69***	.43**	0.37	.66***	.61***	0.36	0.4	.53**	.66*	.50**	.72*	
No. Of Output Area sections	100	163	100	163	100	163	100	163	100	163	100	163	100	163	100	163	100	163	

Dependent Variable: Proportion of an OAs Population
Independent Variables: (i) Average Proportion of an Area's OAs excluding focal OA; (ii) Average Proportion of an Area's OAs excluding focal OA, weighted by Inverse Distance

All variables are proportions
*p<.05; **p<.01; ***p<.001 (two-tailed tests)

Table 9. OLS Coefficients of Regression of the Proportion of an Output Area's Population, Inverse Distance Weighted: North Brent and Kilburn, 2006

5.2.7 Hypotheses accepted.

Overall, housing areas, defined by housing type, are significantly a better explanation of the patterning of racial and the selected socio-economic variables than distance, confirming the extended analysis of Grannis's observations as presented in his 2005 paper, and the first three hypotheses can be accepted:

Grannis's findings, that racial distributions are better explained by delimited pedestrian street networks than distance, in spite of differences in available datasets, can be replicated in a sample of London areas, so becoming as a benchmark for other work.

Similarly, when this analysis is broadened to alternative geographies: the lower super output areas of the census and the housing areas of this research, similar levels of correlation are obtained, with housing areas best explaining the distributions of the variables.

The variability in the geographic patterning of both racial groups and socio-economic variables is better explained by areas of similar housing than by any other spatial units considered, and when distance is accounted for.

5.2.8 Conclusion

This chapter presented the results of replicating Grannis's empirical work in the two Brent study areas. The correlation results of this exercise confirm the validity of transferring Grannis's methodology to a U.K. setting and also confirm that housing areas best explain the ethnic and socio-economic distributions in the two study areas, representative of homogeneity and social interaction and, thereby, neighbourhoods.

Having established that Housing Areas are the appropriate geographical unit for identifying areas of racial and socio-economic homogeneity the next section of this research extends the analysis to examine the strength of associations between type of residence, housing value and 'neighbourhoodness' (socio-economic variables) within Housing Areas, examining the role of wealth, long held to be at the root of social patterning, in the geography of housing areas and in their relationships with socio-economic and demographic variables.

5.3 Understanding Social Distributions through the Built Environment

5.3.1. Introduction

The central theme of the housing area model of the neighbourhood is that the physical environment sets the scene for the built environment which, in turn, through the quality and freehold status of its residential property, conditions social distributions. The mechanisms by which this happens are presented as being property cost and households' ability to afford that cost - i.e. property price and household wealth.

Given the premise that the market cost of any property type is related to its council tax valuation band (CTVB), and that the Talen Index is a socio-economic measure reflecting households' ability to afford housing costs and 'neighbourhoodness', if the above hypothesis is correct it should be possible to see a direct and significant relationship between property type, CTVB and the Talen Index in both North Brent and Kilburn.

The Talen score represents a set of recognised factors associated with neighbourhoods and part of the examination below is to see if these tally with Type and Tax.

Drawing upon the results from the previous section, this section examines the relationships between Type, Tax and Talen to understand better how they explain the similarities and differences between the two study areas regarding the roles of property cost, and households' ability to afford this cost, in connecting the built environment to social distributions.

If it can be shown that there is a positive and significant connection between these variables then there is the potential to identify neighbourhoods by clustering similar housing areas.

It should be emphasised that relationships are being examined in an exploratory rather than definitive manner given the difficulties of the raw data for the study areas. In particular, it should be recalled that the spatial definition of housing areas relies upon a subjective judgement of what constitutes a psycho-social obstacle, arising from which was the need to re-cast data from census OAs to the housing areas to allow analysis; then, it is important to set this analysis in the context of relatively small samples of data for the research as a whole, and especially when the number of housing areas considered is reduced to highlight relationships. Lastly, there are the limitations of the variables being considered, as described below. These general constraints on the data, whilst not invalidating the analytical results, provide the perspective in which they must be seen.

The structure of this chapter is that, firstly, the 3 primary variables are examined to reveal precisely what they represent. Then the results of correlating these variables in each area are presented and discussed in relation to the above hypothesis.

From this analysis a method of clustering housing areas is presented and justified as a means of constructing neighbourhoods of varying size for the two study areas.

The remainder of the chapter then compares the clustered neighbourhoods to neighbourhood surrogates in current use discussing their respective merits and drawbacks, before summarising the substance of the chapter.

5.3.2. Type, Tax and Talen

The purpose of introducing these variables is to relate property cost to households' ability to afford this cost in order to see if there is a significant relationship between the two. Structural homophily presents similar properties as appealing to similar people, and similar people socialise with one another more easily than dissimilar people. Thus, it is reasonable to conclude that similar proximal properties, housing similar people with a greater propensity to interact socially than non-similar people, represent the building blocks of neighbourhoods.

This research presents housing areas as the basic building blocks of neighbourhoods and the premise upon which this is built is that contiguous and substitutable housing appeals to people of similar socio-economic standing (structural homophily) and this similarity of socio-economic status facilitates greater social interaction (social homophily) which generates community and social capital. The mechanism by which this is brought about is, primarily, property cost. People filter themselves socio-economically via their ability to afford different types of property commanding different prices.

The above analysis showed that housing areas best explained the ethnic and socio-economic distributions found in both study areas and the analysis below endeavours to establish and highlight the relationships between housing type and socio-economic distributions through their respective correlations with the cost of property.

However, these three variables are not clean and clear-cut in their definitions: the concept of Housing Type is a simplified hierarchy of property; actual property cost can only be accurately determined at the time of a sale and is therefore substituted by Council Tax Valuation Band; whilst socio-economic status is represented by the Talen Index, an index of variables which neighbourhood literature associates with both socio-economic status and social capital, concepts directly related to the presence of neighbourhood.

The causal link links between housing type, housing prices and affordability and socio-economic status is the primacy of wealth in each element. As discussed in more detail

below, there is a general relationship between a hierarchy of property types and their value; likewise socio-economic status reflects the ability of households to be able to afford various property types. Although the Talen Index used in this study is not presented solely as a measure of socio-economic status it does incorporate variables directly associated with it, such as Social Grade¹⁸, Tenure and Economic Activity. Housing prices in this study are represented by council tax valuation band. Thus the analysis below examines the strength of the links between housing type and housing prices/cost (housing type and council tax valuation band) and housing cost and socio-economic status, taken as representative of the ability to afford the cost of housing and/or the qualification for social housing (council tax valuation band and Talen Index).

In this regard, categorising property by type is a crude, rule-of-thumb measure whereas calculating property prices for each type of property requires sophisticated modelling which could only produce approximations. A compromise between the two was made by introducing council tax valuation banding which is a robust measure and which directly relates to the value of every residence. The Talen Index is introduced as a simple measure of each household's socio-economic status, representing its ability to afford its residence. Figures 24 to 29 illustrate the general association between the more expensive properties, as indicated by their council tax banding and residence type and Talen score, seen more clearly with the lower banded properties. Figures 24 to 26 present the spatial distributions of Residence Type, CTVB and Talen Score for individual residences in North Brent, and it is clear that there is some general spatial association between all three variables: for example, the north central and eastern sections of the study area highlight the association between the lower order of residence type, i.e. flats and terraced houses, with lower CTVB ratings and lower Talen scores. Figures 27 to 29 present the picture for Kilburn and, again, the general association between these three variables is visibly distinguishable.

However, this is rudimentary and a greater appreciation of the value of each variable is needed to enable meaningful interpretations of the relationships.

Property cost or price is difficult to establish for any given set of properties. The real value of each property can only be established when it is for sale, otherwise the best that can be achieved is an assessed professional valuation of the property. These valuations were undertaken by the Valuations Office Agency for the purposes of setting Council Tax banding for each residence. For the purposes of this analysis the actual market value of the properties is less relevant than their assessed value relative to proximal properties. The basis of the VOA assessment was to put similar, proximal residences

¹⁸ UV50 Approximated Social Grade: "Social Grade is the socio-economic classification used by the Market Research and Marketing Industries, most often in the analysis of spending habits and consumer attitudes."(ONS, 2008)

into the same council tax valuation band, thus we could expect to note a significant correlation between CTVB and Housing Type, notwithstanding the simple categorisation of housing type implemented in this research.



Figure 24. North Brent: Type of Dwelling



Figure 25. North Brent: CTVB by Residence

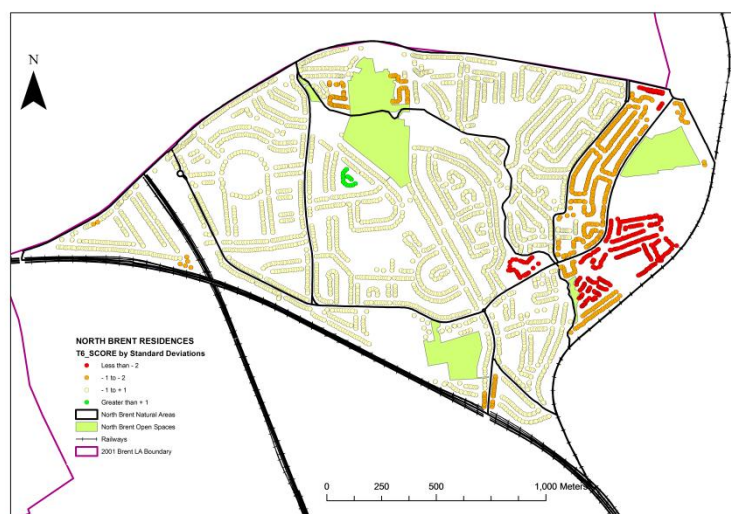


Figure 26. North Brent: Talen Score by Residence



Figure 27. Kilburn: Type of Dwelling



Figure 28. Kilburn: CTVB by Residence



Figure 29. Kilburn: Talen Score by Residence

What the variables represent

Council Tax Valuation Banding is the most stable and reliable measure in the following regression analysis. CTVB is related to the hierarchy of property types – detached, semi-detached, terraced house, and flats – which is taken to be related to their value, but also takes into account all those other factors which contribute to an assessment of a property's value, such as location, access to public transport, environmental qualities, nature of ownership, neighbour and neighbourhood characteristics (assumed to be homogeneous within each study area). The valuations undertaken for the Valuation Office are initially produced by local estate agents or surveyors and thus support the view, noted by Burgess and in neighbourhood literature, that estate agents' delimitations of neighbourhoods, being based on property values, have great utility and validity in marking out neighbourhoods.

This variable is utilised as a representative of the residence's value or cost as assessed by the Valuation Office. The bands are ordinal and not of equal value.

Table 10. Council Tax Valuation Bands (Valuation Office Agency, 2000)

Band	Property Value 1991
A	up to £40,000
B	£40,001 to £52,000
C	£52,001 to £68,000
D	68,001 to £88,000
E	£88,001 to £120,000
F	£120,001 to £160,000
G	£160,001 to £320,000
H	£320,001 and above

It should also be noted here that the bands are of unequal interval which, in the two study areas, tends to give unity to areas of high and wide-ranging property values, favouring the extensive housing of North Brent, whilst conversely acting to fragment the unity of properties of lower value i.e. flats, which dominate Kilburn.

CTVB is assessed uniformly across the whole of Brent enabling direct value comparisons to be made between properties in the two study areas.

Relating average property prices to CTVB

In the absence of individual property valuations maps were produced to visually demonstrate the association between modelled property values and CTVB. There was insufficient real price data available for a meaningful analysis of housing areas - areas were too small and property transactions too few over the period of Land Registry published property sale information – and, additionally, there were considerable technical difficulties in using house price indices to adjust real sales prices to current value. House prices were modelled as shown in Figures 21 & 22 but this modelling was too general and inappropriate for individual property pricing. Instead, Council Tax Banding was used as a proxy for price (Longley, 1994).

Property address and sale prices for all property transactions between January 2000 and 31 December 2005 for the two study areas were obtained from the website NetHousePrices (nethouseprices.com, 2009) by looking up each postcode in the two study areas. The list of postcodes for the two areas was derived from the postcode/output area (PC to OA) look-up tables from the census geography (ONS, 2005 (2014)). Using quarterly data on changes in average property sales values by postcode sector from UpMyStreet.com (Zoopla, (2006) 2009)¹⁹ to create an index, the actual sale prices were adjusted to a current value as at January 2006. However, using index-adjusted property sale price data for mapping and correlation analysis was unsatisfactory a number of reasons:

Particularly in North Brent, but also in Kilburn, the volume of property sales 2000-2005 was too few to provide a satisfactory number of representative properties in the spatial units under investigation. The remedy for this was to interpolate data using ArcView GIS Neighborhood Statistics. The property addresses were subsequently matched to their National Grid references via the Brent Domestic Property Data (Brent, 2005b) and, using the neighborhood statistics block function (5 cells by 5 cells) within the Spatial Analyst function of ArcView 9.2, maps showing quartile mean average property prices were produced for the two study areas

Whilst this provides a generalised picture of property prices across the study areas, by its very nature it cannot take account of social barriers or sharp changes in property type, so it is not usable for assigning a value to any individual property or a small group of properties for the purpose of correlating data.

On comparing the Land Registry sale price data for the period 2000-2005 with the property survey carried out and the Brent GIS property database, it became clear that some properties had been improperly described. Some 10-15% of properties fell into

¹⁹ Both nethouseprices.com and upmystreet.com used licensed data from the Land Registry (Land Registry, 2009).

this category: flats described as houses; terraced houses described as semi-detached houses; semi-detached houses described as detached, and so on. For this additional reason it was not accurate to generalise from one property's Land Registry description to another property seemingly in the same class.

Due to the nature of the property market there were wide variations in sale prices of apparently very similar properties within short periods of time. Consequently, when these sale prices were adjusted to current value using the Halifax Property Price Index (Lloyds Banking Group, 2010), there was considerable variation jeopardising the integrity of a representative average price.

For these reasons, and following other researchers (Longley, Higgs, & Martin, 1994; Beale, Taylor, & Straker-Cook, 2001; Weich, et al, 2002) it was decided to use Council Tax Valuation Banding (CTVB) as representative of individual property values.

Whilst CTVB has been acknowledged as being out of date – it was based on 1991 valuations – the government has declared its intention of introducing a re-valuation. However, current CTVBs do not accurately reflect relative change in property values since 1991 – some classes of property have increased more than other classes and improvements to individual properties only change council tax banding when the property is sold. The methodology of the new valuation will be modelled values based on previous property surveys and other data. The 1991 valuation exercise involved:

- The identification of 'discrete value-significant locations'.
- The main property types falling within these locations.
- For these main property types 'key properties' were identified, fully described and valued as a basis for the banding of other properties.

With the condition that they wholly fall within socially bounded areas, the first step of the valuation exercise identifies the Housing Areas of this study, and the second step helps to identify areas of similar type housing.

Unfortunately, the VOA would not make their data relating to this valuation exercise available for this study.

Superimposing a map of property council tax valuation bands on the map of mean property sale price illustrates the close association between the two, even when multiple dwellings at the same location are represented by one symbol, such that it is reasonable to use CTVB as a more reliable indicator of relative property values than modelling prices from actual property sales – see Figures 30 & 31.

However problematic the link between the council tax valuation and the actual market property value there is clearly a strong link between the two, as is to be expected, and this is more reliable than any other available data. Certainly, having a council tax

valuation band for every residence facilitates more accurate statistical analysis than if property values were derived from surfaces, for the reasons presented above.

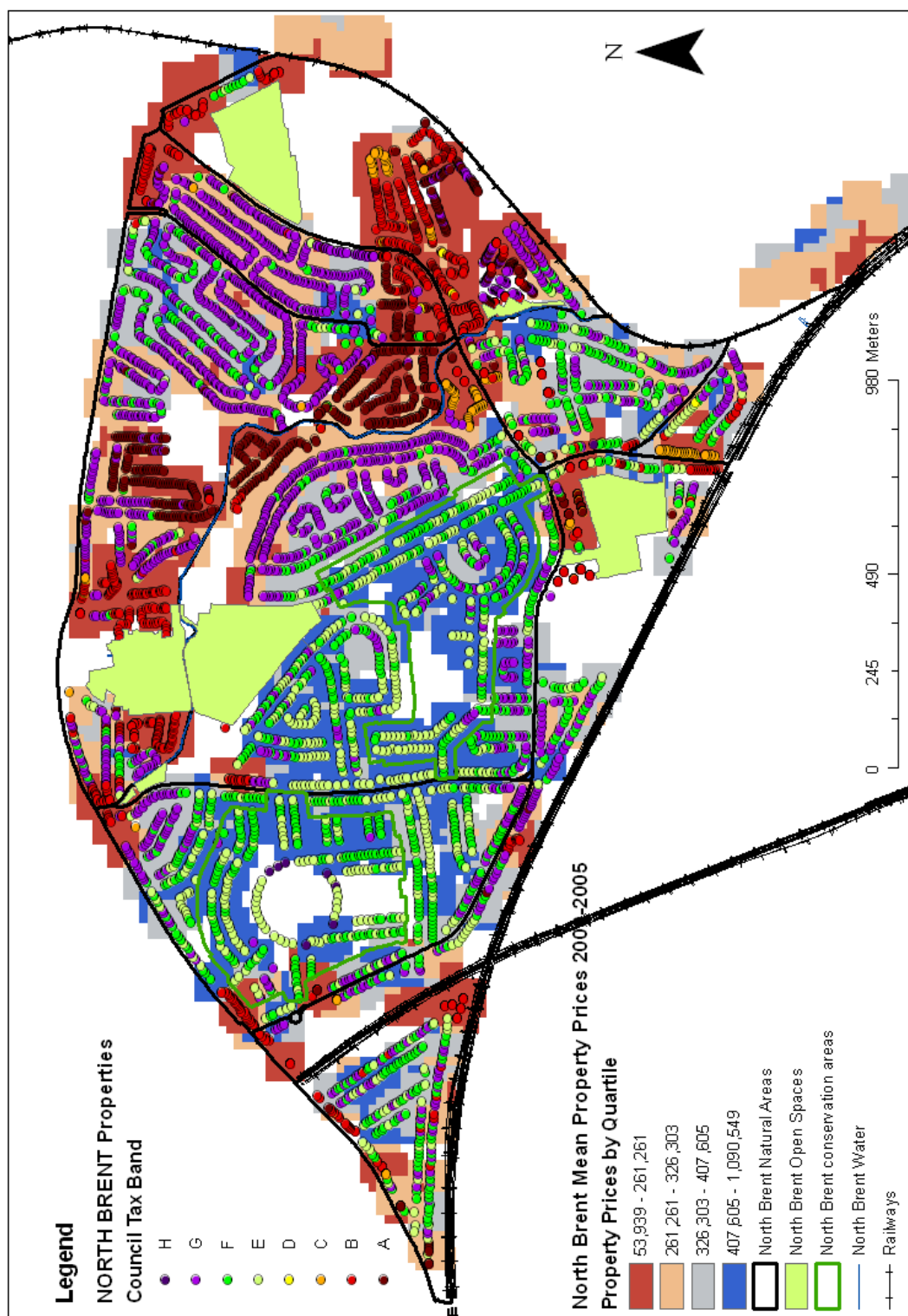


Figure 30. North Brent Properties 2005 Council Tax Valuation Band and modelled property values



Figure 31. Kilburn Properties 2005 Council Tax Valuation Band and modelled property value.

Housing type (Type).

Given that all properties in each of the sample areas are approximately the same distance from the centre of London, all things remaining equal, we could expect that the larger a property is the more expensive it will be and that this price will act as a filter for some people, precluding them from choosing to live in some properties, irrespective of who their neighbours might be.

A generalised hierarchy of property was assumed in accordance with other research work in this field (Crooks, 2008) and in accordance with Land Registry and Brent Council categories. This analysis assumes that the larger the type of property, all things being equal, the higher the price and that detached properties were reasoned to be larger than semi-detached houses which, in turn, were regarded as being larger than terraced houses and that all of these were larger than flats.²⁰

Furthermore, this hierarchy does not distinguish between old and new, good quality and poor quality, or any other differentiating features within each category whereas, for example, the Cities Revealed National Building Class classifies residential property into over 18 building classes and 7 age groups. So, for example, the category 'semi-detached' embraces Victorian, pre-WWI, inter-war, post-war prefabricated and new-build semis, treating them equally and assigning them the same code.

Housing Type categories – as described and utilised by Land Registry and Brent's property database - were assigned codes based upon the above hierarchy. Detached single-household residences were assigned the code 1; semi-detached single-household residences were coded 2; terraced single-household residences were coded 3 and all single-household flat residences were assigned the code 4.

The nature of property in North Brent is somewhat different from that in Kilburn because the two areas were developed at different times and to cater for different markets and circumstances so, for example, the terraced properties predominant in Kilburn and Queen's Park are different from those in the Clarendon area of North Brent, and consequently their value reflects these differences in build quality, size and other characteristics. Likewise with each property class.

The value of the property also reflects the location of the property so that, by and large, the value of properties in Kilburn, per square foot or square metre, will be greater because of Kilburn's inner city location as opposed to North Brent's more suburban location. Thus even similar size, age and construction properties will differ in price in

²⁰ Not true in reality: some flats are large and this assumption may account for some of the lessening of the value of the r coefficient.

the two study areas, complicating the interpretation of correlating Type directly with the Talen Index, making the case for relating Type and the Talen Index to CTVB as a stable intermediary.

Obtaining accurate data was one purpose in conducting a street-by-street property survey but another, important element, was to get a real feel for the material being considered. For example, Webster had declared that we can all identify a neighbourhood when we see one, whilst Galster had expressed a similar sentiment. More importantly, the large U.S. studies of L.A.FANS and PHDCN, amongst others, incorporate assessments of neighbourhood environmental conditions and it was deemed imperative to have first-hand knowledge of the detail of the study areas on such matters as housing classification, pedestrian access, physical barriers and a human appraisal of the character of the areas so that informed judgements could be taken where required.

One example of such a judgement came with balancing detail against generalisation in setting the classes of residential buildings. The Cities Revealed dataset contained over 20 classes of residential buildings which was far too many for the purposes of this study. Instead, this study put all properties into 4 classes of types of property: detached house, semi-detached house, terraced house and flats. This simple 4 category classification of property is that which the Land Registry uses in its reporting. In many ways this is an over-simplification, for example: how should small terraces of 4 or 6 properties be classified, and how can the variety of quality of similarly classified properties be represented? These issues were addressed by making judgements first-hand, in accordance with the objectives of this study. So, for example, the small blocks of terraced properties in the western part of Queen's Park were categorised as semi-detached properties to distinguish them from the smaller terraced properties of the eastern part of Queen's Park and the vast majority of Kilburn which have smaller gardens and where there is a more cramped feel. On the other hand, in the North Brent natural area of Woodcock Park South, fine distinctions between different sized semi-detached properties, in the western and eastern sections, were not made as the internal differences within the semi-detached category were not judged to be as important as the distinction between the whole category and other property categories.

Age of Property was assessed as falling into the following categories, having been narrowed down from the age categories of the National Building Class dataset:

From a field survey all properties were put into 7 age groups:

- Early Victorian
- Late Victorian and pre-WWI
- Inter-War
- Early Post-WWII
- 1960 & 1970s

-
- 1980s & 1990s
 - Recent years

Properties were also classified according to type of property:

- Detached house
- Semi-detached house
- Large Terraced house
- Small Terraced house
- Mews house
- New houses
- Flats above shops
- Flats - small units
- Flats - medium size blocks
- Flats - large blocks
- Flats - tall blocks

Each distinctive, contiguous group of similar-age and similar-type properties was designated as a Housing Area.

For statistical analysis, housing type was simplified to 4 categories:

- Detached house
- Semi-detached house
- Terraced house
- Flats

The Talen Index (Talen Score, or T6). The third element in the regression statistics is the Talen Index (T6), introduced as a socio-economic indicator composed of variables associated with neighbourhoods. Like property type and CTVB the Talen Index is an indicator of wealth. The Talen Index is presented as a general indication of those observed variables associated with neighbourhoods, as presented in the England and Wales census 2001, and there is a clear relationship between these variables and other measures of socio-economic status, such as the Townsend index. In fact the correlation between the Talen Index and the Townsend Index for the whole of Brent is moderate to strong, with $r = -0.64$, $p < 0.01$. As has been noted above geo-demographic classifications can be regarded as simply measures of wealth, and it is this underlying factor which connects the geographic distribution of the three major variables of Type, Tax and T6 through the mechanism of structural and social homophily. Indeed, the basis for census output areas is homogeneity of household ownership and tenancy status – both of which are related to the ability to afford the household residence.

Creating the Talen Index²¹.

The Talen Index was created as an indicator of social capital variables positively associated with neighbouring in order to investigate their relationship with Housing Type and Council Tax Valuation Band.

Grannis asserted in his conclusion to his 2005 paper that pedestrian street networks were a better explanation for the patterning of racial distributions than either distance or school attendance zones; he further added that these street networks also better explained socio-economic distributions. This Talen Index is a proxy for a socio-economic measure. Longley has elsewhere critiqued the fact that there is no precise and accepted definition, and therefore measure of socio-economic welfare, and this Talen Index, whilst based on social capital and neighbourhood indicators, is presented as a gauge of socio-economic welfare. It is a central thesis of this study that all of these concepts are different views of the same core.

Whilst this Index is not a measure of deprivation it was correlated with the Townsend Index for Brent, and found to be moderate to strong, with $r = -0.64$, $p < 0.01$.

The Talen Index was devised as a measure of the presence of neighbourhood as currently understood. The variables selected for the Talen Index are also amongst those which have been recognized as indicating the presence of social capital (Stone, 2001). Given that the presence of social capital is theorised as constituting neighbouring or, at least, being the quality or social environment nurturing neighbouring, it is not surprising that these variables represent this dual nature.

The selection of variables to indicate the presence of social capital and community were:

Length of residence – as an indicator of likely involvement with other members and service providers in the neighbourhood

Home ownership – indicating commitment to the neighbourhood

Resident homogeneity, represented by:

Married couples with children – regarded by Grannis as the essence of neighbourhood.

<p>Economically Active population ABC1 population</p>	}	<p>as indicators of socio-economic status, presented here as the prime filter of social homophily</p>
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²¹ This sobriquet is in reference to Emily Talen, an American academic prominent in the field of neighbourhood research, and reflects her identification of factors promoting a sense of community drawn from literature and substantiated by other academics (see Social Networks).

White population – representing the degree of ethnic diversity and the bridge between Grannis’s racial analysis and the Talen Index.

The variables used were England and Wales Census 2001 data downloaded from the Neighbourhood Statistics web site (ONS, 2004) in conjunction with 2001 Output Area data supplied on disk from Neighbourhood Statistics. The census variables used were:

Figure 32. Census data used in Talen Score

2001 Census Data Set	Data Set Name	Statistic_Used	Term_Used
UV63	Tenure - Households	The number of households who Owned their accommodation	Owned
UV68	Household Type	The numbers of married couple households with dependent children	Marr+Ch
UV28	Economic Activity	The number of people who were 'Economically active'	Econ
UV50	Approximated Social Grade	The number of people over the age of 16 in the ABC1 categories	ABC1
UV52	Migration	The number who lived at same address 1 year prior to 2001 census date	Stable
UV09	Ethnic Count	The count of White people	White

The Index was created for each spatial area by:

Calculating the raw numbers of households (or people if the census data used this as the base) for each spatial unit, re-casting the data where necessary according to the methodology above (Spatial Units/ Census Geography).

From this data the percentage of each variable for each spatial unit was determined. The extensive re-calculations of proportions of variables for each of the customised spatial units examined were computed using Excel Visual Basic code. The percentages were then transformed for all spatial units in each of the study areas. The Z scores for the variables were then added together to produce the T6 (Talen) score or index for that spatial unit. No weighting was given to the variables.

5.3.3 Revealing wealth as the residential filter.

Unlike Type and Tax, which are directly related to property, T6 is concerned with households and individuals and is measured as a composite of six variables, consequently, it is a much more complicated construct than Type or Tax. These variables can only be related meaningfully to property by modelling them to the level of the housing area; modelling T6 to individual properties was not workable for statistical analysis.

The contrasting development histories of the two study areas suggest that the socio-economic profile of the residents would reflect the differences in the nature of their residences and their respective geographic locations' housing stock and its appeal to differing people. Given the age of its development North Brent is likely to align with the general picture of suburbia: areas of semi-detached, home-owning, middle-class families, and Kilburn to be much more varied in its structural and demographic make-up: many more flats and a greater variety in its socio-demographic composition.

To see if the Talen Index reflects this generalisation and what it actually does represent, its constituent socio-economic variables were correlated with the Talen Score, as shown in Table 11.

Table 11. Correlation matrices of Talen variables with Talen Score

KILBURN: T6 SCORE & COMPONENT FACTORS CORRELATION MATRIX							
	T6_SCORE	OWNED	ABC1	MARR+CH	EC_ACT	WHITE	SAME
T6_SCORE	1.00	0.95***	0.86***	0.47***	0.74***	0.87***	-0.11*
OWNED	0.95***	1.00	0.81***	0.44***	0.68***	0.86***	-0.22**
ABC1	0.86***	0.81***	1.00	0.19**	0.83***	0.86***	-0.45***
MARR+CH	0.47***	0.44***	0.19**	1.00	-0.03*	0.07*	0.08*
EC_ACT	0.74***	0.68***	0.83***	-0.03*	1.00	0.81***	-0.5***
WHITE	0.87***	0.86***	0.86***	0.07*	0.81***	1.00	-0.32***
SAME	-0.11*	-0.22**	-0.45***	0.08*	-0.5***	-0.32***	1.00

NORTH BRENT: T6 SCORE & COMPONENT FACTORS CORRELATION MATRIX							
	T6_SCORE	OWNED	ABC1	MARR+CH	EC_ACT	WHITE	SAME
T6_SCORE	1.00	0.80***	0.72***	0.63***	0.49***	0.36***	0.2*
OWNED	0.80***	1.00	0.49***	0.77***	0.11*	0.09*	0.26**
ABC1	0.72***	0.49***	1.00	0.26**	0.51***	0.39***	-0.35***
MARR+CH	0.63***	0.77***	0.26**	1.00	-0.04*	-0.3**	0.34**
EC_ACT	0.49***	0.11*	0.51***	-0.04*	1.00	0.38***	-0.38***
WHITE	0.36***	0.09*	0.39***	-0.3**	0.38***	1.00	-0.23*
SAME	0.20*	0.26**	-0.35***	0.34**	-0.38***	-0.23*	1.00

*** = $p < .01$; ** = $p < 0.05$; * = $p > 0.05$

In Kilburn the housing areas are very significantly associated with the patterns of residential Ownership, and White, ABC1 and economically active people, and, to a lesser extent, with Married Couples with Children, indicating that they are effective discriminators along these criteria.

When Step Regression was conducted (Table 12), it was found that, in Kilburn, very little additional explained variation was accounted for by the other T6 components once the predominant Ownership correlation was established.

Table 12. North Brent & Kilburn: r2 Step Regression of Talen variables on Talen Score

	North	
	Brent	Kilburn
Owned residence	0.63***	0.89***
ABC1	0.17***	0.02***
Married+children	0.04***	0.01**
Economically Active	0.02***	0.02***
White	0.09***	0.01***
Same address 1 year	0.06	0.05

*** = $p < .01$; ** = $p < 0.05$; * = $p > 0.05$

In North Brent the pattern of housing development is much more uniform; most of the area is composed of privately-owned inter-War detached and semi-detached housing, with some terraced housing. Social housing developments are not as extensive or as intense as in Kilburn. Consequently, the close association found in Kilburn between property and socio-economic status is not quite so clear, although it is still the general picture. Given that Asians form approximately 40% of the area's population (as do Whites) and were not the result of settlement by social housing, their pattern of residence is not tightly related to property value or social ownership; they are a socio-economically more balanced population than the occupiers of Kilburn's social housing and, in this regard, less distinguishable from the White population. Nevertheless, home Ownership status is still the primary explanatory factor of the Talen Score.

Especially in Kilburn housing area tenure status is the primary explanatory factor of the Talen Score.

5.3.4. Seeing neighbourhoods in the data.

If property cost is the great residential segregator, as identified in Chapter 3, we can expect a close association between the type of property and council tax valuation banding because both are directly related to the value of the property. The larger the property, all things remaining equal, the more highly valued it is and consequently the higher the council tax valuation. Similarly, if social distributions are related to housing type through structural homophily, as the housing area neighbourhood model postulates, this should be observable in the study areas by correlating housing type, council tax valuation bands and the socio-economic variables held to be indicators of neighbourhoods - the Talen Index or Score of this study.

The following analysis examines these relationships to see if there is supporting evidence for identifying housing areas themselves, or clusters of housing areas, as practical neighbourhoods.

Grannis presented a model of residential location choice which has the implicit assumption that people have complete freedom of choice as to where they want to live and therefore who their neighbours would be, but this is often not the case in the two study areas (see p118). Price of property is the most important consideration in selecting a new home (Silicon Valley Community Newspapers, 2002; Mills, 2003). Price has always been, and remains, a major filter of society. Expensive property is beyond the choice of people who cannot afford it and this has long been recognised in geographical and economic research. Economic Status was one of the three prime variables underpinning Social Area Analysis and Factorial Analysis identifying areas of similarity (the others being Family Status and Racial Status), whilst economic theory has held price primarily to be a factor of distance from the centre of the city and size of the property. Equally important is the fact that a large number of people in both study areas occupy social housing and had a restricted choice of where they would live, largely unrelated to the cost of the property.

Chapter 3 concluded by presenting the housing area model of neighbourhood as the way forward. The above analysis has demonstrated the housing area model to be a better explanation of ethnic and social distributions than the other spatial units examined, but the ensuing analysis seeks to provide further supporting evidence for calling them *neighbourhoods*.

This model is based on wealth being the fundamental social discriminator, with the cost of housing and tenancy status as the means by which segregation occurs.

5.3.5. Correlating the 3 variables.

The general picture in comparing the two areas is as in Figure 33. There is a moderate but significant correlation ($r^2 = 0.46$, $p = <.01$) between the percentages of Flats residences and that of all residences rated as being in Council Tax Bands A-C, in all housing areas containing more than 10 residences (the other housing type, houses, and Council Tax Bands D-H complete the picture and are similarly correlated, being the 'flip-side' of Flats and A-C). It is also evident from Figure 33 that the data for the two areas represent two different datasets, with the majority of Kilburn housing areas having more than 50% of their residences as Flats and many with 100%. North Brent's housing areas are polarised between those with a very high percentage and those with a low percentage of flats.

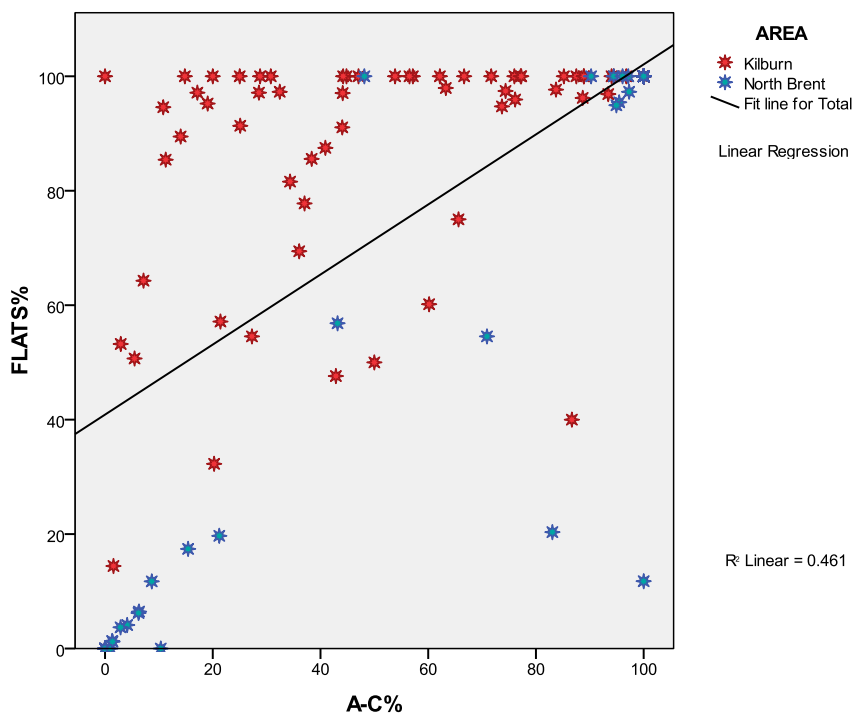
However, the scatterplot in Figure 33 presents a complicated picture: the many housing areas with 100% residences as flats and/or 100% residences rated bands A-C are often hidden by the superimposition of similar-value symbols. In addition, there is a large number of housing areas with a relatively small number of households and, whilst it is critically important not to lose sight of this fact, this large number of small housing areas is given a disproportionate significance in the statistical analysis because they are accorded equal weight with the much larger housing areas in the regression statistic. The effect of this is to create a lot of 'statistical noise', muddying the picture.

Most households are found in the large housing areas: 76% of all households in North Brent are in 11 housing areas containing more than 100 households, with c. 60% of all households in 6 housing areas which have more than 200 households. These large housing areas are areas of almost exclusively (95%) semi-detached and detached inter-war housing of similar architectural style, which are privately owned (97%). Consequently, North Brent is largely characterised by this type of housing and ownership.

In Kilburn 75% of households are in 24 housing areas containing more than 100 residences, with some 52% of households in housing areas with over 200 residences. However, in contrast with North Brent, in this latter group of very large housing areas Flats dominate, accounting for 76% of all residences with the remainder being terraced houses and end-of-terrace semis; only 54% of these are privately owned.

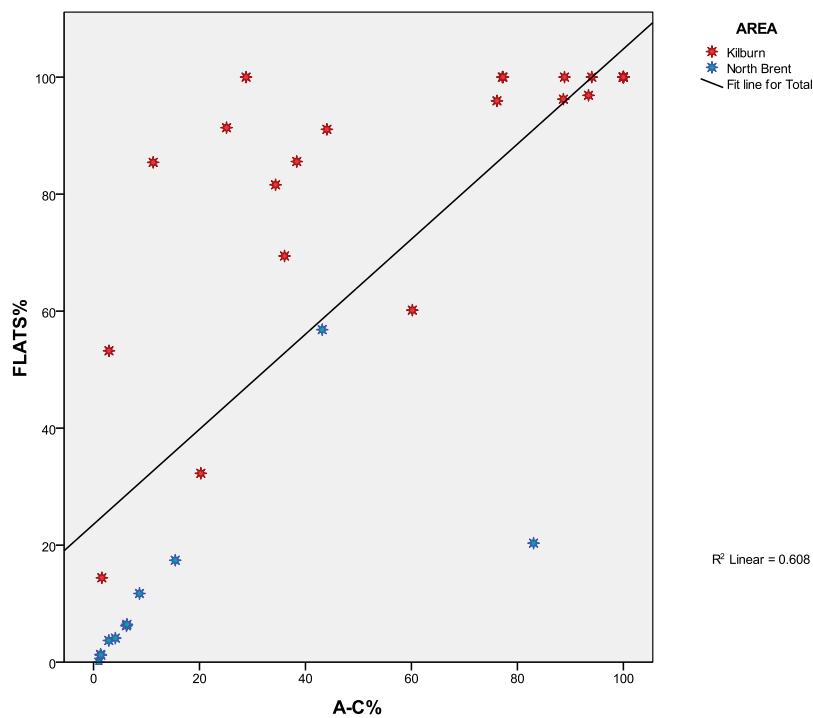
The salient data lies within the larger housing areas and the following, more detailed analysis, focuses on these housing areas. However, it is important to be aware of the considerable number of small housing areas, here defined as those with fewer than 100 households, as these often contain pockets of exceptional residences in juxtaposition to the prevailing, surrounding residences.

Figure 33. Kilburn & North Brent Housing Areas with >10 residences: Scatterplot of % being Flats and % in Council Tax Bands A-C, by Area.



n = 137

Figure 34. Kilburn & North Brent Housing Areas with >100 residences: Scatterplot of % being Flats and % in Council Tax Bands A-C, by Area



n = 47

The breakpoint of 100 households was decided upon because, firstly, it represents a natural break in the data and, secondly, the majority of households in both areas are in housing areas over this size and, importantly, the housing areas larger than this are constituted by majority elements of the composite output areas and the essential characteristics of the two study areas are retained whilst a clearer picture emerges from the data, as shown by Figure 34.

Housing Areas and Household Size. 100 households level represents a natural break in the data of the North Brent area, although it is not as marked in the Kilburn data.

Figure 35. North Brent: Household Size of Housing Areas

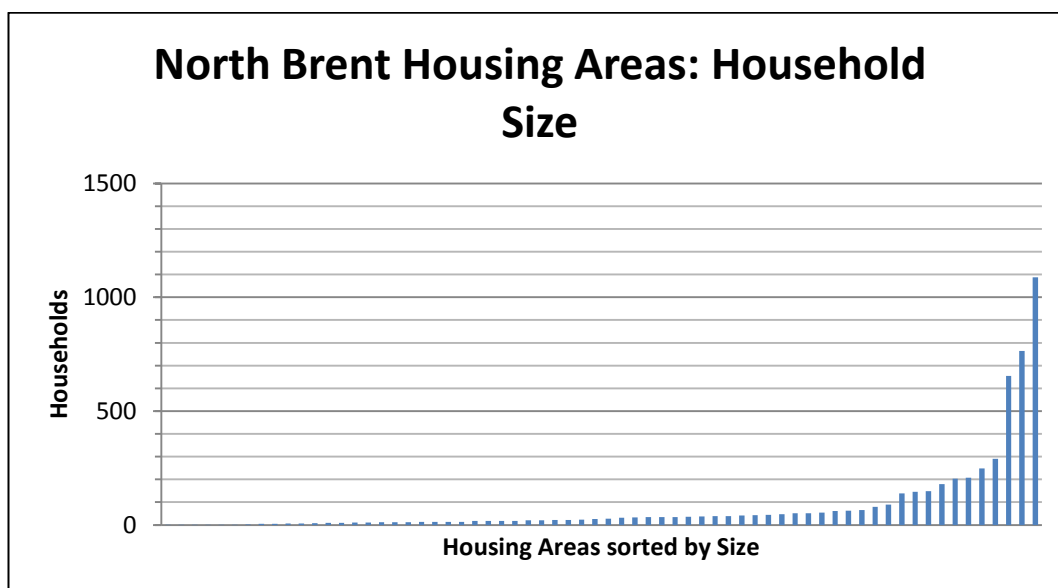
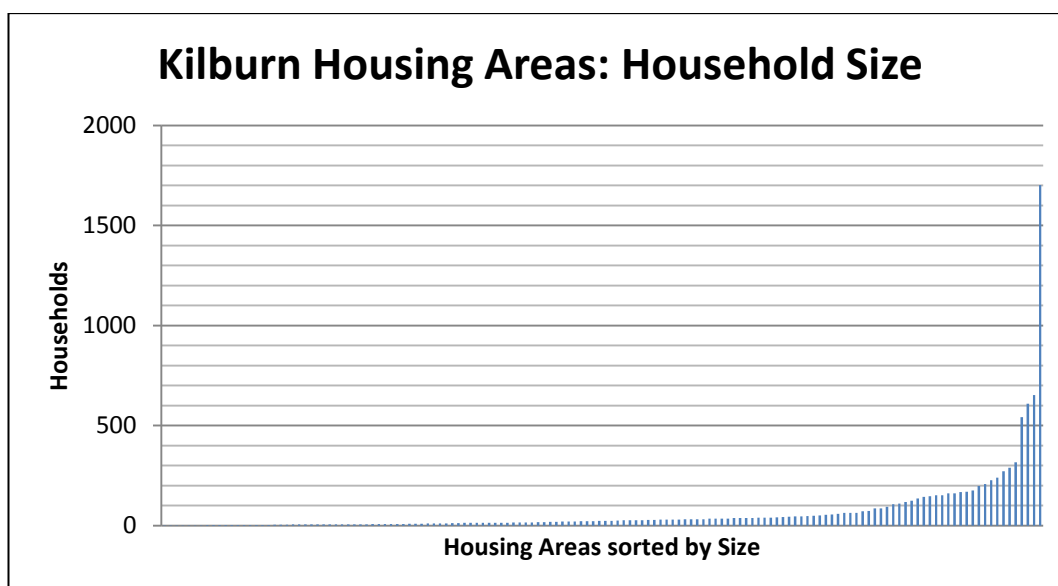


Figure 36. Kilburn: Household Size of Housing Areas

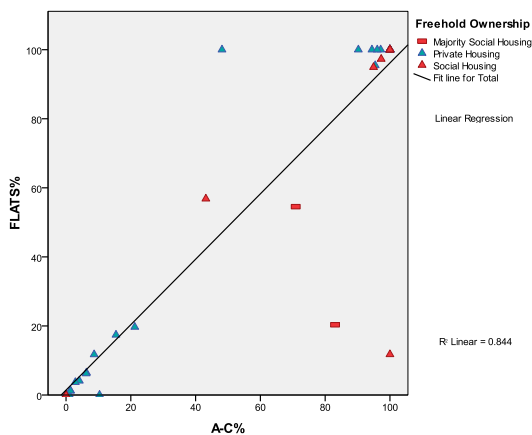


North Brent: n = 61; Kilburn n = 137

A first look at the differences between the two study areas. Combining the two study areas highlights the compositional differences of the characteristic housing areas. Looking at Figure 33 - Flats & A-C - there is hardly any crossover of housing areas between North Brent and Kilburn. By and large, any area with over 50% of its residences being Flats is to be found in Kilburn, and any area with less than 25% of its residences as Flats is to be found in North Brent. Only two types of housing area are exceptions: in Kilburn two areas of original terraced housing, Plympton in North Kilburn and East Queen's Park, have not seen large scale conversions to flats and these fit well with the profile of the bulk of North Brent housing areas. Only 1 North Brent housing area can be said to fit with Kilburn housing areas: Wilson Drive, a recent development of mixed social housing. Likewise, any housing area with more than 50% of its residences in bands A-C is most likely to be in social freehold ownership. The statistical outliers are one area in North Brent, Shakespeare Drive, which is a post-war development of pre-fabricated, semi-detached social housing subsequently modified in terms of its ownership profile by some residents purchasing their housing under the Right-to-Buy scheme. At the other end of the statistical spectrum are the outlier housing areas of Kilburn which are areas of expensive flats in large and good quality houses, occupied by professional workers (high flats/low A-C bands percentages): Brondesbury and Harvist Roads, both of which have good access to Queen's Park Underground Station.

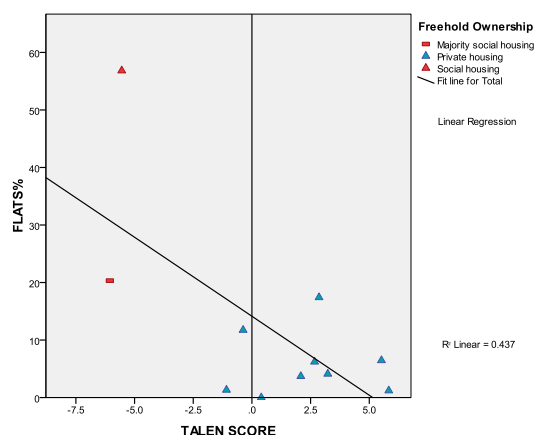
Figures 38 & 42 bring out the distinctive features of the large housing areas of North Brent and Kilburn respectively: while Figure 43 shows that 10 of Kilburn's housing areas have positive Talen scores whilst North Brent has 7 (Figure 39), these represent significantly different percentages of the study areas' households – only 44% of Kilburn households are in housing areas with a positive Talen score whereas it is 70% for North Brent. Figures 40 & 44 highlight the distinctive association between privately owned residences and positive Talen scores and emphasises the gap between the negative Talen scores of areas with high percentages of properties rated A-C and the positive Talen scores of housing areas with low percentages of A-C rated properties.

Figure 37. North Brent Housing Areas with >10 residences: Scatterplot of % being Flats and % in Council Tax Bands A-C, by Freehold Ownership.



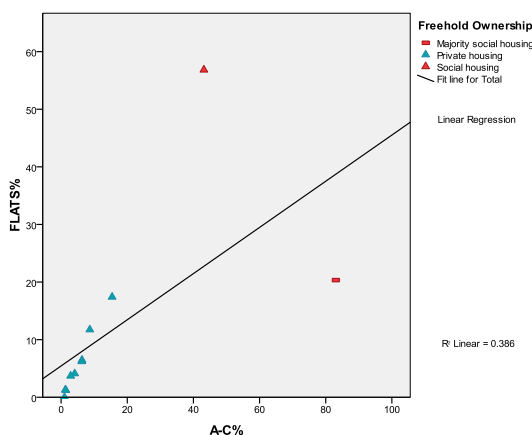
n = 46

Figure 39. North Brent Housing Areas with >100 residences: Scatterplot of % being Flats, and Talen Score, by Freehold Ownership.



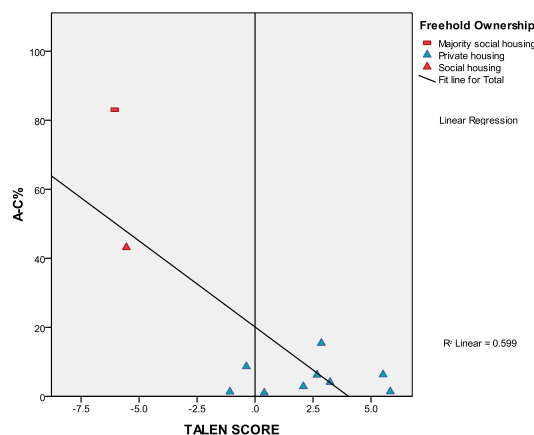
n= 11

Figure 38. North Brent Housing Areas with >100 residences: Scatterplot of % being Flats and % in Council Tax Bands A-C, by Freehold Ownership.



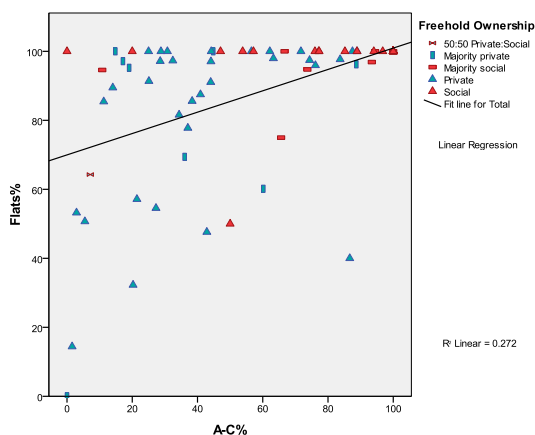
n = 11

Figure 40. North Brent Housing Areas with >100 residences: Scatterplot of % being in CTV Bands A-C, and Talen Score, by Freehold Ownership.



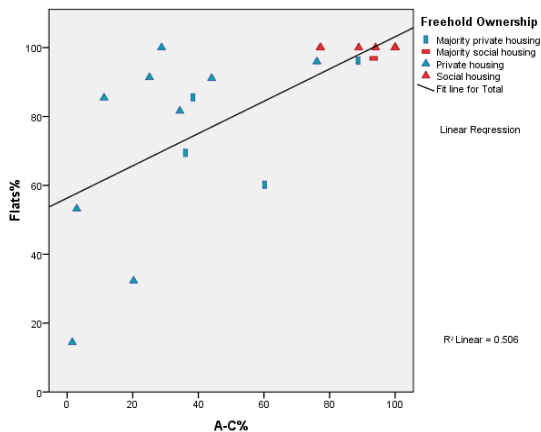
n = 11

Figure 41. Kilburn Housing Areas with >10 residences: Scatterplot of % being Flats and % in Council Tax Bands A-C, by Freehold Ownership.



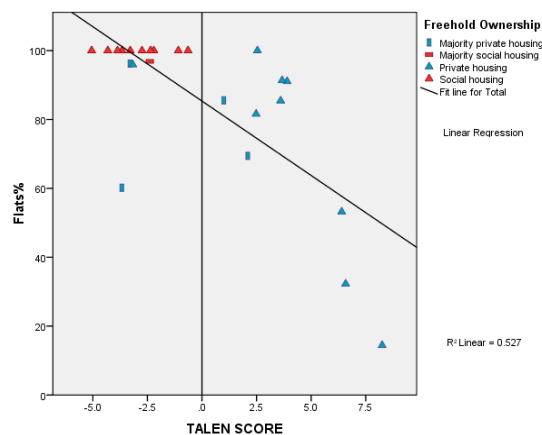
n = 91

Figure 42. Kilburn Housing Areas with >100 residences: Scatterplot of % being Flats and % in Council Tax Bands A-C, by Freehold Ownership.



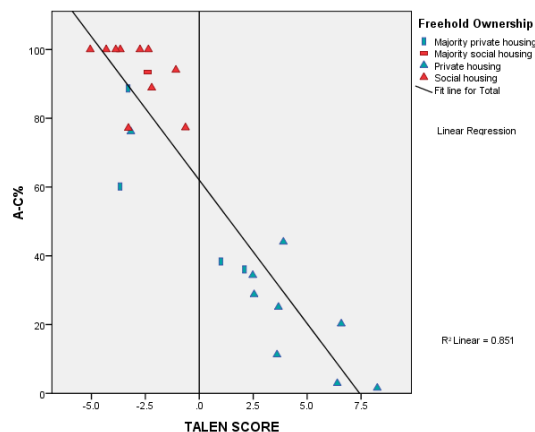
n = 25

Figure 43. Kilburn Housing Areas with >100 residences: Scatterplot of % being Flats, and Talen Score, by Freehold Ownership.



n = 25

Figure 44. Kilburn Housing Areas with >100 residences: Scatterplot of % being in CTV Bands A-C, and Talen Score, by Freehold Ownership.



n = 25

Examining the relationships between the 3 variables in the 2 areas.

Tables 13 and 15 show the correlations between the 3 variables for each of the study areas. Before examining the areas in detail it is important to note that, as the housing area model hypothesised, because of the common association of wealth to each of these variables, there are moderate to very strong correlations between property type, CTVB and the Talen Index within both study areas. In North Brent there is a consistently high correlation between property types and CTVB but an erratic picture of the correlations between these and the Talen Index. In Kilburn, by contrast, there are high correlations between the Talen Index and both the type of property and CTVB, but a somewhat lower correlation between property type and CTVB when compared to North Brent, though in absolute terms it is also a strong correlation.

The following analysis reveals why there is such a difference between the two areas and how this bears on the premise that wealth is the power behind residential segregation.

Tables explained. In Tables 13 and 15 the variables being correlated appear in the left hand column. 'Houses & D-H' refers to the proportion of houses (detached, semi-detached and terraced) in all of the housing areas being considered, correlated with the proportions of all properties falling within the D, E, F, G, & H council tax valuation bands. Together with the following category 'Flats & A-C' all types of property and all council tax valuation bands are covered. Likewise, 'T6 & Houses' and 'T6 & Flats' cover all council tax valuation bands in relation to the property types, whilst 'T6 & D-H' and 'T6 & A-C' cover the Talen Score and all council tax valuation bands. The top table presents the correlation and regression results for All housing areas irrespective of size, and then by size categories: all housing areas containing more than 10 households; then all housing areas with over 100 households, then with over 200 households (also, for Kilburn, all housing areas with over 500 households). The number of households at the bottom of the table indicates the number of households in all the housing areas falling in the relevant categories - so, for example, in North Brent there are 11 housing areas containing over 100 households and in total they contain 4,087 households which is 76% of all households in the North Brent study area

		ALL HOUSING AREAS		>10		>100		>200	
		r	r ²	r	r ²	r	r ²	r	r ²
HOUSES & D-H		0.88	0.77***	0.92	0.84***	0.62	0.39*	1.00	1.00***
FLATS & A-C		0.88	0.77***	0.92	0.84***	0.62	0.39*	1.00	1.00***
T6 & HOUSES		0.21	0.04	0.21	0.04	0.66	0.44*	-0.09	0.01
T6 & FLATS		-0.21	0.04	-0.21	0.04	-0.66	0.44*	0.09	0.01
T6 & D-H		0.28	0.08	0.33	0.11*	0.77	0.60***	-0.12	0.02
T6 & A-C		-0.28	0.08	-0.33	0.11*	-0.77	0.60***	0.12	0.02
No. HHLDS (%)			5396 (100)		5287 (98)		4087 (76)		3232 (60)
No. Housing Areas			61		46		11		6
ALL HOUSING AREAS									
		r	r ²			101-200		>200	
		r	r ²	r	r ²	r	r ²	r	r ²
HOUSES & D-H		0.88	0.77***			0.52	0.27	1.00	0.99***
FLATS & A-C		0.88	0.77***			0.52	0.27	1.00	0.99***
T6 & HOUSES		0.21	0.04			0.75	0.57	-0.09	0.01
T6 & FLATS		-0.21	0.04			-0.75	0.57	0.09	0.01
T6 & D-H		0.28	0.08			0.88	0.78*	-0.12	0.02
T6 & A-C		-0.28	0.08			-0.88	0.78*	0.12	0.02
No. HHLDS (%)			5396 (100)				855 (16)		3232 (60)
No. Housing Areas			61				5		6

*p<.05, **p<.01, ***p<.001

Table 13. North Brent: Correlations between Housing Type, Council Tax Valuation Band and Talen Score

North Brent.

60% of all North Brent households are in housing areas with over 200 residences, with 76% of all households being in housing areas with more than 100 residences. The large housing areas containing over 200 residences have a near perfect correlation between the Council Tax Band (CTVB) ratings and Property Type, providing a neat split of housing values and property type. Given that housing areas are based on categories of different types of property and that Council Tax Bands are assessed by value of property it is to be expected that there is a close relationship between the two.

Across all residences the correlations between T6 and Housing Types, as well as between T6 and Council Tax Bands, are generally weak, though with housing areas containing more than 100 residences the correlations are, respectively, moderate and strong. This is a product of the pattern of housing development and the local Census geography, as well as the method of presenting the results by grouping housing areas by size categories, as much as it is an indication that there are poor correlations between the Talen Index and CTVB as well as Housing Types. Individual housing areas have strong correlations but because they have one variable with a value of 100% or little variation in the category values they do not compute.

The design constraints of the Census output areas has meant that their boundaries in North Brent never coincide with the boundaries of housing areas, as illustrated in Figure 2 where a social housing estate is covered by three output areas, in each of which the housing area's households form a minority of the output area's population. As a consequence of this the housing area's socio-economic Talen profile is compiled from data which is more attributable to the majority elements of the constituent output areas and, consequently, does not portray the homogeneity of the housing area. Only 1 of the 35 housing areas with a household population of more than 10 but fewer than 100 households contains a majority element of any one of the output areas making up its area.

A further complication is that the Housing Type categories are not of a consistent standard: a semi-detached house built in North Brent in the 1920s was of a better quality and in a better setting than the semi-detached properties built on post-war council estates, which, in turn, are different in nature and setting to the semi-detached houses on the modern social housing estates – all three types perhaps being rated differently for Council Tax banding.

Aggregating housing areas into size categories to facilitate correlations also complicates the picture in that several housing areas containing, for example, semi-detached housing, are put together and yet – as described above – the socio-economic profiles of the households may differ considerably so, across housing areas, the same Housing Type may have different freehold ownership, which affects their Council Tax ratings.

This, in turn, confuses the relationship between CTVB and Housing Type as well as that between CTVB and the Talen Index as properties of differing age, albeit the same type and ownership will be variously valued.

It was not useful to correlate T6 values with CTVB or T6 values and Housing Type for individual properties because they are subject to the problem of assignment of the same output area values to either all, or a large number of residences within a given housing area and, as a result, too many housing areas contained properties with the same values or with too little variation to enable correlation analyses.

For housing areas containing between 101-200 households the correlation between Housing Type and CTVB is much weaker than for other categories and is a consequence of there being only 5 housing areas in this category with a considerable difference of CTVB for similar types of housing but of different age and ownership; two housing areas are overwhelmingly composed of social housing and the other three of privately-owned housing (Table 14). Whilst the correlation between CTVB and Housing Type is weak, the correlations between T6 and CTVB, as well as that with Flats, is strong, and similarly for their counterparts: T6, Houses and CTVB.

Table 14. North Brent: Housing Areas of 101-200 households: Type, Tax and Talen

Housing Area	Flats%	Terraced%	Semis%	Detached%	A%	B%	C%	D%	E%	F%	G%	H%	T6 Score
1	57	39	4	-	-	-	43	29	28	-	-	-	-5.55
2	4	96	-	-	-	-	4	88	8	1	-	-	3.23
3	20	6	73	-	1	16	66	17	-	-	-	-	-6.06
4	12	-	71	17	-	-	9	4	28	43	16	-	-0.37
5	-	1	99	-	-	-	1	86	11	2	-	-	0.40

Area 1 is a new social housing estate of mixed property types with median Tax ratings but with low ownership and socio-economic status. Area 2 is composed of privately-owned, old terraced houses, again of median Tax rating. Area 3 is a social housing estate of prefabricated, post-war semi-detached houses and small blocks of flats. Area 4 is an area of traditional housing to the west of the area which has acquired its Talen profile from its constituent 3 output areas, two of which were substantially outside of its area, colouring its data and giving it exceptional status, whilst Area 5 is an spacious area composed of post-war prefabricated houses which have mostly become privately owned.

Whilst each area makes sense in its relationships between Type, Tax and Talen, the quality of the property and freehold ownership fracture the clear relationships that might be expected, for the size group as a whole, in terms of the correlations with property type.

Correlations between Housing Type, CTVB and T6 cannot be established at the spatial level of the individual housing area because there is insufficient variation of the variables to enable correlation analysis, though a visual inspection of the raw data suggests an extremely strong correlation between Housing Type and Tax. Where housing areas are composed of majority elements of output areas then the relationships can be established and can be seen to be strong for the dominant housing type.

In summary, North Brent's correlations are complicated particularly by the quality, freehold ownership and age of the property type, which in turn affect council tax band ratings.

Overall, evidence – including eyeballing housing area data - suggests that housing areas are a valid concept drawing out and showing relationships between the physical and built environments, and socio-demographic features.

In another analysis, by assigning the T6 value for individual output areas to their constituent properties, then across the whole of North Brent the correlation between CTVB and Housing Type is high (0.83) but between T6 & CTVB and between T6 & Housing Type it is moderate (-0.59 and -0.46 respectively.)

Table 15 displays the correlation results for Kilburn.

ALL HOUSING AREAS		>10		>100		>200		>500		
	r	r ²	r	r ²	r	r ²	r	r ²	r	r ²
HOUSES & D-H	0.54	0.29***	0.52	0.27***	0.71	0.51***	0.81	0.65***	0.93	0.86
FLATS & A-C	0.54	0.29***	0.52	0.27***	0.71	0.51***	0.81	0.65***	0.93	0.86
T6 & HOUSES	0.33	0.11***	0.39	0.15***	0.73	0.53***	0.88	0.77***	0.97	0.95*
T6 & FLATS	-0.33	0.11***	-0.39	0.15***	-0.73	0.53***	-0.88	0.77***	-0.97	0.95*
T6 & D-H	0.56	0.32***	0.67	0.45***	0.92	0.85***	0.98	0.96***	0.98	0.97*
T6 & A-C	-0.56	0.32***	-0.67	0.45***	-0.92	0.85***	-0.98	0.96***	-0.98	0.97*
No. properties (%)	9855 (100)		9632 (98)		7346 (75)		5076 (52)		3520 (36)	
No. Housing Areas	137		91		25		10		4	
ALL HOUSING AREAS		101-200		201-500		>500				
	r	r ²	r	r ²	r	r ²	r	r ²		
HOUSES & D-H	0.54	0.29***	0.58	0.34*	0.80	0.64	0.93	0.86		
FLATS & A-C	0.54	0.29***	0.58	0.34*	0.80	0.64	0.93	0.86		
T6 & HOUSES	0.33	0.11***	0.53	0.28*	0.87	0.75	0.97	0.95*		
T6 & FLATS	-0.33	0.11***	-0.53	0.28*	-0.87	0.75	-0.97	0.95*		
T6 & D-H	0.56	0.32***	0.86	0.74***	0.99	0.98***	0.98	0.97*		
T6 & A-C	-0.56	0.32***	-0.86	0.74***	-0.99	0.98***	-0.98	0.97*		
No. properties (%)	9855 (100)		2270 (23)		1556 (16)		3520 (36)			
No. Housing Areas	137		15		6		4			

*p<.05, **p<.01, ***p<.001

Table 15. Kilburn: Correlations between Housing Type, Council Tax Valuation Band and Talen Score

Kilburn

Contrasting the two study areas, in general the picture of correlations is much more distinct in Kilburn than in North Brent. Whilst there is a similar percentage of total households in housing areas containing more than 100 households (75% in Kilburn, 76% in North Brent) there is a smaller percentage of households in the large housing areas with more than 200 households (52% Kilburn, 64% North Brent) though the total number of households is almost double that of North Brent (9,855 in Kilburn, 5,396 in North Brent).

As with North Brent only 2 housing areas with fewer than 100 households are formed from a majority of any constituent Output Area's households and, as a consequence, all housing areas with a household population below 100 have a profile created from the minority elements of their constituent output areas and hence reflect the diversity of the majority elements of the output areas rather than a true profile of the homogeneity (if such exists) of the housing area itself. However, in the case of Kilburn, it is much more likely that adjacent housing areas are similar in their Talen profiles than is the case with North Brent housing areas.

Whereas correlations involving the Talen Index were weak to moderate across all scales of housing area in North Brent, in Kilburn they are generally stronger and once the scale of Kilburn housing areas rises above 100 residences then all correlations become much stronger, culminating in being very strong for the 36% of residences in housing areas of over 500 residences.

For Kilburn as a whole the correlation between T6 and Housing Type is 0.37 and for T6 and CTVB it is 0.63, weak to moderate respectively but subject to the same technical issues identified earlier.

While the history of housing development in North Brent has largely been one of infill into the spacious housing of the 1920s, in Kilburn there has been wholesale re-development of some areas replacing unsuitable housing in South Kilburn, replacing bomb-damaged housing (as in Winchester Road) as well as developing sites to provide more housing (Willesden Lane and Kilburn Square). All of this large-scale re-development took place during the 1960s and largely consisted of blocks of flats. Since then there has been limited re-development or new build. Consequently, there is more uniformity to the pattern of housing in Kilburn leading to large and expansive areas of similar housing and these are associated with a uniformity of socio-economic distributions and hence the strong correlations between them.

The explanations behind these data lie with the development histories and patterns of the two study areas. The story of housing development, and therefore the relationships

between housing type, council tax valuation banding and the Talen Index, is tied to the period of that development and there were, essentially, three phases:

Original development

Post-WWII social housing provision

Recent social and private housing building.

The original housing in both study areas still forms the predominant type of housing and, by and large, the associated social profiles of the population. The post-WWII era brought the wholesale council housing redevelopment of South Kilburn together with other, substantial, flats development in Kilburn. In North Brent, rather than wholesale flats development, the post-WWII era brought council estates of prefabricated houses. In recent decades there has been limited social housing development in Kilburn with one group of houses inserted into an existing large estate of blocks of flats (Chippenham Houses), and some very small private and social developments of groups of houses and flats. In North Brent recent developments have seen the building of a social housing estate of mixed housing (Wilson Dr.) and, like Kilburn, other small-scale developments both private and social.

The introduction of the Right-to-Buy scheme in the 1970s-80s meant that particularly desirable council housing – especially houses, as distinct from flats – were purchased and are now privately owned, thus complicating the relationship between housing type and socio-economic profiles. Accordingly, age of housing is a significant means of distinguishing one housing area from another, because it is linked to freehold ownership and distinctive architecture, which is the basis of the housing area geography.

The notable difference in the values of the regression analysis between the two areas (Tables 13 & 15) reflects the relatively distinct characteristics of both the residents and residences in each of them, as portrayed by the residence Type, CTVB and Talen Index variables. Of these it is Type of Residence which is the most important variable, for not only is it the base data for the CTVB but, as the literature review presented, it is the also the foundation for structural and social homophily.

The explanation for the differences in the regression statistics for the two study areas lies mainly in the differences between the respective property types and ownership. In North Brent the vast majority of the property is semi-detached or detached houses of a similar architecture, built in the same period. The distinction between this housing and the terraced and flat properties in the area is generally clear, with the result that this distinctiveness is maintained in their council tax valuation banding.

Figure 45 shows that there is a succession of bell-shaped distribution curves associated with each property type, with the median Tax rating increasing in accordance with the

assumed property hierarchy, thus verifying that value and Type are overwhelmingly related when all North Brent properties are considered.

In Kilburn (Figure 46), the story is slightly different in that the distinctions between the types of housing are not as clear and there is a wider spectrum of types within each of the two main types: houses and flats. Consequently, in Kilburn, each of these housing types is spread over a broader range of council tax valuation bands than in North Brent. Nevertheless, the association between the hierarchy of property and progressively higher Tax banding is still discernible.

Another important explanatory distinction is the relationship between private and social housing. In Kilburn the balance between private and social housing is 50:50, whereas in North Brent 85% of property is privately owned. These differences can clearly be seen in Figures 45 to 48 which show the diversity of the two areas' datasets in terms of type of property and freehold ownership and how these relate to council tax banding and Talen scores.

There is a general picture of successive bell-shaped curves for each of the property types in the hierarchy which is somewhat complicated in that their CTVB profile is composed of two elements: privately owned housing and social housing, with the social housing CTVB mean negatively offset from that of private housing. The lower mean CTVB valuation for social housing applies not only to the stock of social housing as a whole but also to each of the constituent types of property.

It is important to be aware that the lower CTVB valuations for social housing are not solely determined by the quality of the residence itself but also by all those other considerations which feed into determining a property's market value, such as immediate physical environment, location and perceived characteristics of neighbours.

North Brent's development history is essentially one of a small number of early-20th century terraced houses built around the old centre of Kenton, followed by extensive inter-war construction of good-quality semi-detached and detached properties across the study area, and the subsequent post-WWII development of social housing estates in two phases: a). immediate post-war semi-detached prefabricated houses and b). recent, mixed-housing estates – with some additional small scale developments. The result is a mix of different types of housing, each of varying value as indicated by their council tax valuation band (Figure 45).

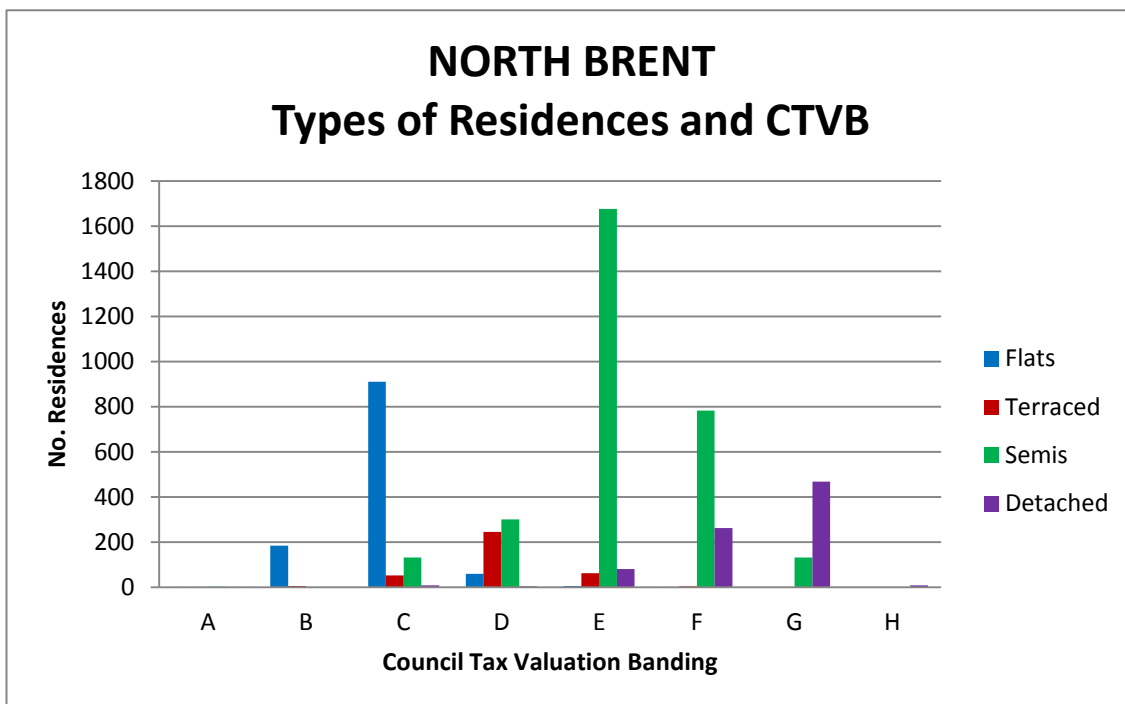


Figure 45. North Brent: Column graph of Types of Residences and CTVB

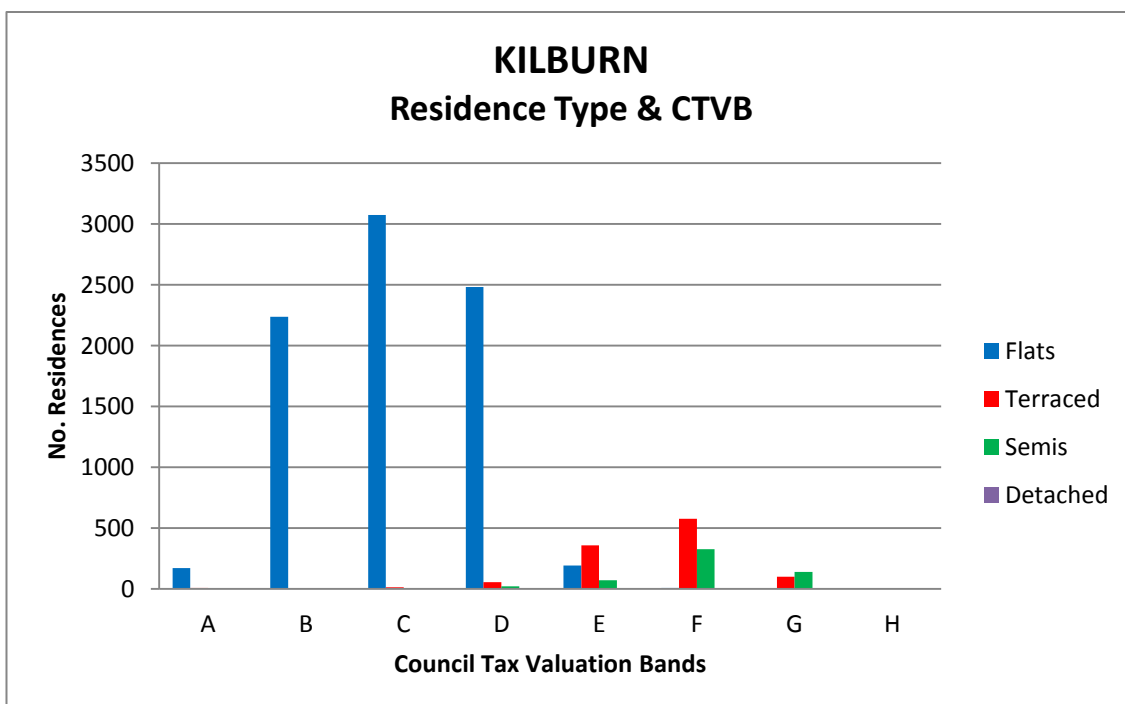


Figure 46. Kilburn: Column graph of Types of Residences and CTVB

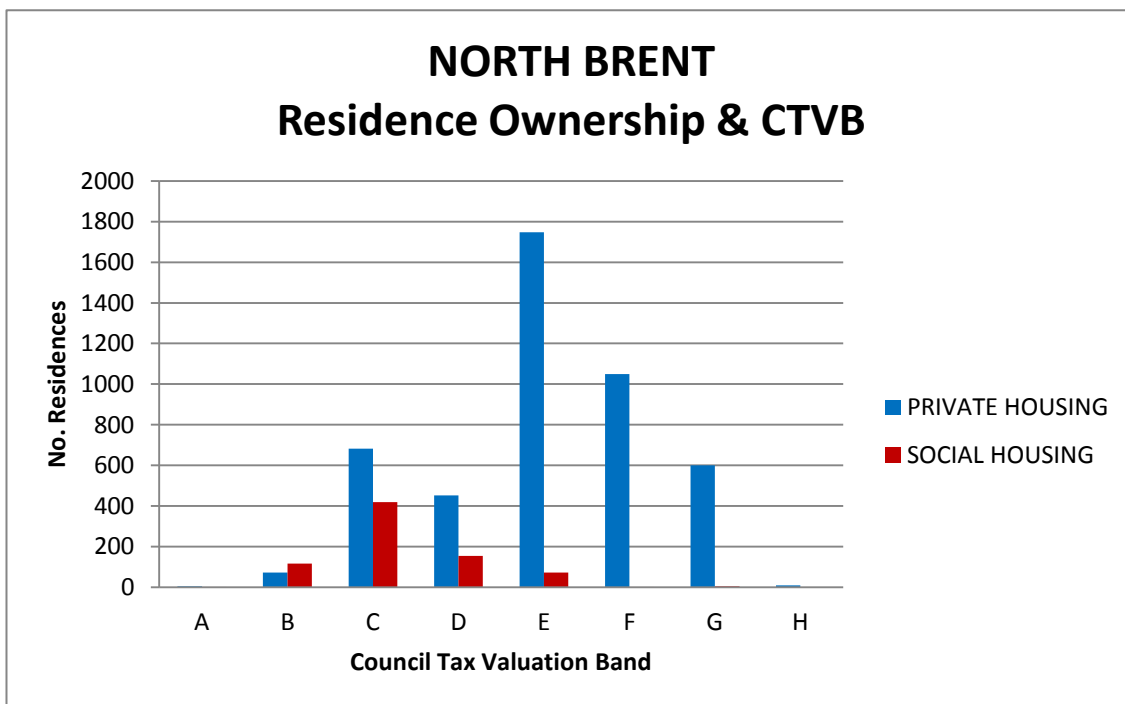


Figure 47. North Brent: Column graph of Types of Residences and CTVB

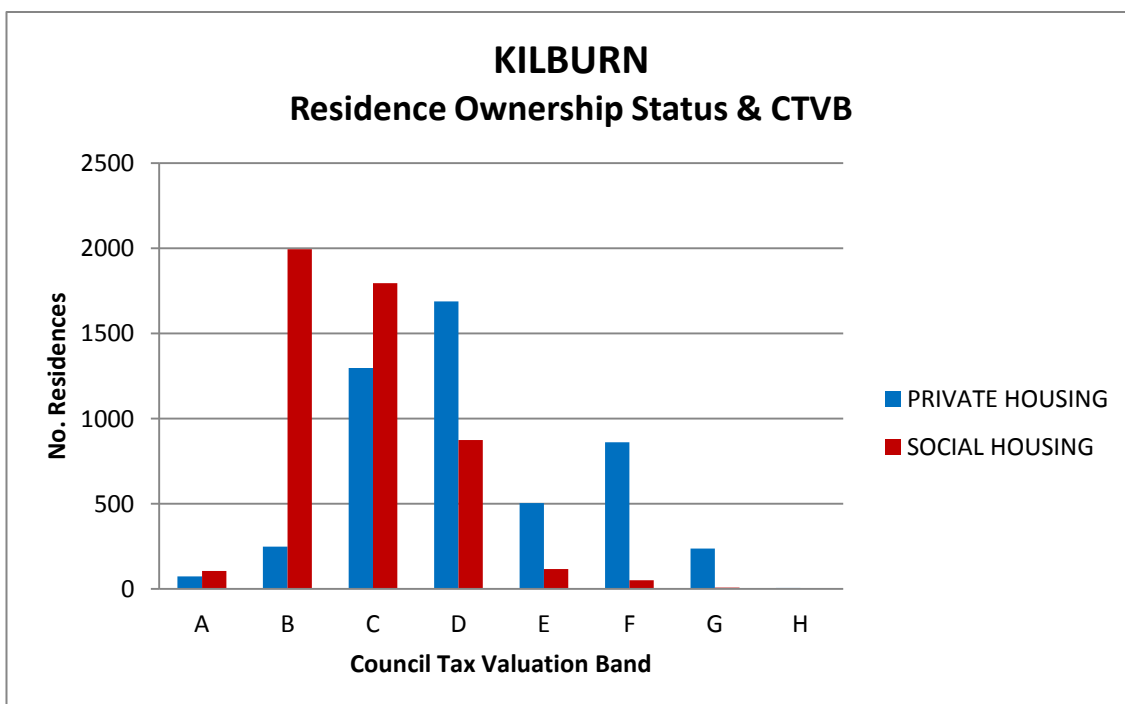


Figure 48. Kilburn: Column graph of Types of Residences and CTVB

For all North Brent housing areas of more than 10 households the relationship between type of housing and CTVB is presented in Figure 37. This figure shows that there is a very strong correlation between the percentage of flats in a housing area and the percentage of those properties falling within A – C council tax valuation bands, the lowest CTVB categories, with $r^2 = 0.84$, $p < 0.01$ and a few outliers, notably the housing area of social housing with a low percentage of flats but with a high percentage of A-C rated properties (Wilson Drive).

For North Brent, the main effect of only considering housing areas with more than 100 households (Figures 38 to 40) is to reduce the correlation between Flats and bands A-C, from $r^2 = 0.84$, $p < 0.01$, for all housing areas with more than 10 households, to $r^2 = 0.39$, $p < 0.01$, as a consequence of eliminating many of the small housing areas where the relationship between flats and smaller houses with the lower council tax bands is strongest, and to leave 11 housing areas with a rump of private inter-war housing in 9 housing areas, together with a post-war social housing estate of semi-detached properties (almost a half of which has been bought privately under the Right-to-Buy scheme), and a modern social housing estate of mixed property types. If these last two social housing areas are discounted then the correlation between Flats and council tax bands A-C becomes $r^2 = 0.98$, $p < 0.01$ reflecting the very strong relationship between houses and the higher council tax bands in the core inter-war housing, the ‘flip-side’ of flats and CTVB.

Kilburn’s development history is much older, more varied and changed than North Brent. Originally, almost all of the housing was terraced of varying quality. Subsequently, post-war wholesale clearances and war-damage replacement housing – exclusively flats developments – together with conversions of terraced property into flats, has resulted in the vast majority of residences being flats and the remainder being terraced houses with end-of-terrace semi-detached. The council tax banding of property types is consequently different from North Brent. In Kilburn (Figure 46) the CTV band spread of Flats ranges from band A to band D and other types of property range from D-G, effectively creating only two property types: flats and terraced houses. As with North Brent, social housing carries a lower council tax banding than privately owned property, Figure 48.

Kilburn has a smaller proportion of its housing areas ($n=137$) containing more than 10 residences (65%) than North Brent (75%) but precisely the same proportion of housing areas with more than 100 (18%). Thus the general picture is of Kilburn having a considerable number of very small housing areas of only a handful of households (Figure 36).

Whereas the general picture of North Brent is one of inter-war housing mixed with newer social housing estates, Kilburn’s story is one where flats dominate: the mean

average proportion of flats for all housing areas is 90%, with 60% having all households in flats, and only 6% of areas have less than a half of households in flats accommodation. Figure 42 shows the strong correlation, in areas containing more than 100 households, between % Flats and % households in council tax bands A-C ($r^2=0.51$, $p<0.01$), but this becomes almost a perfect correlation when council tax band D is included ($r^2=0.96$, $p<0.01$); this is because of the inclusion of private flats with higher CTVB ratings. Figure 44 shows that, with some exceptions, lower CTVB ratings are associated with social housing and vice versa. The exceptions prove to be 3 housing areas, of mixed ownership, whose profiles are heavily coloured by adjacent areas because of the mis-alignment of output area and housing area borders. This correlation between CTVB ratings and % flats accommodation is most clearly brought out in Figure 44 which shows the split between social housing areas with high proportions of flats with negative Talen scores and private housing areas with relatively lower flats accommodation and positive Talen scores ($r^2=0.85$, $p<0.01$).

Thus Kilburn's housing falls into 3 groups: social housing flats from the post-war reconstruction period with low council tax ratings; privately owned flats in the older terraced housing with higher council tax ratings; and older terraced housing areas which have largely remained as single-family houses, which form 30% of all households.

As expected, correlating Flats and the Talen Score (Figure 43) presents the general scene of social housing areas with a high percentage of flats having low Talen scores and housing areas of privately owned residences with low percentages of flats having high Talen scores. For housing areas with more than 100 households, the overall correlation is significantly strong ($r^2 = 0.53$, $p<0.01$) being mainly the product of the Flats category covering a wide range of Talen values in addition to the Houses category also having a similarly wide range and a variety of social settings (for example the Carlton Vale estate of private flats and houses set in the middle of the South Kilburn Regeneration Area and taking much of its social profile from the adjoining properties). The three groups are still identifiably clustered, with an additional, extreme outlier: a recent development of modern terraced and semi-detached housing inserted into the low Talen Score Chippenham estate of post-war large blocks of flats.

Correlating residences in CTVB A-D and the Talen Score produces a similar picture.

5.3.6 Conclusion: Translating data into Neighbourhoods.

For both study areas, three quarters of all households are in housing areas with strong correlations between Property Type and Council Tax, outliers aside in the case of North Brent; and the correlations are even stronger when Council Tax is related to Talen Score. It is also the case that Property Type is strongly correlated with Talen Scores in

the case of Kilburn and moderately correlated in North Brent, even without adjustments for outlier housing areas.

The conclusion from the above is that Type, Tax and Talen are strongly and directly related and it is not by chance that the socio-economic and ethnic distributions of T6 coincide with different property types. Their reciprocal correlations with council tax ratings identify property value as the mediator of their connection - property price is on one side of the equation and affordability on the other.

However, the cautious note regarding the limitations of the data, voiced in the introduction to this section, needs to be recalled. This analysis has been exploratory rather than definitive. Nevertheless, adopting a commonsense view of the difficulties encountered leads to the conclusion that, despite the fog of data difficulties, there is reasonable evidence that most of the time, in most cases, there are real and meaningful relationships, underpinned by the data analysis, notwithstanding the small numbers of observations and the outliers within.

The empirical work of this research has demonstrated that housing areas are a better explanation of ethnic and socio-economic distributions than tertiary natural areas, pedestrian street networks and census lower super output areas, and it has also been shown that housing areas are socially meaningful spatial units and that they provide an explanation for socio-economic and ethnic distributions by directly relating them to the ability of households to afford the cost of housing. This relationship bridges the environmental and social divides so evident in neighbourhood literature; until now such an explanation has been absent and often thought unachievable.

5.4 From analysis to Neighbourhoods.

The three analytical criteria examined are CTVB, Type of Residence and the Talen Index. The first two are obviously characteristics of the residence and the latter is a characteristic of the household. It is the central thesis of this study that there is a positive and direct relationship between the quality of the residence, as indicated by its value, and the socio-economic status of the residents themselves. The key to this relationship is the physical framework for social homophily provided by structural homogeneity, i.e. that proximate and similar residences, of similar value, act as the means by which people of similar household wealth and socio-economic status sort themselves into socially homophilous groups.

Of these three criteria Type of Residence is the best indicator of presence of neighbourhood: it is similarity of residence which enables people to judge who their neighbours are likely to be, their likely socio-economic status and whether or not these potential neighbours are similar to themselves. Most people will have a fair idea of the value of properties in an area and, even if this is unreliable in absolute terms, it will serve as a discriminatory, relative measure. The types of property and residences also give the area its physical identity and visual coherence, in conjunction with other elements of the built and physical environment. Even without actually seeing who their potential neighbours may be the immediate presentation of the property being considered and those about it enable an informed judgement to be made about the area and they are an ever-present reliable statement about the neighbourhood now and for many years ahead.

CTVB, whilst having a robust construction, has some limitations as a determinant of neighbourhood on its own. Firstly, it is invisible and usually not known by people unfamiliar with a given property; secondly, properties of similar CTVB may actually be very different physically and not generate a feeling of unity; thirdly, the band values are ordinal values and not of a fixed interval scale, so band A covers residences up to £40,000, the range of band B is £12,000, the range of band C is £16,000 and then the ranges are £20,000, £32,000, £40,000, £160,000 with band H, the highest band, covering all properties valued over £320,000; these are not familiar figures to the general public which could be converted into a meaningful language and it is unlikely that this value has any greater significance other than as a local tax and so plays no significant part in the choice of location. Multiple residences in the same property, possibly of different CTVB ratings, further complicate the use of CTVB as a means of discriminating residences on the ground. The big benefit of using the CTVB is its reliable and robust means of construction, part of which is to determine distinct areas of similar-type residences and then, from a detailed assessment of a representative

property, to set comparative values for different types of residences within the discrete value-significant locations.

Similarly, using the Talen Index is insufficiently discriminatory as the index is compiled from aggregate data which is then modelled to individual residences. Ideally, individual household-level data is required to provide a sound measure of purpose-tested variables. The Talen Index used here is only an indicator, utilising variables traditionally associated with neighbourhoods, and is not a proven measure. Nevertheless, it is based on reliable census data and clearly has great value as an indicator.

Together, these criteria serve as indicators of social and structural homophily which is theorised to be the basis for neighbourhoods, and the above application of Grannis' methodology and this study's extensions to it substantiates this theory in the two study areas selected.

5.4.1 Freehold Ownership²².

What emerges from this analysis of the two areas and from field survey is that freehold ownership is an extremely important factor in explaining both quality of housing and socio-economic distributions. It is generally the case that social housing can be distinguished from private housing on-the-ground, primarily with regard to quality of building, layout, and number of units and property maintenance, which is supported and verified by data contained in the property database supplied by Brent Council. Related to type of property/residence and ownership is the age of the property. The development history of both study areas starts with the provision of private housing, with subsequent private and social housing developments. These later developments can be related to specific periods, each period having a characteristic quality and type of development: large scale social housing in both areas immediately post-WWII and more recent social housing estates. Post-WWII private housing developments also tend to be distinctive in character, being usually small infill developments of flats or a handful of houses.

5.4.2 Clustering.

Given the close association seen in the regression analysis between type of residence and ownership, and the database and survey evidence of the relationship between these and the age of the property, it was reasoned that clustering housing areas by property type and age could be used as a means of identifying groups of similar housing areas which could form larger neighbourhoods than those of just the housing areas themselves, providing that the social obstacles between the housing areas are weak.

²² Freehold ownership is used here because, although councils may have sold property under the Right-to-Buy scheme bestowing leasehold ownership on the purchaser, the property itself (usually flats in blocks) remain surrounded by majority social housing and the council or their agents are responsible for management and maintenance.

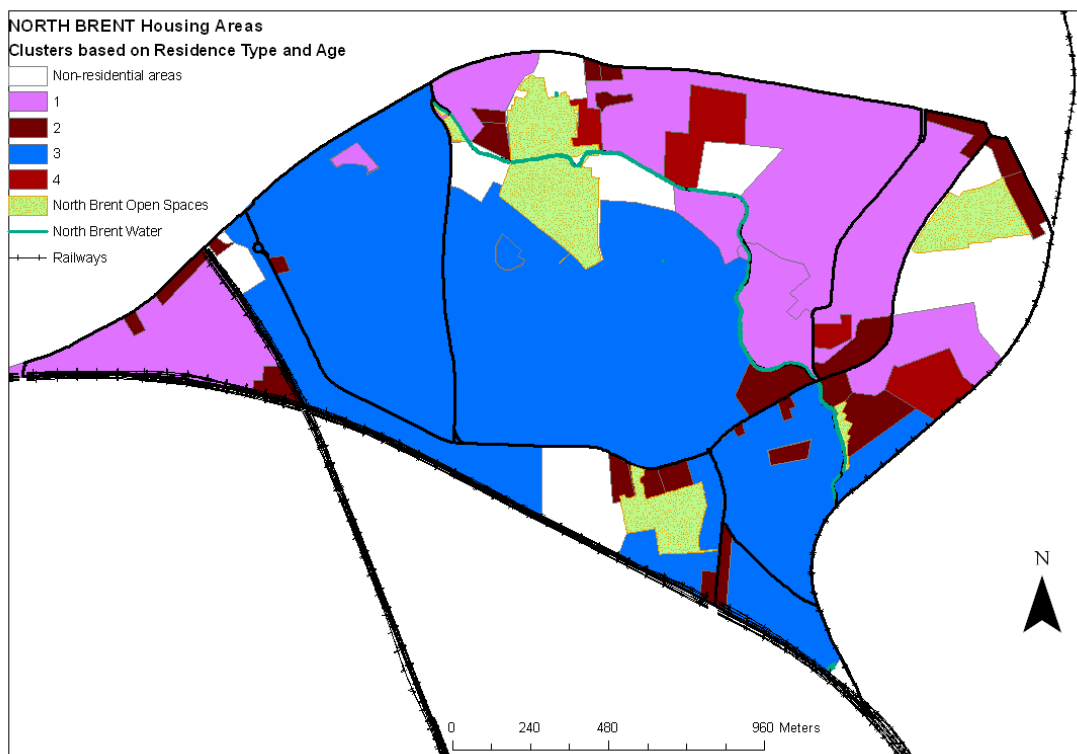
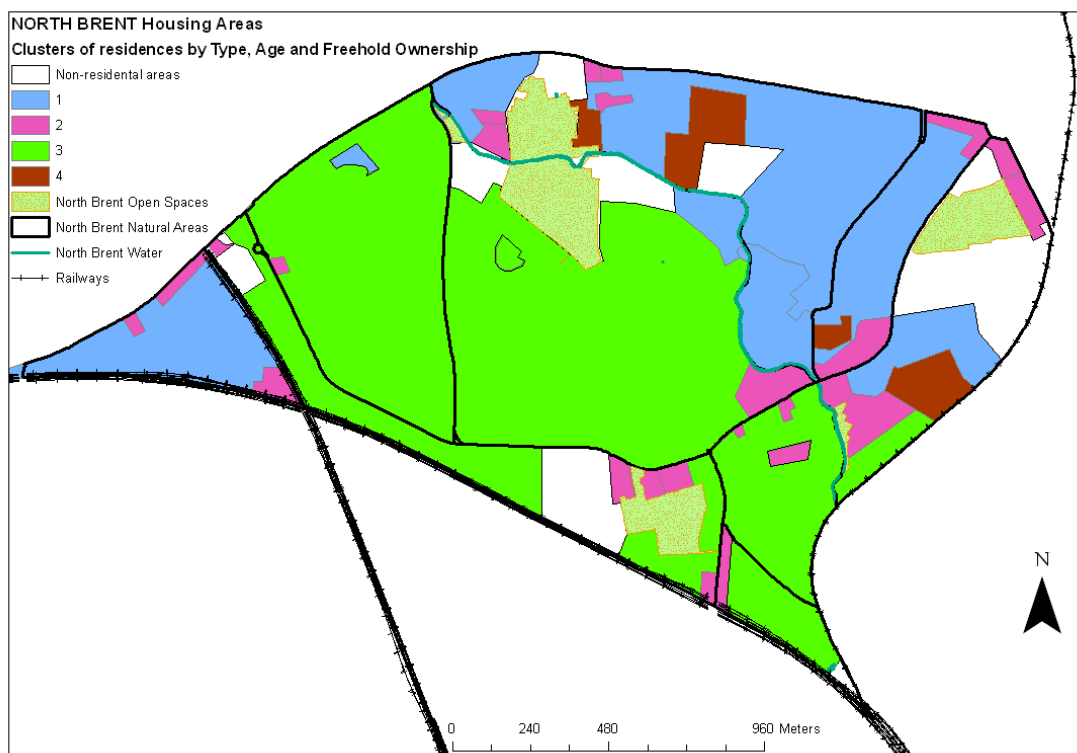
Clustering of housing areas was undertaken on the basis of Type of Residence, Age of Residence and Freehold Ownership. It must be recalled that housing areas were defined by Type and Age of Property and social obstacles. This latter criterion was taken to be busy roads (as defined by Brent Council) as corresponding to Grannis' non-pedestrian streets and other barriers to social interaction.

Clustering was conducted in the software statistics package SPSS 17.0. The input variables were the individual normalised Talen variables, the Talen Score and the proportions of housing type, council tax banding, pre/post-WWII age of properties and the proportion of housing in private/social ownership. Clustering was repeated for various combinations of variables and the results exported to Excel for input to ArcView 9.2.

Having identified the distinctive housing areas in each of the study areas the challenge is to see if these neighbourhood building blocks can be combined with similar others to form larger neighbourhood units.

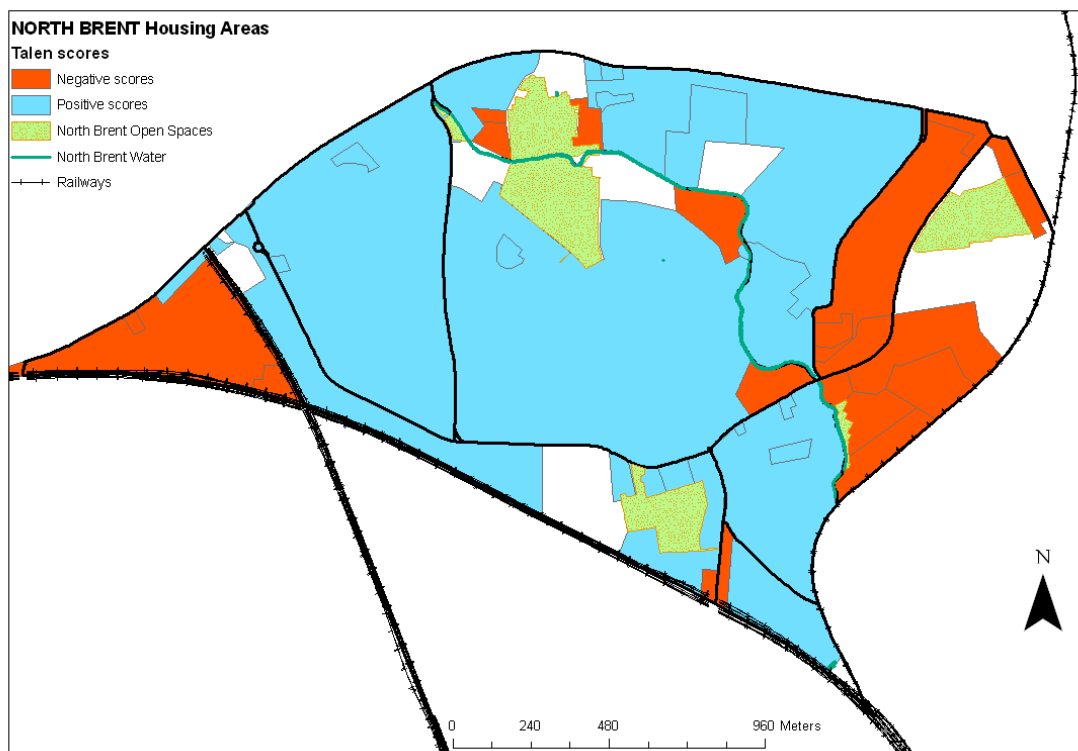
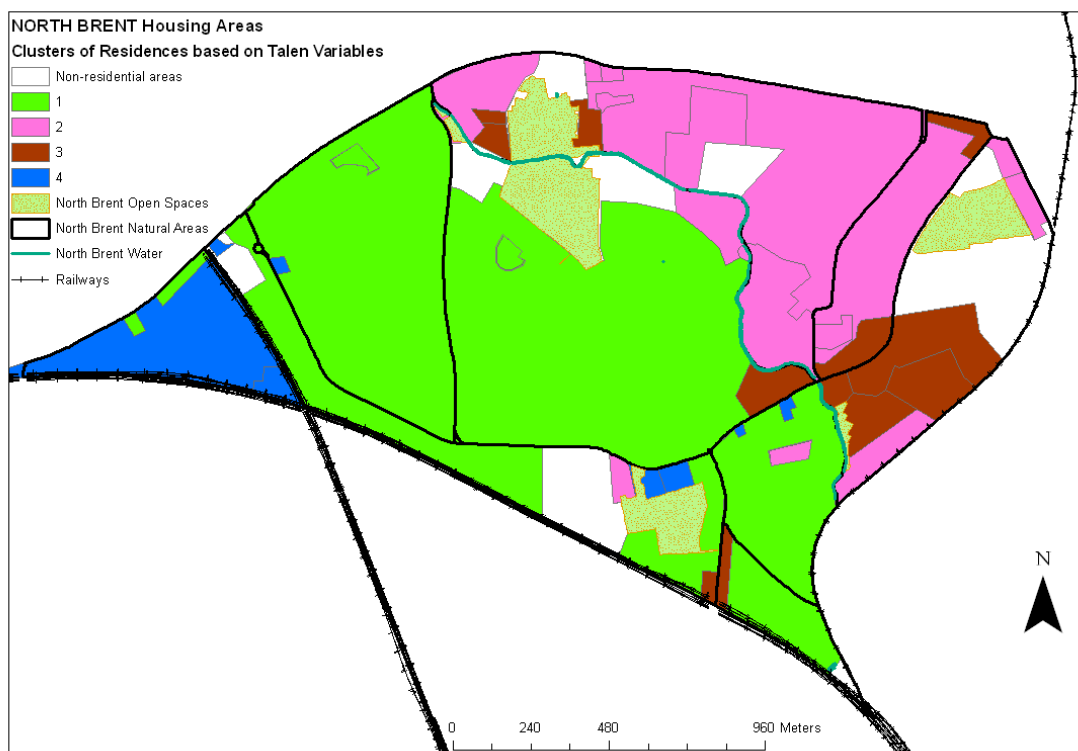
The size of neighbourhoods is an unresolved issue; Grannis noted the presence of very large t-communities in some U.S. cities whilst others suggest the size of a neighbourhood to be an area which can be walked across in 10-15 minutes. For this study non-pedestrian, busy streets have been used as physical and psychological barriers to social interaction, thereby delimiting neighbourhoods. Clustering was applied to housing areas of similar residence qualities: type, age and freehold ownership and also to Talen scores.

Figures 49 – 56 show the clustering of housing areas, firstly by Type, Age and Freehold Ownership (same clusters as just Type of residence and Age), then by values of Talen Variables and also by Talen scores for the two study areas.



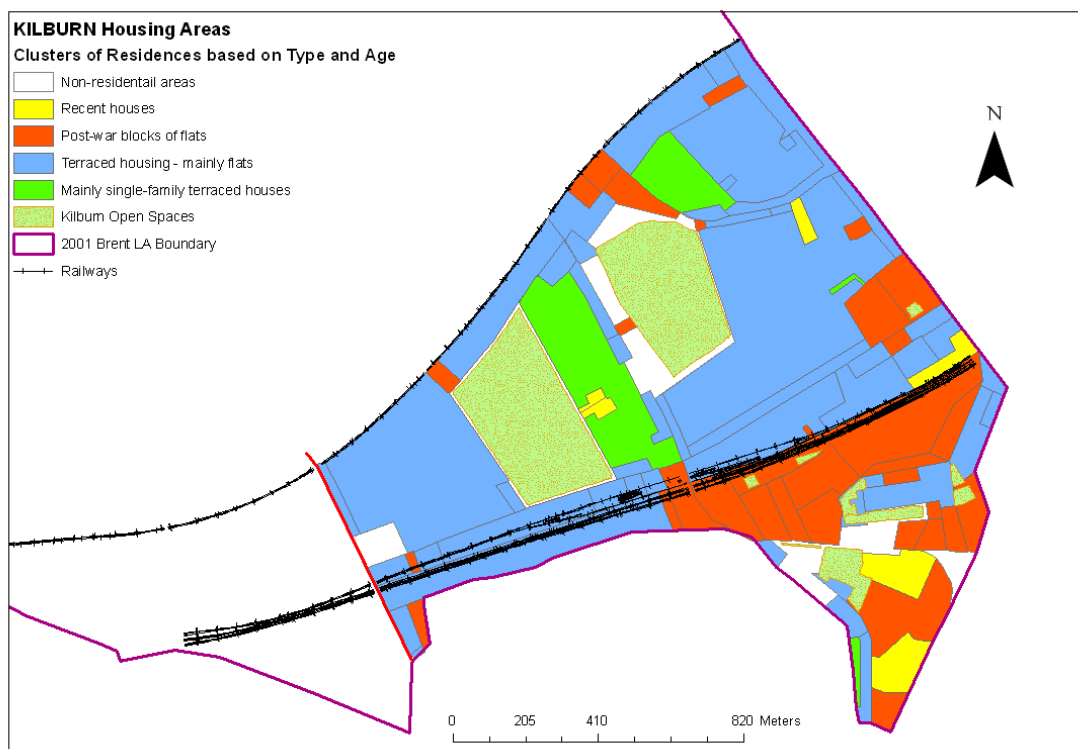
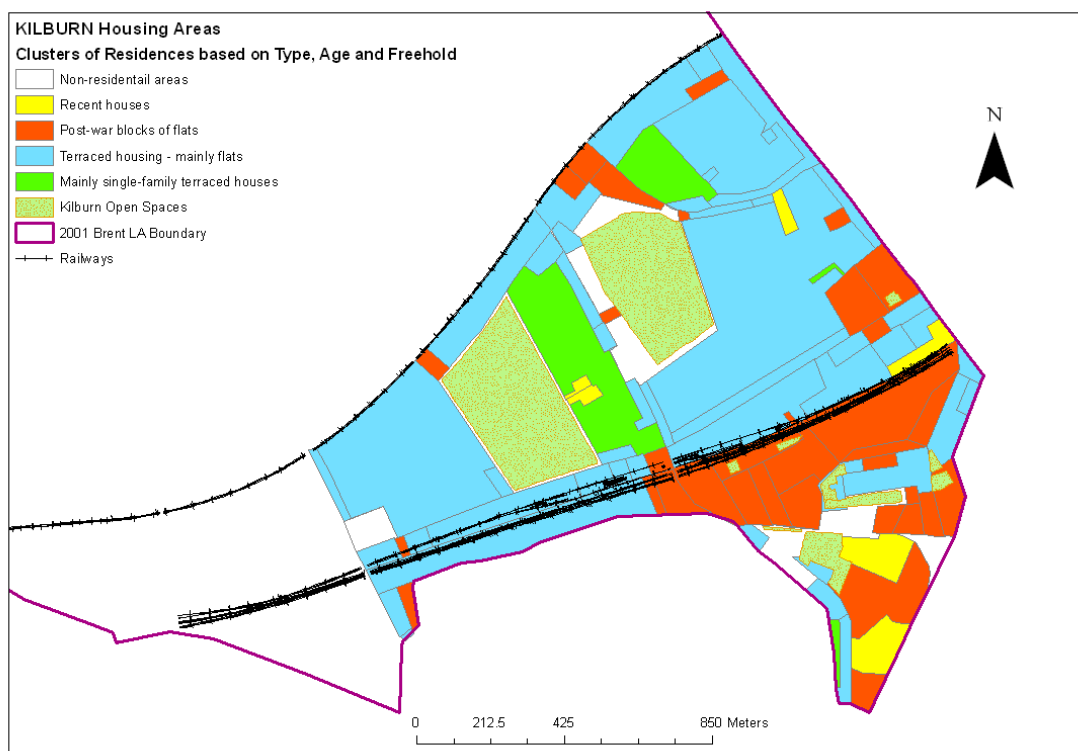
Top: Figure 49. North Brent Housing areas clustered by Residence Type, Age and Freehold Ownership

Bottom: Figure 50. North Brent Housing areas clustered by Residence Type and Age



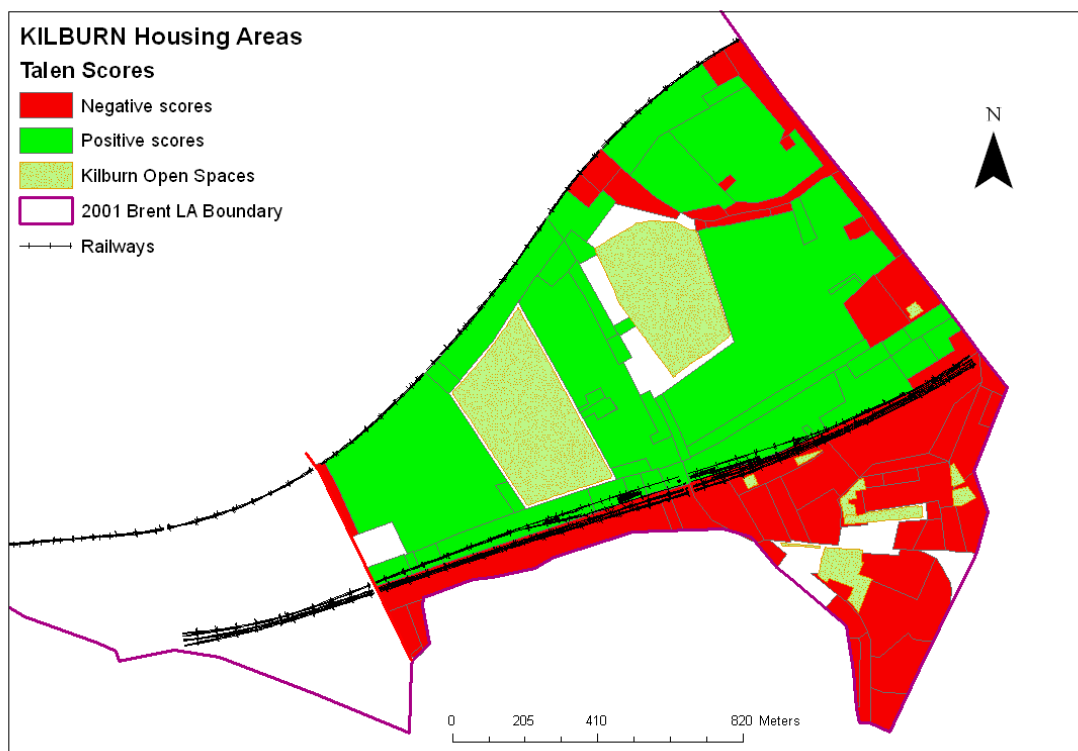
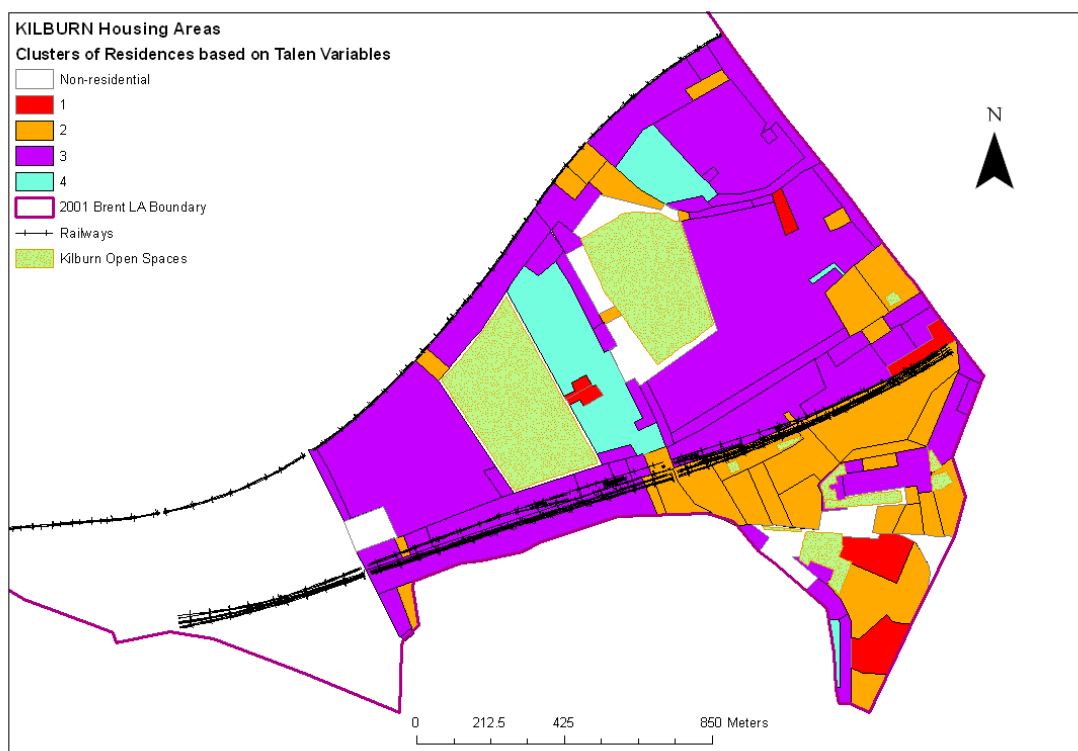
Top: Figure 51. North Brent Housing areas clustered by Talen Variables

Bottom: Figure 52. North Brent Housing areas clustered by Talen Scores



Top: Figure 53. Kilburn Housing areas clustered by Residence Type, Age and Freehold Ownership

Bottom: Figure 54. Kilburn Housing areas clustered by Residence Type and Age



Top: Figure 55. Kilburn Housing areas clustered by Talen Variables

Bottom: Figure 56. Kilburn Housing areas clustered by Talen Scores

Freehold ownership manifest in Housing Type and Age. The first thing to note is the correspondence between property values as seen in Figures 21 and 22 and the pattern of clusters determined by clustering housing area data on the basis of Type and Age of residence. Secondly, clusters of housing areas defined by Type and Age of residence alone and that of clusters defined by Type, Age and Freehold Ownership are identical in both study areas indicating that residence types are directly related to the phases of private and social housing developments. Thirdly, there is a close similarity between those clusters of Type and Age and the cluster of housing areas based on the values of Talen variables.

Figures 49 to 52 tell the story of the relationships between clusters of residences in North Brent. Figure 50, of clusters of residences of similar Types and Age, tallies with the picture of property values in that there are broad swathes of similar residences running south east to north west, as do the bands of similar value properties (Figure 22). This relationship is incorporated in the regression values of residence types and council tax valuation bands. Likewise, the pattern of clusters of housing areas of similar residential Type and Age is similar to housing areas clustered by their profiles of Talen variables (Figure 51).

With regard to creating larger neighbourhoods than housing areas it has been argued above that similarity of type of residence, contiguity and absence of barriers to social interaction are necessary conditions. Unfortunately, there are no indications in neighbourhood literature to suggest how wide the value differential between adjacent housing areas has to be to act as an effective obstacle to social interaction. Similarly, there is little indication from neighbourhood literature as to what, precisely, act as physical and psychological barriers to social interaction (Grannis used dual carriageways with a central barrier, and Ottawa City Council custom-defined barriers to social interaction but without presenting any rationale for their selection). However, for the purposes of creating larger neighbourhood units the criteria used for housing areas needs to be relaxed for their creation:

Merging housing areas of different residential Type and Age if they fall within the same Natural area

Natural obstacles, such as the Wealdstone Brook and open spaces should not be regarded as being social barriers.

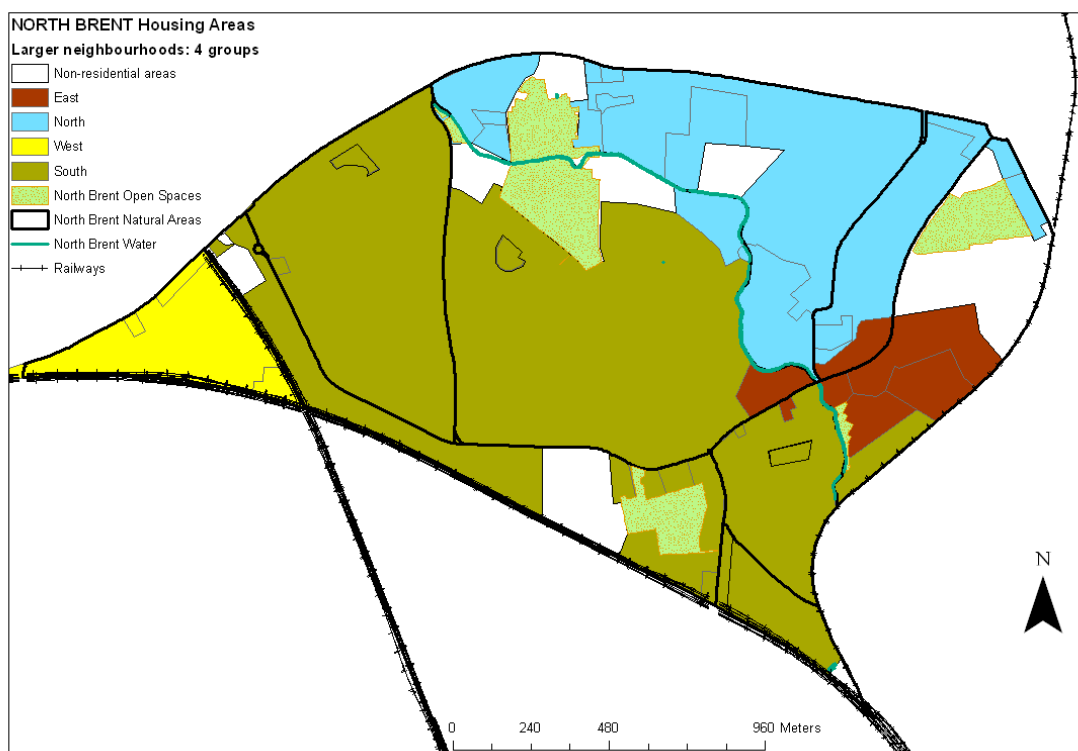
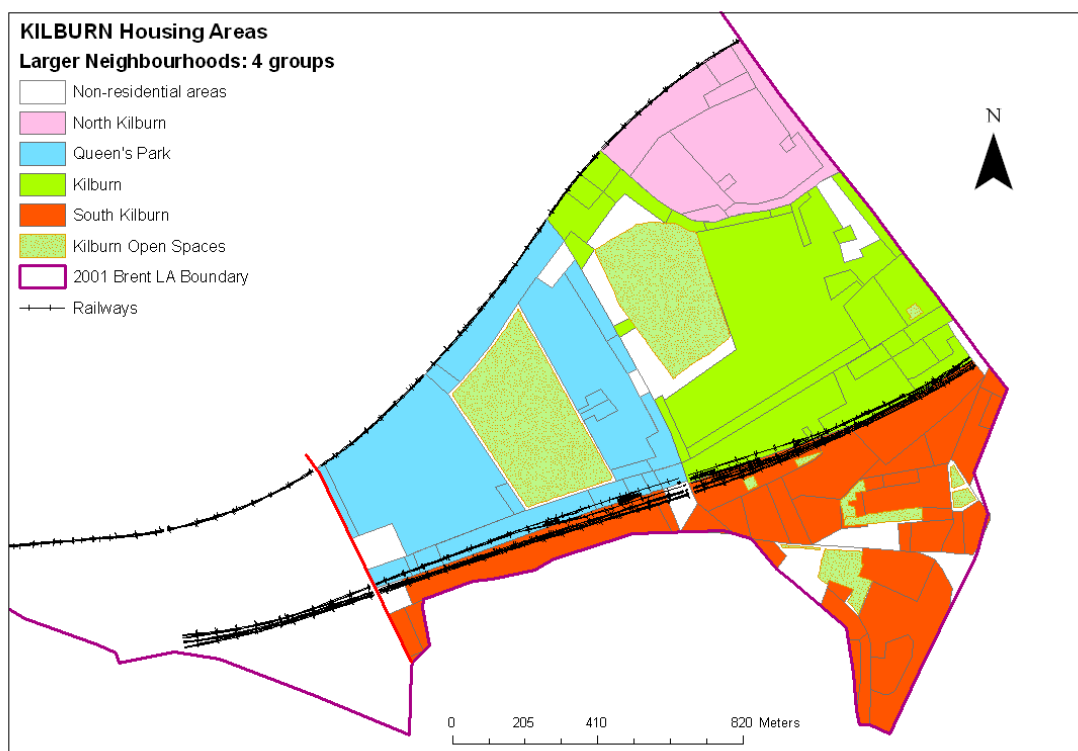
Disregarding lower-order non-pedestrian streets as social obstacles. Effectively this leaves railways and the 'A' and 'B' class roads only as social barriers.

Utilising the guidance provided by positive and negative Talen scores (Figures 52 & 56), judgement is required for appropriate allocation of housing areas to larger units:

In North Brent the status of Kenton in the west of the area is questionable. The Talen variables for this area were calculated from 3 output areas, two of which were substantially outside of the Kenton area, covering Northwick Park hospital and nursing homes. The Talen variables gave Kenton a marginally negative score but it is probable that this is a result of these outside influences, particularly scoring negatively high on Unstable Residency. Kenton could, and perhaps should, be regarded as part of the bulk of private housing and be merged with Woodcock Park South. There is a similar case with the status of Preston Hill West, whose Talen variables statistics are also a composite of several output areas (5) with a Talen score just negative but in this case the high negative Talen variable is with the Whites variable, reflecting the dominance here of the Indian population.

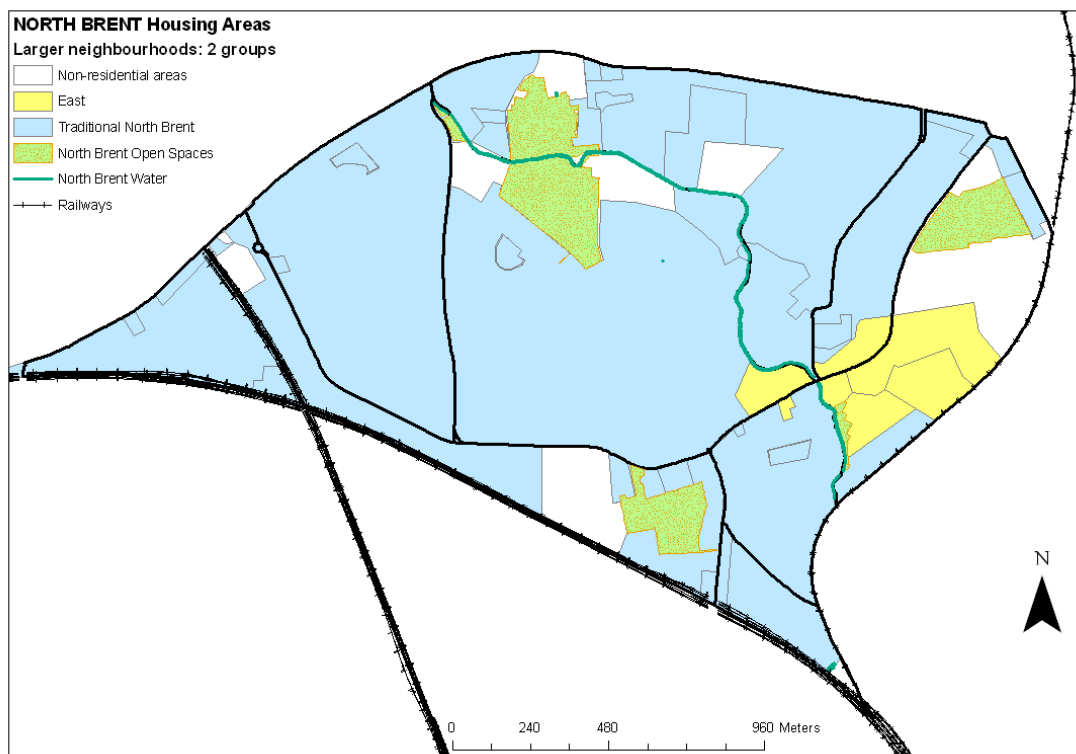
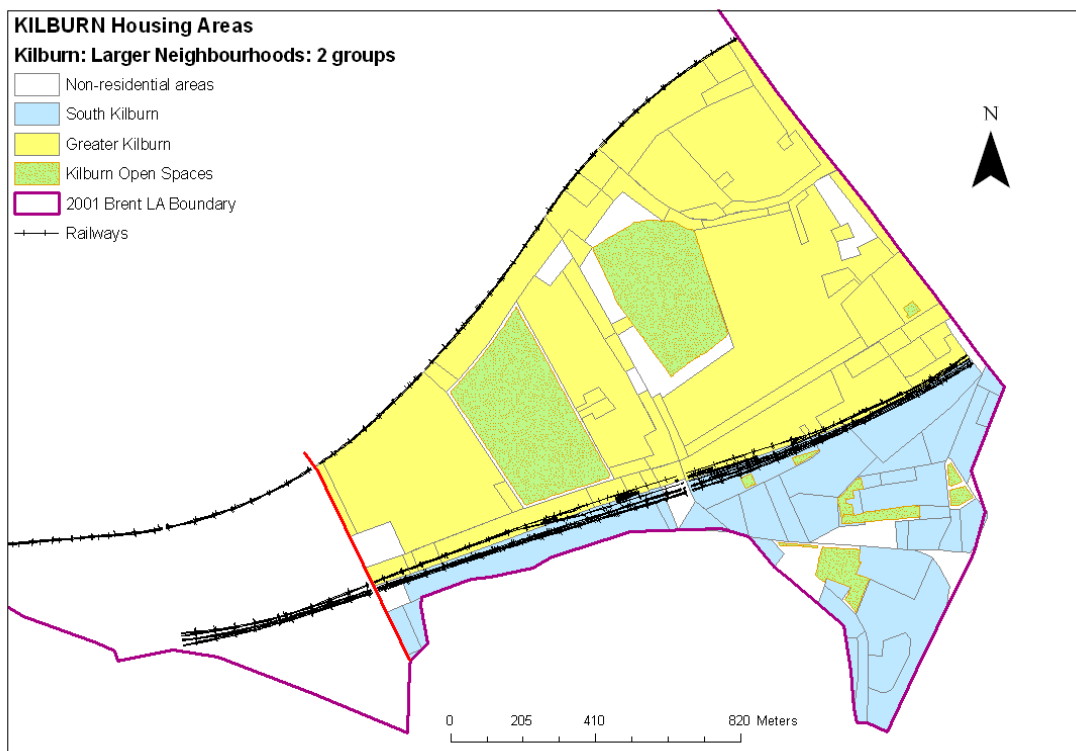
In Kilburn, it is justifiable to merge Plympton with the rest of North Kilburn as it is with west and east Queen's Park on the grounds of familiarity and judgements through field work. Likewise, reference has been made above to the cross-over of output areas across the railway lines for Kilburn Lane/ Harvist Road which complicates the allocation of this housing area; here the difference between south and north of the railway is clear and the two parts have been separated. The dominance of social housing in South Kilburn overwhelms the smaller areas of either private or social houses which are merged into the larger unit.

The results of following these relaxed rules are shown in Figures 57 & 58 and, when relaxed even further, in Figures 59 & 60.



Top: Figure 57. Kilburn: 4 Larger Neighbourhood Units

Bottom: Figure 58. North Brent: 4 Larger Neighbourhood Units



Top: Figure 59. Kilburn: 2 Larger Neighbourhood Units

Bottom: Figure 60. North Brent: 2 Larger Neighbourhood Units

From this analysis it follows that housing areas are shown to be the fundamental physical and social building blocks for the construction of larger spatial units which fulfil the essential neighbourhood criteria of being areas of internal socio-economic homogeneity whose boundaries are formed by barriers to social interaction.

5.5 Housing Area Neighbourhoods and neighbourhood surrogates in use

Having produced this set of neighbourhoods it is legitimate to ask how well do the new neighbourhoods compare to those in actual practice and, as a corollary, how do they compare in practice to wards, the historical surrogates for neighbourhoods, and other civil administrative spatial units, such as output areas? Are the traditionally used spatial units good enough generalisations of neighbourhood such that their utility outweighs the benefits of using neighbourhoods as defined and delineated in this study?

This returns to the classic question in neighbourhood studies of the suitability of spatial data units for capturing meaningful social distributions. Current implementations of neighbourhood – mostly, wards and compounds of census output areas – are inadequate and poor approximations to the neighbourhoods defined and delineated in this study, and the reasons for this are the complex, competing design requirements of these spatial units, each of which has to be balanced against the others, wherein the social dimension is only one criterion. Inevitably, there is always a trade-off between these design requirements which diminishes the utility of the resultant spatial units for representing meaningful social distributions. This is a dilemma at all scales in reconciling social distributions with uniform spatial units for administering civil and service activities. For example, in the context of the current debate on reforming the design of electoral wards to make them more uniform in size of population, the problem was succinctly described as choosing between ‘community or size’ (Johnston, 2010)

5.5.1 Wards.

As is common to many local authorities, in Brent the spatial unit most associated with neighbourhoods is the ward – the Brent health authority, BrentPCT, neighbourhood policing, deprivation assessments and housing needs assessments, for example, use wards as their spatial divisions. Three wards cover the North Brent study area (Figure 61) and two wards cover the South Brent (Kilburn) study area (Figure 62).

The most obvious contrast between these wards and the neighbourhoods of this study is size; wards are much larger than either the natural areas or housing areas identified above. The size of wards is a product of the electoral system which endeavours to provide an equality of electorates within England, with the majority of London wards having between 9,000 and 14,000 inhabitants. None of the natural areas approach this size, the largest of which is the Kilburn natural area with a population of c. 4,500; for both study areas the median housing area population lies between 50 to 150 people. Chisholm and Dench tease out the statutory relationship of wards to communities which rests solely on the Electoral Commission’s need to have regard ‘to any local ties’ which would be broken by the fixing of a boundary (Chisholm and Dench, para. 2.2). In an

ideal world one or more entire neighbourhoods or communities could lie within a ward (for the purposes of this discussion neighbourhoods are defined as contiguous areas of substitutable housing and communities as residential areas which utilise common public institutions and services (from Chisholm and Dench, para. 3.18)). However, the above analysis of the Brent study areas identified socially-coherent housing areas separated by social boundaries, all of which were considerably smaller than wards. Whilst it is possible to have a ward containing only one neighbourhood, this would jar with the prevailing view that neighbourhoods are ‘pedestrian-size’, roughly with a population of 5,000 people and that neighbours have, so-to-speak, ‘eye-contact’ with one another. However, none of the wards covering the Brent study areas meets this exceptional case; they are all composed of whole or parts of neighbourhoods as defined by this study.

Chisholm and Dench listed the design criteria of wards as being:

“...to achieve, "as nearly as may be", an equal number of electors for each councillor within the authority being reviewed. In addition, wards must respect certain boundary constraints, namely:

- a) Wards must lie wholly within the county or district.
- b) Every ward of a civil parish having a parish council shall lie wholly within an electoral division.
- c) Parishes which are not divided into parish wards shall lie wholly within an electoral division.

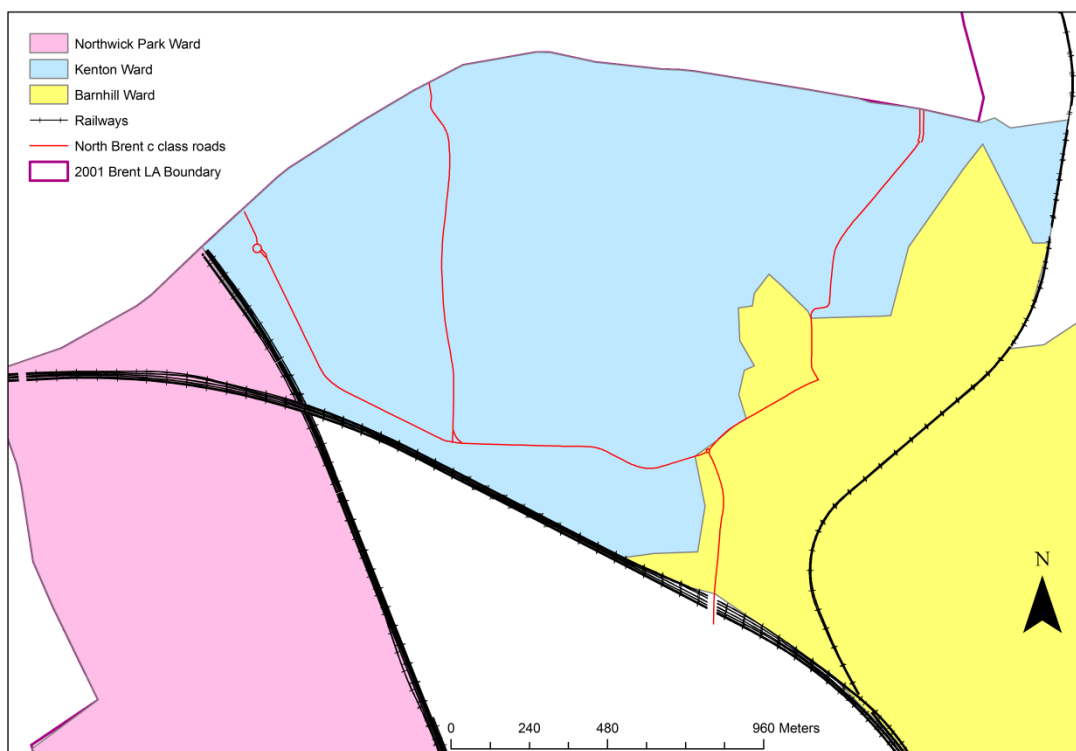
Subject to the above constraints, regard should be had to:

- a) The desirability of fixing boundaries which are and will remain easily identifiable.
- b) Any local ties which would be broken by the fixing of any particular boundary.
- c) In the case of counties, regard should also be had to the boundaries of the wards of the districts in the county.” (Chisholm & Dench, para. 2.3)

Additionally, Chisholm and Dench refer to the need for a compact shape constraint to obviate gerrymandering.

The two study areas were selected because each made sense on the ground in terms of their historical development, understood cohesion and boundaries. In particular, the outer edges of the study areas were formed from strong social barriers – main roads and railways - and it could be expected that wards would successfully reflect these elements. However, in both study areas the ward boundaries cross over railway lines and main roads, integrating areas largely divided socially, whilst often using boundaries which are neither legible on the ground nor mark out one social group from another. For example,

the Kilburn ward embraces three distinctly different housing areas: North Kilburn, Kilburn and South Kilburn. The first two areas are divided by the busy Willesden Lane and the latter two areas are divided by the railway, yet the western boundary of the Kilburn ward is a 'soft' boundary between properties which are similar, with no pedestrian impediments. The western Queen's Park ward, which covers the remaining part of the Kilburn study area, incorporates the Kilburn Lane area south of the railway which has no direct access to the main part of the ward and which is naturally aligned with South Kilburn in the South Kilburn Regeneration Area. Similarly, North Brent was selected because it presented itself as an understandable, united area on the ground, being contained in the north by the borough boundary and by railway lines in all other directions, breached only by three roads leading to other parts of the borough, only two of which are non-pedestrian roads. Thus the North Brent study area is considerably constrained as an area for the free movement of pedestrians. However, the area is apportioned between 3 wards (Figure 61) and, whilst the boundaries of these wards comply with identified housing areas, the apparent rationale for splitting the area between 3 wards seems to be a function of the need to have similar size ward populations.



Top: Figure 61. North Brent Wards

Bottom: Figure 62. Kilburn Wards

In 2001, Kenton ward, which is at the heart of North Brent, had a population of 11,881 and the Brent ward average was 12,545. The 2001 population of the parts of North Brent falling in the Northwick Park and Barnhill wards was 3,184 which, when added to the Kenton ward, gives a total population for North Brent of 15,065, which would have made it the second largest of Brent's 21 wards. In terms of social interaction, however, the western-most part of North Brent - called Kenton in this study, but falling in the Northwick Park ward - is really much more accessible to, and a part of, the main body of the current study area than it is to any part of the Northwick Park ward, separated from the latter by a railway line, the complex of Northwick Park Hospital and the extensive adjacent open land. Similarly, there appears to be no means of pedestrian-friendly social interaction between the parts of North Brent included in the Barnhill ward and the main part of the ward.

However, wards do possess qualities which encourage their adoption as practical units:

Until the launch in 2001 of the Census output geography there were no alternatives in respect of a uniform set of similar-sized spatial units, related to social distributions, for which accurate data was available. Added to this is the longevity of wards which substantially added, and continues to add, to their legitimacy.

Wards have a reciprocal identification with the area, coming into being around understood communities or historical areas. As the study areas showed, there is a clear link between the historical residential development of areas, their place names and identifiable social distributions, which wards were designed to capture.

The delineation of ward boundaries is guided by legible differences in the built environment, most visible with variations in the housing stock and it is plain that ward boundaries often coincide with housing area boundaries for this reason, justifying them as demarcating different communities.

As the ward system is based on equality of representation and services the product of these internally homogenises wards and imbues each with a common identity.

Through their relation to residential population size, wards have a stability associated with the housing stock, just as with housing areas. The services and functions fulfilled by wards are discharged through residency which is the common denominator for wards, natural areas and housing areas. It is this common association which leads wards to be presented as neighbourhoods though the degree of social interaction or their compliance with networks of reciprocity is not established and it is this which primarily disqualifies them as being valid neighbourhoods.

It appears that the need for equality of size, their historical development in response to an ever-changing electoral and demographic environment is responsible for the present

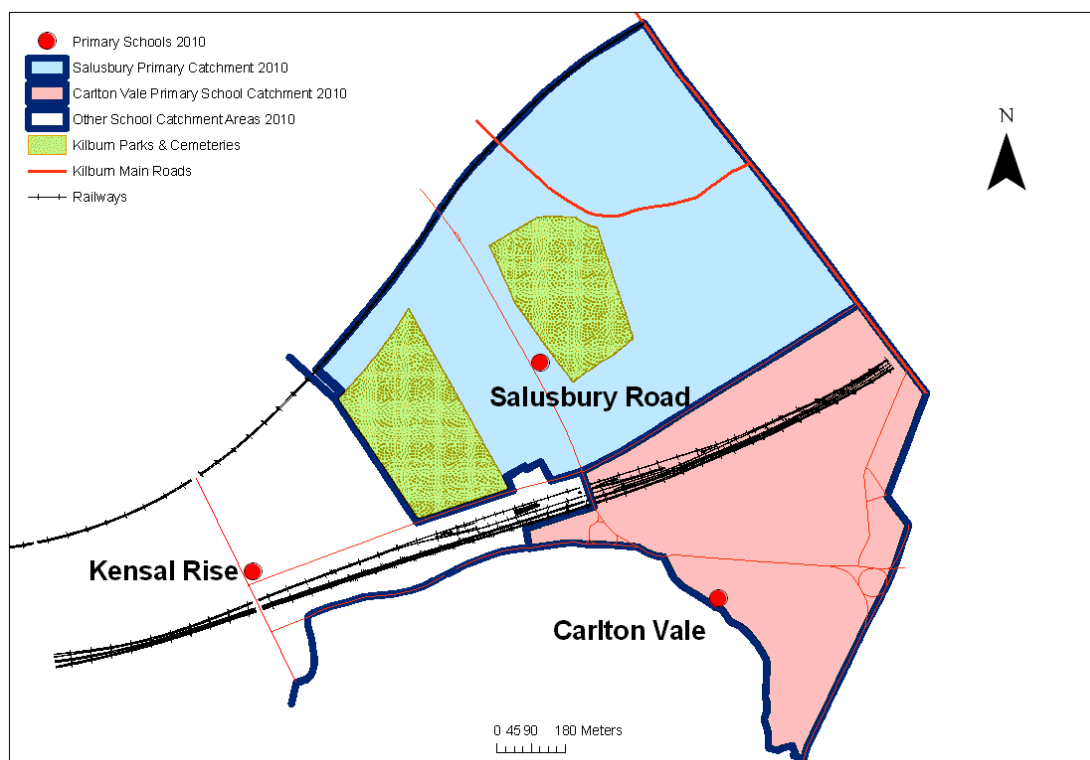
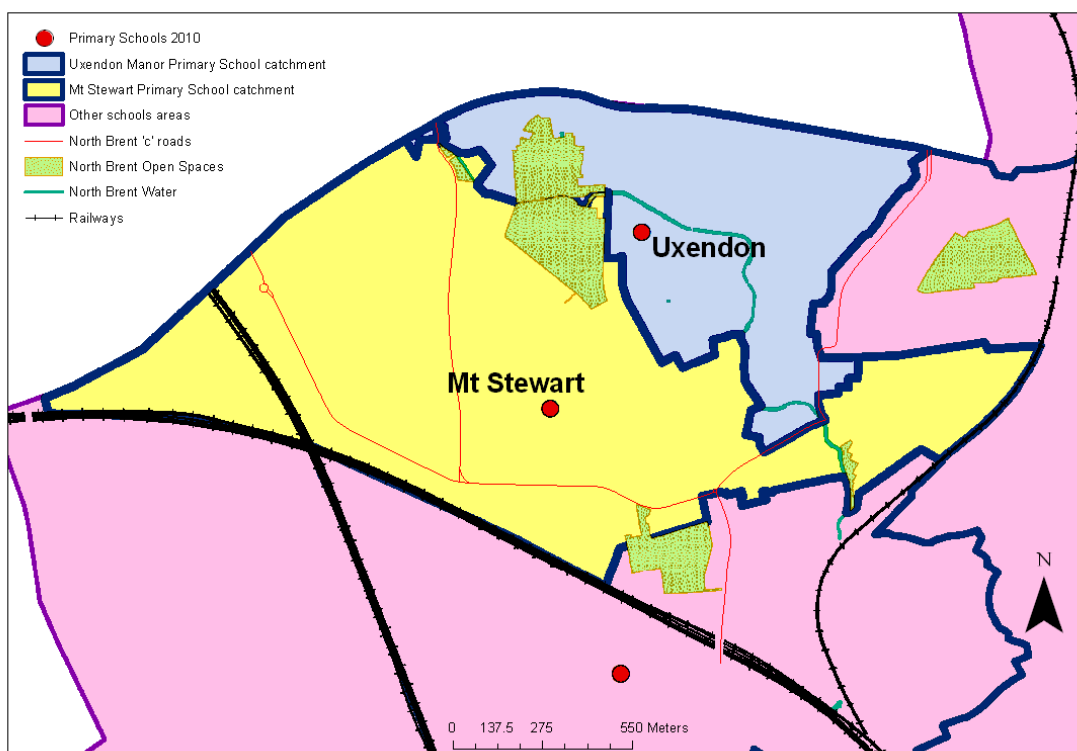
day Brent ward geography, which, when compared to the purpose-specific, customised neighbourhoods of this study, highlights their shortcomings as adequate substitutes.

5.5.2 School catchment areas.

Throughout urban neighbourhood history primary schools have been regarded as being at their core, serving the community in close, and often pedestrian, proximity and it is here that mothers with children meet and mix (Figures 63 & 64). Whilst detailed data was not available to replicate Grannis' analysis (Grannis found that school catchment areas were not as good as t-communities in accounting for socio-demographic and socio-economic variations), some observations can be made:

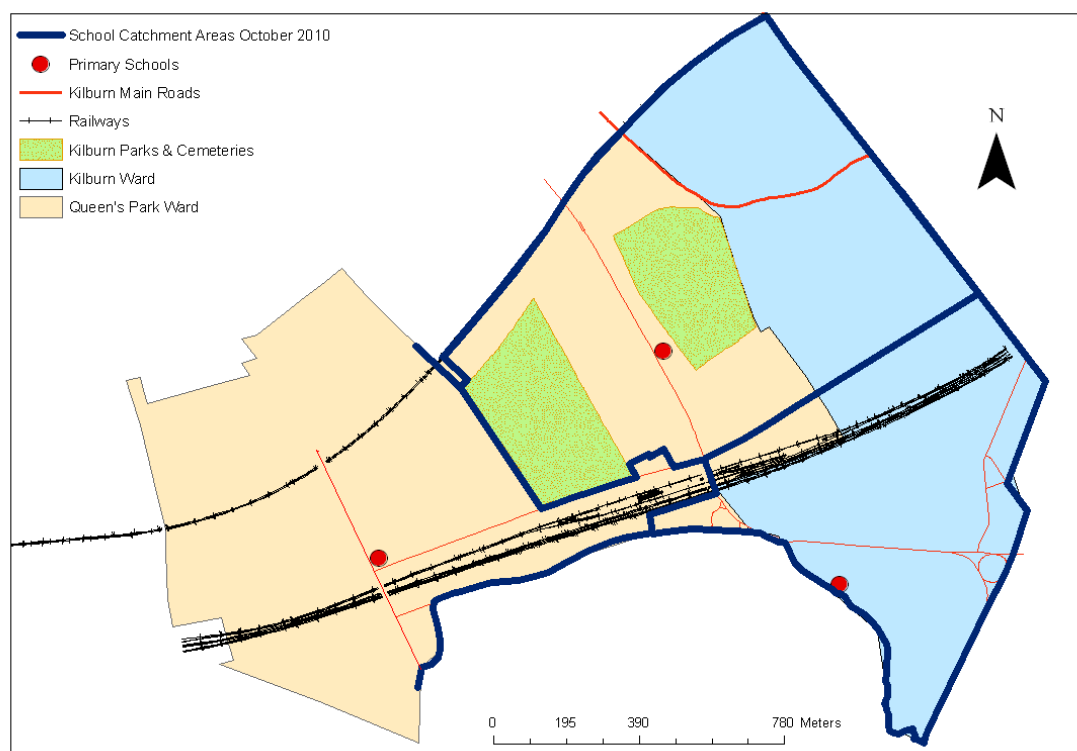
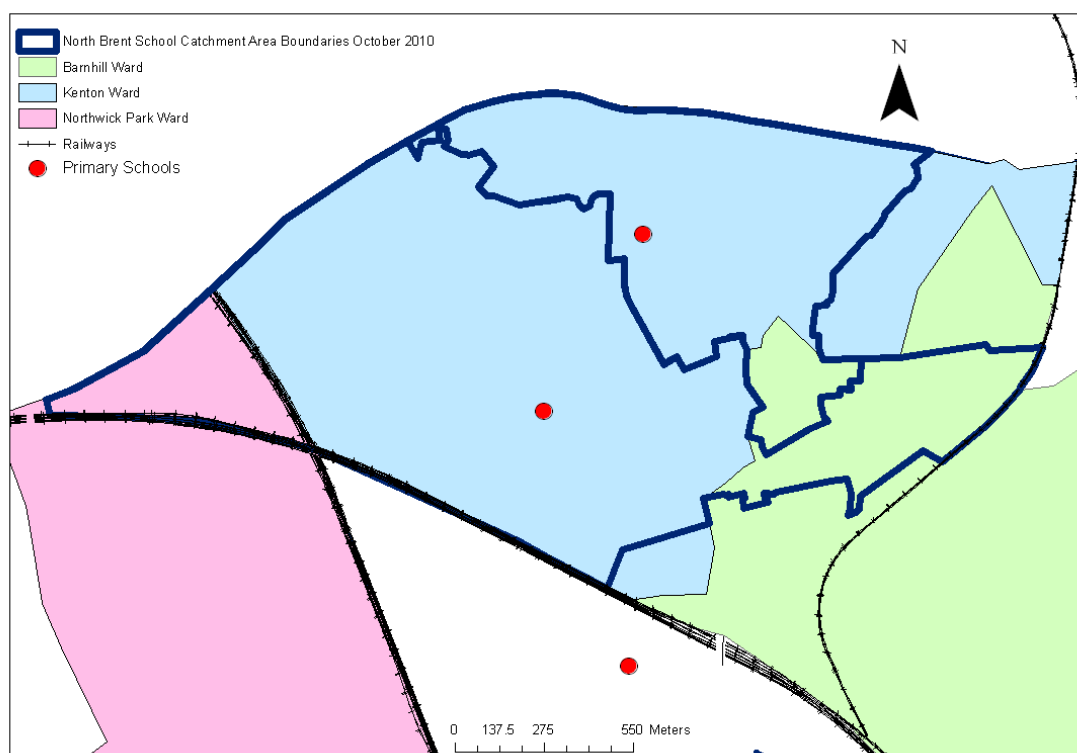
Figures 65 & 66 show that school catchment areas bear little relationship to ward boundaries – no school catchment area sits wholly within a single ward.

Whilst the boundaries of the catchment areas in North Brent mainly honour the boundaries of housing areas there are two major exceptions in densely populated areas which, as with ward boundaries, could well be the result of having to meet certain school population numbers. In Kilburn, besides two small divergences, the main issue is that 2 out of the 3 school catchment areas stray across railway lines which are significant and real physical barriers to movement, with this arrangement preserving ward orientation at the expense of access. Catchment areas appear not to regard roads or rail as pedestrian barriers for pupils to school access and, in this regard - as with wards - other design criteria over-ride the importance of easy social access and interaction.



Top: Figure 63. North Brent School Catchment Areas 2010

Bottom: Figure 64. Kilburn School Catchment Areas 2010



Top: Figure 65. North Brent Wards & School Catchment Areas 2010

Bottom: Figure 66. Kilburn Wards & School Catchment Areas 2010

The Kilburn schools were built at the same time as their surrounding residences with Salusbury Road and Kensal Rise schools being built in the late 19th century and Carlton Vale School during the post-war redevelopment of South Kilburn. The cores of the school catchment areas are long-standing with boundaries only being shifted to balance pupil numbers. In North Brent the story is the same though with less sympathy between wards and catchment areas – the two main schools serving North Brent are in the same Kenton ward.

During the time of this study the boundaries of the school catchments in both study areas were modified at the edges, presumably to reflect changes in local demographics, both numbers and social mix. However, given the investment in bricks and mortar, the school catchment areas are stable at their cores and have a degree of permanency with their relationship to feeder residences, always acting as gravity centres.

There is only a loose association with wards indicating a weak administrative association between primary schools, wards and neighbourhoods or communities.

This dislocation between ward administration – as with the Brent PCT – and school catchment areas could well mean that neighbourhood effects analysis becomes much more difficult and can easily be missed. The social dynamics of the neighbourhood are not properly identified or analysed because inappropriate spatial units are used.

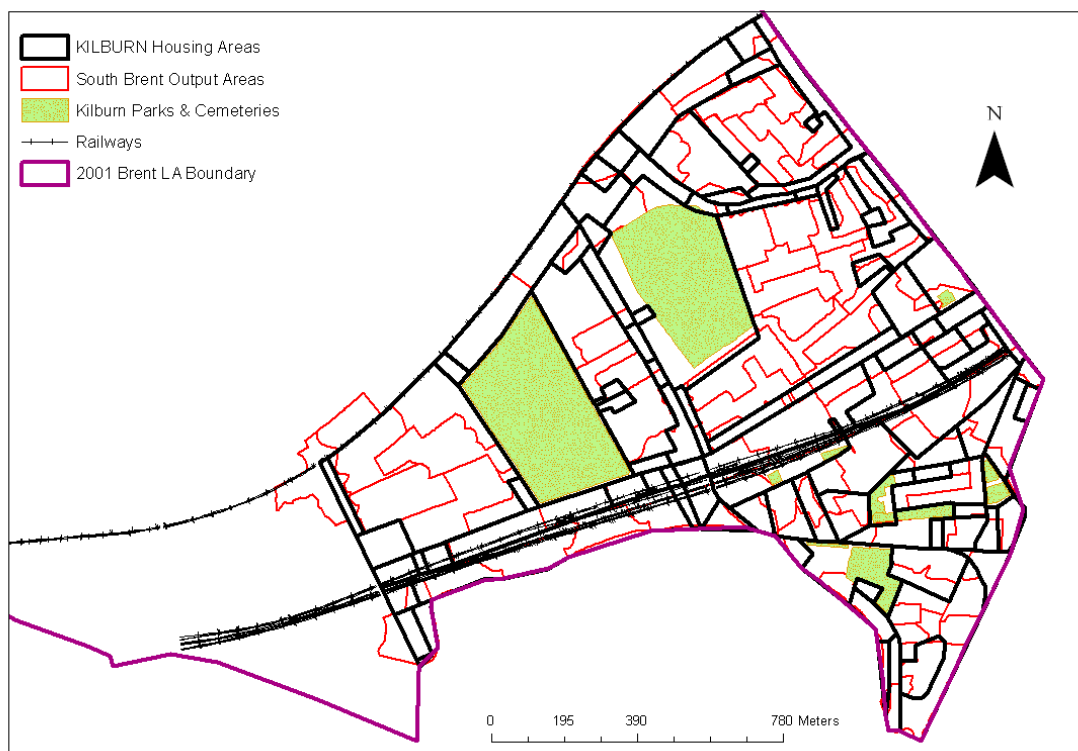
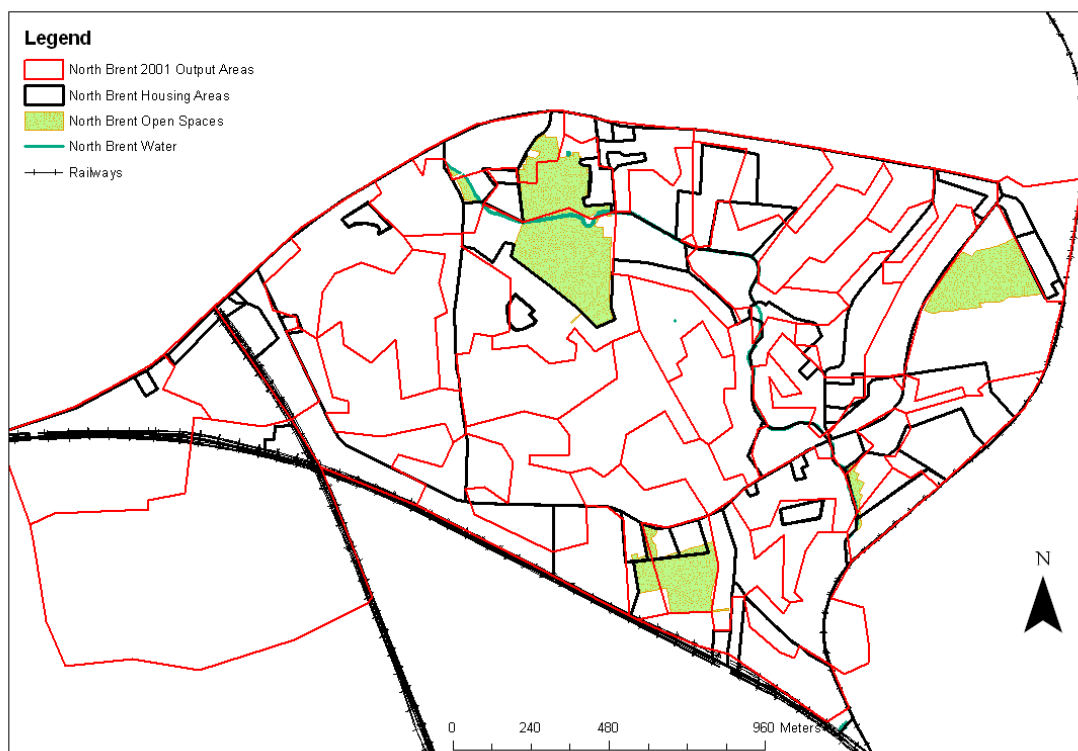
5.5.3 Census Geography.

Besides wards the literature review revealed that the most common spatial units used in neighbourhood studies are those of the census geography. It was conceived that creating small census reporting units, output areas (OAs), which complied with the administrative and electoral ward geography would provide users with reliable data for small areas which could be combined to form larger units, such as neighbourhoods. Evidence from the London Borough of Brent is that there has been no official attempt to delineate neighbourhoods using output areas though census output data is extensively used to inform all forms of geographical analysis. Neighbourhoods, as such, have not been defined though the nomenclature associated with BrentPCT and policing remains and continues to be ward based.

The new 2001 Census Geography was introduced to provide more detailed information at a smaller scale and it was envisioned that the output area building blocks could be approximated to neighbourhoods identified on the ground, informed by the OA data. Compounds of OAs were introduced as Lower Super Output Areas (LSOAs) and Middle Super Output Areas (MSOAs) approximating levels of 1500 and 7500 households respectively. Can LSOAs, MSOAs or other combinations of OAs be identified which are more meaningful and useful than this study's neighbourhoods? Figures 67 and 68 respectively map housing areas and output areas in North Brent &

Kilburn and illustrate the fundamental problem of the two main approaches to mapping socio-demographic data. Housing areas have no restrictions of size or shape and have only one design criterion: that of circumscribing areas of substitutable housing wherein neighbour networks develop. Output areas and their compounds, on the other hand, have at their heart social homogeneity based on similarity of home ownership and tenancy status, just as with housing areas, but they also have other design criteria which diminish their utility. These other design criteria – size, shape, appropriate borders and fitting existing geographies (see page 88 above) create a dilemma in reconciling social distributions with uniform spatial units for data reporting and administering civil and service activities. The ultimate outcome is a compromise between capturing the social interactions dynamics of the unit and meeting their menu of design criteria.

The question raised here is: is there a means of reconciling the two approaches which would prove workable and meaningful; are there combinations of output areas which approximate this study's housing areas? Given that the criteria used for output area homogeneity is household ownership and tenancy it could be expected that there would be a close correspondence between the census output areas and the housing areas of this study which also use home ownership and tenancy status for their basis.



Top: Figure 67. North Brent Housing and Output Areas

Bottom: Figure 68. Kilburn Housing and Output Areas

The overall impression from both maps is that there is little agreement between the size and boundaries of output areas and housing areas, and the principal reason for this is the design of the output areas: basically, the design criteria for output areas are similar to those of wards with regard to having to meet a certain size requirement and to fit the existing ward geography. Most housing areas are smaller than output areas and will be better described by smaller data units, such as a household or data on individuals from sources other than census OAs which will often not pick up their characteristics; others are larger and the question then is: can these housing areas be adequately represented by some combination of OAs?

One method of answering this question is to combine output areas whose centroids fall within the same housing area and to take the borders of these combined output areas as the edges of these 'new' proxy housing areas. This is best-fitting, presented by the Office for National Statistics for building 2011 Census estimates from Output Areas (ONS, 2012). As an illustration, Figure 69 identifies these groups in North Brent and the result is a reduction from 45 housing areas of this study to 15 'new' housing areas and a totally different 'neighbourhood' geography. Some housing areas, or neighbourhoods, have disappeared. There are considerable difficulties with this approach:

The real difficulty with these neighbourhood derivatives is that they fail to accurately capture the neighbourhood dynamics and thereby undermine their utility. In fact they cease to be neighbourhoods as understood by this study.

The borders of the 'new' neighbourhoods only approximate the borders of the housing areas and therefore divide the latter up. The borders of the new units have no intrinsic social value and are relatively meaningless on the ground. It is also the case that the design criteria of the output areas, as is evidenced on the ground, pay little attention to using social barriers as boundaries for the output areas. Although the design criteria for output areas states that OAs were constructed from polygons "clipped to ward boundaries, road centre-lines, railways and water courses where these formed appropriate boundaries." (Martin, Nolan, & Tranmere, 2001) it appears that OA boundaries relate to sensible land divisions rather than being adopted because they act as social boundaries.

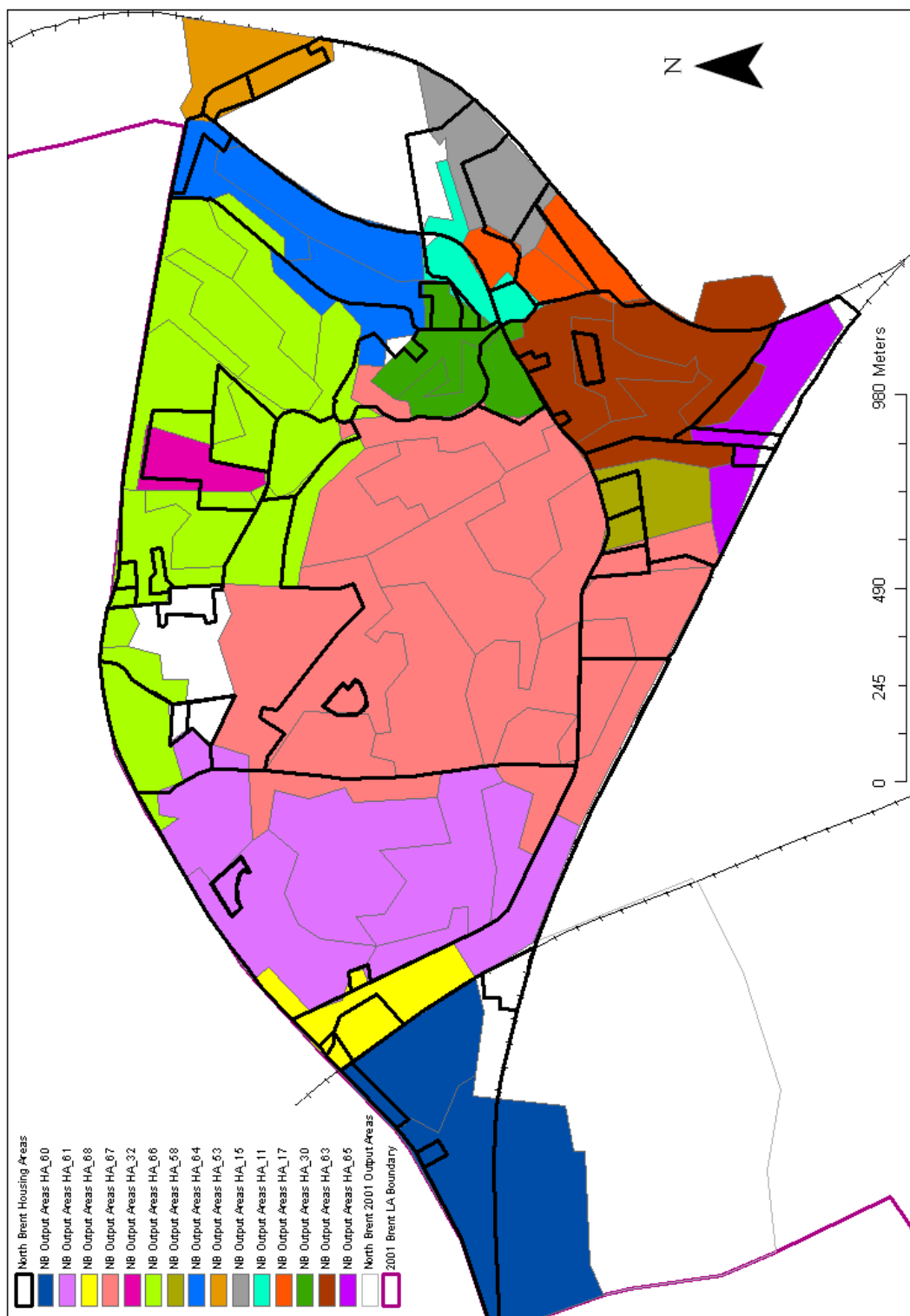


Figure 69. North Brent Output Area approximations to Housing Areas

Because the newly formed neighbourhoods do not accurately capture the housing areas they therefore do not capture the arenas of natural social interaction, and the consequential neighbourhood effects, or help diagnose cause and effect between, for example, housing and health, housing and social relationships, wealth and housing. All service delivery and administration based on the 'approximate' neighbourhoods further exacerbate the problem of proper neighbourhood identification and the addressing of neighbourhood difficulties as they stray further from the basic building blocks.

Designing neighbourhoods based on output areas introduces the Modifiable Areal Unit Problem. The MAUP is a product of the selection of areal units when studying a particular distribution; the problem is one of selecting the most appropriate set of units. However, if, as is the case with housing areas, there is only one set of appropriate spatial units then the adoption of these spatial units obviates the need for any other selection of spatial units which would only approximate to the subject distribution and, indeed, the selection of any other set of areal units introduces the MAUP. "MAUP would be irrelevant if areal units were chosen for theoretical reasons rather than administrative convenience." (Grannis, 2007, p. 15) The theoretically justified units are housing areas.

There is, in addition, the difficulty of selecting the means of combining the output areas. If housing areas are first determined and then nearest-fit output areas are then constructed, then it has to be asked: what are the perceived benefits of these new units as distinct from the housing areas? The result of using combinations of OAs as 'nearest-fit' units to housing areas would be the wrong number of neighbourhoods being identified, of the wrong size, with boundaries not aligning with social divisions, and the supposed benefit of more accurate data being an illusion because the value of the data is compromised by the use of inappropriate units in relation to social distributions captured by housing areas.

The alternatives are the sets of Lower and Middle Super Output areas. Unfortunately these compounds of output areas suffer two sets of design problems in relation to the housing area defined neighbourhoods of this study. Firstly, they carry through the design problems of their constituent output areas and, secondly, they are constrained by the census geography to fit within wards which themselves have not been objectively validated as capturing social distributions. Given the shortcomings of the design of output areas in capturing housing area neighbourhoods the super output areas take them even further away. The starting point for output areas, and also for super output areas, is that they are clipped to ward boundaries and if it is the case that the ward boundaries do not successfully capture neighbourhoods, as understood here, then particularly the super output areas will evidence a dislocation between the census geography and the social interaction areas identified in this study.

Whilst these super output areas appear to make more sense in relation to the neighbourhoods identified in this study, earlier analysis showed that Lower super output areas were not as effective as housing areas at capturing the variations in the social variables measured by Grannis and the Talen Index (Table 7).

5.5.4 Geodemographic Classifications.

Adaptations of pure OA data are the geodemographic classification systems which endeavour to get under-the-skin of OA data by modelling some of the data down to the constituent unit postcodes and then adding in other data collected from a variety of sources, primarily commercial consumer data. The basis for these classifications is that people living in similar neighbourhoods have similar consumption behaviours.

Increasingly, geodemographic classifications are being tailored to address welfare issues in addition to the usual consumer classifications and, given that these are primarily based on census output area data, it is profitable to investigate just how areas of homogeneity determined by such classifications compare with the housing areas of this study and to see if they are acceptable substitutes for them.

Being partly census output area derivatives the patterns emerging from the classifications show their pedigree by categorising households according to the qualities of the output areas they are in irrespective of any uniformity of neighbouring properties should those properties be in differently classed output areas. This means that two adjacent and identical properties can be classed differently if they fall into two different output areas whose overall classifications vary as a result of all of the other households in their respective output areas. This is not uncommon and the two study areas provide many such examples (see Figures 72 & 73). The other characteristics of the output area designs also often show through into the pattern of the classifications such as, for example, the shape of the classified areas, their sizes, their compromises over boundaries, and their lack of adherence to psycho-social boundaries. The classification patterns are the outcome of the output area designs and that often grates with the observed or understood cohesion of an area's households on-the-ground.

The Acorn geodemographic classification of both study areas presents a pattern somewhat at odds with the prevailing wisdom of neighbourhood literature and implementation (which suggests that either wards or school catchments are the foundations of neighbourhoods) in as much as the classification distributions do not neatly comply with them (Figures 70 & 71).

In North Brent the western half of the area is largely well-off and falls in one catchment area but across two wards. This is the most consistent portion of North Brent by all assessments. The remaining part of the study area, to the east, is mostly classified as Comfortably Off but, curiously, the eastern part of the Mt. Stewart Primary School

catchment area, which this study determined was of mixed property types and ownership but generally a poorer part of North Brent, is surprisingly classified as falling into the Urban Prosperity category. The reasoned explanation for this is:

That the Acorn classification is a national classification and does not pick up the idiosyncrasies of small areas.

That the residence-based wealth analysis of this study does not wholly agree with the methodology of the Acorn classification which, being based on consumption behaviour, may reflect disposable income more than asset wealth.

The output areas boundaries cover up or smooth over differences in property type, ownership and Talen variables.

However, this area is a real anomaly and the Acorn classification does not tally with any field analysis.

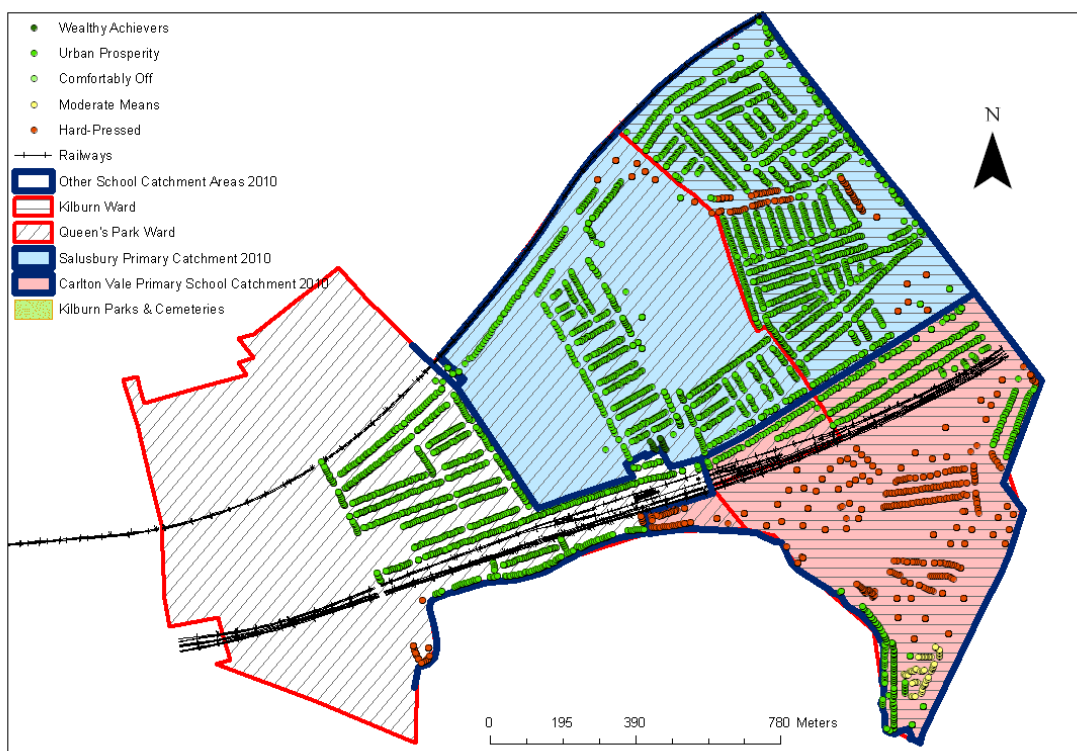
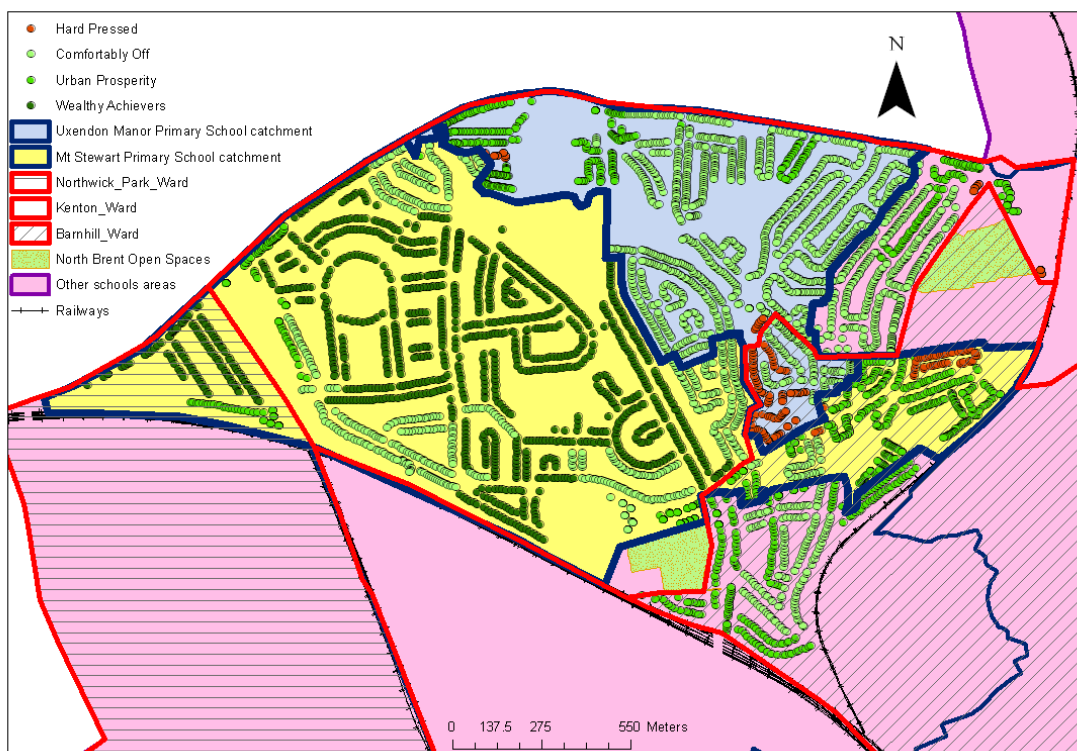
Acorn 2013

Since the above was written, Acorn have rebuilt their classification giving a new segmentation using public sector Open Data and commercial sources to replace or supplement census data (CACI, 2013a). This methodology largely frees the Acorn geodemographic system from using census output area data, instead basing its segmentation on postcode- and household-level datasets which, it claims, provide a timely level of precision and discrimination not previously attainable (CACI, 2013b).

Given that 96% of North Brent's and 93% of Kilburn's postcodes entirely fit within housing areas (likely to be 100% if the technique employed by Acorn, of allocating housing status of new housing postcodes according to the majority classification, is used) there is considerable potential scope for cross fertilisation between the data rich sources used by geodemographic classifications and the aggregations of postcodes making up housing areas and neighbourhoods. CACI permit only a very limited public access to the 2013 ACORN classification online, but it was possible to re-examine those anomalies highlighted in Figure 72 and to determine that the new classification appeared to eradicate them and present a more accurate picture in relation to the findings of this research. Interestingly, and perhaps tellingly in this context, accessing the classification for any particular postcode brings up a picture of a representative building of that postcode (believed to be actual buildings from the postcode as recognised by this author) - a picture which tells its own story alongside the written summary.

In theory it should be easy for geodemographic classifications to re-tailor their systems from segmentations of consumers to create housing areas based on property status and wealth. However, whilst this would certainly add robustness to the identification of

housing areas and help clarify distinctions between their respective residents, we are still left with the difficulty of establishing satisfactory boundaries to natural areas and neighbourhoods - though a database of road traffic volumes, in conjunction with the road hierarchy, might fill this gap.



Top: Figure 70. North Brent Geodemographic Categories, School Catchment Areas and Wards

Bottom: Figure 71. Kilburn Geodemographic Categories, School Catchment Areas and Wards

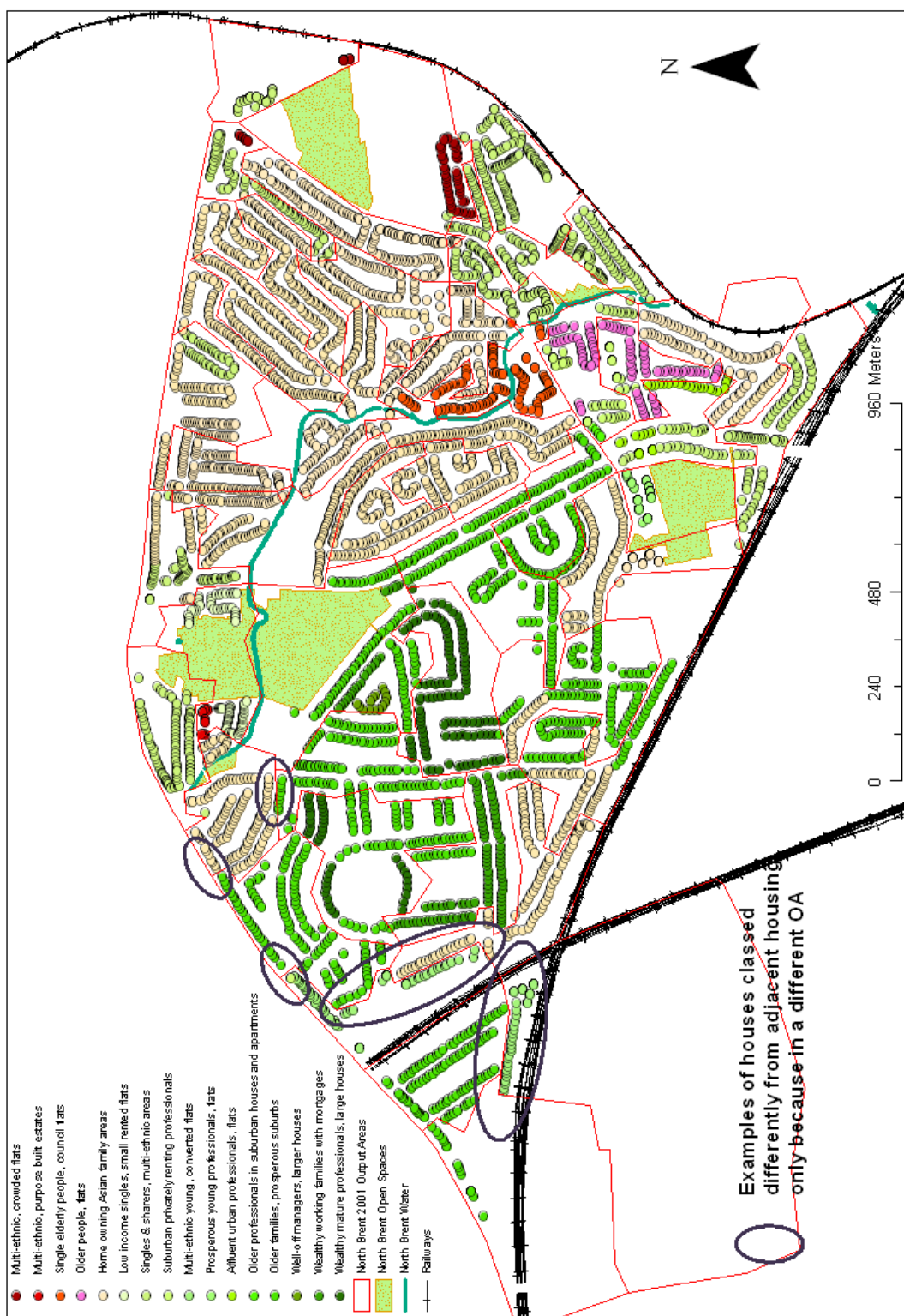


Figure 72. North Brent Acorn Geodemographic Classification: Sub-Groups



Figure 73. Kilburn Acorn Geodemographic Classification: Sub-Groups

The Acorn classification of the Kilburn study area is more straightforward, mainly because there are really only two classes identified: Urban Prosperity and Hard-Pressed (there is one small group of Moderate Means households in the southern part of South Kilburn), which demarcates the division between original housing and the post-war flats developments. There is no category of Wealthy Achievers in spite of property prices being on average higher than in North Brent, which is likely to be because the property stock of North Brent enables a richer descriptive categorisation than the prevalence and uniformity of flats and terraced housing accommodation which dominates Kilburn. This highlights the distinction between urban Kilburn and suburban North Brent. Drawing contours around the classes in Kilburn would, for the most part, make field sense because of the housing stock but would fail to recognise boundaries of social interaction and pedestrian barriers.

In both areas, using Acorn sub-classes distinguished more classes but also introduced more inappropriate classifications as the problems of the output areas' design came to the fore.

It would be difficult to delineate meaningful neighbourhoods from the Acorn classifications simply by drawing contours around the classifications as they carry all the limitations of output areas with regard to ignoring physical and psycho-social barriers as well as the limitations of their construction. As generalisations of the two study areas, this Acorn classification system has its merits. Its limitations are the limitations of the construction of output areas for this analysis:

Too large to capture many housing areas.

Boundaries often ignore pedestrian barriers.

Their size and shape requirements, allied to the unit postcode building blocks, together with the use of road centre lines, often result in the 'unnatural' allocation of properties to different output areas.

Their need to fit with existing electoral and administrative geography causes diverse households to be combined in the same output area.

Their utility for identifying areas of social interaction are diminished accordingly.

The emphasis of the geodemographic systems is on the qualities of the population which are really the outcome of structural and social homophily, resulting from the qualities of the physical environment, in combination with the historical development of different types of residences and their relationship to the psycho-social dividers of the built environment. More pertinent data collection would enhance the orientation of current geodemographic classifications towards social applications but they would always be subject to the limitations of the basic statistical unit used.

For specific neighbourhood delineation a more accurate and contextualised analysis is required which identifies the areas of social interaction where neighbourhoods develop, such as that conducted in this study.

5.6 Conclusion

This chapter has brought out the prominence of home ownership as the dominant variable in the construction of the Talen Index, itself a function of a household's ability to afford the cost of the property regarded as a measure of wealth.

It is the relationship between dwelling cost and household wealth which explains the strength of the regression values between type of residence, CTVB and the Talen Index, and it is the differences between the two study areas' types of residences and freehold ownership, consequential to their development histories, wider economic forces, social policies and differing tenancy pressures on the housing stock, which account for the variations observed.

This chapter also highlighted the close association between type of residence, ownership and age of property and from this it was reasoned that clustering the neighbourhood building-block housing areas by property type and age could indicate larger neighbourhoods if the barriers to social interaction between them are weak.

Ending this chapter, neighbourhoods identified by this study were compared with neighbourhoods in use in Brent and showed the dislocation between the two, highlighting the greater utility of this study's neighbourhoods, and serving as a reference for their reconciliation. However, freeing geodemographic classifications from being anchored in census output areas opens up the possibility for integrating geodemographic techniques and data with those of this study's housing area neighbourhood model.

CONCLUSIONS AND DISCUSSION

6.1 Introduction

This research traces the history of the neighbourhood from the post-Industrialisation period through the 19th century where the emphasis was on the social injustices of the urban landscape, particularly the living conditions of the poor. At this time the politico-economic debate focused squarely on class differences founded on the disparity of wealth, as presented by figures such as Weber, Durkheim, Marx, Simmel, Tocqueville (Scott & Marshall, 2009). Rigour was introduced into these debates and the movement for social reform by detailed descriptions and social and geographic surveys of where and how the various populations lived in different areas (Rawson, 1837; Mayhew, (1851) 2008; Booth, 1902). For neighbourhood studies this work culminated in the seminal researches of the 1920s Chicago School of Sociology who introduced their theories of Human Ecology and Urbanism, producing their model of urban form which distinguished and mapped the various communities and neighbourhoods of Chicago. They identified the driver of both geographical competition for possession of area qualities and social discrimination between groups as being wealth (Park & Burgess, 1967 (1925)).

Subsequently, neighbourhoods, as sub-divisions of communities, were identified as areas of homogeneity and, in geography, the emphasis centred on techniques for identifying these demographically homogeneous areas, rather than establishing the geographic and social generators of the homogeneity itself (Timms, 1971; Johnston & Herbert, 1978; Davies & Herbert, 1993; Knox, 1995; Longley, 2005; Batey & Brown, 2007).

Recently, a renewed interest in the drivers of social injustice and remedies for it, alongside a greater appreciation of the effects of the physical and social environment on individuals and groups of individuals (neighbourhood effects), together with advances in social theory, have stimulated a scrutiny of the neighbourhood as a fundamental spatial unit of society and urban form. At the core of this interest are living conditions and social interaction, both functions of financial discrimination, or wealth (McCrea, 2009). In many ways this can be viewed as a return to the original agenda of neighbourhood enquiry.

This chapter draws together the problem, the investigation into its resolution, and the research results, to assess what contributions have been made to the research issues and problem; what are the limitations of the research; the implications which arise from this research for theory, policy and practice and, lastly, a wider discussion.

The research problem was to critically review and assess both theoretical and practical presentations of the neighbourhood with the objective of identifying meaningful, practicable neighbourhoods underpinned by theory.

The general background to this question is the urgent demand for robust neighbourhoods supported by theory, given that neighbourhoods have been deemed to be at the heart of the political agenda and central to devolving democracy (Blunkett, 2004; Allen & Duncan Smith, 2008). Besides the ever increasing need for more efficient civic and commercial service delivery and resource management, neighbourhoods are seen to be the key spatial scale for improving our understanding and administration of, as examples, health, education and justice, and other life-long qualities (Communities and Local Government, 2010; Communities and Local Government, 2011).

Chapter 3 set out the current theorising and practical realisations of neighbourhoods. The chapter ended by summarising the results of this research.

There is no generally accepted theory of the neighbourhood; rather there is much confusion over its definition, and its relationship to *community*, and this imprecision makes their physical identification equally imprecise (Harris & Johnston, 2003; Kingston, 2003; Chisholm & Dench, 2005). Geographical studies have shied away from tackling the theoretical difficulties of defining neighbourhood (Johnston, Gregory, Pratt, & Watts, 2000) and, instead, concentrated on techniques of identifying areas of homogeneity as manifestations of neighbourhoods (Doncaster NHS Public Health Intelligence Unit, 2003; Ashby & Longley, 2005; Chisholm & Dench, 2005; City of Plymouth, 2009; Robson, Lympelopoulou, & Rae, 2009; Communities and Local Government, 2010; Lupton, Fenton, Tunstall, & Harris, 2011). Economic analysis has made progress in defining and identifying housing sub-markets, without elevating them to neighbourhood status, as well as producing some theorising around gentrification which could be extended to other coherent residential areas (Hamnett, 1991; Galster, 1996, 1997). Similarly, researchers in the field of sociology have made both theoretical and practical advances in defining and identifying neighbourhoods with one study offering a sociological definition of the neighbourhood (Grannis, 2009), supported by social interaction theory, and its empirical research linked neighbour social networks to pedestrian street patterns. In major U.S. cities pedestrian street networks were shown to explain racial distributions better than either distance or school attendance zones. This explanation was also held to apply to socio-economic data, and the formative street networks were called neighbourhoods (Grannis, 2005, 2009). Drawing on this theorising this current research put forward a model of the neighbourhood built on substitutable housing bounded by impediments to social interaction as a means of addressing the research question.

Chapter 4 described the proposed methodology for addressing the research propositions and question, with chapter 5 presenting the results of the empirical work. This chapter weighs up the value of current practices against theoretical knowledge and, drawing on all of the above work together, assesses what advances and contributions this research makes to neighbourhood theory and practice.

6.2 Research clarifications, advances and contributions

Chapter 3 concluded that there was a seeming theoretical consensus amongst several social science disciplines on what a neighbourhood is: sociological research ventured that a neighbourhood was an area of social interaction networks delimited by non-pedestrian streets (Grannis, 1998); politics presented the neighbourhood as the crucible for democracy and civil participation (Communities and Local Government, 2011); and housing economics identified areas of substitutable housing as individual sub-markets, subject to common economic forces (Hamnett, 1991; Galster, 1996; Goodman & Thibodeau, 1998; Galster, 2001). A housing submarket can be defined as “a set of dwellings that are reasonably close substitutes of one another, but relatively poor substitutes for dwellings in other submarkets” (Bourassaa, Hamelink, Hoesli, & MacGregor, 1999, p. 162); whilst the sustainability and environmental movements have presented walkable neighbourhoods as encouraging social interaction (Moudon, et al., 2006; Smith, 2008). Combining this consensus with the main geographical finding of long-standing scholarship on residential patterning – that wealth is the driver of differences (Park & Burgess, 1967 (1925); Pacione, 2005) – this research built upon this model, hypothesising that areas of substitutable housing enclosed by obstacles to social interaction were practical geographical neighbourhoods.

The research results of chapter 5 show that this model of geographic neighbourhoods better explains social distributions than other spatial units, demonstrating that they can be regarded as both theoretical and practical geographic neighbourhoods.

This research makes a significant contribution to neighbourhood scholarship in drawing together these strands of social scientific theory into realising a geographical neighbourhood and a supporting geographical neighbourhood theory.

In getting to this point, this research tackled all of the outstanding issues from the literature review. For example, it has advanced the distinction between *community* and *neighbourhood*, which has caused so much confusion. In geographical terms a community is larger, more complete in its provision of services, and more comprehensive in its relationships than a neighbourhood (Wellman, 2001), which is simply a collection of proximate homogeneous households and contiguous residences which make coherent sense (Park & Burgess, 1967 (1925); Venkatesh, 2001), bounded by pedestrian barriers, the fundamental building block of urban structure.

This research also advanced scholarship by successfully transferring Grannis's methodology to a U.K. setting, thereby introducing a theoretically-informed means of delineating areas of social networks.

This study's empirical work then made a distinct contribution to neighbourhood scholarship by developing Grannis's methodology and applying it to housing areas, rather than pedestrian street networks, an alternative spatial division with an established theoretical provenance. Housing areas were reasoned to be a better explanation for social distributions than pedestrian streets which, of themselves, only facilitate interaction, whereas housing itself is a fundamental social filter and organiser (McCrea, 2009)²³. Housing areas were operationalised by classifying housing by type and age from field work, then adding a suitable boundaries data set and, crucially, by creating a suitable set of data from re-cast census information. This is a significant enhancement of Grannis's model as it firmly embeds social networks with the built and natural environments, consistent with the evidence of the sampled areas' historical housing developments, the development of the road and rail networks and the observed characters of the areas. Analysis showed housing areas to be better explanations of social distributions than either Grannis's t-communities (however defined) and Lower Super Output Areas.

A consequence of demonstrating housing areas' superior explanatory power over Lower Super Output Areas was to make another contribution in highlighting the latter's (and thereby also wards') inadequacy in capturing social distributions. The reason for this inadequacy arises from their constitution, based as they are on census output areas, whose shortcomings as substitutes or surrogates for neighbourhoods were extensively discussed.

A similar contribution was made in the techniques employed in analysis: and by extending the research analysis to the development of the Talen Index. Although simple, the Talen Index represented three important factors: a social capital component, a socio-economic dimension and a connection with variables traditionally associated with neighbourhoods. With the analysis demonstrating that housing areas were the best explanation of the distribution of these variables the research substantiated the validity of housing areas and connected them to traditional conceptualisations of neighbourhoods.

The core of Grannis's neighbour networks rested upon his research on the use of pedestrian streets by mothers with children, and youths, which he saw as the genesis of neighbourhood effects (Grannis, 2009). In this regard, this research, by using housing

²³ The settled social composition of housing areas is a function of time: with changing market conditions the nature of tenancies may take some time to reach equilibrium e.g. the gentrification of Kilburn's Queens Park area has taken several years and is still incomplete. During this transformation of the housing stock the social composition is in flux but, nevertheless, this interim state may still mark the housing area out as being distinct from adjacent housing areas.

areas, removes the narrow basis on which Grannis relies for the generation of neighbourhood effects; housing areas involve the entire population in having an impact on one another and this gives a firmer foundation for theorising the generation of neighbourhood effects.

Using housing areas rather than pedestrian street networks does not undermine the validity and applicability of Grannis's underlying theoretical rationale - in many cases pedestrian streets correspond with housing areas as part of the same developments – as the process of neighbourhood development remains the same whilst the geographical presentation is only a different interpretation of the same data. Thus, a further contribution of this research has been to transpose Grannis's social theoretical framework to underpin the practical use of housing areas.

Furthering this link between housing areas and social interaction this research introduced developments in structural (McCrea, 2009) and social homophily (McPherson, Smith-Lovin, & Cook, 2001; Hipp & Perrin, 2009) which identify social similarity and spatial proximity as creating neighbourhood, fortifying the theoretical justification for regarding housing areas as neighbourhoods, and this is a significant contribution to this subject's knowledge.

Likewise, the theory of gentrification (Hamnett, 1991) gives supporting theoretical credentials to using areas of substitutable housing (the housing areas of this research) as a representative of housing economic theory more generally, it being reasoned that whilst the phenomenon of gentrification has been studied and theorised, precisely the same rationale and theorising applies to other identifiable areas of substitutable housing, such as areas suitable for buy-to-let developments where the reverse of gentrification tenancy occurs, that is that properties may change from single-family ownership to multiple occupancy (Hamnett, 1991; Butler & Robson, 2001). It is also reasoned that the entire residential urban landscape could be subdivided into such areas of substitutable properties i.e. the building blocks of neighbourhoods. Indeed, these mosaics of housing areas correspond with the 'discrete value-significant locations' of the Valuation Office Agency and the theorised housing sub-market literature.

Additional theoretical support for housing areas comes from politics where the equitable representation, civic, social and service provision rests upon a reciprocal transmission of power from the individual to the state, with attendant rights and responsibilities. The forum for ensuring this democratic structure, where state meets individuals, is in the neighbourhood (Communities and Local Government, 2011).

In arriving at these positive conclusions about the nature of neighbourhoods, a considerable amount of information was gathered about what neighbourhoods are not or, at least, is unsubstantiated about them, and this also contributes to neighbourhood knowledge.

Neighbourhoods are not wards, Lower Super Output Areas, school catchment areas, or any administrative or small-area-initiative areas; they are not police 'neighbourhoods', planning areas or health action zones, nor, as yet, are they geodemographic classification 'neighbourhoods'. Each of these has been shown in this research to be wanting theoretically and in their practical identification; some significantly so, such as wards, whilst others contain a thread of neighbourhood authenticity in practice, particularly census output areas and geodemographic classifications, on the basis, simply, of the homogeneity of a number of variables. Whilst the size of neighbourhoods is a variable, it is a factor of the size of the substitutable housing plot and spatial social dynamics rather than a given size or other element. Thus, without denying the existence of differing social dynamics in venues of different dimensions, this research suggests that these venues, even if they are commonplace, are not neighbourhoods and should be re-named accordingly.

Yet another contribution of this research has been to demonstrate the shortcomings of the theorising of individuals', and aggregates of individuals', neighbourhoods. At this stage they are under-theorised and impractical, problems which are compounded by the inadequate techniques of elucidating individuals' notions of neighbourhood (Coulton, Korbin, Chan, & Su, 2001; Coulton, Cook, & Irwin, 2004; Hipp, Faris, & Boessena, 2012; Sampson, Morenoff, & Gannon-Rowley, 2002). In a similar vein, the cultural view of neighbourhoods, and that which views them as products of structural forces are unhelpful in determining their boundaries (Harvey, 1989; Massey, 1993; Castells, 1996; Savage & Warde, 1996; Beaverstock, Smith, & Taylor, 2000; Gieryn, 2000; Galster, 2001; Whitehead, 2003; Dorling, 2004).

The main contribution of this study to our understanding of neighbourhoods has been to offer a theoretically-supported definition of the neighbourhood - aggregations of *housing areas* (areas of substitutable housing) delimited by impediments to social interaction - which enables their clear delineation on the ground and which is both consistent with the traditional presentations of the neighbourhood whilst incorporating the currently understood applied conceptions of neighbourhoods. This, together with the need to ensure a practical outcome, was the main challenge for this thesis.

This study also found that within Housing Areas there were stronger correlations between a number of socio-economic variables and housing characteristics than with census geography, Grannis's t-communities or tertiary natural areas, and this observation could be extended to wards and school catchment areas.

Many of the historical themes of neighbourhood scholarship are incorporated into the above understanding of the neighbourhood and this provenance gives added weight to its validity and acceptability. The presentations of the urban ecologists, that

neighbourhoods are coherent sub-divisions of the urban landscape based on discriminations of wealth, are shown to be well-founded, as is the concept of natural areas though this needs to be interpreted in respect to the built environment rather than exclusively with regard to the physical geography of the landscape. Coherence or social homogeneity has consistently lain at the heart of neighbourhoods but this definition brings out the explicit connection between social homogeneity and the built environment through structural and social homophily²⁴. Likewise, the view that neighbourhoods can be visibly distinguished one from another is verified by the physical distinctiveness of the housing areas and this means that they are places which are popularly understood. These physical distinctions become the vernacular vocabulary as, for example, with the August 2011 English riots where social housing estates were widely named in the media as the spatial repositories of social deprivation. This link between the environment (housing estates in this case) and social distributions has always been an intuitive and reasoned basis for the neighbourhood but the definition presented here makes a direct connection between them through the underlying theory. Similarly, the basic understanding of neighbourhoods has been that they are places where one's neighbours – people living nearby with whom one has neighbourly interactions – live, and this core concept is the nucleus of this study's neighbourhoods. Added weight is given to the observation that social distinctiveness is related to the built environment by the findings of studies examining the geography of poverty and urban morphology, for example, in relation to streets and space (Spicker, 2003; Vaughn, Chatford Clark, Sahbaz, & Haklay, 2005) and housing (Orford, Dorling, Mitchell, & Shaw, 2002). Clearly, this is a developing area of research but, with regard to this research, indicates an ever-increasing appreciation of the way in which social contacts and social distributions are influenced by the topology of, for example, axial streets and their role of being channels for people's movements through a local area (Steadman, 2004).

This presentation of neighbourhoods, as distinctive composites of housing areas with clear boundaries, facilitates a significant step forward in neighbourhood studies for they are no longer vague concepts unidentifiable on the ground. Instead the extent of neighbourhoods can be described and measured precisely, and they are likely to be long-lasting over many generations. Once described and identified they can form a recognised neighbourhood geography. Housing often lasts for over a century and when it changes it is usually an entire area which changes because the forces of change act on uniform housing uniformly, thus if an area is ripe for gentrification then it is the whole

²⁴ This relationship between the built environment and social distributions is the subject of research looking at the persistence over many generations of the spatial distribution of poverty in relation to urban morphology, using space syntax measures applied to part of East London surveyed by Charles Booth. An initial conclusion is "how the morphology of the streets can have an impact on people's lives" and how "space can itself be considered as a factor in the geography of poverty." (Vaughn, Chatford Clark, Sahbaz, & Haklay, 2005)

area of similar housing which is ready even though gentrification usually happens property by property; on the other hand if the housing stock deteriorates then that happens to all similar housing and the entire housing area may be renovated. Thus this study's neighbourhoods are stable, consistent and measurable. They are also real spatial units of housing which circumscribe social interaction and this roots them as meaningful units contrasting with the invisible popularly-unknown postal, census or political geographies currently used as approximate, surrogate neighbourhoods.

The definition presented here incorporates the historical development of areas which creates the original pattern of housing. It also rests upon the work of Grannis, who establishes the relationship between neighbour networks and pedestrian street networks, thus making the critical link between social distributions and, via the built environment, the physical environment. This study developed Grannis's work by determining that it is the cost of housing which, in the U.K., is the primary factor determining residential purchase (rather than Grannis's view that people live where they live because of 'who lives down the street'), thus incorporating the historical discriminatory role of wealth. The definition relies upon the body of sociological work identifying social networks as the mechanism of social interactions sufficient for the creation of social capital, and it integrates other sociological research which, via social and structural homophily, identifies social similarity and spatial proximity as creating neighbourhood.

This conception of neighbourhood addresses the issues surrounding neighbourhood in the following ways:

This research presents a working distinction between communities and neighbourhoods.

It offers a spatial definition of the neighbourhood consistent with the historical thread of wealth being the primary social discriminator through the agency of property values, relying upon social interaction theory, political and economic theory and practice, residential purchase evidence and social agency managerialism.

This research applied the new neighbourhood model in two sample areas of the London Borough of Brent and demonstrated its efficacy in those settings, establishing *housing areas* and *aggregations of housing areas within psychological and social interaction constraints - neighbourhoods* - as the basic social interaction spatial units of society, which are the fundamental pattern of social distributions.

Because the definition offered is based on the built environment, itself influenced by the physical environment, it is a more constant entity than any conception of neighbourhood founded upon socio-demographic criteria simply because the turnover of buildings in any given area is much more likely to be stable than a population in any given area (in the case of Brent it has been estimated that the average churn of population across the borough is about 25% over a 2 year period (Mayhew, 2006)). This explains the

persistence of similar socio-economic status areas over lengthy periods of time that, for example, Dorling and colleagues (Dorling, Mitchell, Shaw, Orford, & Smith, 2000) found in London and, especially, as exhibited in this scheme of work by South Kilburn.

Using the definition offered, unambiguous, clear and meaningful delineations of neighbourhoods can be undertaken with confidence and their borders be defended as being stable, reliable and socially significant.

In identifying the built environment as the prime variable in determining neighbourhoods, neighbourhood observers and professionals are able to investigate and research, with greater precision than hitherto, all those considerations of neighbourhood, such as a neighbourhood's life-cycle, the interactions of the host population, the changing demographic dynamics over time, the relationships of the neighbourhood to other areas in its urban environment, the service needs of the host population, the economic health of the neighbourhood and planning for its future. For the first time a consistent and robust means of delineating neighbourhoods, as offered here, permits their detailed study both individually and comparatively, thus facilitating the monitoring and classification of neighbourhoods as undertaken in parts of the U.S. with the Neighbourhood Indicators Initiative.

Identifying and enabling neighbourhood delineations, based on disparities of wealth, allows a more accurate targeting of resources for small area initiatives than their current definitions.

As the raw materials of neighbourhoods are the spatial patterns of households and their residences the above definition incorporates and emphasises the explicit and implicit dependent relationships between neighbours, whether contractual or not, which contribute to the quality of life of residents, such as behavioural standards, appearance of estates or streets, community organisations and so on, which form the collective efficacy or social capital of the neighbourhood.

The clear presentation of the social theories underlying the development of neighbour networks, their relation to the built environment, and their product enables neighbourhood professionals to 'get-under-the-skin' of neighbourhoods and examine, study and thereby influence collective and individual outcomes within the neighbourhood as, for example, is already being implemented in the provision of mixed accommodation on small estates, in respect of ownership and tenure, to integrate different populations. Health studies, in particular, can extend the analysis of individual health outcomes to an individual's or household relationships to their living accommodation and their neighbourhood thus integrating the environment and the social worlds.

As the definition relates the environment to social distributions, all those concerned with neighbourhood can see the role that the environment plays in shaping neighbourhoods and will need to incorporate environmental and sustainability considerations into service provision and planning, such as with street planning, identifying social barriers and access to services.

Although affective approaches to defining neighbourhoods have contributed little to their delineation to date, it is highly likely that individuals' understanding of their neighbourhoods, however defined, are related to the built environment – estates, blocks and streets, for example – such that they are most likely to match the housing areas of this study. People do know a neighbourhood when they are in one (Webster, 2003) because it has a unity of appearance and this will be the vocabulary and geography of their perceptions of neighbourhoods (Proshansky, 1978; Lynch, 1996 (1960); Goodings, Locke, & Brown, 2007; London, 2008). Place identity is clearly related to place history of the built environment (in common with this study's neighbourhoods) and this is what people identify with and which provides a continuum of history from one generation to another (Lewicka, 2008).

Referring to Galster's 'bundle of spatially based attributes' definition each of the attributes he identified can be measured once agreed, stable boundaries have been established for an area, thus incorporating the most comprehensive listing of a neighbourhood's characteristics, indicating just what a major step forward this production of socially-meaningful boundaries is.

At first sight, it may seem too simplistic to state that neighbourhoods are 'natural areas' of pedestrian social interaction circumscribed by social barriers within which there are concentrations of neighbourly interaction, arising from the proximity of similar people brought together by the filtering process of housing costs, forming housing area neighbourhood building blocks. After all, neighbourhood literature suggests that there are other relationships which contribute to neighbourhood such as the relationship of old people to their environments, and opportunities for social engagement in common activities, for instance shopping and accessing local services. Similarly, neighbourhood has often been defined in a wider context of relationships with work colleagues and friendships other than the immediately local. In addressing these issues this study has tried to focus on clarifying the concept of the neighbourhood and on identifying its essential nature. With regard to assessing which relationships are significant in defining neighbourhood this study accepts Grannis's contention that the important relationships are those which generate neighbourhood effects – primarily those of mothers with children, and young people. These are the pre-eminent relationships shaping the nature of social relationships within a neighbourhood and to preference other social relationships fails to capture the fundamental nature of neighbourhood. For example, it may well be the case that people in the same locality use the same shops and services

and may well recognise others who are also regular users, perhaps even exchanging pleasantries in so doing, but this covers only Stages 1 and 2 of Grannis's progression of neighbouring relations; few of these passive contacts will be converted into Stages 3 and 4 which cover the intentional initiation of contact and that of engaging in activity indicating mutual trust, or shared norms and values, stages which take the social interactions to a far more meaningful level. Older people may also develop these reciprocal relationships of similar import to them but perhaps to a lesser degree in terms of their significance to neighbourhood effects than with mothers and children. It is also the case that other groups, such as church members, can also develop strong relationships (Sastry & Pebley, 2003) but it is suggested here that these are not, in their totality, of the same dimension as those of mothers and children (Grannis, 2007). The social influence of these relationships depend on their sheer number in a neighbourhood and their strength, frequency and the exposure to differing behaviours, perhaps with mothers and children being the dominant groups in this respect. Nevertheless, each of these groups of people recognised as contributing to the social capital of a locality require further investigation to see how they fit into the picture of neighbourhood portrayed here. However, the evidence of neighbourhood effects themselves presents a powerful argument in favour of firstly identifying those forces which bring them about before emphasising the exceptions and other contributors. Endeavouring to incorporate all social networks covering work colleagues, extra-local friendships and family relations, for example, loses the key focus on effect-generating relations between people in proximate residences, i.e. neighbourhoods. The argument here is not that extra-neighbourhood relationships are not strong or influential for individuals or households, but that the formative place-based values developed through social interaction primarily develop in the neighbourhood. Put another way, there have been no presentations of neighbourhood defined by the territorial extent of the multiplicity of a household's social networks.

To give further weight to the approach taken here of concentrating on those forces and elements generating social capital and neighbourhood effects, it is explicitly emphasised that the environment plays a central role in this regard. An increasing area of neighbourhood research, referred to herein, is on the physical environment and the long term effects of that environment on the social and physical welfare of a neighbourhood's residents, some would include the moral and spiritual dimensions also (Driver, 1987; Wirth, 1996 (1938); Creedon, 2002; Crump, 2002; Sampson, 2003; Knox, 2005). These, of course, were the pre-occupations of the Urbanists and the social reformers preceding them. Presenting the building blocks of neighbourhoods as housing areas emphasises the quality of the residence as absolutely central to the welfare of its residents and their relationships with one another. The nature of the property, its immediate setting and the household dwelling space all have a major impact on all welfare considerations. If a particular dwelling is situated within an old estate of high-

density, poorly-maintained blocks of flats suffering damp and insanitary conditions then it is easy to imagine the effect such conditions would have on all aspects of a household's welfare. To varying degrees the entirety of a household's accommodation impacts on a household's welfare – ownership, tenancy status, maintenance, type of building, architectural quality, occupation density, open space, surrounding buildings and their occupants, for example – and so are central to understanding how they promote or discourage social relationships and neighbourhood effects. Therefore, this study emphasises the residence as rooting the residents themselves to the environment. It is this discrimination between residences – largely a function of the cost of accommodation – which directly enables the delimitation of neighbourhoods, as composites of homogeneous housing areas, on a property by property basis.

Grannis's work concluded with him presenting t-communities – areas connected internally by pedestrian streets and delimited by non-pedestrian streets – as neighbourhoods. These tertiary communities were found to enclose networks of neighbour-to-neighbour-to-neighbour social relationships based on people choosing where they located in accord with who lived down the street. This study has a different emphasis whilst acknowledging the provenance of Grannis's and others' groundwork. The conclusion reached here is that people choose to live where they specifically do primarily because of who else lives nearby, constrained by the cost of the property: people live where they can afford to live within their chosen area. Structural and social homophily foster social relations particularly between mothers and children like themselves, thus we find proximate similar people binding together. The delimitation of these neighbour networks is a function of psycho-social boundaries, be they physical barriers such as non-pedestrian roads, railways, rivers, open spaces which separate social groups, or administrative boundaries acting as socially-organising units (for example, borough boundaries orientate health provision, school activities, etc., to be within their administrative territories and discourage cross-boundary traffic in these regards), and psycho-social barriers such as sharp social status differences between adjacent properties or estates. These boundaries may restrict the neighbourhood to one housing area if there are sharp distinctions between it and surrounding properties, for example, the new blocks of private flats built for professionals in the social housing area of Kilburn Lane, or the similarly-styled block in Draycott Avenue built in the one-family houses area of North Brent. (In this regard it is worth noting that private developers recognise this social distinction and, where required to make provision for social housing as part of their private development, they will either physically separate social and private residences in different buildings or in separate parts of the same building but with different entrances/exits such that the two groups do not have to mix or meet each other.)

In this way, aggregations of housing areas make up ‘natural areas’ – areas contained within clear pedestrian barriers. In the case study presented here the natural areas had boundaries formed by railways, non-pedestrian roads, rivers and open spaces, and the borough boundary. None of the natural areas of either North Brent or Kilburn was constituted by only one housing area. In some of the natural areas, such as the Kilburn natural area and Preston Hill in North Brent, the social differences of the constituent housing areas is steep, whereas in others, such as the Uxendon natural area in North Brent and the Brondesbury Villas and Harvist natural areas of Kilburn, the differences were comparatively slight querying the validity of delineations of the housing areas as being socially distinctive. Only in the case of the Ottawa government was an example found where social barriers – both classifications and named roads – were clearly defined. In the case of Brent more detailed data and local knowledge could better determine relevant barriers.

In this study both the delineation of housing areas and natural areas form understandable, cohesive and meaningful socio-spatial units.

6.3 Limitations

A brief word first about the strengths of this research to provide a perspective: this research rests upon a wide base of theory forged over a considerable period of time. There is a broad consensus behind identifying residence as the common denominator of household and territory, which this work relies upon. Similar residences are homes to similar people, and similar people interact socially; this is the residential neighbourhood. The real potency of this research has been to modify recent work, by reinterpreting its reasoning in the light of historical scholarship and, in so doing, enhancing its authority by broadening its theoretical foundation. This research tests this simple concept in the field and verifies its reality and superior explanatory power.

This research rests considerably upon validating the theoretical constructs with empirical work. For reasons already explained, it was not possible for a comprehensive look at all U.K. urban areas or even a structured sample, instead this research had to rely upon a case-study approach and this introduces some caveats.

The major limitation of this research is in generalising its findings for broad application (Yin 1994, Hodgkinson and Hodgkinson 2001). To offset this limitation this research carefully focused attention on the research’s theoretical framework, which can act as a guide and template for future research (just as Grannis's research provided), and centred on theory-related analysis which is universally applicable.

Certainly, the theoretical material this neighbourhood research is drawn from, and the contribution of this research has been, not to develop green-field theory but to reason and review theory, sift and analyse, and to reformulate a theoretical framework, and

then to test this new formulation in the field. In this way the theoretical analysis is already of a general nature and can easily be transposed elsewhere; whilst the case study methodology of this thesis can be applied to all urban residential areas, housing areas may well be able to be identified from a combination of the Cities Revealed National Building Class dataset²⁵, geodemographic classifications and open data, such as freehold ownership, obviating the need for resource-intensive case studies and enabling widespread identification of urban residential neighbourhoods. For neighbourhood professionals it is hoped that they will recognise the material of this research and can extend its application to other situations.

Another limitation of this research is the complex nature of case study research, handling both theoretical questions as well as qualitative and quantitative data. Necessarily, painting in the historical background of the case study areas and presenting the detailed picture of the relationships between the subject variables is very data-intensive and complicated, particularly when the researcher is not a disinterested party. However, in being aware of the dangers of this partiality it is hoped that obvious dangers are averted.

Whilst this is a clear presentation of neighbourhoods there are some elements of its basis which are lighter on evidence than others, most importantly the mechanism by which property values filter people in structural and social homophily. The substantial circumstantial evidence of the results of these processes is clear but the actual means by which it is brought about rests primarily on the work of McCrea, and Hipp & Perrin (Hipp & Perrin, 2009; McCrea, 2009), and more specific verification on the home location decision-making process, friendship development and the role of wealth and property values would substantially underpin the methodology presented herein.

Likewise, the primacy of mothers with children as the means of defining neighbourhood networks, responsible for neighbourhood effects, is perhaps a bit narrow in its focus and more research would help clarify precisely the roles of mothers with children and other demographic groups in generating neighbourhood effects.

Similarly, the role of race in this presentation of neighbourhoods has been subordinated to that of social and structural homophily and the role of wealth within these mechanisms. Given that race is a prime demographic discriminator and that Brent has been classified as being distinguished by its racial diversity (ONS, 2005) neighbourhood distinctions should give more weight to this factor than the positive methodology adopted here.

²⁵ An application was made to The Geoinformation Group, the providers of the Cities Revealed National Building Class database, to establish, as far as it is possible, the database's current accuracy for the two case study areas, previously found wanting. The company replied that they did not wish to supply me with supporting data.

Two other elements contribute to the limitations of this research: defining boundaries and size. Precisely what constitutes a pedestrian barrier, especially in terms of social distance, requires more intensive research for any definitive statement, as does size. Large housing areas were not satisfactorily explained by Grannis's work and the issue remains unresolved by this case study. At the other end of the scale, how small can a neighbourhood be? Bond Huie, et al, in suggesting units other than census tracts which would be consistent with what makes up a socially meaningful neighbourhood (social contact within a relatively small area), used VSAs (Very Small Areas) of between 4-8 housing units to enhance within-area homogeneity and statistical inference, whilst emphasising that neighbourhoods should portray maximum variation between each other and minimising internal variation (Bond Huie, Hummer, & Rogers, 2002). Operationally, such spatial units lack social boundaries and theoretical justification, besides jarring with widespread conceptions of neighbourhoods. Neighbourhood theory presented in this thesis emphasises the environmental and social delimiters of neighbourhoods which will vary from place to place. The size of the neighbourhood is a function of what makes them socially and spatially meaningful.

These limitations do not outweigh the strengths of this research or challenge its main findings; rather they provide foundations for future research.

6.4 Implications for theory

The research results of chapter 5 show that the housing area model of geographic neighbourhoods better explains social distributions than other spatial units and indicate that they can be regarded as both theoretically supported and practical geographic neighbourhoods.

Accepting this model of the neighbourhood immediately asks questions of individuals' and aggregations of individuals' neighbourhoods: do they, for example, align with housing areas? Speculation earlier in this research and elsewhere (Cutchin, Eschbach, Mair, Ju, & Goodwin, 2011) suggested that there was likely to be a significant level of agreement given the common relationship between social interaction and the built environment. Recognising the neighbourhood model of this research would also prompt the theoretical substantiation of the spatial dynamics of other scales previously covered by the umbrella term neighbourhood, such as the Home Area, Locality and Urban District or Region of Kearns and Parkinson (Kearns & Parkinson, 2001) and the hierarchies of Suttles (1972), Hunter, (1979) and Kusenbach (2008).

With regard to non-container conceptions of neighbourhood, housing areas permit a more rigorous study of them by introducing precision and specificity of space. For example, by naming a particular social housing estate in the East End of London as a neighbourhood and looking at the structural and social forces shaping it and giving it its

personality may bring forth theories concerning the life and characters of such areas, as distinct from the supply and demand factors creating new private housing areas elsewhere in London. In particular, the production of housing areas enables theorising related to that produced for gentrification neighbourhoods (Hamnett, 1991).

Certainly, urban geography would need to review urban land use development and structure by theorising the life-stages of neighbourhoods and their respective relationships to one another, larger urban units, such as communities, the Central Business District and metropolitan sub-centres.

Likewise, economic and urban geography would be able to improve theorising on the contribution that types of neighbourhoods, or even specific neighbourhoods, make to a thriving or declining urban economy (Sawicki & Flynn, 1996), giving impetus to *smart growth* and *cultural restructuring* theories and analysis. Housing area neighbourhoods would rejuvenate residential area analysis and theorising by providing a significant part of the theoretical fabric and rationale previously missing from social area and factor analysis applied to residential distributions.

Another pertinent application of housing areas theory is in regard to regeneration theory. Almost by definition the properties of the subject areas are similar in many ways suggesting that the host populations are also similar and that these are likely to be housing areas as defined here. Regeneration estates are often archetypal housing areas.

Neighbourhoods are complex geography; they embrace politics, territory, structure, culture, history, economy, environment and society and this stimulates a major re-consideration of all aspects of the relationships between households, society and the environment, ranging from the spatial distributions of social groups, social group formation and settlement, to the geography of social justice and equitable distributions of civic goods and services. For example, it is easy to see the relevance of housing areas to the theorising surrounding the causes of the 2011 riots, centred, as they appear to have been, on neighbourhoods (Phillips, Frost, & Singleton, 2012; Riots Communities and Victims Panel, 2013).

The parent theories supporting neighbourhood theory are those of economics, politics, planning and sociology in particular, but what needs to be emphasised is that the fundamental distribution is the environment. Throughout history the physical landscape has guided and influenced the site and development of urban areas, and within towns and cities the pattern of the built environment reflects the physical nature of the site and the area's social history. The resultant built environment and related social distributions are the raw material of neighbourhoods.

Sociology arose from the complex problems of eighteenth and nineteenth century society, of which the rapid urbanisation and industrialisation of that time had major

impacts on social functioning. Several of its theories are foundational for neighbourhood theory: the group of theories classed as social interaction theory, social disorganisation theory, social and structural homophily theory, neighbourhood effects theory, and social, family and individual capital theory. Given that neighbourhoods are seen as the social building block of society in general, the consequences of neighbourhood theory to sociology are far reaching.

A major consequence of being able to bound neighbourhoods is that accurate observation and measurement of neighbourhood functioning can be reliably undertaken. The conclusion of Ruth Lupton that the imprecision surrounding neighbourhoods, both conceptually and practically, rendered neighbourhood initiatives “almost meaningless and possibly misleading” (Lupton, 2003), was a major stimulus in conducting this research, and remedying this imprecision would greatly advance social welfare theorising and practical work, particularly in the major interest area of neighbourhood effects. Neighbourhood effects research is one of intense interest, where many of the perceived social ills and benefits have their roots. The four main areas of this research are in education, health, criminology and civic engagement. Each of these is fundamental to both individuals’ and society’s health and being able to validly set boundaries and compare different scenarios and control various factors in a known environment, would greatly aid theoretical progress.

Clearly, understanding the social dynamics and extent of neighbourhoods would further research and knowledge of the urban distributions of ethnic groups, class distributions and insight into theory concerning spatial concentrations of disadvantage and all forms of social justice.

The transformation of space into place is a key interest of sociological studies and the neighbourhood is an ideal venue for studying this phenomenon. Neighbourhoods are not simply bundles of variables; they are creative agents in their own natures. This research’s theory of the neighbourhood provides a framework for more detailed and insightful theory, as well as a ‘meta-neighbourhood’ agenda, that is, how geographical communities relate to one another and society as a whole. Gieryn spoke to this agenda in his introductory piece to a special volume in the *American Review of Sociology* (Gieryn, 2000). The social dynamics of the neighbourhood may not be repeated or occur at the city scale or the street-level scale, but understanding the neighbourhood sets a reference point to see what they have in common and how they differ.

“Nothing of interest to sociologists is nowhere (Casey, 1993): Everything that we study is emplaced; it happens somewhere and involves material stuff...”(Gieryn, 2000, p. 466) Thus the starting point for developing neighbourhood theory and as a stepping-stone for theorising at other scales is the identification of the subject place, through the homes of residents.

Economic theory would be enhanced by housing area (neighbourhood) theory in obvious areas such housing economics (Forrest & Williams, 2009), urban economic geography and neighbourhood life-cycles, but other theory of a broader scope would also be beneficially moved forward, as, for example, social welfare contracts such as presented by Webster where co-residents, willingly or sub-consciously, enter into behavioural and co-interest contracts when they reside next to or near one another. (Webster, 2003) Household economics are dominated by the cost of housing which, in part, is a function of neighbourhood status and there is clearly an area of community economics to be mined here.

Neighbourhood health – both in terms of environmental structure and constituents' health - also has ramifications for the finances of the local authority and the wider city authorities. Understanding the persistence of urban economic blight and, conversely, the urban wealth distribution, through the housing structure of neighbourhoods, is greatly enhanced by neighbourhood theory.

Clearly, residences house households wherein are the working population and consumers of goods and services. Employment levels, as an indicator of local household income and prosperity, in particular, set the neighbourhood agenda, socially, economically and politically, and an understanding of their relationship to the neighbourhood is critically important for its, and residents', welfare. Changing the urban patterning of employment is related to social status, itself related to housing patterns.

Politics is interwoven with the social, geographic and economic in the neighbourhood, which is the chosen spatial scale for major innovation. The political theories of the current government centre on re-engaging the individual to society through the devolvement of power to the neighbourhood level. Making the individual, through the local community, responsible for decision-making and the subsequent outcome is central to the government's theory that local power is better governance. Hence there has been an emphasis on local consultation, Localism and local partnerships of people at the neighbourhood scale. This is the Big Society agenda which is/was this government's major political policy initiative.

Reference has already been made to the August 2011 riots and their causes. The full report on these was published in March 2013 (Riots Communities and Victims Panel, 2013), and identified neighbourhood social conditions as a contributing cause, whisking neighbourhood structure and functioning way up the political agenda, and housing area theory will make an extremely valuable contribution here, pointing out the underlying spatial organisation of property and people.

Neighbourhood theory as presented here largely explains why certain racial and social groups concentrate spatially and, given that all the post-war British riots have been

concerned with race, and concentrations of race in local neighbourhoods, it has a great deal to contribute to political theory of race relations, housing policy, deprivation, citizenship and policing, as examples. The race riots of Oldham, Burnley and Bradford, for example, were reported as being caused by racial tensions and local town council decisions were cited as being responsible for Oldham's problems: "The report (by Burnley Action Partnership)...claims area-focused spending on regeneration in the 1990s had an "unintended side effect" and was partly to blame for the race riots. The report says the spending caused problems by "drawing investment and activity away from a neighbouring area, or displacing a problem such as anti-social behaviour across a ward boundary." The study claims this "contributed to social fragmentation by increasing neighbourhood rivalries". (Manchester Evening News, 2006)

Similarly racial concentrations in poor housing and conflict over scarce local resources was held responsible for the riots in Burnley of the same year, 2001: "housing is probably the key to unlocking the way to resolving a number of related issues, e.g. Property Values, Deprivation, Regeneration, etc...The problems associated with the housing market in Burnley are complex. On the one hand, the Black and Ethnic minority communities are experiencing household growth and tend to be housed in smaller, older property which is inadequate for their needs, whilst on the other hand, demand for the social housing estates which traditionally have housed people of white/European descent has been falling because of demographic and wider social changes...These problems were compounded by a growing problem of obsolescence in the stock of two up and two down terraced housing which has manifested itself in falling prices and increasing vacancy rates...That is the urgent issue of housing market renewal."(Burnley Task Force, 2001)

Housing policy was also at the heart of Margaret Thatcher's social policy with the 1980 Right-to-Buy council property a means of giving people a stake in society with the theory being that they would then be more responsible citizens as they looked after and nurtured their home investment. A consequence of this policy has been that the best council property was bought up in highly desirable areas, leaving the poorer quality properties populated by low-income households leading to high turnover rates and less stable environments, polarising neighbourhoods.

Neighbourhood theory has a contribution to make towards political theorising about such agendas as social harmony, citizen involvement, deprivation alleviation and housing policy, as in these cited cases.

Likewise, there is tension over housing policy with regard to breaking up racial and social segregation. One the one hand, developments of mixed housing are theorised as a solution (Blunkett, 2004; Kleinmans, 2004; Holmes, 2006; Monk, Clarke, & Tang, 2011), whilst others say that it is perfectly natural and instinctive that different groups

spatially concentrate and that social engineering to prevent this is doomed to failure (Maslow, 1968; Mumford, 1954; Putnam, 1995; Saunders, 2009). Such theorising is pertinent to the racial riots referred to above, for example, where neighbourhood housing conditions, cost and management, together with poor racial and social interaction - precisely the subject matter of neighbourhood theory – were absolutely central to the problems and their proposed resolution.

These are just some examples of how neighbourhood theory is pertinent to, and can be influential in, political theory.

Politics, economics, and sociology provide the parent theories which neighbourhood theory builds upon but these disciplines are not the only contributors; amongst others, planning, environmentalism and history have also fed into neighbourhood theory and are changed by it.

6.5 Implications for Policy and Practice

The neighbourhood is such a central element of all of our lives that scarcely anything is not affected by it and, as with impacts on theory, tracing the implications for policy and practice of producing precise coherent, practical neighbourhoods underpinned by theory is too great a task for this research. However, an idea of the dimension of the impact on some activities may be gained by selecting just a few areas of interest.

Coulton (2005, p. 73) presented several features which researchers have identified as likely being “essential for healthy, strong, sustainable, or effective communities, such as social capital, including bridging and bonding capital (Putnam, 2000; Temkin and Rohe, 1998); community capacity, including leadership, governance, and organization (Chaskin, Brown, Venkatesh, & Vidal, 2001); collective efficacy (Sampson, Raudenbush, & Earls, 1997); sense of community (Brodshy, O’Campo & Aronson, 1999); social control (Sampson and Groves, 1989); neighboring; and amenities and resources (Fuerstenberg, Cook, Eccles, Elder, & Sameroff, 1999) institutional strength, interorganizational relations, civil participation (Daley & Marsiglia, 2000); and safety (Buka, Stichick, Birdthistle, & Earls, 2001).” The work of this research follows Coulton’s call for neighbourhood boundaries to be identified and geography being incorporated into the analysis of the mediating processes and mechanisms for change, with a view to intervene effectively.

There is substantial interest in the effects of neighbourhoods on individual social and economic outcomes and there is a burgeoning body of research investigating the phenomenon; it is widely believed that individual welfare outcomes and life chances are enhanced or diminished according to whether the individual lives in non-deprived or deprived neighbourhoods (Diez Roux, 2001; Kintrea & Atkinson, 2001; Dietz, 2002; Macintyre, Ellaway, & Cummins, 2002; Sampson, Morenoff, & Gannon-Rowley, 2002;

Lupton, 2003; Cummins, 2007; Andersson, Musterd, Galster, & Kauppinen, 2007). Central to this research is the concept and definition of the neighbourhood and much of the research reviewed earlier comes into this category.

One of the main areas of neighbourhood research has been in ascertaining their health impacts and much of the recent work undertaken to precisely define neighbourhoods has been of this nature (Diez Roux, 2001; Dorling, 2004; Fone, et al., 2006; Macintyre, Ellaway, & Cummins, 2002; Weich, Blanchard, Prince, Burton, Erens, & Sproston, 2002; Sastry & Pebley, 2003; Corburn, 2004; Veenstra, Luginaah, Wakefield, Birch, Eyles, & Elliott, 2005; Croucher, Myers, Jones, Ellaway, & Beck, 2007; Parenteau, et al., 2008; Drackley, Newbold, & Taylor, 2011; Weden, Bird, Escarce, & Lurie, 2011). However, there is a consensus that much still remains to be done.

One of the main impacts of housing area neighbourhoods, in terms of the relationship between health and neighbourhood qualities, would be to provide confident, stable boundaries for the gathering of data for authoritative individual-case, longitudinal and multi-disciplinary studies. Which health outcomes are affected by what neighbourhood characteristics? Likewise, it facilitates classifications of neighbourhoods for comparative studies. This would be a major step forward in producing reliable data.

It is not, however, only in the area of neighbourhood and health associations that stable neighbourhoods would benefit health provision. In terms of planning health resources, having housing area neighbourhoods would aid long term allocation of resources by having an understanding of neighbourhood life-stages and the associations between life-stages of neighbourhoods and resident populations, for example, as housing fabric deteriorates, or as regeneration/gentrification occurs, so the population changes.

Knowing patterns of social interaction helps model disease and information dissemination. Allocation of health resources, such as health centres, prevention clinics and surgeries are better sited when health planners understanding the social interactions and collective social structure of the neighbourhood. A more rational division of the population is achieved where whole neighbourhoods are kept together in, for example, GP and health treatment catchment areas, rather than using postcodes or distance or simply patient numbers.

Having stable, recognised neighbourhood boundaries means that research and information can be better co-ordinated with other service providers who, for their own organisational reasons, may work off different understandings of neighbourhood. Having a common neighbourhood geography is beneficial to all.

Another sphere where coherent, practical and meaningful neighbourhoods are critically important is with local authorities. More than any others, local authorities need to have the best possible knowledge about their districts, for they not only supply data to central

government about their area but they are also the main body concerned with planning for their area's and population's needs. Having a meaningful means of dividing up the district in physical and social terms is the ideal means of making sensible planning units and, whilst housing area neighbourhoods will not match any given population requirement, combinations of coherent housing areas can be used to approximate the desired population threshold. This leads to more meaningful spatial and social divisions than planning areas simply based on set population requirements and convenient compliance with other spatial divisions. Knowing the key statistics and boundaries for all the neighbourhoods in the district would mean the co-ordination and matching of all the different types of spatial divisions that local authorities produce as, for example, with Housing Areas, regeneration areas, conservation areas, shopping areas, electoral wards, school catchment areas, parking zones, planning areas, as well as with other locally-based services, such as Local Area Partnerships, Health Action Zones, Respect Action Neighbourhoods, Priority Policing Neighbourhoods, Sure Start and Educational Action Zones.

Several neighbourhood professionals have complained of wasteful, duplicated and unco-ordinated small area initiatives with sometimes contradictory objectives (Smith, 1999; Cemlyn, Fahmy, Gordon, & Bennett, 2002). Clearly, resources are optimised and focused where there are the same neighbourhoods.

Criminology and policing is an area of research particularly concerned with neighbourhoods, and also with neighbourhood effects. Like educational achievement and health outcomes, the propensity for people to become involved with crime is believed to be closely relate to the environment in which youths grow up and the social, educational and economic circumstances of these neighbourhoods (Sampson, Raudenbush, & Earls, 1997; Leventhal & Brooks-Gunn, 2000; Sampson, Morenoff, & Gannon-Rowley, 2002; Kling, Ludwig, & Katz, 2005; MacDonald, et al., 2009). Together with health and education, criminology is in the vanguard of neighbourhood effects research. With regard to the working definitions of neighbourhood in this area of research there are two main themes. The first, epitomised by Sampson's early work has been to use census tracts based around homogeneity and supported by Ecometrics, critiqued above (Sampson & Groves, 1989; Sampson & Morenoff, 1997; Sampson, Raudenbush, & Earls, 1997; Sampson & Raudenbush, 1999; Sampson, 2003). In this research Sampson was relating the theory of Urbanism to social disorder. More recently, Sampson has emphasised the role of networks (Sampson, 2004), a theme which has been central to the recent work of other criminologists, who have pursued networks as a means to defining neighbourhoods (Hipp, 2010; Hipp, Faris, & Boessen, 2012). Others have investigated spatial regression models, mimicking diffusion models, though making a strong case for greater theoretical clarity on the neighbourhood as place and crime in geographic space (Tita & Radil, 2010).

The housing area neighbourhoods of this study similarly utilise social network theory and although the mapping of networks is in its early stages it is speculated here that there will be a consonance of social networks with housing area boundaries given the supporting research on social networks developing through structural homophily.

From another perspective, housing area neighbourhoods will make a significant contribution to policing in a number of ways. More effective targeting of resources is achieved by matching policing to those neighbourhoods seen to be the sources of crime, a task which is made easier by better and more relevant statistical neighbourhood data. At the moment, neighbourhood policing, though not the front line of tackling crime, is organised by wards which bears little resemblance to the variation of crime on the ground. There is some evidence of crime contagion spreading outwards from problem core areas which housing area neighbourhoods would identify.

From a supply side of policing, there has been criticism of the Police Force's organisational structures which are not seen as being suitable for a sensitive response to local communities' needs, recognised in the recent Police Reform White Paper which calls for a "detailed, neighbourhood level understanding of the demographics of the community it serves" (Home Office, 2004a, page 67, quoted in Ashby, Irving, & Longley, 2007), in spite of the government's localism agenda. Whilst these authors call for the application of geocomputation and geodemographic classification systems (Ashby & Longley, 2005), the housing area neighbourhoods of this research go further and not only are more accurate in pinpointing the sources of crime, and the residences of the perpetrators, but, more importantly, link in crime with neighbourhood and environmental factors. Housing area neighbourhoods are more than simply ways of using resources more efficiently; they focus attention on the root causes of crime through a better understanding of the background of criminals and the criminal culture, in conjunction with other disciplines.

6.6 Implications for methodology

In practical terms, this research would have benefitted from a more rigorous classification of housing developed from a broader base of housing than just the two study areas. Associated with this is the desirability of establishing a framework for understanding what differences between housing areas effectively distinguishes one from another in residents' eyes: is it simply status of freehold ownership, or the cost of housing and, if so, how large does the cost difference have to be to act as a discriminator. How, if at all, do architecture or appearance affect status; and what about demographic characteristics? If the social obstacles between housing areas are not too sharp the neighbourhood extends until the neighbour networks are delimited by other barriers. Determining the strengths of differences which inhibit or enhance social interaction is an interesting avenue for future neighbourhood research. Subjective

evidence gained in the field suggests that the big distinctions between social groups are that of private/social ownership, property types, sharp property value disparities and obvious lifestyle differences.

In a similar vein, the development of the Talen Index could be more useful if its census variables were either refined or accepted as neighbourhood indicators, as it proved to be a useful tool in this analysis. However, by far the most helpful practical development would be the identification by local authorities of a set of local barriers to the free movement of pedestrians and, in particular, mothers with children, for their areas.

An obvious limitation of this study is its singularly positivist approach and the natural question is whether or not other methodologies would produce a similar or sympathetic set of neighbourhoods to those determined herein. Broader definitions of neighbourhoods have been presented in the literature, ranging from compounds of individuals' perceived neighbourhoods, pedestrian walking spaces around individuals' homes, self-defined 'home areas', places of identity, areas defined by common access to services, use of local area, and so on, but none of these methods has found general acceptance, or has been able to clearly define a neighbourhood, provided substantial theoretical support, or produced meaningful cohesive socio-spatial units. Such scant evidence as there is suggests that further investigation of these concepts allied to the findings of this research would illuminate relationships between them; for example, individuals' perceptions of their neighbourhoods – in physical form and associated social, psychological understandings – will be largely informed by the nature of the built environment and the various inhabitants of it (in fact the Pacione (1983) and the Schell & Benjamini (2004) studies, referred to earlier, respectively found a notable similarity between the perceived neighbourhoods of individuals and those of estate agents and the media). Likewise, place identity is informed by the historical place names and development of the built environment and the inhabitants of the area, just as has been seen in the emergence of the different neighbourhoods of this study. Personal and cultural identities view neighbourhood differently, but still through the same social and environmental framework, it is suggested. The L.A.FANS study (Sastry, Pebley, & Zonta, 2006) found that different cultural groups viewed and used the neighbourhood differently and it is indeed likely that the Asians in North Brent, for example, have a different view and usage of their neighbourhoods than, say, the established White population. However, it is still the case that each cultural group will choose to locate in an area and type of residence compatible with their cultural norms and subject to their ability to afford the accommodation. The key to each of these approaches to understanding neighbourhood is the relationship of the individual or group to the physical environment and it is the contention of this study that these are intricately related through structural and social homophily. Given that the raw material is common ground for all approaches it is logical that they are all related through the built

environment. Only Lee's conjecture that the socio-spatial schemata he identified, being a psychological phenomenon, common to all individuals, of a set area of about a half mile surrounding their home which people identify as their neighbourhood, is outside of this analysis (Lee, 1968).

However, for the reasons set out in Chapter 4, it was concluded that there is no reliable metric for assessing the 'neighbourhoods' produced by these alternative methodologies against the neighbourhoods of this study, notwithstanding their practical and theoretical limitations.

Neighbour relations. It is important in the context of the broader approaches to understanding neighbourhoods to recall that this study has utilised Grannis's presentation of neighbour networks and the neighbourhood rather than the colloquial usage of these terms. Specifically, neighbour relations are effect-generating relations, intentionally entered into, rather than the common ties of proximate co-residence which may involve no social interaction. Neighbourhoods are defined as the spatial venues of these neighbour relations which are delimited by the psycho-social barriers resulting from structural and social homophily, and non-pedestrian streets. Neighbourhoods are geographically-constrained areas wherein neighbourhood effects are generated. With regard to different cultural norms and use of local areas there appears to be no reason to suggest that these differences are not similarly related to the built environment; they may well be different from cultural group to cultural group but if cultural groups segregate themselves by residence then these differences will similarly be evident spatially. The social processes of structural and social homophily, and the development of neighbour relations are common to all cultures.

Allied to differences of individual and cultural views of the neighbourhood is the extension of the definition of neighbourhood beyond that covered by neighbour relations, as understood above. What about the neighbourhoods of old people or any other specific sub-group of the population not resident in households with children; how do they fit in with the spatial pattern of 'effect-generating' neighbourhoods? As with any sub-group, old people, in relation to the neighbourhood, should be seen in the context of their membership of their primary cultural group and wealth status as they too are subject to the common social processes already described. To re-present the neighbourhood tailored for population sub-groups is to subjugate the universal social processes described to the idiosyncrasies of particular minority populations, ignoring the evident spatial patterning of homogeneity and leaving the definition of neighbourhood unresolved. There is a balance to be struck between drilling down to the distributions and use of the neighbourhood of sub-sets of people, and capturing the homogeneity within a proximate population to reveal the generators of neighbourhood.

Neighbourhood studies have been bedevilled by a lack of theory, a bewildering set of definitions, terminological confusion, and disagreement over what constitutes their boundaries. This study advances the theoretical understanding of the neighbourhood by synthesising structural and social homophily with social interaction theory and linking it to the general pattern of land values and the role of economic filtering presented by economic geography theory. The cost of housing is the mechanism by which residents segregate themselves, or are segregated by, and thus there is a clear relationship between residential cost, socio-demographic distributions and social interactions: social patterns follow patterns of housing. Distinctive housing types and ownership, together with barriers to free social intercourse, enable the clear demarcation of neighbourhood boundaries and this represents a major step forward for neighbourhood studies which have been severely held back by the imprecision in defining what a neighbourhood is and precisely where it is.

6.7 Implications for further research

For many reasons this work is but a stepping stone to a fuller understanding of the neighbourhood; it does not, for example, advance affective approaches to the neighbourhood or comprehensively explain social distributions of all sub-groups. However, the findings of this research open up the possibility of a more structured approach to future research. Using the paradigm of the neighbourhood presented in this research provides a framework for future investigations, firstly, in relation to addressing some of the limitations of the model presented here and, secondly, in informing the direction of associated research into peoples' neighbourhoods.

As discussed, there is extensive uncertainty surrounding neighbourhoods defined by people in terms of different perceptions and use of the neighbourhood associated with different racial and demographic groups, as well as according to individuals' understandings of the term neighbourhood. Added to these must be the difficulties of reaching a consensus on what the neighbourhood is in relation to people: is it the social or practical use they make of the neighbourhood, or is it the area with which they identify? Then there are the difficulties of addressing the reliability of respondents' perceptions and the methodologies employed in finding out the dimensions and spatial vocabulary of these neighbourhoods. These issues make this a difficult path to follow.

These questions can be helped by an approach utilising the housing area neighbourhoods of this study. Do the housing area neighbourhoods of this research, for example, make sense to respondents as a vocabulary for understanding their built environment; are they meaningful to them as places and do they resonate as consequential entities? The neighbourhoods of this study provide, so-to-speak, a basis for others to hang their research hat on, providing them with a structure for investigating individuals' neighbourhoods. This research bases neighbourhoods on the built

environment, itself related to the local development history and its form; are these meaningful concepts within individuals' ideas concerning their neighbourhoods? Do local people recognise the obstacles to social interaction of this research and are they aware of such things as social contracts and shared, common amenities and services which unite those using them? More direct questions, relating to such matters as their awareness of the social status of their neighbours before and after moving to the area, and their reasons for selecting their residence, would help to understand any relationship between the neighbourhoods of this study and individuals' neighbourhoods, as well as furthering our knowledge of the latter.

These are some of the subjects for further research which will benefit from the availability of more detailed datasets, the progression of social network analysis, the technological developments promising a revolution in geo-ethnicity, and advances in behavioural contract theory and economic theory, as some examples. Practically, the delineation of boundaries will stimulate more targeted, meaningful research and services. Not only do stable boundaries facilitate the classification and monitoring of neighbourhoods both geographically and temporally but they also permit the identification of cause and effect by controlling inputs and observing outputs. However, this set of neighbourhood boundaries based on housing type, ownership, tenancy and psycho-social barriers does not yet exist and is in danger of being totally eclipsed by the popularity of geodemographic classifications of custom-designed neighbourhoods or the seductive attraction of the pseudo-neighbourhoods which can be built or adopted from the Census geography. It is contingent upon the geographic community to encourage the production of a neighbourhood geography in each local authority to build upon the substantial framework presented here and advance the efficient, sustainable use of resources and promote social welfare and justice.

6.8 Conclusions about the research problem

The problem behind this research has been the unfulfilled need to identify theoretically-supported, practical and meaningful neighbourhoods. The urgent demand has come from a greater political awareness of the need to rebuild society and deliver greater social justice, together with a burgeoning need to understand the spatial dynamics of the neighbourhood responsible for those neighbourhood effects shaping the opportunities and outcomes of its individual residents. In order to address these needs the neighbourhood first had to be understood both theoretically and on the ground. To date, supporting theory for the spatial neighbourhood has not been adequately identified, described or applied, partly because theory is still developing within associated disciplines, whose shifting interests make them moving-targets, but also because the availability of practical surrogates has, to some extent, satisfied the rapidly increasing demand. However, academics have questioned the validity of research results from

neighbourhood studies, and social unrest and austerity have fuelled the need to better understand what, and precisely where, neighbourhoods are.

The research question then posed was: Is it possible to identify meaningful, practical neighbourhoods underpinned by theory?

The housing area aggregation neighbourhoods of this research show that it is possible to produce reasoned, understandable and meaningful neighbourhoods identifiable on the ground. Housing areas are the smallest meaningful unit of residential space outside of the home. They relate the physical to the built environment which, in turn, shapes social distributions. These neighbourhoods are meaningful because they are the arenas of social interaction. They are also easy for anyone to identify and delineate, and they are the enduring, basic, holistic spatial unit common for all social purposes. Thus they form the bases of the common-interest residents' and tenants' associations.

In presenting housing area neighbourhoods as the answer to the research question, much of the terminological confusion and conceptual imprecision surrounding neighbourhoods and small urban areas is made redundant, and the need to use surrogates is avoided. Conceptual clarity, a common vocabulary and uniformity is introduced providing a means of co-ordinating and delivering neighbourhood policy and action from diverse bodies such as agencies responsible for regeneration, health delivery, local economic policy, democratic representation, education provision, policing, housing and community policies.

The results from the analysis of Brent data show that, although this was a time- and place-specific, data-intensive case study, there is every reason to believe that the methodology of this research could be simplified and applied to any urban area in the U.K. and wider afield. More and more relevant data is becoming available, as CACI describe in relation to their revised Acorn Classification (CACI, 2013b, p. 12), and there is an entire spectrum of commercial data sets which could be combined to make the practical identification of housing area neighbourhoods easier. For example, there are commercial data sets for all U.K. residential buildings which provide age and type classifications. One such data set is the National Building Class database which categorises all residential buildings, in towns and cities with over 10,000 population, by structure type, class of building (96 classes) and age band (Geoinformation, 2010); CACI have also produced a buildings database for their Acorn geodemographic classification product. An alternative to these is the methodology employed by (Cutchin, Eschbach, Mair, Ju, & Goodwin, 2011) who combined aerial photographs with residential maps and field work to determine their neighbourhoods based in part on housing type. The National Building Class data set obviates intensive field work, requiring only local verification and customising of the buildings classes. Traffic data and freehold ownership data can be obtained from local authorities, usually without

problem, but otherwise by application of free access to public data progressively being rolled out by government (HM Government, 2010). Traffic flow data is also available commercially from, for example, satellite navigation system companies (TomTom, 2013). From such data and digital mapping, e.g. Open Street Map (OpenStreetMap, 1999), housing areas and social barriers can be determined, though field work would be highly desirable as a moderator and for deciding precisely what constitutes a social barrier within the subject area. However, by far the most promising route for producing housing area neighbourhoods on a national basis lies in the new geodemographic classification systems based on unit postcode and household data. Agglomerations of unit postcodes were shown in this research to almost perfectly coincide with the extents of housing areas, and the current geodemographic classifications of residents as consumers could be customised, together with buildings data (such as the Cities Revealed dataset) and boundary sets (such as railways, open spaces, rivers and traffic data) to demarcate coherent housing areas and meaningful neighbourhoods of social interaction. As more affective data becomes available from local surveys and attitudinal research these could be used to substantiate and/or modify the neighbourhoods derived from the statistical analysis. Whilst such work could be conducted locally for, say, a local authority, using the methodology of this research, the above references to large data sets indicate that it is feasible for one of the large geodemographic classifications to customise their data on households and buildings and combine these with clear pedestrian barriers (rail, rivers, open spaces and busy roads) to provide the basic housing area and neighbourhood geography outlined in this research, demonstrating their practicality.

The conclusion is that neighbourhood mapping covering extensive areas, especially with the co-operation of local authorities, is easily achievable without burdensome and costly field work, enabling replication of the methodology of this research. Thus, it is possible to *identify meaningful, practical neighbourhoods underpinned by theory*.

Neighbourhoods, in the sense of being areas of substitutable housing, have conceptual reality in many of the social science disciplines supported by theory, as the above describes. Clearly, there are common dynamics at the scale of the urban neighbourhood which do not occur at any other scale, either larger or smaller. Consequently, one of the major contributions of this research is to have identified this theoretical framework. From this comes the support for a theory of the geographical neighbourhood, which could be expressed:

A geographical neighbourhood is a coherent area of contiguous, housing areas, enclosed by barriers to social interaction, which is subject to common external and common internal forces.

Until very recently the prevailing U.K. view about neighbourhoods was that they were too complicated and uncertain, both conceptually and practically, and there was no challenge to the idea that they could never be defined and delineated satisfactorily. The various academic traditions concerned with neighbourhoods worked around the practical difficulties of a loose neighbourhood concept and consequently the academic literature was peppered with working definitions which were unsettled, inconsistent and unstable. Besides, there was no pressing demand to wrestle this concept to the ground. To fill the void, practical and available surrogate neighbourhoods, in the form of census statistical units, geodemographic classifications and administrative areas, provided working alternatives and were harnessed to fill the gap and work around the problem, relieving any urgent need to tackle it. However, more recently, things have changed.

A coincidence of newly available data, developing academic knowledge and the urgency of social problems linked to neighbourhoods have whisked neighbourhood definition up the political and academic agendas, such that it is now in the vanguard and therefore important practically. In the U.K. neighbourhood regeneration has been a leading tool to tackle social injustice, health and education problems, and this has been extended by launching local political empowerment in all areas of local government and civic decision-making as the primary means for re-building democracy. This interest has stimulated the provision of more detailed data sets and these, together with technical advances in spatial analysis, have presented an opportunity for a fresh approach to neighbourhood investigation.

Simultaneous with these developments has come an appreciation of the significance of neighbourhood social dynamics and their impact on individuals' and society's welfare, termed neighbourhood effects, and this, together with the urgency of lancing the boils of social problems, has energised the search for precision in both the definition and spatial realisations of neighbourhood. The evolution of social networks and social group formation studies alongside the greater appreciation of the symbiotic links between society and environment have been additional developments, and all these factors combined have been pressing researchers to resolve the ambiguities of neighbourhood definition.

This research recognised the theoretical and practical gap in neighbourhood definition and delineation and the vital need to resolve these issues. The extensive, multi-disciplinary evaluation of the extant literature embraced both classical and new theory, practice and technical developments which were sifted and synthesised to establish the foremost, accepted academic view of the neighbourhood. New theory, arising from the search, was combined with traditional explanations for socio-spatial distributions and original reasoning to offer a new, enhanced model of the neighbourhood visible on the ground. In particular, theories concerning social interaction and social group formation in relation to the built environment were incorporated into the new neighbourhood

model, thereby reconciling social theory and social distributions to the physical environment, enabling their practical identification. This new model was presented as a geographical neighbourhood theory.

The research problem originally identified was that there was no accepted definition of the neighbourhood supported by theory. In academia neighbourhoods were invariably aggregations of census data reporting units with no supporting theoretical basis or customised spatial units reliant upon either socio-economic homogeneity or research-specific criteria for theoretical substantiation. Outside of academia neighbourhoods were a hotchpotch of definitions which ranged from regarding neighbourhoods as simply sub-divisions of an urban area for any purpose to any territory adjacent to another, in the common understanding of something neighbouring another. Within geography itself, the inability to determine affective neighbourhoods supported by theory, proved an insurmountable hurdle when combined with the leading theoretical approaches suggesting that neighbourhoods were task-specific and that there was an unbridgeable gap between environmental and social distributions. Nevertheless, the demand for a rational division of urban space into small units was met by the provision of surrogate neighbourhoods, utilising administrative or census geography. Added to these issues was the problem of timely and accurate fine-scale data.

These theoretical and practical difficulties of defining and delineating neighbourhoods undermined the reliability of effective analysis and the trustworthiness of measures taken to tackle the grave social problems, epitomised by the 2011 riots, and the declared urgent need to rebuild democracy and society.

This research presents housing areas as the building blocks of neighbourhoods though it is fully recognised that this is an immature neighbourhood model needing greater field verification. The theoretical justification for housing area neighbourhoods rests, as yet, on a light body of work and theory. This research, for example, has been a one-off case study whose results require verification from a broader body of research. Likewise, the rationale of the housing area neighbourhood requires more evidence and experience as, for example, in determining social interaction barriers and identifying the creators of social networks. Similarly, evidence from ethnographical and phenomenological research needs to be developed and incorporated into this neighbourhood model.

Better data, conceptual refinement, improved analytical techniques and theoretical developments - especially with regard to affective neighbourhoods - will inevitably modify and shape the housing area neighbourhood though its current status provides an invaluable tool for all neighbourhood investigators, consumers and suppliers of goods and services. However, understandable and coherent geographical neighbourhoods, consistent with and supported by theory, are certainly practicable as this research has

shown and, with the application of the considerable resources of large-scale data providers, eminently practical in the near future.

Within geography itself the neighbourhood model of this research presents a valuable context wherein the gaps between theory and practice, physical and human elements, quantitative and qualitative analytical techniques and between positivism and other epistemologies are brought closer by a greater comprehension of their respective and integrated roles in the neighbourhood.

In the context of the broader urban landscape the definition of the neighbourhood prompts a reassessment of the urban hierarchy and the definitions of the component spatial layers as identified by various researchers, such as Suttles (1972), Galster (2001), Kearns and Parkinson (2001) and Webster (2003). Social distributions and dynamics appear to be directly related to the scale of place and concepts such as the spatial community and block face are better appreciated by this clear description of the geographical neighbourhood.

In terms of the broader issues of neighbourhood identity the current situation is that neighbourhoods are either undefined, but with a loose understanding that they are, in fact, small communities (Harris, Sleight, & Webber, 2005, p. 209) or they are geodemographic, or, in rare cases, customised, neighbourhoods of similar consumers or residents. These approaches have the common quality of lacking, or being light on, theoretical substantiation.

There is clearly a need to broaden the definition of the neighbourhood and to substantiate it. The common understanding of a neighbourhood is one which has associated social connotations and which is related to residents' identification with the area. In this regard further evidence is required to establish the relationship between the familiar conception of neighbourhoods in everyday use and the neighbourhood model presented here.

The definition offered in this research would benefit from a broader base of evidence to support it and clearly more investigations are needed to underwrite its validity and widespread applicability. Not only is more evidence required concerning the relationship between the physical and built environments and how they relate to social interaction but also more investigation is needed into what actually constitutes social interaction and how that is meaningful in terms of the neighbourhood and coherence. Is it, for example, sufficient for a level of casual interaction, such as that of conversations and an almost a subliminal absorption of social codes and mores, as postulated by Johnston and Pattie (2011) in explaining local influences on voting patterns, or does the social interaction need to be stronger and more significant with regard to neighbourhood effects and lifelong outcomes? Or do these factors simply have to be different from adjacent areas to be marked out as a separate entity?

This research has introduced a new model of the geographical neighbourhood relating social distributions to the physical and built environment and founded upon traditional theory and views of neighbourhoods and new theoretical explanations for this relationship. This new model presents the housing area as the basic building block of the neighbourhood, placing it in the urban hierarchy between the household and a geographical community. Rooting neighbourhoods in the physical and built environment explains their longevity and geographical stability and, it is speculated, provides the physical vocabulary for residents to identify with their area, as well as presenting the extent and dimensions of the neighbourhood. However, in this regard, neighbourhoods tend to be seen in relation only to patterns of demographic distributions as indicators of social interaction, but it is also possible to examine the qualities of the physical and built environments for evidence of how the neighbourhood is used or what assets it possesses which could signify its status. For example, facilities such as health centres, schools, shopping centres, libraries and health clubs could be viewed as places which draw people together, so encouraging social interaction. This line of investigation relates back to the hierarchy of towns with their spheres of influence though set in an urban environment (Smailes & Hartley, 1961). Associated with these patterns of social interaction is the use that residents make of their neighbourhood. The basis for this view rests upon the concept of the neighbourhood being a place where people live and their daily needs are met (Warren, 1978, cited by Chaskin, 1997; Hunter, 1979; Merrifield, 1993, cited by Martin, 2003; Forrest & Kearns, 2001; Galster, 2001). Using the same local facilities, it is argued, brings people together and provides opportunities for social engagement and there is a view that neighbourhoods are places where people live and their daily needs are met. Local markets and local economies cannot arise without the existence of local societies. At the local scale the institutions of central places and local societies are expected to meet the daily needs of the local community. The theory is that by identifying central places, as a means of measuring locality and local society, so local communities can be recognised (Hillery, 1955; Wilkinson, 1991; Jacob, 2000). This technique of identifying communities was used in the identification of fishing communities in Florida (Jacob, 2000), but, other than persisting as a social theme of the neighbourhood, no practical means of defining neighbourhoods along these lines has evolved, nor is there any evident theoretical support for this approach.

The outstanding questions in the broader picture are all related to residents' perceptions of their neighbourhoods: do the neighbourhoods of this research match the neighbourhood of the individual resident, or aggregations of residents' perceived neighbourhoods, or even some commonality of residents' neighbourhoods? Then there are the associated and corresponding questions related to residents' actual use of their neighbourhoods. Some use of the neighbourhood can be captured by data on shopping habits, travel patterns, patient address data, for example, which could be helpful but no studies were found relating these to neighbourhoods. Whilst this research has made a

case for the likely association between the neighbourhood model of this research and residents' perceptions and use of their neighbourhoods, much more evidence and research is needed to fully address these questions.

In the interim, the presented neighbourhood model offers itself for more research into those factors which bring localised coherence and opportunities for social interaction. For example, geodemographic resident classifications could be made more meaningful and related to the physical geography and built environment by being tailored to capture areal associations, such as nearness to shopping centres, transport links, and schools - all things which create neighbourhood identity - by applying such techniques as those of retail location, 'hot-spotting', and dissemination modelling (Harris, Sleight, & Webber, 2005), to determine shopping and cultural spheres of influence, transport hinterlands, school catchment areas, administrative divisions and the like, aimed specifically at identifying characteristics and qualities of those elements which bring and bind people together, providing a common identity. The important thing here is the spatial association between these physical elements and the social interaction rather than a simple cataloguing of which built elements are where.

In this way geodemographic classification techniques and new data sources can aid the capture of housing areas and natural area neighbourhoods, based on theory presented here in conjunction with classifications of residents and their use of the environment, to produce a practical and meaningful neighbourhood geography.

Through the clear exposition of the supporting theories and its environmental basis, the neighbourhood paradigm presented here directly addresses the urgent demand of government, industry, the third sector, and social scientists and has real potential to be instrumental in delivering significant and beneficial improvements in the urban landscape, service provision and administration, and, especially, in welfare, social justice, democracy and a better quality of life.

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