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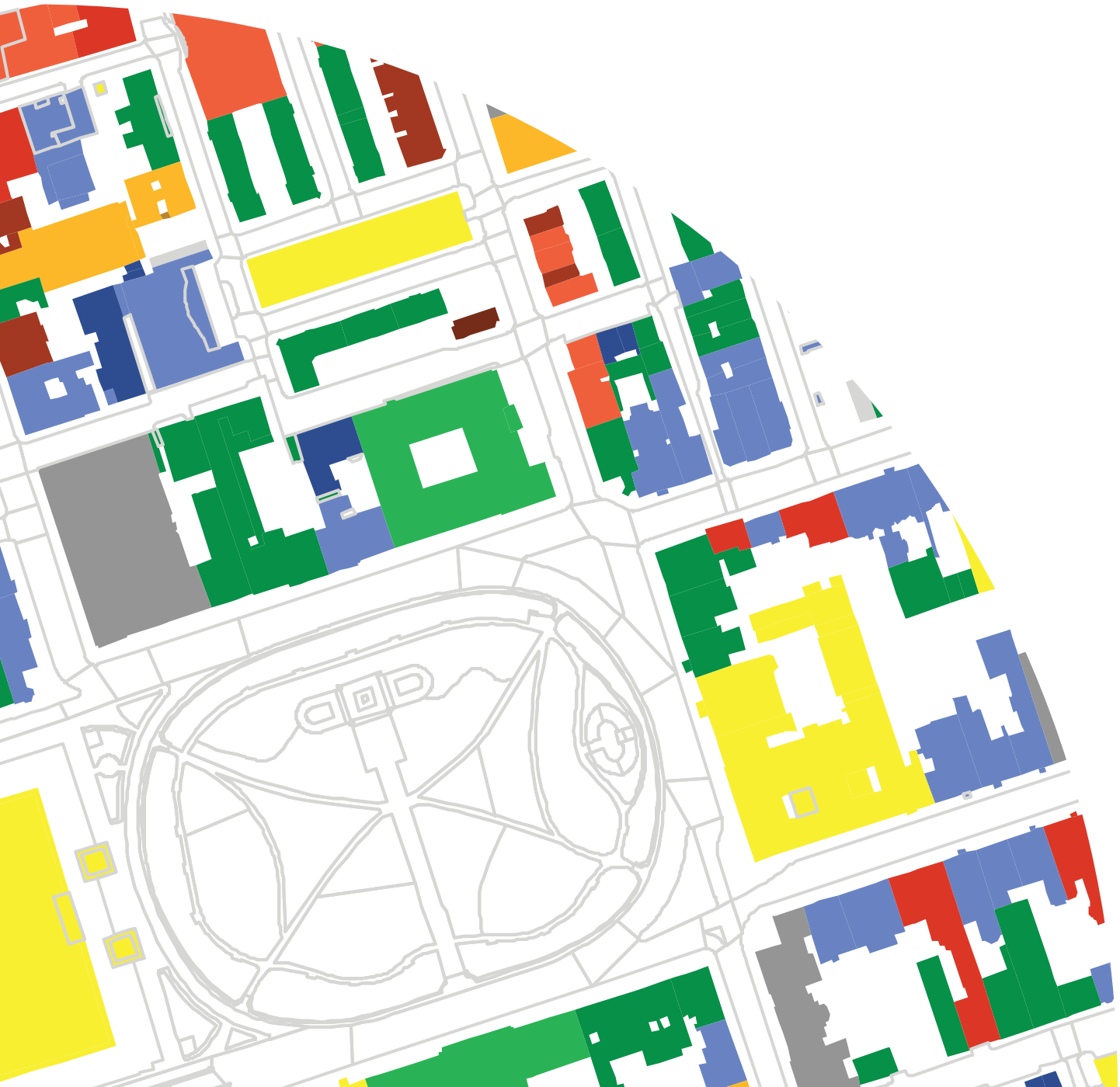
EVOLVING CITIES

Exploring the relations between urban form resilience and the governance of urban form



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Neil Smith

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Cover Image: Mayfair ground floor use map

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Figure 1: John Rocque, excerpt from Map of London, Westminster and Southwark, 1746, showing the newly developed Grosvenor Mayfair Estate in the context of West London (Source: Motco Enterprises Ltd)

1.0

INTRODUCTION: BUILDING RESILIENCE

Cities are continually changing. Sometimes change will involve growth, whereas at other times it will lead to decline. Growth and decline are reflected in the built environment through dynamics of development (including redevelopment and renewal) and decay (including redundancy and ruin). Growth and decline may overlay or become entwined with one another through the processes by which cities overcome their pasts – troubled histories of natural disaster, of political upheavals or economic crisis for example – or enter into cycles of development and renewal. Such forward and backward, progressive and regressive, new and repeating processes may be rapid or slow, episodic or gradual. They may expose people and places to varying levels of uncertainty. At different times and in different ways, cities develop and put in place mechanisms for managing these processes and their outcomes, and for endeavouring to create favourable conditions for handling future change.

This project, broadly speaking, is an exploration of the interplay between the designed and built qualities of urban form and urban governance over time in creating 'resilience'. Its focus is on neighbourhood-scaled pieces of major cities and urbanised regions which exemplify long-term processes of land management through ownership, planning, investment and development. It examines the role of these processes in informing the patterns and timeframes of infrastructure provision, build-out, adaptation, renewal and redevelopment that characterise how such areas evolve from their inception.

Resilience is a term which was first theorised within ecology but which has received a great deal of attention in Urban Studies, Planning and Urban Design in recent years. It is said to be one of the most important topics within wider contemporary discourses of sustainable development (Brand & Jax, 2007; Folke et al., 2002). Since the start of the project in 2011, urban resilience has been the focus of three international conferences – the 4th International Urban Design Conference (Sydney, 2011), the 3rd Global Forum on Urban Resilience and Adaptation (Bonn, 2012) and the 1st International Conference on Urban Sustainability and Resilience (London, 2012) – as well as numerous other smaller and more localised events. However, arguably, its increasing popularisation has resulted in a loss of meaning, as its original uses, connotations and implications have been increasingly diffused across fields, subject areas and sites of instrumentation (Pickett, Jones, & Kolasa, 1994). It is therefore important to consider carefully what we mean by resilience in the context of this project, given its focus on urban form and long-term urban management.

Our interest in 'resilience' emerges from the desire to understand the conditions of both urban form and its management over time that enable localities to persist in attracting and generating use and value and/or to adapt in order to remain viable and productive. In response, our aim is to employ this concept both in exploring and evaluating a number of case studies and to take it forward in theoretical and practical terms. The project involves two principal lines of investigation. First, it seeks to develop a way of conceptualising and evaluating the resilience of urban form, drawing on resilience and related literatures from urban studies and urban design. We argue that the resilience of urban form cannot be apprehended by comparing physical characteristics of built environments alone. It is necessary to devise a broader set of measures that enable the changing social life, economic value, and environmental performance of urban form to be taken into account. Our measures are applied to eight case study neighbourhoods, each of which reflects both inherited and ongoing forms of urban planning, design, building and investment. The case studies encompass a rich array of urban forms – from the terraced urban form of Mayfair to the courtyard blocks of Berlin, and from the tall towers of Hong King to low-rise 'planned communities' of Orange County.

Second, it examines how the varying kinds and degrees of resilience found to typify these examples can be seen to have been shaped by actions, decisions and

strategic approaches embedded in urban development and management processes over time. It does so by exploring the role of land ownership, planning and financing, both at the inception of the development of each case study and at the present time of research, and how this has created the urban forms we observe. In conclusion, we endeavour to consider what sorts of alignments of these categories are best placed to create resilient urban form over the long term, and under what broader conditions. We also seek to identify lessons that can be drawn from historical research for the policy and practice contexts of developing resilient urban form and governance for the future

This report begins by introducing the concept of resilience, and discussing its more recent applications to urban planning, design and urban research. In Section 2, 'measures' for resilient urban form are proposed, which establish a framework for evaluating the eight case studies that follow in later sections. Section 2 finishes with a brief outline of how the idea of governance of resilient urban form is approached in the case studies, and with three hypotheses that establish a propositional basis for the research. Section 3 sets out a methodology for selecting and analysing the case studies. Sections 4-11 present the findings from each of the case studies, based on the approach established in the preceding sections. In the concluding Section 12, the outcomes are presented.

The current report represents the outcome of an intense and focussed period of twelve months' research based at LSE Cities. It is, in all senses of the word, a work in progress which we seek to take forward over the coming two years.

1.1 Ecological Resilience

The concept of resilience began to acquire prominence in the field of ecology in the 1970s. It was first theorised by ecologist C.S Holling in a 1973 paper entitled 'Resilience and stability of ecological systems'. Its emergence reflected a growing emphasis within ecology on the influence of change or 'disturbance' on ecosystems, and on the growing need for new conceptual tools for understanding their complex capacities to handle it. Holling defines resilience as the 'persistence' of 'relationships within a system and [as] a measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters, and still persist' (1973, p. 17). Building on this definition, ecological studies of resilience became concerned with understanding the relationships that enable natural systems to re-stabilise following change, and with conceiving stability in this context as a contingent reality and a process. The resulting resilience literature, according to Holling more than twenty years after his foundational work, produced two models of and measures of resilience. The first, defined as 'engineering resilience',focusses on the idea of 'resistance to disturbance' [,] where speed of return to the equilibrium is used to measure the property' (Holling, 1996). The second, defined as 'ecological resilience', focusses on 'the magnitude of disturbance that can be absorbed before the system changes its structure by changing the variables and processes that control behavior' (Holling, 1996). Since the mid-1990s, the adaptive processes implied in the second definition have been considered the most applicable to the contemporary study of 'urban ecology' (see for example, Wu and Wu, 2012) and to urban design, and are often discussed in the associated literature.

The city has long been understood and represented in ecological terms. Ecological concepts have been used as metaphors for urban realities, applied to urban research, and used to inform approaches to planning and design (Pickett, et. al, 2012). According to Cadenasso and Pickett, urban ecology as a distinct field of study unfolded in three major waves, beginning with the work of Robert Park and Ernest Burgess of the Chicago School in the 1920's on understanding the socio-spatial structure of rapidly urbanising modern Chicago (2012, 30-38). These three waves are characterised by critical engagement with urban ecology as an idea and reflect transforming conceptions of its potentials and difficulties in theoretical and applied realms. In the second, mid-twentieth century wave, urban ecology is said to have been dominated by a focus on systems rationalities and notions of functionality and efficiency. Jane Jacobs' work is highlighted as a counterpoint to this, through its emphasis on spatial and temporal diversity and the fine-grained specificity of urban life. Jacobs (1972 [1961]) highlights the interdependence between social, built, biological and physical components of the city in her understanding of urban ecology, arguing that 'a city ecosystem is composed of physical-economic-ethical processes active at a given time within a city and its close dependencies'. It is through developments of this kind of thinking that important strands of research within the third and current wave of urban ecology are said to be characterised. Indicative of this, Folke et al (2002) emphasise the need to understand urban landscapes as 'socioecological systems' characterised by the interplay of biophysical, social, cultural, political and economic processes. However, less structural and systems-logic approaches and interests are also said to characterise this wave, and it is these that we are most interested in for this study. This does not involve doing away with the word 'system', but downplaying some of the 'rational' connotations which this term has acquired. The historical application of notions of resilience to

contexts of uncertainty and unpredictability helps to underscore the value of such alternative, less systematic approaches to understanding 'urban ecology'. At the same time, there is clearly a need to continue to consider how productive ecological metaphors are, by endeavouring to bring newer definitions of resilience back to the 'original' meanings of this term in ecological studies and science (Adger, 2000).

1.2 Urban Resilience

Urban resilience embraces a wide range of ways in which cities absorb and then adapt to change. Change unfolds over radically different time spans - from one moment to the next, to over a lifetime to over centuries and millennia. Studies on urban resilience tend to be divided between those which focus on drastic change in the form of sudden shocks - such as earthquakes, hurricanes, or terrorist attacks (Coaffee, 2009; Pelling, 2003; Savitch, 2008) - and those which explore slower processes of transformation in economic, social, and environmental fields (Müller, 2010). Authors concentrating on how cities recover from traumatic events (Vale and Campanella, 2005; Prasad et al., 2009; Clark, Evans, & Nemecek, 2010) typically seek to identify the properties of urban systems which show least 'vulnerability'. Their aim is often to use this research to highlight lessons on how cities can survive future shocks and plan within contexts of present uncertainty. Authors concentrating on more gradual transformations consider properties that enable cities to maintain or (re)gain stability over the long term (for example, Müller, 2010). Their aim, in contrast, tends to be to identify how cities manage the relation between change and stability as a dynamic process.

Change can create impacts across a variety of spatial scales and social organisations. It can affect neighbourhoods, cities, regions and/ or the world (Müller, 2010). Whilst the impacts of change can be concentrated at a particular scale, they often extend over a number of scales because of the existence of complex relationships and interpenetrations between them. Müller (2010, p. 5) argues that the 'extremely complex and open character of urban and regional social, economic, cultural, and political systems' can make it difficult to pin point qualities of resilience that pertain to different scales. It is important to develop robust methodologies for analysing the forms of resilience that relate to different scales and those that run across scales.

It is widely recognised that urban resilience unfolds in the context of complex and dynamic webs of interaction. For Pickett et al, these interactions may be classified under the principle headings of 'landscapes' of 'process', 'choice' and 'outcome' (2012, p. 16-17). In contrast, the research organisation Resilience Alliance

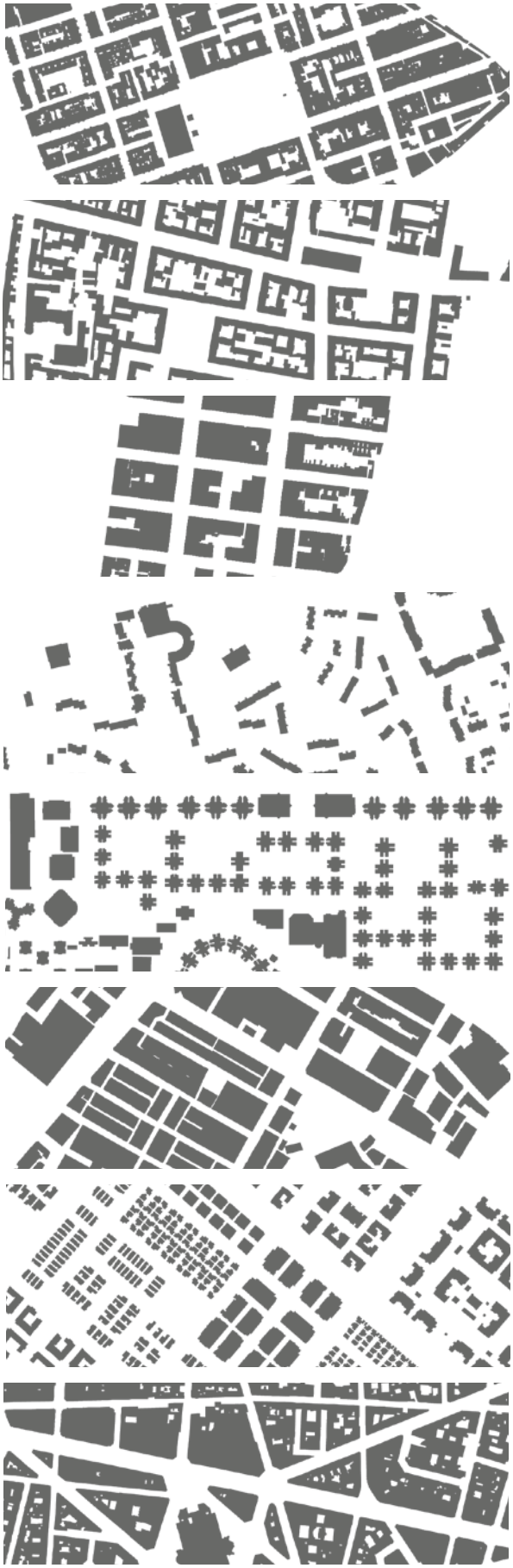


Figure 2: Figure ground drawings highlighting contrasting urban forms. From top: London, Mayfair; Berlin; Chamisso; New York, Hudson Square; Reston, Lake Anne; Hong Kong, Taikoo Shing; Singapore, Chinatown; Irvine, Woodbury; Paris, Opéra

emphasises the importance of the following four aspects of the life and functioning of cities (2007, p. 10):

- **Metabolic flows:** the production, supply and consumption chains that cities need to sustain urban functions, human well-being and quality of life
- **Governance networks:** institutions which show abilities to learn, adapt and reorganise in response to urban challenges
- **Social dynamics:** demographics, human capital and inequity of citizens, communities, and consumers
- **Built environment:** the physical patterns of urban form and their spatial relations and interconnections

It is clear that urban resilience may be defined as a property of the relationships between the spatial, physical, social and cultural, environmental and economic aspects of the city, in the varied ways in which these are classified and described. It denotes, further, the abilities inscribed within these relationships to learn, adapt and stabilise the city more broadly in response to change. Notwithstanding, it has become possible to speak of 'economic resilience', 'social resilience' or 'environmental resilience' as relatively discreet categories, which allow for focussed explorations of the persistence, durability and adaptability of certain aspects of the city which may or may not be a reflection of the city as a whole.

In the fields of planning and urban design, 'resilience' is, not surprisingly, often explored primarily in terms of physical, spatial and material aspects of urban landscapes, environments and forms. Because urban design and planning, unlike urban studies, is actively engaged in constructing and projecting futures, emphasis tends to be placed on preparing for risk scenarios rather than a close focus on the contexts of historical and present change. Resilience in these fields is seen to reside in areas such as: a) the in-built capacities and flexibilities of infrastructure, buildings and urban fabric; b) technological strategies for reducing energy consumption/ increasing efficiency; and c) spatial strategies for addressing the potential and/or projected impacts of climate change, natural disasters or security challenges (see Coaffee, 2009). The primary question addressed within this literature is how existing cities and cities in the making become able to adapt to environmental disturbances related to climate change and to the prospect of peak oil (P. Newman, Beatley & Boyer, 2009). Using the concept of 'resilience' in a normative way, resilient cities are defined as those that are able to reduce their environmental impact and/ or in which security and risk management features are embedded in the urban fabric. The resilient city has thus come to be viewed as 'secure', 'green' (Coaffee, 2009) and 'compact' (Bansal, Mukherjee & Gairola, 2012; ResilientCity.org, 2012) – definitions which risk losing sight of the process-based understandings of ecological resilience which was so important in the early literature on resilient cities. In addition, they can risk losing sight of the original understanding of resilience as a property of living beings rather than 'dead' material. There is clearly a need for conceptual work on resilience in the fields of urban planning and design, which emphasises the place of the physical in broader social processes, and in this context the ability of urban form to be active and 'acting'.

With these issues in mind, this study seeks to develop an historical approach to the study of urban resilience. It does so by exploring first the potential to speak of a resilient urban form, and second the role of governance networks in shaping how designs and built fabric become amenable and/or adaptable to changes which unfold and affect them over time. These changes may have been quite complex and diverse, composed of a mixture of dramatic and humdrum events, and have been more or less anticipated. It does not, in these terms, set out to specify a type or duration of change, but rather a period of time over which to conduct research.

We begin the study by developing a framework for evaluating and assessing resilience in urban form – and in this, seeking to hold fast to notions of resilience as the property of living processes. We will go on, as highlighted above, to apply this method to the study of eight historic urban developments. These case studies reveal not only different types of urban form, but also different strategies for dealing with change through the managed development of these types over time. Such an historical empirical approach is innovative and is intended not only to contribute critically to the growing resilience literature, but to provide lessons for the future practice of building and managing resilient cities.

1.3 Research Questions

The following questions are key to this research:

- How can we define and assess the resilience of urban form?
- How resilient are different kinds of urban forms set within varying national, regional and urban contexts?
- What forms of governance appear to best serve to create resilient urban form – in both general and more context-specific terms?

2.0

MEASURES OF RESILIENCE

Pursuing our research questions, this second section of the report sets out to provide a framework for defining and evaluating resilient urban form and the governance frameworks that inform development over time. It aims to establish a basis for claiming that whilst some urban forms are 'inherently' more resilient to change over the long term than others, certain characteristics or alignments of land ownership, planning, and financing can serve to powerfully promote or constrain resilience. This claim is based on an understanding of urban form as an assemblage of components which may reflect organisational principles that date from the earliest stages of development, yet are continually being shaped. This understanding raises methodological challenges as it requires us to navigate between the stability and changeability of urban form over time, and to reflect on what this means for the resilience of different aspects.

2.1 Resilient Urban Form

The resilience of urban form has not received a great deal of attention to date, though this is beginning to change (see for example, Shane 2012). Across the relatively small literature that considers this topic, resilient urban form is generally defined in both static and normative terms as dense, inclusive of a diversity of building types, founded on co-ordinated and robust movement infrastructure and accommodating of multipurpose or 'flexible' open spaces (Bramley, Dempsey, Power, & Brown, 2006; Jenks, Burton, & Williams, 1996; Williams, Burton, & Jenks, 2000). These, variously, are seen as properties which create conditions for withstanding change, usually defined in terms of climate and environmental change. In this context, it is usually argued that by far the greatest contributor to urban form resilience is density. This, it is argued, is because the lower levels of 'energy usage and greenhouse gas emissions following a lesser demand for polluting modes of travel, [the] reduced pressure on greenfield sites and greater use of more efficient technologies' associated with dense urban form (Jones & MacDonald, 2004, p. 4), create abilities to hold back if not withstand the anticipated impacts of climate change on urban and natural environments worldwide. In addition, increased residential density is usually associated with increased accessibilities to public transport options, amenities, services and employment, which can contribute in various ways to economic, social and environmental forms of resilience.

The tendency to reduce definitions of resilient urban form to measures of density relates to the strong conceptual relationship between the established compact city paradigm of sustainable development and understandings of urban resilience in planning and urban design. A few authors have sought to challenge this tendency. For example, Burton (2000) argues that concealed behind the environmental sustainability credentials of dense urban form are potential costs, including the compression of private and public space and the inflation of property values. Dempsey et al. point out that whilst density may appear to 'provide an objective, spatially-based, measure of the number of people living in a given area, it is also assessed subjectively; it is a social interpretation dependent on individual characteristics' (2010, p. 23). Jones and Mac Donald (2004) argue that if change is considered in more diverse terms than climate and environment – encompassing, for example, social, political and economic change – then a number of other aspects of urban form, including building type, street layout, the configuration of open spaces, land use distribution and transport infrastructure may become as important for creating resilience to change. This project builds strongly on this latter argument in particular, and seeks in response to explore the shaping over time of a number of aspects of urban form. It argues further that this resilience can only be apprehended by considering urban form as something which both reflects and locates social, environmental and economic processes.

With these arguments in mind, we frame the challenge of exploring the resilience of urban form by establishing four key 'measures', which in summary are as follows:

- **Physical:** a) population and built form density over time; b) adaptabilities of street layouts and building types
- **Environmental:** a) public transport accessibility; b) green space accessibility and open land preservation.
- **Social:** degrees of land use and tenure diversity.
- **Economic:** property values in a wider urban context.

These measures are by no means intended to create a full or complete representation of the reality of places. However, we argue that they are important because they are resources which have the capacity to inform how change impacts on places over time. The measures are, of course, highly interlinked and reinforce each other. Before going into them in depth, it is important to clarify that whereas the emphasis of some of the more environmental sustainability-focussed studies has been on interpreting resilience in terms of energy performance and carbon costs, this research places less emphasis on this area in order to emphasise more strongly the social and economic aspects.

We see the intensities and diversities of population, forms of mobility, land (re)usage on the one hand, and the performance of property relative to other places on the other, as primary indicators of resilience in terms of urban form. Such a focus brings us close to studies which emphasise urban 'vitality' (as the discussion below suggests). These indicators or measures, as the case studies reveal, may come into conflict with one another, and when they do, the role of management and governance in influencing the unfolding (rather than fixed) resilience of urban form becomes apparent.

The measures are grouped into four broad categories - physical, social, environmental and economic – under which there are a series of subheadings. Whilst the first three denote explicit aspects of urban form, the fourth does not so clearly – though economic performance may, of course, depend on and reflect urban form.

2.1.1 Physical Measure

The physical measure of urban form is defined in three ways. First, in acknowledgment of the weight given to density in urban resilience literature, it is defined according to two measures of density:

- Density of population: a measure of the intensity of residential occupancy and efficient use/ management of urban land as a resource.
- Density of built form: a measure of the intensity of development in relation to available ground level open space.

Second, in recognition of the importance of adaptability in resilience studies more broadly, it is defined in terms of the capacities that street layout and building type have shown for adaptive reuse over time.

a. Density levels

While density in a general sense has come to be associated with resilience, there remains a lack of evidence as to its genuine contribution to the durability and adaptability of urban form in the context of change over time. Density is a complex concept with a variety of definitions depending on whether it is measured in terms of people, uses, residential units, habitable rooms or floor area ratios. However it is measured, there is no single number to define the optimum density of an urban place needed to create urban resilience.

Jane Jacobs (1972 [1961], p. 261-289) argues that population density, measured in terms of dwelling units/acre, may be viewed as a measure of urban vitality. Higher residential densities stimulate the co-location of diverse other uses in the same vicinity, even though these may also reflect wider locational forces. This argument resonates with more recent contentions that concentrations of people are key for sustaining the vitality of urban places and providing the social capital and resources that create resilience at the level of 'communities' (see for example Montgomery, 1998, p. 103). It also resonates with a long-standing emphasis on the importance of diversity in natural and urban ecological systems for resilience.

Jacobs argues that the ideal density for creating diversity is between 125-200 dwelling units/ acre (approx. 300-500 units/ hectare). According to her findings, densities below this are at risk of producing 'grey' areas. Densities much above this reflect, for her, urban planning approaches that strive to achieve maximum efficiency but often produce urban forms that lend themselves poorly to diversity. Whilst we take forward Jacobs' broad assumptions about the relation between diversity and density, our analysis focuses on density in terms of population/ hectare rather than dwelling units. This is considered a more valid measure of the density of people in a given urban area, because dwellings may be of different sizes and may be occupied at different levels of intensity over time.

We do not seek at this stage to define an optimal density as a resilience 'test', but rather use our measure to explore in each of the case studies the relationships between density, mixed-use diversity, social amenities and the uses of the public realm. More work needs to be done on reviewing the density literature in order to understand how our preliminary findings match up

to the findings of past density studies and the policy implications these may have had.

There may be various ways of accommodating given numbers of people within an area, and it has long been recognised that these may have implications for the viability of the public realm, for quality of life measures and for the long-term adaptability of urban form. With this in mind, we also seek to explore the role of land cover in creating resilience. Jacobs argues that in order for a combination of density, diversity and spatial generosity to be achieved, high levels of land cover are needed. Low population densities, combined with low levels of land cover, risk compromising not only functional diversity but also social diversity, as is apparent in many suburban developments. However, she cautions that high levels of land cover carry consequences for the capacity to create a public realm which she regards as key to the vitality of urban areas (1972 [1961], p. 283 - 289). She argues that high levels of ground coverage 'can become intolerable, particularly as they approach 70 per cent' (p. 283). A number of more recent studies have shown the effectiveness of moderately high land coverage, combined with low rise building typologies such as terraced housing, at creating a 'human scaled' fine-grained high density built form and public realm (see, for example, Llewelyn-Davies, 2000). Montgomery promotes built form which averages five to six storeys (including some higher and lower buildings), set within a framework of differently scaled open spaces (1998, p. 104). Seeking to capture (for the purposes of this study) key aspects of the morphological relations between land areas and habitable built form and between buildings and open spaces, we measure both Floor Area Ratios (FAR) and land coverage.

Our working understanding of the contribution of density to the resilience of urban form is as follows. Resilient urban form is:

- **Able to sustain residential populations of sufficient density to make adequate use of available infrastructure and space and to help support a diversity of other collocated uses.**
- **Able to provide levels of land cover that realise density without inhibiting the economic, social and cultural potentialities of the public realm.**

b. Adaptabilities of street layout and building types

Through this measure, we focus most explicitly on the role of urban design and architecture in creating resilience, recognising that urban patterns, spatial arrangements and structural solutions have properties which can hinder or constrain adaptability. Dempsey et al (2010, p. 25) argue, for example, that, 'the configuration of the street network, in terms of its urban block sizes, their overall location within the city, pedestrian and vehicular connectivity can affect the functioning of a city by, for example, influencing the location and intensity of activities' . Montgomery (1998, p. 106) in turn argues that 'places which continue to succeed despite changes in economic conditions, technology and culture do so because their built form is itself mixed and/or highly adaptable'.

The adaptability of buildings is important for resilience for several key reasons. First, buildings have the capacity to outlive the economic viability of uses and thus are at risk of becoming obsolete. Second, as the economic viability of different uses sometimes follows cyclical patterns, there is a rationale for designing for convertibility between uses. Third, as Wilkinson, Reed, & Reed (2009, p. 47) argue, adaptability allows the 'social and cultural capital embodied in buildings' to be retained to create value over time.

We look at adaptability by focussing on street patterns and building forms which have lasted from the time when they were first designed and developed, as opposed to those which have become subject to redevelopment. In doing so, we seek to recognise from the outset that adaptability is not a designed quality that necessarily translates into reality. Buildings are often redeveloped as a result of political, perceptual, cultural and economic forces, and not because they have become genuinely obsolete or redundant. Some urban forms and buildings may decline and decay for quite some time, but be later rediscovered in the context of evolving and emerging cultural predispositions to different styles of urban life. Some may be protected although unused, which raises questions of the relations between heritage value and resilience. Others might present viable use opportunities, but these may not be able to provide the financial resources needed to maintain them. Ruin can result in contexts of use, not only of disuse and abandonment.

We also recognise the need to define adaptability with care, given the capacity of this term to denote flexibly used spaces and retrofits, as well as significantly altered and extended structures. If at one end of the adaptability spectrum lie multipurpose interiors and temporary structures, at the other are the recycled remnants of ancient monuments in states of partial reconstruction. It is sometimes argued that the most adaptable buildings are those that have the flexibility to accommodate minor space planning modifications - convertibility allowing for changes of use and expandability facilitating subtle additions and extensions to the original footprint of a building (Moffatt & Russell, 2001). Whilst the conversion of old warehouse

and light industrial buildings to loft-living are most often used as examples of adaptability, Montgomery (1998, p. 106) suggests that there are many examples of residential buildings being converted into offices and commercial spaces. Mansion blocks or town houses, for example, 'are not only adaptable in the types of activity they can accommodate, but also the levels of intensity of activity'. Whilst understanding that the dynamics of adaptability create challenges for analysis, we seek to use a combination of spatial and contextual governance research to uncover the particular spatial conditions that over time appear to enable some forms to survive whether in complete, partial and/or extended form.

These conditions may include the street and pavement dimensions, structural assemblages and the dimensional constraints created by built layouts, sections and elevations. As with density, there is no particular arithmetic governing how relations between building height and street width contribute to resilience. Wider streets may be more adaptable because they allow for the integration of different transport needs, such as bus or bike lanes. Similarly, wider pavements may be more adaptable because they promote walkability and create the opportunity for multiple uses, such as street markets or side-walk cafes, which enhance urban vibrancy

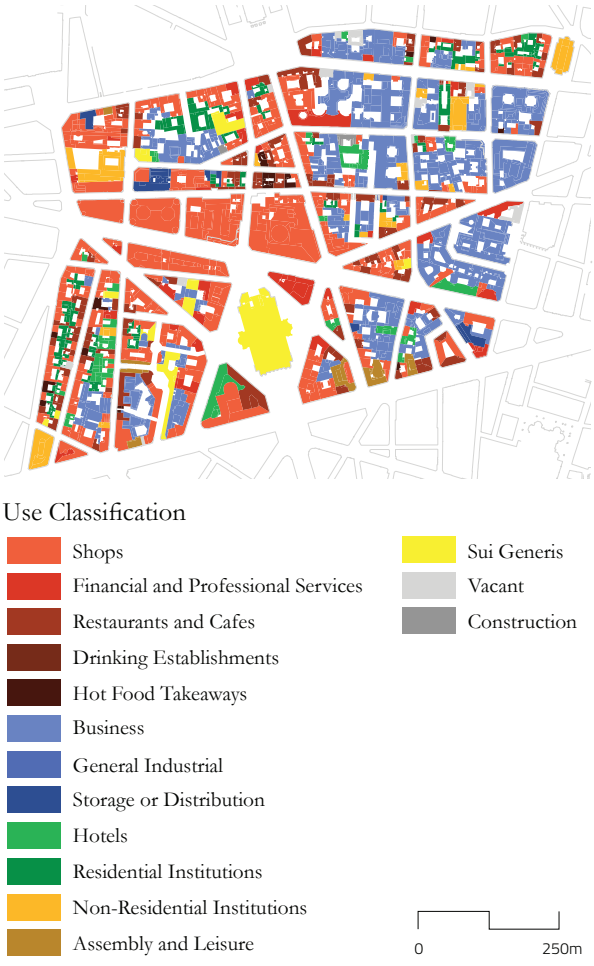


Figure 3: Paris, Opéra, ground floor land use map

and contribute in diverse ways to sociability and local economic prosperity (Bryant & Allen, 2011).

Our working understanding of the contribution of physical adaptability to the resilience of urban form is as follows. Resilient urban form is:

- **Able to integrate different transport options/ needs within its streetscapes and create opportunities for a variety of street-based activities.**
- **Able to be used differently, to be converted, adjusted, extended or retrofitted in ways that continue to facilitate and enhance use in economically sustainable ways.**

2.1.2 Environmental Measure

The environmental measure of urban form resilience is defined according to two separate indicators:

- Public transport accessibility: a measure of environmental sustainability benefits associated with public transport and of scope for integration and connectivity.
- Green space area and accessibility, and open land preservation: a measure of the scope for protecting biodiversity as well as for securing long term public assets (natural, cultural, social, economic).

a. Public transport accessibility

Transport infrastructure helps to determine the ease with which buildings, spaces and places can be reached. Enhancing public transport accessibility has been viewed as an important strategy for reducing energy consumption and pollution (Breheny, 1995). Petroleum consumption in cities has long been known to have a strong relationship to density. In Peter Newman and Jeff Kenworthy's ground-breaking 1989 study, an inverse correlation between urban density and petroleum consumption was identified. High density cities are generally those with low car usage and at least the potential for being walkable and for incorporating public transport options.

In this study, we look at levels of accessibility in each case in terms of transport infrastructure. 'Accessibility' is a multi-layered concept and is not simply equivalent to distance. Accessibility includes the ease with which distant services and facilities may be located, as well as the degree to which these are proximate. Accessibility is thus dependent on a number of factors, including how well connected different parts of a city and/or region are via the transportation network, and how individuals use the transport system (Liu & Zhu, 2004). In this study, accessibility is assessed by mapping the number and variety of public transport options in each case

(including how easy these are to reach) and by noting the relative levels of connectivity to other places within their 'host' cities and beyond.

Our working understanding of the contribution of public transport accessibility to the resilience of urban form is as follows. Resilient urban form is:

- **Permeable and accessible from near and far places.**

b. Green space accessibility and preservation
Green spaces 'have important amenity values that include provision of leisure opportunities and aesthetic enjoyment' (Kong, Yin, & Nakagoshi, 2007, p. 240). They accommodate numerous human recreational activities which evolve over time. However, they also often provide habitats for native flora and fauna and thus represent one strategy for preserving urban biodiversity. Greening is considered an important strategy for adapting to temperature increases, floods, and droughts. Green spaces can, at sufficient scale, also help to reduce temperature rises associated with hard, thermally-absorbent urban materials such as asphalt and concrete. Covering urban surfaces with green space has the effect of reducing the total quantity of thermally-absorbent artificial material, and the shading provided by trees and shrubbery reduces the amount of light, heat and electromagnetic radiation that reaches the ground.

In this study, we measure and compare the proportion of land given over to green space in each of the cases. The role of green space in creating urban form is further considered by focusing on the development of planning strategies for creating green space and conserving rural or wild land. Whilst these strategies have spatial implications, they also usually have financial and management issues which are explored in terms of the governance of the case studies (see below).

Our working understanding of the contributions of green space accessibility and preservation to the resilience of urban form is as follows. Resilient urban form is:

- **Able to incorporate publically accessible green open space for recreation and the promotion of urban biodiversity.**

2.1.3 Social Measure
The social measure of urban form resilience is defined in terms of two different indicators:

- Land use diversity: a measure of the multiplicity of interests in using and being collocated within urban areas, and consequently in generating the social, economic and environmental benefits known to be associated with mixed use development.
- Tenure diversity: a measure of socio-economic heterogeneity.

It is generally assumed that, as with biodiversity in ecological systems, diverse uses as well as ownerships and communities in the urban environment are less vulnerable to change than single or primary use areas.

a. Degree of land use diversity
Evans and Foord (2007) summarise the benefits of land-use mixing using three principle lines of argument. First, they claim that a diversity of uses can promote safety and 'vitality', as intersecting rhythms of activity ensure presence in the public realm throughout the day. Second, proximate urban land uses can help relieve pressure on traffic, promote walking and encourage greater 'use of and opportunity for public transport' options (p. 2). Third, a concentration of varied uses has the potential to promote local economies by creating the opportunity for different kinds of activity to stimulate and catalyse one another, building intensity. These benefits, arguably, can help make neighbourhoods more resistant to economic shocks or socio-political changes which, at certain times, impact on some activities more strongly than others. They can also potentially help reduce the risks, as well as ameliorate the impacts of future anticipated climate-related change through the environmental credentials of walkable city form.

Land-use patterns are dynamic rather than static phenomena. The dynamic evolution of land uses is strongly connected to the adaptability of the urban form. It is also, of course, connected to patterns and structures of urban governance that may impact at different moments and serve to either promote or constrain adaptability.

We consider land-use diversity by mapping ground floor uses at given scales. We endeavour, where possible, to provide a sense of how land-use patterns have shifted over the history of each case. The evolution of land use over time is discussed in terms of the governance of each case, in the manner described below. Given that the ground floor often accommodates the widest range of uses but the lowest proportion of residential use in mixed-use areas, we include a key section for each case which illustrates how uses are distributed vertically. We also provide a map of key amenities such as medical centres, educational, and cultural institutions for each case, which help to emphasise the degree to which different localities not only benefit from the proximities afforded by mixed land-use patterns but are also publically 'resourced'.

Our working understanding of the contribution of land-use diversity to the resilience of urban form is as follows. Resilient urban form is:

- **Able to concentrate diverse land uses, including social and public amenities and resources.**

b. Degree of tenure diversity
Diversity extends to the types of housing within neighbourhoods that accommodate different kinds of people, such as young families or senior citizens, and different levels of affluence. Areas which include a diverse range of housing opportunities tend to reflect more heterogeneous communities. Our study uses a measure of tenure diversity to reflect heterogeneity.

Though different forms of housing often become associated with particular tenures, there is no strictly defined correspondence between the two. Tenure diversity is thus not an implicit property of urban form but rather a reflection of development and management strategies that create unfolding relationships between form and social differentiation.

We map tenure diversity across the cases. In doing so, we consider how tenure mix at the local scale can help to create resilience in a social sense by, as Marcus et al put it (2011, p. 13), generating a variety of 'cultural (ways of thinking) and social (connections with others) capital', which in turn has the potential to create 'a frame for creativity and adaptive capacity'. We primarily consider this adaptive capacity in terms of those who are in a position to develop and manage tenure diversity, rather than those who experience it as an everyday reality of their local environment. As we discuss further below, we consider how tenure diversity results in the possibility for different sectors to be cultivated more or less strongly in response to evolving conditions in the property market, and thus for areas to develop greater overall resilience to economic change through their management. In doing so, we recognise the need to navigate a complex territory of possible interpretations of resilience from the perspectives of the different potential beneficiaries of relative economic stability.

Our working understanding of the contribution of tenure diversity to the resilience of urban form is, in essence, as follows. Resilient urban form is:

- **Able to accommodate diverse tenure types, given the scope this provides for sharing resources and amenities across socio-economic categories.**

2.1.4 Economic
The economic dimension of resilient urban form is considered in terms of property values over time and in comparison to its broader urban context. As with tenure mix, property price does not have a fixed relation to urban form. Property prices are considered within this study as measures of the 'economic resilience' of urban form in the sense that spatial representations of property prices can serve to indicate the evolving utility and desirability of buildings in localities over time. It is recognised, however, that viewing resilience in these terms is not without some dangers, as it can serve to privilege the perspectives of investors and developers concerned with maximising property yields rather than with optimising use and diversity. Property price rises, as Burton (2000) and others argue, can impact negatively on social diversity and can contribute to the destabilisation of historic communities. Property market inflations may be experienced as a shock and carry consequences as profound as an economic crisis for those whose livelihoods are impacted. Our working assumption, then, in dealing with this difficult measure is that localities are more resilient when they are able to reflect a diversity of relatively stable economic values – a situation which requires skilful, ethically motivated governance.

a. Property values over time
Jones and Mac Donald (2004) are right to argue that the relative value of real estate at the local scale can reflect characteristics of urban form. These may include density, land use patterns, public space accessibility and transportation infrastructure, which become factors in the decision-making processes of potential developers and buyers. At the same time real estate markets, as Watkins argues (2001, p. 2250), are 'generated by a complex process of supply-side and demand-side dynamics, which reflect both spatial and structural influences on housing choice and urban form'.

A property market is said to be resilient when it is able 'to sustain itself through downturns in the property cycle' (Jones & MacDonald, 2004, p. 14). In order to measure the resilience of the property market in each case study, we endeavour to track property value change over time through a combination of quantitative and qualitative research methods. Actual values are tracked back twenty years to show how the cases have performed over recent economic cycles.
We also seek to use archival materials, including advertisements and newspapers, to gain insight into changing value in a wider sense, including the individual appeal of different areas and the socio-economic levels they became associated with.

b. Property values in the wider urban context
We are interested in how the property values of the cases compare to other areas within their host cities, recognising that location can play a major role in determining relative property values in cities (see, for example, Bengochea Morancho, 2003; Kong, et al., 2007).

Our working understanding of the contribution of property value to the resilience of urban form is, in essence, as follows. Resilient urban form is:

- **Reflective of property values which show relative stability over time.**

2.2 Governance and Resilient Urban Form
Influencing the resilience of urban form are complex interrelations between different aspects of governance. This project seeks to show that whilst resilience can, to some extent, be defined in terms of urban form – as we have endeavoured to do above – it actually depends on continually unfolding governance relations. Given that resilience is a process, it needs to be understood as 'path-dependent'. The institutional specificities of governance at the time that urban places were created can have a crucial bearing on the long-term resilience of urban form. At the same time, changing kinds and styles of governance can also shape resilience over time. Our focus in developing this argument is on the role of, and relationships between, land owners, planners and planning authority, and the financing of development.

Land Ownership
The principal forms of land ownership are generally understood to be as follows: private property involving single ownership; private property involving communal or 'common' ownership; and state property or a joint venture - such as a lease on the part of the state to a private person or vice versa (Kivell & McKay, 1988). Different forms of ownership are defined by specific sets of rights and duties which become reflected in urban form in terms, for example, of the accessibility of open space or urban grain. How ownership is defined is to a degree place-specific, depending on legal traditions and frameworks which are particular to different countries and contexts. Patterns of land ownership may change over time, and in so doing, may impact on how urban form is managed and at what scale development, redevelopment, accretion or adaptation occur. How land is held therefore clearly influences the resilience of urban form over time. We are interested in considering its role in informing each of the measures defined above, individually and collectively.

Planning
Planning is defined in terms of public authority plans and policies, private owner development plans, and the relationship between them. In considering the first of these, we build on Healey & Williams's (1993, p. 702) identification of three key functions of public planning authorities. First, they have a plan-making function that guides spatial organisation and land use. This includes zoning and development plans. Second, they have a developmental function including, for example, land assembly, infrastructure development, and even construction activity. Third, they have a regulatory function which is expressed through documents and processes such as the Building Regulations. In turn, private owners may have their own ideas for how to plan, implement development and safeguard standards and quality. How public planning authorities interface with private owners depends on the historical planning traditions pertaining to each case study and the ways in which these have evolved in each location.

We seek to explore two key areas in the case studies. First, we consider whether and how the ways in which spatial strategies are implemented at the inception of development can be said to make a difference to their long-term resilience. In other words, what shadows are cast by choices made at one time over the future? Second, we consider how planning serves to promote or constrain resilience building in an on-going sense by impacting on how localities are able to adapt. For this, we look at the unfolding patterns of development and redevelopment that describe the evolution of each case study.

Financing
How development is financed, and what finances are available, are issues which have a clear bearing on the longevity of urban form and on the economic resilience which localities are able to acquire.

Options for securing finances for development – such as loans or investment funds – are usually time-limited and may also carry a number of other conditions and constraints. How developers secure finance impacts on decision-making processes relating to the timescales of development. The need to secure returns for investors or repay loans in given timeframes may inform decisions relating to density, distributions of land uses, and provision of infrastructure, mixed-tenure housing and amenities. It can take a considerable time for investments in infrastructure to be recouped, given the relatively slow pace of urban value creation. This can have a bearing not only on the choice of infrastructure at the outset of development, but also on the resilience of development for many years to come.

We explore these issues by considering the role of financing in infrastructure provision at the inception of each case and, in turn, issues connected to the adaptability of this infrastructure over time. We focus on mobility infrastructure and the public realm – streets and open spaces, and public transport links and lines.

In order to explore the roles of ownership, planning and finance within each of the case studies, we have developed three primary hypotheses which establish a propositional basis for the research. These, we suggest, are of special relevance to the creation and maintenance of resilient urban form – an idea which we seek to test through empirical study.

2.3 Hypotheses:

1. Long-term perspectives are key to the creation of resilient urban form.

Short-term strategies address issues connected with the immediate future, but are often poor at anticipating longer-term change or at considering the potential impacts of present actions and decisions. Long-term perspectives on urban development and its management may be held by land owners who hold land for extensive periods of time, by strong planning authorities with long-term strategies and/or by financiers prepared to invest upfront in urban quality and resilience for the long term.

2. Long-term perspectives are most effective when they manage to integrate a form or style of stewardship that works to secure quality of life for its residents.

Given that we argue that resilience-building is a process, a long-term perspective is not in itself enough to create resilience. Given, further, that resilience represents the safeguard of a number of different sorts of urban value – including economic value but also use value and the complex values of diversity and density – resilience-building requires an ethical orientation. We refer to this orientation in terms of principles of 'stewardship'. Stewardship as a term has been used extensively recently to describe the approaches developed by some long-term land holders in the UK, and is thus a productive theme to explore in conjunction with resilience.

Nelson (2011, p.3) argues that in an urban environment, 'the key feature of stewardship […] is the long-term approach to the development and management of land'. Stewardship represents an approach to the balance of human needs that depend for their satisfaction on the careful development and management of land as a collective resource (Lucy & Mitchell, 1996, p. 597). Stewardship operates by creating a 'limitation' of private interests, implying that controls over urban land are exercised with due regard for the interests of others.

3. Urban-scale planning facilitates the creation of coherent areas of resilient urban form.

Being able to balance different needs through land development and management suggests the need to be able to plan and build at an urban scale.

As opposed to piecemeal development, urban-scale planning facilitates the design of strategic infrastructure such as road networks and transport accessibilities in advance of development. It enables land-use mix to be managed as an unfolding constituent of a neighbourhood. Urban-scale planning over time also allows the balance between economic profitability and the quality of life aspects of urban development to be managed.

In order to explore these hypotheses, we have looked at eight case studies from across the globe and how they have developed over time. The study initially aimed to identify global parallels to the Grosvenor 'estate' model of development. However, it quickly became apparent that the estate model is particular to the United Kingdom's political history and is not easily transferable. As a result, the project focus broadened to encompass a wider variety of case studies, which are all broadly speaking examples of long term development and urban management. Each provides scope for learning about the relationship between institutional and physical adaptability in urban settings.

3.0

METHODOLOGY

The case studies were selected according to the following three criteria in order to help make places, which on the surface are quite different, comparable on the terms established through the analytical framework above.

a. Spatial scale: the case studies are pieces of cities of between 0.5 - 2.5km2 in area. This is both small enough to enable close focus on patterns of use and specificities of urban form, but large enough to denote neighbourhoods, small administrative areas in some cases and urban landholdings in others.

b. Temporal range: all the cases began to be developed more than forty years ago and can thus be evaluated in terms of processes of evolution over at least this period. The oldest cases were developed in the eighteenth century.

c. Land ownership: urban-scale land ownership was important for all the case studies at their inception, though this has not necessarily continued to be case to the present day. Today, the case studies reflect a variety of legacies of their initial land ownership characteristics. This variety has been beneficial for the exploration of our questions and hypotheses, as it has allowed us to compare and contrast different models and their effects

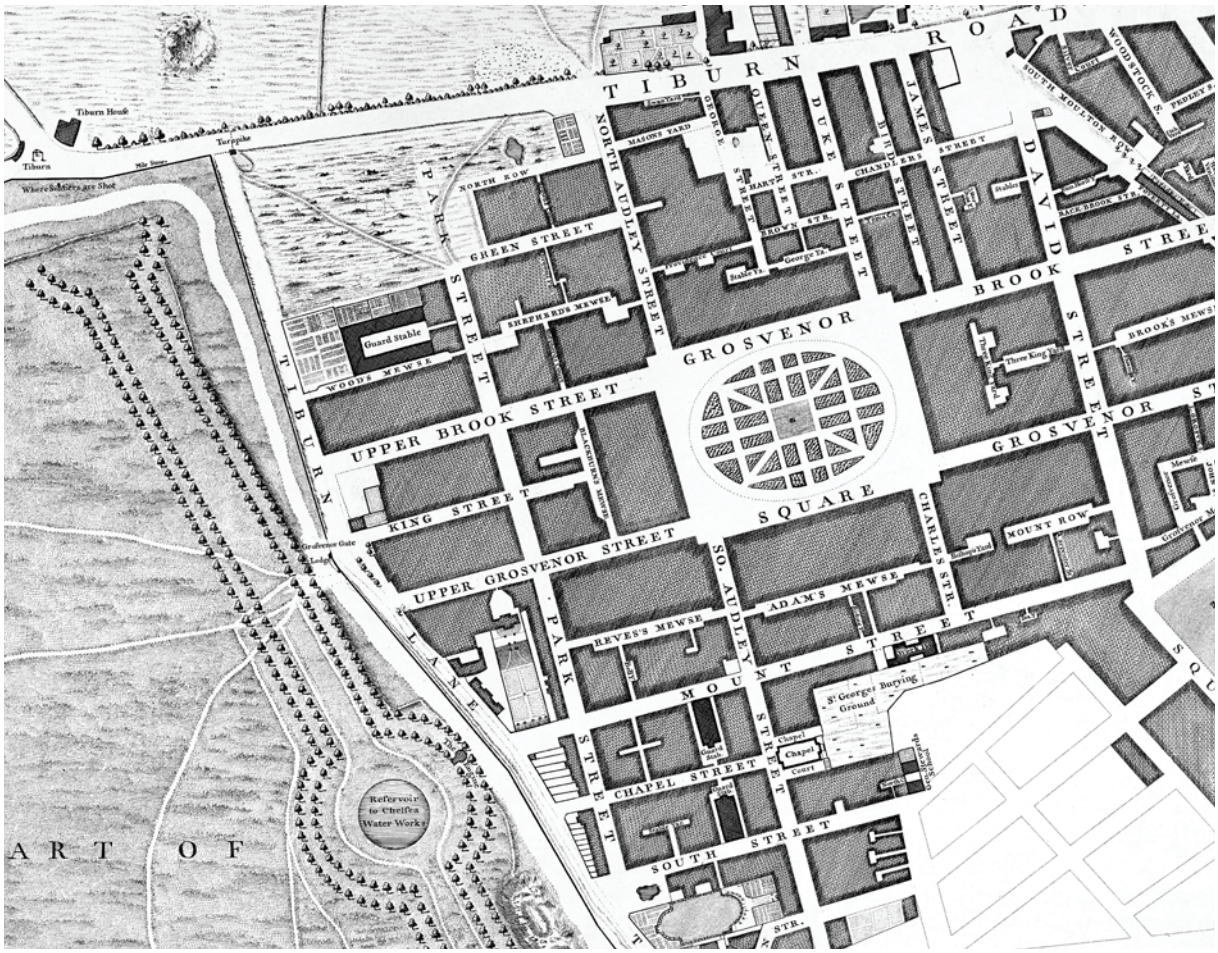
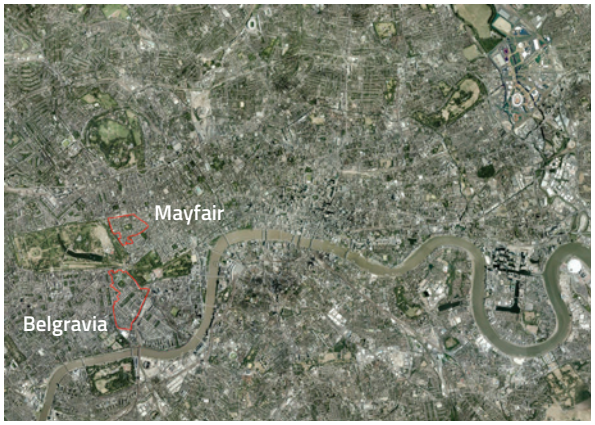
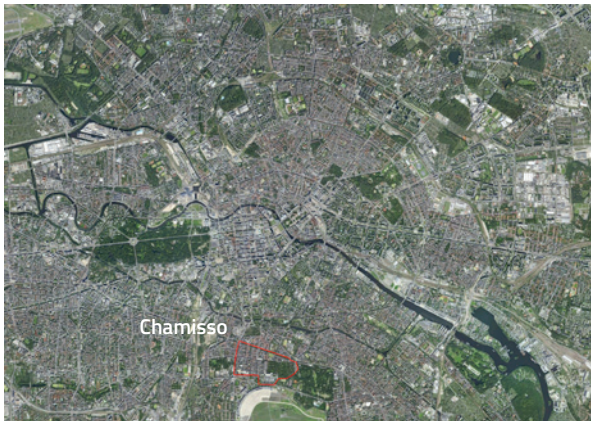


Figure 4: John Rocque, excerpt from Map of London, Westminster and Southwark, 1746, showing the Grosvenor Mayfair Estate, then twenty five years into development (Source: Motco Enterprises Ltd.)



London, Mayfair and Belgravia, Area: 1.18km²

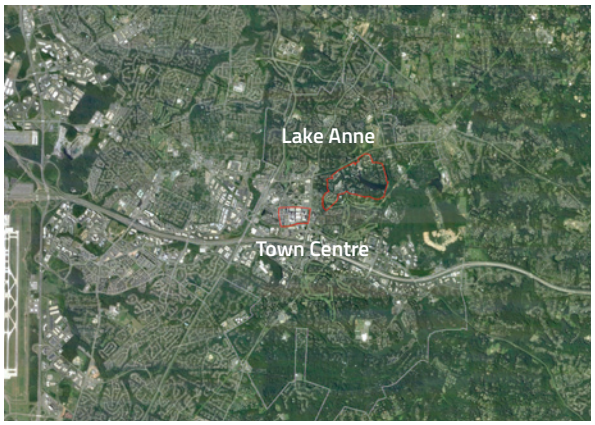


Berlin, Chamisso, Area: 1km²

Paris, Opéra, Area: 1.18km²

New York, Hudson Square, Area: 1km²

Irvine, Woodbury, Area: 2.49km²



Reston, Lake Anne and Town Centre, Area: 1.35km²

Singapore, Chinatown, Area: 0.72km²

Hong Kong, Island East, Area: 0.46km²

Figure 5: Comparative Case Study Areas (Source: Google Earth)

in different contexts. It has further allowed us to expand our research to be able to consider how resilient urban form may be created in the absence of long-term, urban-scale land ownership.

An emphasis on the role of land ownership has resulted in a study which embraces a wide array of urban forms – including those which would perhaps often be discounted as non-resilient at a first glance. As this eclecticism allows us to evaluate the scope for resilience-building in many contexts, it has the advantage of allowing us to step beyond the world of 'normative' resilience definitions and to consider how relations between planners, owners, and financiers might potentially produce very different models of urban form resilience over time.

3.1 Measuring resilient urban form

The four dimensions of resilient urban form and some of the challenges in measuring these have been discussed in detail above. The following table provides an overview of how measuring these dimensions was carried out using a variety of tools, though predominantly using statistical surveys, archival research, and mapping.

3.2 Analysing the governance of resilient urban form

The case studies that follow respect the structure of the conceptual and methodological approach established in the preceding sections. After a short introduction, each case is assessed according to the measures of resilient urban form established above. The aim is not to define the resilience of each case on a numerical scale at this stage, but to explore specificities of, and connections between, the four dimensions. This becomes even more relevant when exploring governance and how the particular relations between land ownership, planning, and financing created and maintain the urban form of each case. The governance of each case is considered in two parts. First is an historical account in which relations of ownership, planning and finance surrounding the development of each case at its inception are discussed. Second is a 'contemporary' account through which we evaluate how each case is governed today, and seek to point to some of the challenges this raises for the future.

Case, City (State)	Spatial and temporal scale	Land ownership	Urban form
Grosvenor Estate, London	Estate built in the eighteenth century	Cohesive ownership since development	Low-rise high-density terraced housing; mixed-use
Chamisso Kiez, Berlin	Neighbourhood built in the late nineteenth century	Fragmented ownership since development	Low-rise high-density tenement blocks; mixed-use
9e arrondissement, Paris	Administrative area redeveloped in the nineteenth century	Fragmented ownership since development	Low-rise high-density apartment blocks; mixed-use
Trinity Estate, New York	Estate first built in the eighteenth century	Cohesive ownership at development inception, becoming gradually more fragmented	High-rise high-density industrial buildings; mixed-use
Woodbury, Irvine (California)	Suburban 'village' planned from the 1950s	Cohesive ownership development inception, becoming gradually more fragmented	Low-rise low-density single-family houses; single use
Reston Village and Town Centre, Reston (Virginia)	Satellite town planned and developed from the 1960s	Cohesive ownership at development inception, becoming gradually more fragmented	Mixed-density residential and office development; mixed-use
Island East, Hong Kong	Neighbourhood redeveloped in the 1970s	Cohesive ownership since development	High-rise high-density residential towers; mixed-use
Chinatown, Singapore	Neighbourhood built in the late nineteenth century	Fragmented ownership since development	Low-rise high density shophouses; mixed-use

Table 1: Case selection criteria

1. Physical	**a. Density**	- Population density per hectare (Maps) - Coverage and floor area ratio (Maps)
	b. Street layout and building types	- Street and building sections (Illustrations) - Building floor plans (Illustrations)
2. Environmental	**a. Public transport accessibility**	- Public transport stations (Maps)
	b. Green space	- Green space coverage (Maps)
3. Social	**a. Land use and social amenities**	- Ground floor use (Maps) - Section use (Illustrations) - Social amenities (Maps)
	b. Tenure	- Housing tenure statistics (Statistics)
4. Economic	**a. Property values over time**	- House prices since 1990 (Statistics) - Historical prices (Archival research)
	b. Property values in urban context	- House price heat maps across the city (Maps)

Table 2: Measuring four dimensions of resilient urban form

4.0

LONDON

Mayfair and Belgravia

Mayfair and Belgravia are the names given to the two areas which describe Grosvenor's London Estate. Located predominantly within inner London's City of Westminster (approximately 5% of Belgravia is located within Kensington and Chelsea), these are moderately dense mixed-use areas totalling 1.18km². Mayfair and Belgravia include some of the UK's most exemplary Georgian and early Victorian architecture. They have also become some of the most expensive parts of London.

Mayfair is an exercise in rational town planning – a grid of wide, straight streets with a large oval-shaped public space at the heart. Into this grid, a variety of building typologies have been inserted over time, ranging both in height and grain. The surviving eighteenth century fabric lining the principal streets is typically Georgian, comprising long stretches of 5-6 storey, flat-fronted terraced town houses with narrow mews to the rear. Later additions include the 1870s remaking of Mount Street to create a series of 4-5 storey, highly modelled buildings which line the street; the 1890s redevelopment of the Duke Street area to create 7-8 storey 'mansion blocks' of socially rented 'model dwellings'; and the twentieth century gradual redevelopment of Grosvenor Square to create 6-8 storey neo-Georgian blocks of flats and modern deep-plan office blocks. Of the two, Belgravia is the more complete area, preserving

Figure 6: Grosvenor Square (Source: Sabina Uffer)

much of the original development from the first half of the nineteenth century. The polygonal form of the Belgravia estate is laid out as a grid of orthogonal streets, beginning at Grosvenor Crescent to the north and connecting Belgrave, Chester and Eaton Squares. The principal streets and squares are lined with 5-6 storey terraced townhouses. 2-3 storey mews run along the backs of these and there are private gardens between the townhouses. The edges of the estate comprise a variety of building and scales, reflecting the evolving value of these areas over time. Grosvenor Place is lined with deep-plan office blocks of approximately 6-8 storeys. The western corners of the estate, including Chester Row and Caroline Terrace, are lined with smaller terraces which preceded the extensive mid-nineteenth century development. Owned by the Grosvenor family since 1677, this 'great estate' is the most intact of the aristocratic land developments which transformed London through the eighteenth and nineteenth centuries. Its history is inextricably intertwined with the dynastic rise of the Grosvenor family and exemplifies important evolving connections between land ownership, political power and urban planning in English society and culture. The London Estate represents a uniquely enduring model of private long-term urban land ownership and asset management.

4.1 Measures of Resilience

a. Physical: density

Almost 50% of Mayfair is covered in buildings and the floor area: land ratio is 2.4:1. This degree of land cover has historically created the basis for intense occupation and a diversity of uses, a high level of inhabited space within a compact footprint and relatively low-rise form (fewer than 10 storeys or 30 metres). Mayfair's population per hectare in 2001 was relatively low at approximately 50 persons (approximately half the average for Westminster at 94.4 per hectare, though equivalent to the London average of 46.7). However, Mayfair's population was much higher in the nineteenth century. The 1841 census reveals that there were 17,064 residents on Grosvenor's Mayfair estate, against a mere 1,600 in 2001. The decline in population over time is due to evolution in the social fabric of the estate, which is itself reflective of the transformation of traditional class distinctions, interdependencies and affiliations within the city. Following the Second World War, population decline was strategically countered by promoting the increase of non-residential uses, including office, retail and hotel. In spite of the reconversion of numerous Georgian town houses back to residential use since the 1990s, the population in 2001 was still almost a third of its 1961 level of 4,354.

Figure 7: The location of the Grosvenor Estate (which once consisted of Mayfair, Belgravia and Pimlico) within Central London (Source: Google Earth)

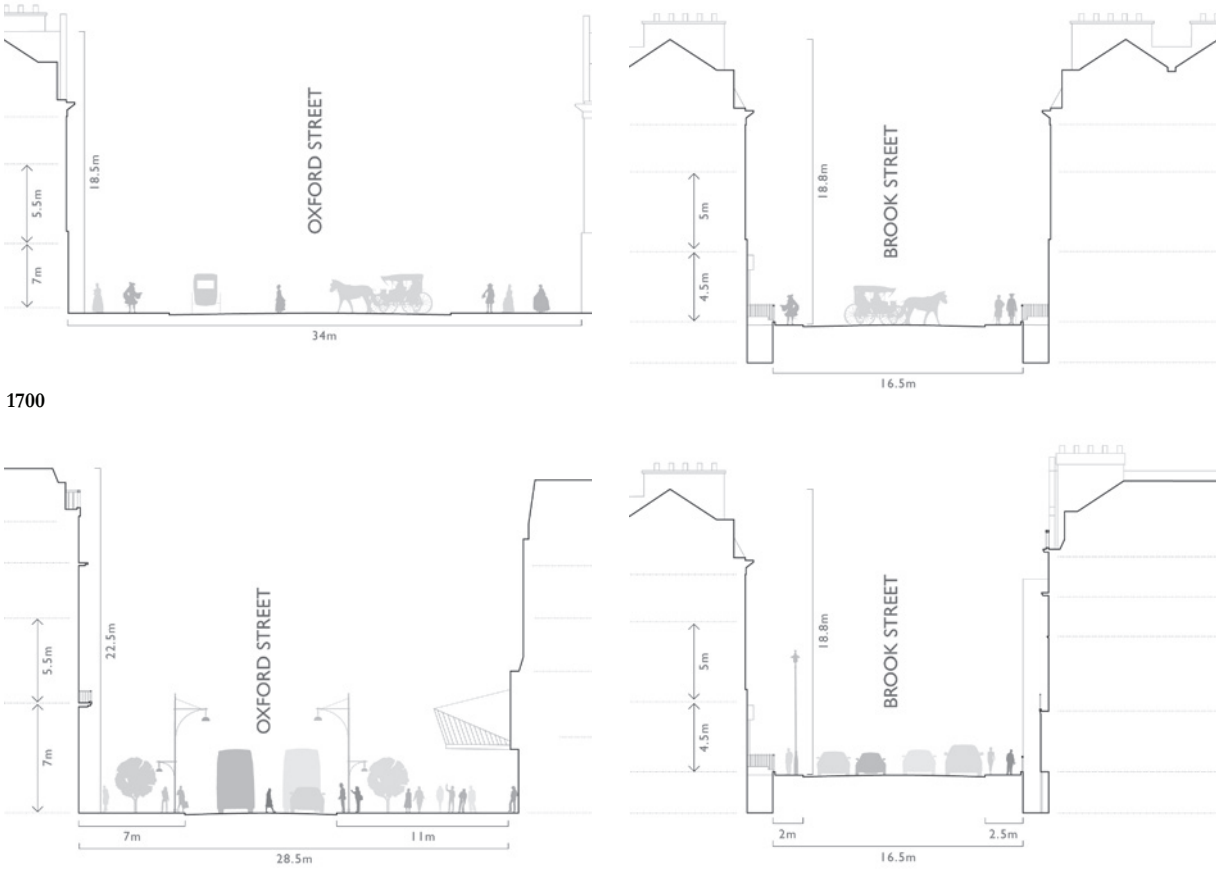


Figure 8: Diagram illustrating comparative street sections

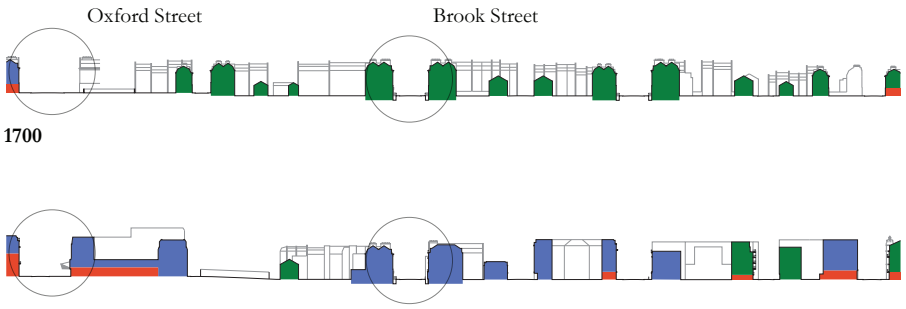
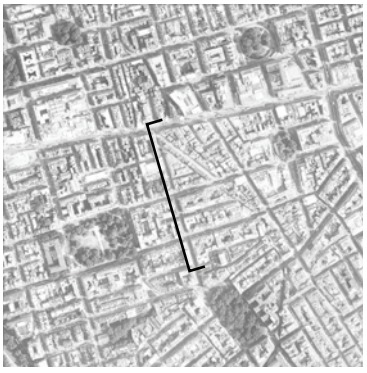


Figure 9: Diagrammatic section illustrating evolving land uses through time

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction



Section through Mayfair

A combination of decline in the size and number of households may account for this difference, with wealthy contemporary residents tending to occupy more space individually, as well as the phenomenon of 'absent households' (denoting residents are from overseas who may not have been in London on the day of the census but who will often be 'at home' for 90 days of the year) in what is now a prime property area for international investors. The overall population of Westminster hit its lowest recorded level in 2001 (189,000), but has since risen sharply (by 21,000), a trend which has yet to be reflected in Mayfair (Greater London Authority, 2012). These findings suggest that the urban form is able to accommodate and sustain a variety of levels of population density. At the same time, the area's resilience in the face of low population density clearly depends on its economic performance, its investor appeal and the ability of the urban form to be converted to other urban uses which generate occupation and create a sense of vibrancy.

Belgravia is slightly less dense in FAR terms than Mayfair. 38% of the land is covered in buildings and the floor area: land ratio is 1.8:1. This difference may be accounted for by the larger scale of open spaces in Belgravia, the slightly less compact urban grain and generally lower rise built form. Only the buildings along Buckingham Palace Road and Grosvenor Place are 8 storeys and more, compared to a larger number of buildings in this category in Mayfair, where more redevelopment of low-rise mews and other low-rise structures has taken place. Belgravia's population is approximately 75 persons per hectare, more than Mayfair's and closer to the Westminster average for the same year (2001). Belgravia's higher population to built form ratio reflects the greater predominance of residential land use in an area in which use demands have remained more constant over time. Notwithstanding, Belgravia's actual population has fallen significantly since it was developed in the first half of the nineteenth century. In 1961, the population of Belgravia was 10,109, indicating a drop of 41% in just the last fifty years. The same general conclusions on this can be drawn as in Mayfair.

b. Physical: street layout and building type

The urban form of Mayfair and Belgravia has accommodated changing building and public realm uses over time. The streets of Mayfair were built significantly wider than the traditional medieval lanes of the City of London. At approximately 17 metres wide, including 2-2.5 metres of pavement either side of the carriageway, the principal streets are generous by today's standards for local neighbourhood roads (Department of Environment and Transport, 2007). They were designed to accommodate wheeled carriages, which as Whitfield argues was 'an unmistakeable sign of social class' in an age in which traffic first emerged as 'a major factor in London's life' (Whitfield, 2006, p. 59). Images contemporary with the development of Grosvenor Square depict horse-drawn carriages dwarfed by the scale of the streets, which appear as stages for the pageantry of everyday life. The dimensional generosity of both pavement and carriageway has assisted in rendering these streets adaptable over time to evolving volumes of traffic and footfall, and to different types of vehicles. It has additionally created the flexibility to allow for pedestrian street space to be expanded and improved without loss of vehicle accessibility or parking space (Grosvenor, 2008).

In Mayfair, the grander scaled Georgian fabric, with its high ceilings and generous floor plates, has proved highly adaptable to changing social, economic and political contexts. Large townhouses during the war and in the post-war years underwent conversions to office space, and many were also subdivided as the original appeal of large residential properties faded. The areas targeted for redevelopment tended to be those comprising poorer, smaller artisanal dwellings and shop-houses and/or mews areas situated typically behind the principle streets. This is illustrated by Chapman Taylor through their extensive 1971 survey of Grosvenor's London Estate (p. 51), which highlights the scale of redevelopment that occurred between 1930 and 1970 as the uses of the area and patterns of urban mobility changed. These areas contained properties which were less well built, less physically durable, and also more dimensionally constrained. They may have been adaptable and useable but they were typically less flexible in economic terms than the bigger houses. These issues facilitated the 'social construction' of these areas through rehabilitation and modernisation, as well as providing an opportunity for intensification and capitalisation through redevelopment. There has, in this sense, been a variable level of adaptability across 'front'

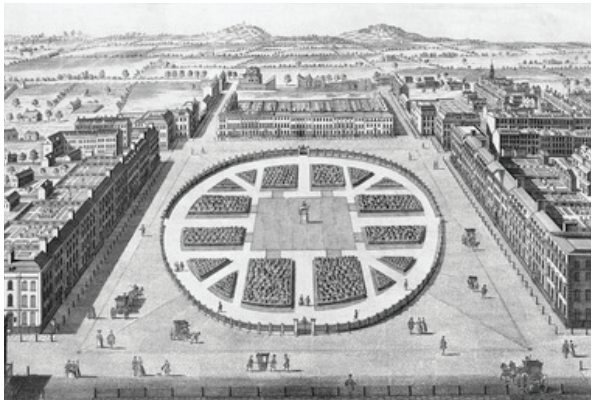


Figure 10: Sutton Nicholls, Grosvenor Square: Bird's eye view of the square showing its ornate gardens enclosed within a circle, 1730 - 1732 (Source: Museum of London)

and 'back' areas of the original eighteenth century urban form.

One major area which does not fit with this general pattern is Grosvenor Square itself. This area was substantially redeveloped after the Second World War and highlights the realisation of different sorts of strategies in response to periods of high-impact change – from the rapid adaptation of valued historic buildings to ensure survival, to the redevelopment of devastated fabric. The desire to preserve the 'image' of the original Georgian townscape informed the establishment of continuity in terms of the scale of new buildings and the composition of neo-Georgian frontages around three of its sides. This image of course was radically contradicted by Eero Saarinen's American Embassy, built in 1960. The use of opposing approaches to the adaptation of the Square reflects the dependence of urban form through time on complex negotiations between different ways of assigning value and meaning to buildings, as to property and urban history.

In Belgravia, whilst there has been greater continuity of residential use, many of the same kinds of conversions - of single occupancy houses to offices or to multiple households - took place during the twentieth century. Like Mayfair, Belgravia has been a favoured location in relatively recent times for international diplomacy and includes a number of embassies. Redevelopment in the post-war period was limited to the edges of the estate, a reflection not only of the higher degree of continuity of residential use here but also of the more integrated townscape of Belgravia – whereas Mayfair always accommodated a wider mix. However, it would be wrong to assume that a slightly higher level of use continuity reflects greater social or economic stability over time, or that it implies steadier, more consistent processes of adaptation. According to one former London Estate chief executive, Belgravia faced redevelopment in the late 1940s as it was 'almost derelict after the war' (James, Interview, 2011). Former use was clearly not sustained in the context of this high-impact change, leading to decline and apparent redundancy. The decision in 1950 to retain Eaton Square was taken strategically, and restoration and adaptation strategies followed in the wake of it. Adaptation, in these terms, is clearly dependent on the nature and profundity of change, but also on strategic decision-making.

c. Environmental

Historically, Mayfair and Belgravia have been walkable due to their wide pavements, built form densities and their mix of uses. The street layouts of both areas ensure that they are permeable and yet that major traffic is relegated to their perimeters. There are twelve fully pedestrian lanes across the two areas. Walkability has been further improved in Mayfair in recent years through a series of public realm enhancement projects. As the position of both Mayfair and Belgravia within London has transformed since the eighteenth century, it has been increasingly well connected via diverse forms of public transport to other parts of London. Victoria Station lies at the southern foot of Belgravia, making this area accessible from southern England and overseas via the Gatwick Express. Victoria Coach Station which opened in 1932 as the gateway for coach trips to the South coast is now the 6th largest point of departure for overseas travel in the UK. This high level of integration and connectivity is due to increase further with the opening of a Crossrail Station at Bond Street in 2017 and enhancements to Victoria Station by Transport for London(Victoria Station Upgrade) as well as by Network Rail. Crossrail 2, if adopted, will also serve Victoria.

The urban form of Mayfair and Belgravia incorporates a number and variety of green open spaces, the most significant of which are the squares. The largest green space in Mayfair is Grosvenor Square (23,129m2), whilst the largest in Belgravia are Eaton Square (47,471m2) and

Figure 11: Street elevations of 66 and 68 Brook Street (left) and 53 Davies Street (right), fine examples of early-Georgian architecture (Source: British History Online, 2012)

Belgrave Square (24,641m2). In addition, both areas are bordered by Royal Parks. Eaton, Belgrave, Chester and Grosvenor Squares were all planned as formal, urban spaces which marked the heart of the elite residential communities they were designed for. The squares played a key role in the social life of the estate when first built, as illustrated in a number of engravings from the time. Today, they are well-maintained spaces that include mature trees and a variety of other plants and vegetation in more or less formal garden arrangements. A transition to more public and inclusive use has taken place in a number if not all of these spaces. Grosvenor owned publically accessible squares include Grosvenor Square, Upper and Lower Grosvenor Gardens, Victoria Square, Brown Hart Gardens and Ebury Square. Belgrave Square is open to any resident on the Belgravia Estate. However, the tradition of exclusivity remains in place as all other green open spaces are private, including Chester Square and the communal gardens of Green Street, Culross Street and South Street which only freeholders and leaseholders of these areas have the right to access.

d. Social

The urban form has accommodated a wide cross section of society over time, as well as of uses and activities. The 'Survey of Householders' of 1790 showed that the 1526 inhabitants living in Mayfair at the time represented a wide range of occupations, from titled persons to members of parliament to professionals such as lawyers and doctors, to tradesmen. The various classes were located in different parts of the neighbourhood, with the houses around Grosvenor Square regarded as the 'best address' (Sheppard, 2004 [1977]). The 1841 Census additionally revealed a similar social spectrum, with 34% of the population engaged in service to a relatively smaller proportion of upper class residents. We may speculate that this diversity originated in the context of uncertainty about the appeal that urban development would hold, and reflects a hedging strategy.

Though many of the aristocrats and local trades have gone, the social and functional mix of Mayfair continues to be great. The nineteenth century 'model dwellings' around Duke Street are managed by Peabody as social housing, whilst at the other end of the spectrum town houses at prestigious addresses such as Upper Brook Street are owned by some of the world's most affluent. Approximately 25% of housing in Mayfair is socially rented. Though Mayfair is becoming more residential following population loss during the twentieth century, it continues to include a wide variety of retail and office spaces.

Across the Estate, 80% of retail units are leased by independents or 'sole traders', reflecting Grosvenor's aim of creating local distinctiveness. Both chain establishments and independents span low- to high-ends of the retail market, ensuring a diverse offer. The area has several four to five star hotels (including Claridge's and The Connaught) and accommodates a number of embassies. It also includes some social amenities such as churches, a library, two medical centres and a nursery which cater to the diverse local population. Land uses are most diverse on the ground floor. Typically either office or residential occupy the floors of buildings above ground. The types of office use that the Mayfair townhouses have accommodated has evolved over time – from professions such as medicine and dentistry before the war to international relations and associated businesses (diplomats, advertising and public relations firms for example) (Sheppard, 2004 [1977], pp. 98-102) to financial services in more recent times. This changing use suggests that the urban form has proved remarkably capable of absorbing complex forms of 'disturbance' affecting its role, without losing functionality or appeal over the long term.

Belgravia's social mix was historically not as marked as in Mayfair, though a degree of social mixing did exist as a result of the presence of some social housing and live-in servants. The area was planned to articulate a social hierarchy and to denote prestige from the outset. Its earliest occupants included a number of peers of the realm, including the Duke of Bedford, Earl of Essex, Lord Ingestre and Lord Sefton (Hobhouse, 1971, pp. 132-133) The proximity of Belgravia to Buckingham Palace, the relatively new Royal residence (as of 1837), was an important factor governing the prestige with which the development of Belgravia was associated. This prestige exists in a new form today, but has not persisted continually through time. The mid-twentieth century Belgravia, described by a former London Estate executive from this era, was more 'local' and down at heel, very much in recovery from the traumas of the Second World War.

Today, Belgravia's uses are mixed but less so across individual buildings than Mayfair. This is due to the origins of the development in which emphasis was placed on grand residences rather than a mixture of residences, retail, light industry and institutions. The heart of Belgravia combines office and residential use, whilst the perimeters predominantly consist of office and retail. This land-use pattern is partly historic but also reflects Grosvenor's land-use policy from the 1970s, as summarised by Chapman Taylor (1971, pp. 156-157). This encouraged the intensification of retail use on Knightsbridge and near Victoria Station and of office space along Grosvenor Place and Buckingham Palace Road. Today Belgravia includes a wide range of social amenities, which, alongside factors such as location, architecture, the employment hub around Victoria and

transport connectivity, contribute to its present, revived status as an elite residential area. Belgravia reflects a low level of tenure diversity.

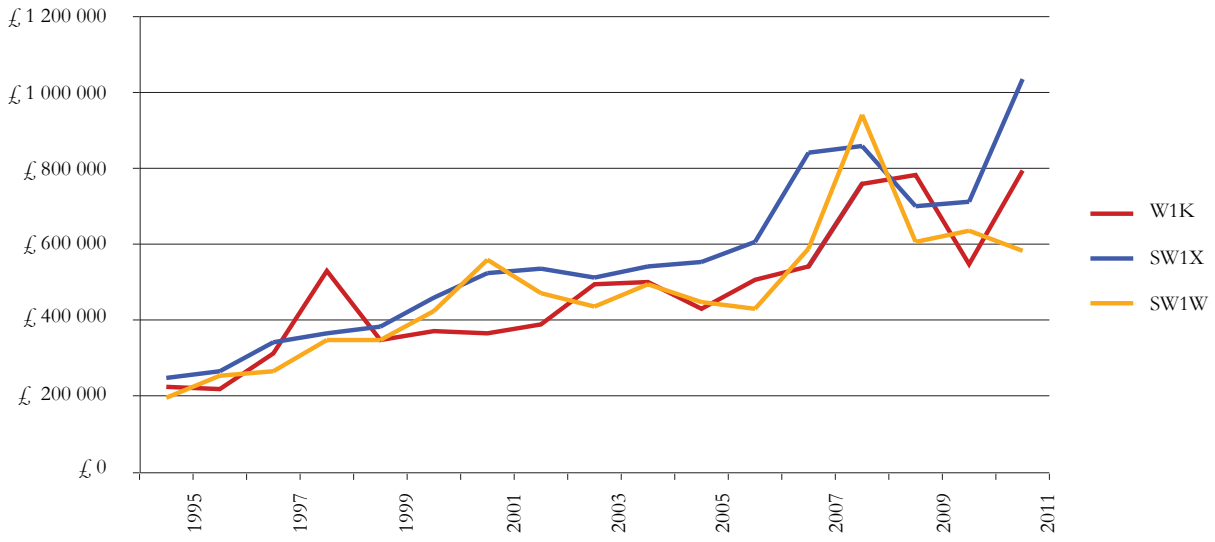
e. Economic

The economic value of Mayfair and Belgravia is high by any standards. The properties in the area were, and continue to be, part of the highest valued in London. Records of who lived in Mayfair and Belgravia at the time they were built speak of how the areas were regarded and the values associated with them. Both were exclusive neighbourhoods designed to attract premium values, and did so. Value related directly to urban form in the sense that the highest values concentrated around the squares, along the most generous streets, at the ends of terraces and street corners. Lower value development could be found a layer and more back from these spaces. In both areas, early residents purchased relatively short-term leases from Grosvenor, as discussed below. When these expired, the property, and hence its value, returned to the estate. The length of lease played a key role in determining value, from the perspective of the freeholder or leaseholder.

The exclusivity of both Mayfair and Belgravia addresses applies to residential, office and retail use. Both areas are key locations for overseas investment. In 2012, local agent Wetherell expected to fetch £15,000,000 for a leasehold (of 111 years) for a four bedroom flat (3,649ft2) and £18,000,000 for an un-modernised 7 bedroom Victorian 'corner mansion' (11,000ft2) on Mount Street (Wetherell, 2012). According to Zoopla, the average price per square foot in Belgravia for houses was £1,551 in mid-2012 and the average asking price £3,722,787 - up 6.91% from mid-2011. According to Grosvenor's Estate Surveyor however, £4000 per square foot is regularly achieved in some parts of Belgravia (Interview, Hughes, 2011). In Mayfair, the average asking price was £1,138,784, which was up 3.8 % from mid-2011 (Zoopla, 2012). These figures massively exceed the national average asking price of £246,235, which increased 1% from mid-2011 (Rightmove, 2012). Both areas have experienced a more than fivefold increase in average house prices since 1995 (inflation adjusted). House price indices suggest that across Westminster, house prices have risen above the Greater London average and significantly out-paced the South East Region as a whole. The 'resilience' of this property market in the context of the double-dip recession from 2008 reflects the power of overseas investment, and, according to one local estate agent, the strong brand both areas have acquired over time (Wetherell, Interview, 2011). This is said to at least in part be due to the lasting quality of the architecture and the management of the Estate. However, under the resilience terms used in this report, there are key issues relating to exclusion and reduction of social diversity which elite property markets create. To an extent, these processes are countered in Mayfair through the protection of social housing.

f. How resilient?

Both areas highlight the need to understand resilience as a dynamic process and as a property constituted across a number of measures. Mayfair, in general terms, demonstrates resilience in terms of the physical and social measures in particular, as does Belgravia (though to a lesser extent). Both areas perform well on the environmental measure owing to the combination of a Central London location and the presence of green spaces within and around them . Both areas reveal the complexity of the economic measure of resilience,



Graph 1: Average House Price for postcodes W1, SW1X, and SW1W (inflation adjusted, 1987=100)
(Sources: Land Registry, All Items Retail Prices Index CHAW, ONS)

as defined, and suggest the need for closer work on assessing the impacts of high property values on population diversity in the area.

4.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

The present boundaries of Grosvenor's London Estate are a palimpsest of the ancient boundaries of the medieval Manor of Eia. Three portions of this manor - Tyburn (Mayfair), Ebury (Belgravia) and La Neyte (Millbank and Pimlico) - came into the Grosvenor family through the marriage of Sir Thomas Grosvenor Baronet of Eaton to Mary Davies in 1677 (Ellis, 2000).

The precedent for developing this landholding at the edge of Westminster whilst maintaining the land title began in the 1630s, when the Dukes of Bedford and Southampton started to develop their land. This pattern of development continued apace after the Great Fire. As Whitfield (2006, p. 56) argues, the 'process of building and leasing of the aristocratic estates would become the fundamental pattern which would shape London's growth for almost two centuries'. The growth took place on a piecemeal basis owing to the tendency for planning to be carried out by wealthy land owners on their estates and the lack of an overarching planning authority.

Grosvenor's ownership enabled the creation of a comprehensive master plan for the different portions of the estate. Sir Richard Grosvenor, the eldest son of Sir Thomas Grosvenor, began to prepare the land in Mayfair for development in 1720 through his appointment of Thomas Barlow as Estate Surveyor. Barlow created a grid of wide streets with an oval garden at the heart of an urban square. Belgravia began to be planned in 1813 under Estate Surveyor Thomas Cundy. The Estate Surveyor was responsible for producing a 'block plan' for the development, which provided a basic outline of the relationship between open spaces and building plots. The details of streets, and the way in which service accommodations such as mews and stables were configured, were the responsibility of the speculative developers who acquired the plots under lease.

Grosvenor as Ground Landlord sold 50 to 100 year leases to developers who built out the different portions of the estate. Alongside each lease was a Building Agreement, which set out the respective responsibilities of the Ground Landlord and the developers with respect to different parcels of land. This system of leases and Building Agreements stimulated the development of the speculative property market in London. The scale of this speculation was small by today's standards, a fact reflected in the tight grain and subtle variety of architectural approaches between buildings and across streets. In Mayfair alone, 92 separate Building Agreements were drawn up between Grosvenor and builders/ developers between 1720 and 1790. The system allowed Grosvenor to exert a degree of control over the urban form as a whole – allowing for the planning of the square, the wide streets and other infrastructure - without having to shoulder the risk of development.

In Belgravia, much of the development was carried out by Thomas Cubitt. As the principal lessee for the estate, Cubitt was able to gain control over the architectural unity of the area. He also became responsible for much of the infrastructure underlying the development through his Building Agreements. These agreements included the stipulation by Grosvenor to level the garden of Belgrave Square, to negotiate with the Westminster Commission of Sewers over their infrastructural requirements (Hobhouse, 1971, p. 119) and to construct roads and pavements. The roads and pavements specified by the Grosvenor Place Trustees were expensive and had to be of high quality (Hobhouse, p. 125). Builders were paid for their work once the streets were adopted by the Grosvenor Estate Trust. The Grosvenor Place Trustees could refuse to adopt poor quality roads lacking drainage gulleys or sewers (Hobhouse, p. 124). Lighting, when it came, was also paid for by the builders, though adopted later by the Trustees. The combination of the Trustees' high expectations and Cubbitt's determination to profit from his endeavours by attracting rich tenants led to the production of high quality infrastructure by mid-nineteenth century standards, which survives to this day.

In Mayfair, building work was financed through a combination of loans for procuring the leases and paying the ground rent; forms of co-operation and exchanges of skill between builders; and short-term credit accounts (Sheppard, 2004 [1977]). One of the major sources of capital loans was actually Grosvenor, the ground landlord. Others included a diverse range of private individuals rather than institutional lenders. In Belgravia, Cubitt secured individual mortgages for each of the properties he developed. He was able to transfer the risk of his speculative work by transferring financial responsibility to a syndicate, which took over the rent on a number of the properties that he had formed agreements to develop (Hobhouse, 1971, p. 118). It would appear that one of the major advantages of Cubitt's approach was that it bought time to realise the value of his work. Indicative of the effectiveness of this approach was the fact that of the three major developers working north of the Grosvenor Canal - Thomas Cubitt, Seth Smith and Joseph Cundy - only Cubitt

emerged solvent. Thus individual city-builders have had an important role in building resilience at particular times. These resilience-building processes can in turn have longstanding impacts, as the lasting urban value of Belgravia shows.

Following development in both Mayfair and Belgravia, properties were sold on under new leases to their first occupants. According to Hobhouse (1971, pp. 150-151), the traditional practice in the Grosvenor Office was for the Estate Surveyor to negotiate with each individual builder for each 'take'. Some builders were able to sell their financial commitments on at a profit to future occupants before even completing their buildings. Residential and commercial space was leased across the Mayfair estate by the ground landlord directly to occupants (more than 4,000 leases by 1830). In addition to the cost of the lease, leaseholders paid a ground rent designed to cover the upkeep of shared infrastructure, including stabling, water pumps and gardens. The leasehold system enabled Grosvenor as landowner to draw revenue from the development in an on-going sense and, through this, to fund itself and its urban management.

b. Contemporary land ownership, planning context and financing of infrastructure

The original landholdings of Mayfair and Belgravia have, to a large degree, remained in Grosvenor's hands. Pimlico, the third sub-portion of the estate, was sold off in the 1950s as a failed, unprofitable development. The nature of the ownership of the estate is, however, somewhat different to what it was at the inception of the development. A major change occurred in the 1830s when the 'Estate' in its original form was re-established as a Trust. Today, this Trust forms one facet of Grosvenor, the international property company.

Long-term ownership and strategic control over urban-scaled development has enabled Grosvenor to be in possession of a piece of city which has been continuously adapted to suit changing social, economic and political contexts and is now a model of flexible planning and development. However, this long-term ownership and control has arguably only relatively recently been framed in terms of long-term forward thinking. The need for a more strategic, visionary approach to planning the future of the estate was first highlighted in the context of the challenges involved in stabilising it after the Second World War. At this stage, one of the major impediments to strategic management and development was the complexity of the estate's lease system. In order to facilitate this, efforts were made in the 1950s to harmonise the expiry dates of leases within blocks across the landholding. In 1970, the Trustees of the estate commissioned Chapman Taylor to produce a long-term strategy for the development of the estate over the next 100 years. This formed an important backdrop for negotiations between Grosvenor and the planning authorities at Westminster and the Greater London Council.

The Chapman Taylor/ Gerald Eve strategy was a crucial turning point in the relationship between Westminster and Grosvenor, which had been antagonistic in past decades. This antagonism appears to have arisen because of divergent perspectives on the estate's future. For example, after the war, Grosvenor was keen to secure from Westminster permanent change of use permits, from residential to office, whereas Westminster wanted to issue temporary permissions in order to retain flexibility (James, interview, 2011).The Chapman Taylor report enabled Grosvenor to represent their case for the future in terms of their long-standing knowledge of the estate - a way of thinking forward through the past.

Thinking in these terms was crucial for enabling the estate to survive the impacts of leasehold reform under the 1967 Leasehold Act. This legislation granted lessees of more than 21 years the 'right to buy'. It led to the sale of a considerable number of Grosvenor's properties in Belgravia that were on longer term leases. Through the 1970s, Grosvenor sought to counteract such losses by granting shorter leases, especially on the most valuable properties. However, this approach appears to have been undermined by the simultaneous use of the estate as a revenue raiser for the internationalisation of Grosvenor's property portfolio. According to Grosvenor's current Estate Surveyor:

> 'So, it wasn't until five or six years ago that the penny finally dropped that there's a risk of the estate becoming unsustainable, because we took so much capital out of it by selling - so that it's only a shadow of its former self. So, the question then was, do you act like a property company and take out as much as you can or do you act more as a real estate management company?' (Hughes, Interview, 2011)

The decision was taken to act in the latter way and thereby emphasise the value of a long-term perspective on the development of specific urban areas. Today Grosvenor strategically redevelops its properties, manages the retail offer of the estate, and works in conjunction with Westminster to improve public infrastructure and the public realm. This new strategic approach is reflected in the public realm improvement projects highlighted above.

The resilience of the estate today is a reflection of the fact that the land has been held over a long period of time. However, this brief account has shown that at

many times and in a number of ways, this resilience has been tested. This reflects not only the contingency of resilience on the past, but also the need to continue to cultivate resilience-building in the present for the future.

4.3 Concluding Points

- **Resilience:** the adaptability of the Georgian built fabric, combined with the managed reuse of buildings and incremental redevelopment of the estate, has played a key role in maintaining and actively cultivating use and value over time.
- **Ownership:** long-term ownership has enabled control over the relationship between urban form, diversity of use (including tenure) and value, creating an economically viable model of long-term urban management, if at the same time an exclusive, expensive environment.
- **Planning:** the historical planning by Grosvenor created a lasting urban fabric of on-going significance in the absence of visionary state planning.
- **Financing infrastructure:** placing heavy responsibility for financing infrastructure on the developers exposed them to high levels of risk, whilst allowing the estate to realise the value created over time. In the short term, this compromised the estate's resilience.

5.0

BERLIN

Chamisso

The Chamisso case in Berlin is defined by the boundaries of a planning area within the district administration of Friedrichshain-Kreuzberg. It is a mixed-use neighbourhood of about 1 km², situated 2km south-west of Potsdamer Platz and still within the inner city demarcated by the circle rail line. The urban form consists of nineteenth century Wilhelminian tenement blocks defined by their closed structures with a front house, side and rear wings. Several rear wings follow each other, creating a sequence of courtyards. The buildings are five to six storeys high. Chamisso's development over the last century is inextricably linked with the political history of Berlin. The neighbourhood survived the bombings of the Second World War in almost its entirety. During Berlin's division Chamisso was, however, increasingly neglected. Only 1.5km away from the Berlin Wall, private investment in the neighbourhood came to a halt. In the 1970s, West Berlin's government mandated one of its state-owned housing companies to buy up the apartment blocks and renovate them with subsidies. Chamisso represents a model of fragmented land-ownership with state intervention. Today, the neighbourhood stands for the successful adaptability of the old urban fabric and the newly gained popularity of such inner-city neighbourhoods among professionals and young families.

Figure 12: Nineteenth century Wilhelminian tenement blocks in the Chamisso neighbourhood (Source: Sabina Uffer)

5.1 Measures of Resilience

a. Physical: density

Chamisso's land coverage and population density have the characteristics of a resilient urban form. There is a high enough density of diverse activities and population to create social and economic value. 30% of the area is covered with buildings. This low land coverage is mainly due to the large open space of the cemetery in Chamisso. This is also reflected in the floor area ratio (FAR) of 1.29, which is significantly lower than other areas in Berlin with the same urban form. The built up area is however of high intensity, incorporating a diversity of land uses which create a vibrant urban place.

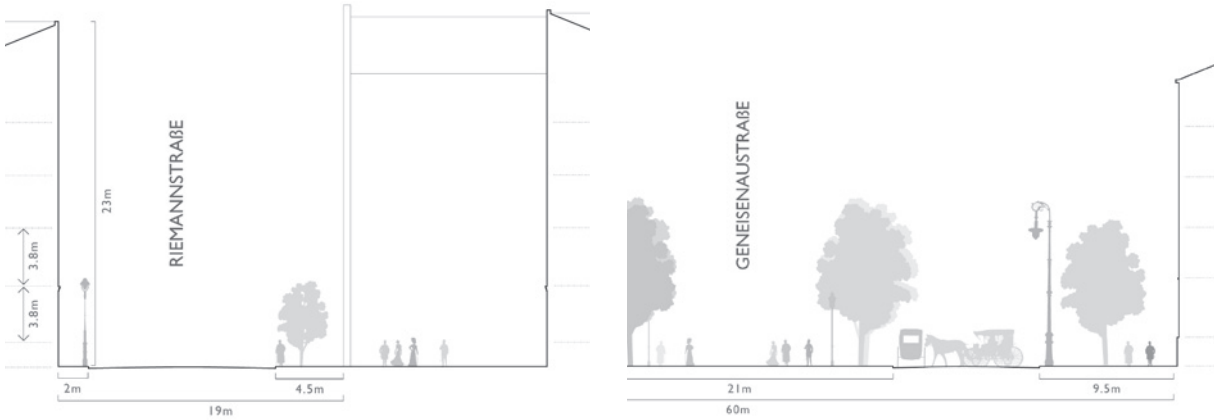
Discounting the sites of the cemetery and the police headquarters, the area is 56 hectares and has an average population density of 102 residents per hectare. Some of the residential blocks accommodate more than 600 residents. Combined with the mixed land use, this density enables activities during most of the day. Historically, the density within the Wilhelminian block developments was considerably higher, with 660 residents per hectare being the norm (Haberland, 1913, p. 20), reflecting the housing shortage for workers during Berlin's industrialisation. Today's population density represents the dense urban form of tenement blocks, reduced however by the physical adaptability they have undergone during the renewal process: smaller apartments were merged to create larger ones and a number of original side and rear wings were demolished to create more open space between the blocks.

b. Physical: street layout and building type

Chamisso's street layout and building type have proved adaptable over time. The generous streets and public space provisions within Hobrecht's original plan meant that increased intensity of use could be adequately accommodated. Similarly, his planning strategy facilitated a flexible and accommodating street grid, premised on facilitating change within a framework. The Hobrecht Plan allowed streets wider than 15m to be lined with unlimited building heights, and ensured those buildings built on streets narrower than 15m were limited in height to 1.25x the width of the street (Hegemann, 1930). The generous street widths have allowed cafes to spill out onto the pavements. Wider pavements also create a sense of 'publicness' which helps to promote commercial functions – as the pedestrian feels the neighbourhood is open and accessible.

Chamisso's courtyard forms have created opportunities over time to accommodate different degrees of population density without breaking the uniformity of the street façade. With urban renewal, side and rear wings were torn down in order to open up courtyards and enhance the public realm. Similarly, the flexibility

Figure 13: The location of Chamisso within central Berlin (Source: Google Earth)



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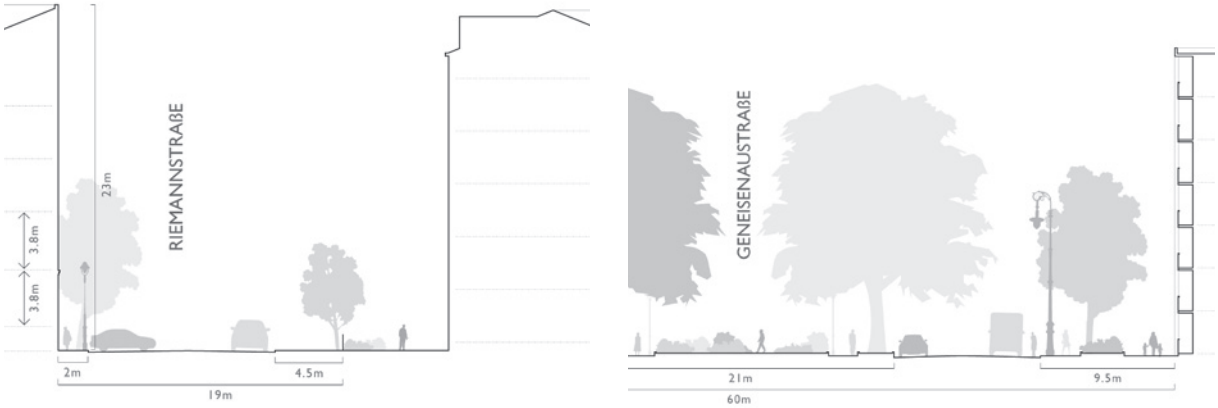
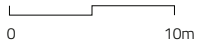
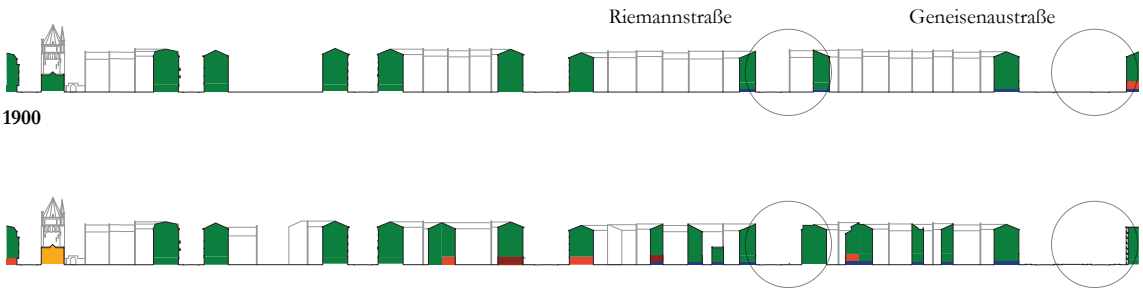


2012

Figure 14: Diagram illustrating comparative street sections





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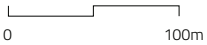


Figure 15: Diagrammatic section illustrating evolving land uses through time – which remain relatively stable

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

Section through Chamisso

of floor plans allowed the combining of several small apartments into larger ones, as requirements for greater residential floor areas increased. The direct relationship established between the continuous street façade of neighbouring buildings and the street has also facilitated changes of building use in some instances over time. For example, numerous ground floor residential apartments have been converted into retail units. This, together with generous floor heights that create comfortable work spaces, has facilitated a mixed-use adaptation of the buildings.

c. Environmental

Chamisso's public realm and transport infrastructure have provided its residents with recreational opportunities and good access to the wider urban network. The wide pavements and the cobble stone streets with no major traffic routes have created a walkable neighbourhood. The mixed-use character of the neighbourhood makes it possible to reach local shops and amenities on foot within a few minutes. Chamisso is well connected to Berlin's major business areas through an east-west and north-south underground line and several buses. The north-south line was constructed in the first two decades of the twentieth century. The government refused to allow Siemens, a private corporation, to finance the project, considering it a task for public authorities. The east-west line started out as a branch of the north-south line, going off to the east. It was constructed in small stages due to the hyperinflation of the 1920s and 1930s. After the Second World War, when the stations in East Berlin were closed off, West Berlin's authorities rapidly extended both lines further out to newly developed areas in West Berlin. Again, development and financing was entirely undertaken by public authorities. Only after reunification and the reopening of the entire underground system did Chamisso become as accessible a place as it is today.

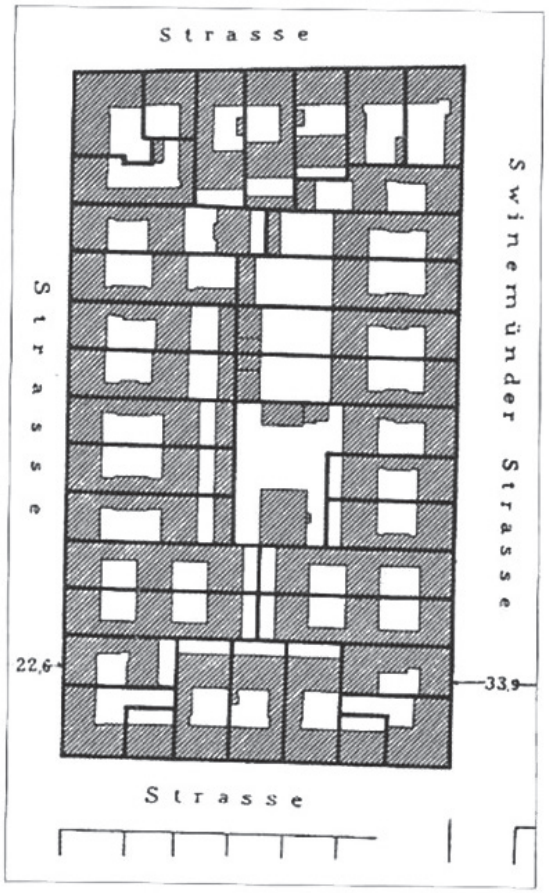


Figure 16: Tenement block with inner courtyards. Average floor plate 56m x 20m (Source: R. Eberstadt (1910). Handbuch des Wohnungswesens & der Wohnungsfrage, p.66)

Chamisso's urban form consists of a variety of public and private green spaces that play an important role as recreational spaces for the neighbourhood's residents and therefore contribute to its resilience. 22% of Chamisso comprises green public space. This includes a cemetery of 210m2 and two smaller parks (Chamisso Square and Marheineke Square). The cemetery was inaugurated in 1844, before Hobrecht's plans. The squares were outlined by Hobrecht and their construction was undertaken by the municipality. These spaces, and especially Chamisso Square, have become economically valuable, creating higher property prices around them. They also have been an important recreational resource historically for its residents and continue to be so today, adapting to changing needs. Chamisso Square, for example, now includes a children's playground, reflecting the neighbourhood's demographics. The enlargement of courtyards was combined with the greening of them, which provide semi-private spaces for the residents of the block.

d. Social

The urban form has persisted through considerable social change. Though Chamisso was a lower middle-class neighbourhood at the inception of the development, the continuous degradation of the urban fabric after the Second World War led to the flight of the middle-classes to the new housing estates on the outskirts of West Berlin. In the 1960s and 1970s, the area was predominantly occupied by students and immigrants. Young West Germans who wanted to avoid compulsory military service came to Berlin and settled in this neighbourhood, historically known for its socialist roots. Immigrants from Turkey who were not granted access to the newly built subsidised housing estates also moved into Chamisso and nearby neighbourhoods. With the start of the urban renewal process, the socio-economic character of the area changed again. Today, it is mostly young families that are moving in to the neighbourhood, and this is reflected in the high concentration of day care facilities and schools. The share of foreign nationals has remained about the same. However, whilst Turkish immigrants dominated

forty years ago, immigrants from Italy, Greece, Spain, Switzerland, and the Scandinavian countries now increasingly move into the area (interview with urban renewal agent, 2012). These changes are closely connected with the rise in capital value of the renovated and modernised properties.

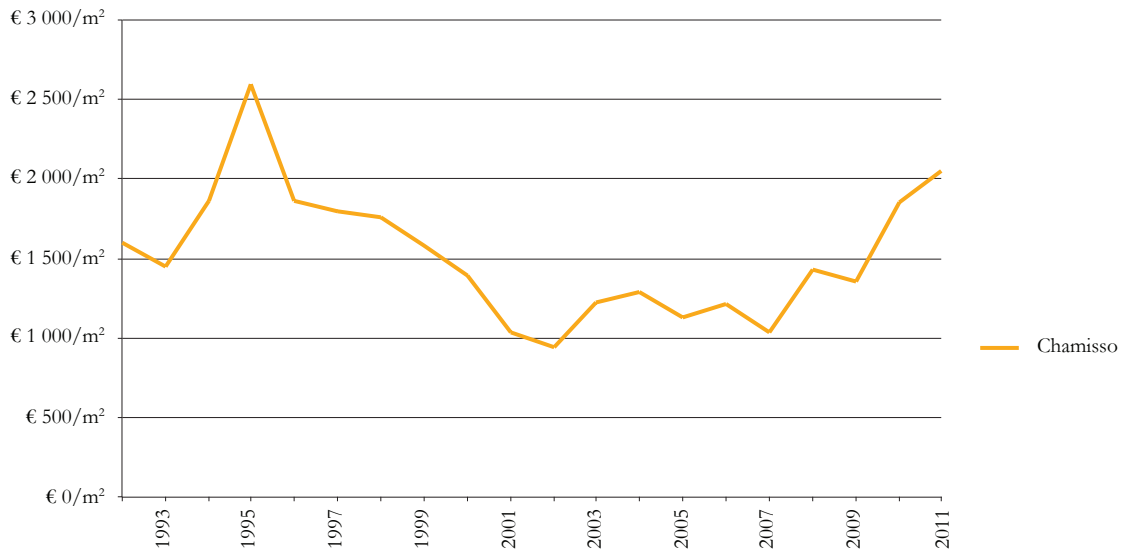
Chamisso evolved from an industrial and residential area to a mixed-use neighbourhood of residential, commercial, and small office units. At the end of the nineteenth century, the area consisted mostly of craftsmen's workshops, small trade and repair businesses, or even cowsheds on the ground floors with houses to the rear. Later, when these traditional trades increasingly went out of business, the ground floor units were adapted to residential units. Recent urban renewal has increasingly attracted shops, cafes, and restaurants. Today, a majority of the ground floors are occupied by shops and restaurants, with occasional small businesses and institutions such as creative start-ups or day-care facilities. The upper floors were always residential units. In order to maximise rental income, landlords often developed the habitable surface intensively, cramming in apartments, especially in the rear and side houses. With urban renewal, smaller apartments began to be combined to form more generous, higher-value units.

e. Economic

The urban form has appreciated variably in economic terms over time, reflecting the turbulent political economic situation of Berlin more than the cases' resilient urban form. At the beginning of the 20th-century, housing in Berlin was extremely expensive. Industrialisation triggered a rapid population growth, which the building industry could not cope with. The average price for a 66m² room was between 420 and 500 Marks per year, depending on location (Haberland, 1913: 35). With an average income of between 800 and 1000 Marks a year, these rents were taking up almost 50% of income (Winter & Robert, 1997: 361). Rent levels were so high that a 'sleeping men' system was invented: families rented out their rooms to single men for hourly rates. Overpopulation in the tenement buildings was also an increasing urban problem at the time.

In the 1980s, the rent levels in the tenement buildings were at pre-war levels, at 3.81 DM/m2 (Berliner Mieterverein, 2008). Because of the immense housing shortage after the Second World War, rents in West Germany were frozen at pre-war levels. Whilst most of the German cities abolished this regulation in the early 1960s, Berlin kept it for the old tenement buildings until 1987 (Heinz, 1991; Krätke & Borst, 2000), since when rent levels have continuously increased. In Chamisso, they are currently between 3 and 12 Euros/m2 (email urban renewal agent, 2012). This wide range is due to the subsidies system applied during the urban renewal programme. Dwellings that were modernised first received the highest subsidies and have therefore the lowest rents. The average of all the apartments is around 8 Euros/m2. This is significantly above Berlin's average of 5.21 Euros/m2 (Investitionsbank Berlin, 2012). Whilst there continues to be a form of rent control for these apartments due to the high levels of government subsidy for renovation, rents are closer to market levels. Thus, whilst in 1976, residents in Chamisso spent on average 13% of their income on housing, they now spend 28% (Bremer, Klahr, Porst, & Stein, 2007).

Whilst Berlin has always been, and continues to be, a tenant city, there is an increasing tendency towards owner-occupation. Whilst prices have fallen significantly in the economic downturn of the late



Graph 2: Average Sales Price (€/m²) for Chamisso (inflation adjusted, 2005=100) (Source: Senatsverwaltung für Stadtentwicklung und Umwelt, Geschäftsstelle des Gutachterausschusses für Grundstückswerte in Berlin)

1990s and early 2000s, they have picked up in recent years and apartments are now going for over 2000 Euros/m2, which is almost at the level it was in the years after reunification when Berlin was undergoing a real estate boom. Comparing the prices with other neighbourhoods in Berlin, the neighbourhood is not in the most expensive category, but certainly approaching it. The apartments around Chamisso Square, with prices between 2500 and 6000 Euros/m2, are already in Berlin's top category. According to the state-owned housing company who owns a majority of the buildings in the area, the properties in Chamisso are some of the most profitable ones in its portfolio (interview housing company representative, 2012).

f. How resilient?

Chamisso's urban form has proved to be resilient in its physical, social, and environmental dimensions. Most notably are the tenement blocks that have proved adaptable to changing densities and needs. The neighbourhood has, however, suffered due to Berlin's historical and political context. This has primarily affected the continuous investment in the renovation of the buildings, thus impacting on its economic value and adaptability at certain times in its long-term history.

5.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

How Chamisso was built is emblematic of the development of wider Berlin at the end of the nineteenth century. At the time, Berlin's urban development was closely linked to the Hobrecht Plan. When, at the end of the nineteenth-century, Berlin industrialised and had to deal with rapid population growth, it became necessary to have a coherent urban administration and planning department (Schwenk, 2002). The Hobrecht Plan, named after the head of the Prussian Police department James Hobrecht (at the time in charge of urban planning), outlined the conditions for Berlin's planning at the turn of the century and was crucial for the development of nineteenth-century tenement block neighbourhoods of the kind represented by Chamisso. The plan focused on the areas to be developed around the historical core of Berlin, which Hobrecht left untouched. Hobrecht divided the undeveloped areas between the city centre and the circle railway line into rectangular building blocks and parks, through diagonal and arterial roads (Forsell, 2006). Intended as it was to solve the housing problem, the plan encouraged dense construction. A

Figure 17: Workshops on the ground floors have been converted to restaurants and shops. Restaurant at Arndtstraße, 2012.
(Source: Sabina Uffer)

planning ordinance also issued by Hobrecht allowed private builders to develop four to six storey blocks with a minimum courtyard of 5.34x5.34m in order that fire hose vehicles could turn. No other design regulations were attached. Typically, land owners divided their land into parcels and sold the land to individual developers, creating a highly fragmented ownership structure. At the end of the nineteenth century, the developers were predominantly small-scale tradesmen who sold off the finished buildings to property owners who aimed to 'secure for themselves a lasting source of income' (Forsell, 2006, p. 123). Property owners were required to pay fees to the municipality for canal and street building, pavements, and street cleaning. Whilst the fees for roads and pavements were relatively low (around 14% of the expenses), they bore over 80% of the canal-building costs (Forsell, 2006, p. 34).

This set the conditions within which development between 1877 and 1910 took place and created the particular urban form embodied by the Chamisso neighbourhood. Up until the early nineteenth century, Chamisso was a vineyard. Through marriage, a master mason came into the ownership of the land in 1809 and decided to open a countryside restaurant on the land. When he died in 1860, his inheritors sold the land to two speculators, Major von Hake and Friedrich Spielhagen. From 1873 onwards, Spielhagen was the sole owner of the land and started to prepare it for development by dividing the plots into smaller parcels. Spielhagen sold the parcels to craftsmen who were willing to try their luck in the Wilhelminian building boom (Bremer, et al., 2007). Often, they were highly indebted with less than 5% equity (interview Professor for Urban History, 2012). This fragmented ownership and the financial pressure to recoup development costs created a particular urban form that impacted on the environmental and social characteristics and qualities of the neighbourhood in two particular ways.

First, whilst Hobrecht planned the open spaces and parks on a Berlin-wide scale, especially in working class neighbourhoods, these were often not realised. Hobrecht did not have the power to purchase the land. It was within the district governments' power to purchase the land in order to keep it as open space. Landowners were often over proportionally represented in these municipal governments and had an interest in keeping public costs down. They were under pressure to create financial returns and this impacted on their capacity to deliver a public realm (Interview Professor for Urban History, Interview, 2012). In the case of Chamisso, the two planned squares were built, though one has become significantly smaller than originally planned because of a market hall that took up half of the land plot.

Second, fragmented ownership promoted profit maximisation of individual plot owners over the creation of sustainable dwellings. The high indebtedness of developers forced them to maximise the living space on their plot, creating dense living conditions. It was common for developers to build to the maximum density allowed by the regulations. This led to the construction of the now well-known nineteenth-century tenement buildings with several housing blocks in a row, creating small and dark inner courtyards on their parcels (Schwenk, 2002). At the beginning of the 1890s, Berlin was the most densely built-up town in Europe (Forsell, 2006). With rapid population growth during Berlin's industrialisation, the tenement buildings became increasingly overpopulated. The form of the tenement block also had consequences for social mix creating what Häußermann et al. (2002, p. 35, author's translation) called 'a 'social mix' within segregated structures' - meaning that the relationship between the cheaper and more densely built smaller apartments in the rear wings and the more generous apartments in the front buildings articulated a social divide. Of course, there was still segregation between neighbourhoods, with affluent areas having more generously sized apartments, including modern-day facilities such as built-in toilets. In the Chamisso Kiez, only 4% of the apartments had built-in toilets and bath tubs.

The Hobrecht plan created opportunities to develop Berlin on an urban scale, with relatively wide streets and a generous public realm with open squares and parks. This created an urban form that has proved to be adaptable over time. However, the implementation of this plan was in the gift of public authorities in the different districts, who were often under pressure from land owners who wanted to capitalise on the development of their land. Similarly, the speculative approach of individual parcel developers meant profit maximisation at a small scale. Thus, the historical governance of Chamisso lacked a long-term perspective and stewardship, resulting in congested living conditions. The governance of the area has changed, with public authorities now taking a stronger role in ensuring the long-term value of the area.

b. Contemporary land ownership, planning context and financing of infrastructure

Chamisso's urban form is closely linked to Berlin's political turmoil in the second half of the twentieth century. Whilst the neighbourhood survived the bombings of the Second World War almost in its entirety, it declined rapidly in the early post-war period. This was due to several factors. First, with West Berlin's isolation, private investment was scarce and Chamisso's close proximity to the Berlin Wall did not help this either. Moreover, tight rent regulation did not create

the necessary incentive to invest in these outdated properties. Second, the government's planning focus rested on the construction of new housing estates, sometimes comprehensively replacing the nineteenth-century tenement block neighbourhoods. Replacing the tenement blocks with subsidised high-rise buildings was partly motivated by the need to support a construction industry that had increasingly lost interest in investing in Berlin. Towards the end of the 1960s, however, residents began to protest against this form of comprehensive urban renewal. Ultimately, this protest led to a rethinking at the political level which resulted in a reorientation towards a more 'sensitive' form of urban renewal, preserving the built environment of the nineteenth-century. Chamisso was one of the first neighbourhoods to be designated for this type of urban renewal. The government of Berlin created a mandate for a state-owned housing company, which had been operating since 1919, to buy up the parcels from private owners who were not willing to invest and modernise them with government subsidies in exchange for limited rents and allocation priority. This created an opportunity to plan on a larger scale and thus to implement a strategy for the entire neighbourhood.

In the context of a long-term urban renewal strategy spanning almost thirty years, Chamisso's properties and public realm were renovated and modernised between 1979 and 2003. After initial protest from residents who were against the renovation because they anticipated higher rent levels, the state-owned housing company achieved a consensus through a participative approach to the renewal process. Renovation occurred block by block and involved removing some of the side and rear wings of the tenement buildings in order to increase the open space in the inner courtyards and reduce density. There was a strategy to achieve a change of commercial use, from the casinos that had moved into the area during the years of decline, to neighbourhood cafes and shops, thereby increasing the neighbourhood's attractiveness for residents and tourists alike. Today, 36% of the properties are in the ownership of the state-owned housing company, whilst the remaining properties are in private ownership, either with landlords who own the entire block or just a single apartment. This has an impact on the ability to plan on a larger scale. Despite being the majority owner in the area, the state-owned housing company's influence is limited. Since the neighbourhood was released from the urban renewal programme in 2003, there has then also been a lack of a neighbourhood-wide strategy. There is thus a danger that the diversity of uses and tenants could be eroded by market forces.

During the urban renewal phase, both the public authorities and the state-owned housing companies demonstrated stewardship with a long-term perspective and a transparent development strategy involving different stakeholders in the process. This created a mixed-use neighbourhood that is occupied by young families, small start-up businesses and a variety of shops and restaurants, making it a vibrant urban place. The withdrawal of the public authorities and the relatively small influence of the state-owned housing company does, however, endanger the future of this resilient urban form.

5.3 Concluding points

- **Resilience:** the Hobrecht plan created an urban form that has proved adaptable, but the way it has been governed over time has impacted on the area's value at times.
- **Ownership:** fragmented ownership led to the maximisation of each plot rather than the ability to optimise development over a larger area.
- **Planning:** in the absence of single ownership, this case highlights the need for a strategic long-term plan in order to create and manage the necessary diversity for a resilient urban form.
- **Financing Infrastructure:** in the context of fragmented ownership, authorities play a strong role in providing street infrastructure and collecting the financial resources to undertake major projects.

6.0

PARIS

9th Arrondissement

The 9th arrondissement is an administrative district located within the centre of Paris, adjacent to the inner city business district (the 8th arrondissement). Measuring 2.2km², the arrondissement is divided into four neighbourhoods (quartiers): Saint-Georges, Chaussée d'Antin, Faubourg Montmartre, and Rochechouart. The urban fabric consists of predominantly seven storey high buildings, formed along irregular street blocks with almost uniform façades. The arrondissement is representative of the distinctive urban fabric deployed by Haussmann at the end of the nineteenth century. It includes a wide land-use mix, typical for central Paris. The late modern development of the 9th arrondissement took place in three phases. First, the south of the arrondissement was developed when speculators divided and built on the land from the end of the eighteenth-century. Second, the north was similarly developed from around 1840 onwards. The third phase was marked by the cutting of the existing fabric to form a new streetscape as part of Napoléon III's Second Empire Reforms led by Seine Prefect Baron Haussmann between 1853 and 1870. The study focuses on this last period for two key reasons. First, it was through Haussmann's administrative reform that the 9th arrondissement, with its current borders, was formed. Second, it was during this phase that the bulk of the urban form still remaining in place today was developed. Though the redevelopment of the eighteenth-century

Figure 18: Typical apartment blocks in the 9th arrondissement with retail on the ground floor (Source: Sabina Uffer)

and early nineteenth-century buildings continued until they almost entirely disappeared, since 1915, the morphology has remained largely static. The case is representative of Haussmann's wider redevelopment programme for Paris, which established an urban form that whilst radical and lastingly controversial in terms of its political connotations and the social impacts it generated at the time, has persisted and continued to attract use and investment as well as widespread interest, respect and emulation. It is an example of urban-scale intervention realised in the context of state authority and power rather than of single land ownership and thus provides the opportunity to explore the kinds of resilience that this has been able to create.

6.1 Measures of Resilience

a. Physical: density

The land coverage and population density of the 9th arrondissement has allowed an historically established high density of different land-uses. It also results in a lack of open space in the form of squares or parks, and is associated with generally narrow streets (APUR, 2001). The floor area ratio (FAR) of the 9th arrondisement is 2.62 and the coverage ratio is 0.58. This floor area ratio is considerably higher than other areas in Paris, also redeveloped by Haussmann. For example the Quartier Parc-de-Monceau, a wealthy neighbourhood in the second ring of Paris, has a FAR of 1.9 and coverage ratio of 0.38. The 9th arrondissement's high density stems from the area's development before Haussmann: he intervened here when it was already a fully built-up neighbourhood. By contrast, in the Quartier Parc-de-Monceau, he started on undeveloped land which enabled a lower density to be determined.

With a total of almost 60,000 residents, the 9th arrondissement has a population density of 271 residents per hectare. Historically, population density was significantly higher. In 1861, the 9th arrondissement recorded 107.3 thousand residents (493 per hectare). At the beginning of the twentieth century, in 1911, it had 119.6 thousand residents (549 per hectare). From the 1960s onwards, the population started to decline continuously (Bonvalet & Tugault,1984). These changes predominantly reflect the socio-economic and demographic transformation that occurred in the second half of the twentieth century. Whilst historically the population density created overcrowded living conditions, the current population density enables diverse uses to persist.

b. Physical: adaptabilities of street layout and building type

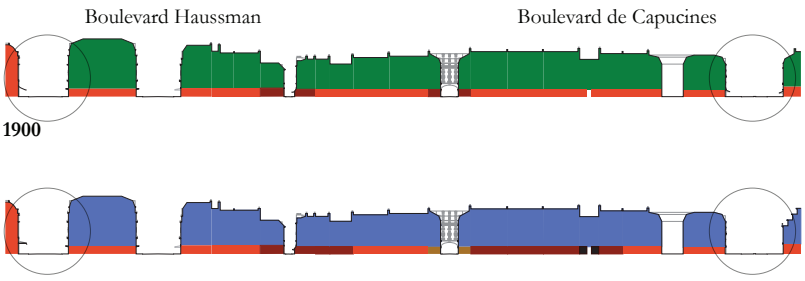
The 9th arrondissement's narrower streets, which are legacies of pre-Haussmann development, are less adaptable than Haussmanns's Grand Boulevards to evolving patterns and modes of transportation. The

Figure 19: The location of the 9e arrondisement within central Paris (Source: Google Earth)

1900

2012

Figure 20: Diagram illustrating comparative street sections



1900

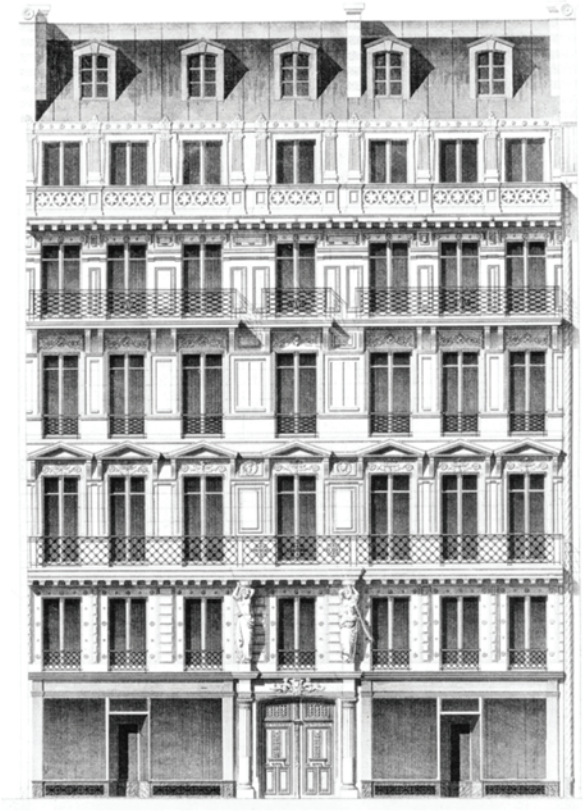
2012

Figure 21: Diagrammatic section illustrating evolving land uses through time

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

Section through Opéra



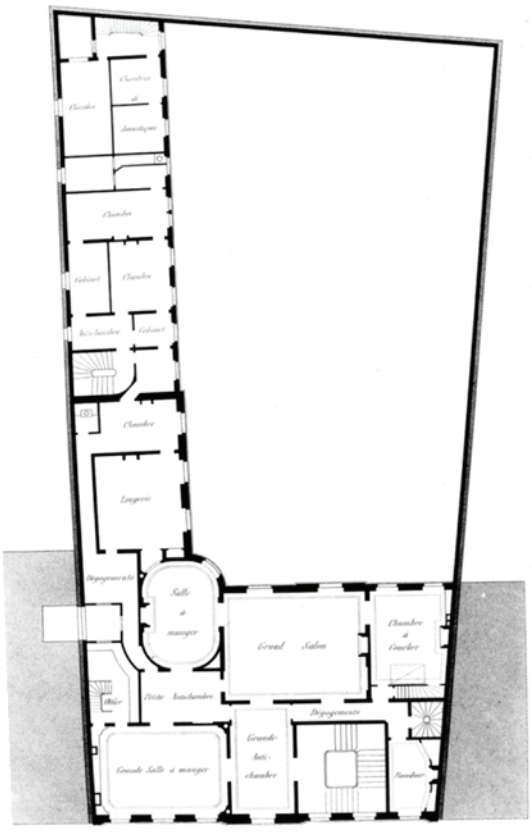


Figure 22: Typical apartment block built under Haussmann during the Second Empire (Source: P. Pinon (2002). Atlas du Paris Haussmannien. La Ville en Heritage du Second Empire a nos Jours. Paris, Parigramme, p. 133-134)

smaller streets which today remain open to traffic, such as the Rue de Caumartin, become congested with parked and moving vehicles and pedestrian space and activity is constrained. By contrast, the Grand Boulevards with their wide pavements reaching as much as 9 metres on the Boulevard de Capucines allow for the spill out under awnings of ground floor commercial uses and the coexistence of multiple street-based activities, kinds of movement and modes of transportation (Jacobs, MacDonald and Rofé, 2002). The pavements are able to be furnished with kiosks, benches, cycle stands and other constructed items that provide for multiple uses, as well as planted to provide shade and the experience of greenery. The roadways of the Boulevard de Capucines, in turn, are wide enough to incorporate four lanes including designated bicycle and bus lanes and, in some places, taxi pick up and drop off space. One drawback which this dimensional generosity and integration of transportation modes creates is the division of the boulevard's pedestrian areas as a result of the relative difficulty of providing for free and safe movement across them.

The scope for adaptation of the six to seven storey buildings lining the streets has been constrained over time by legislation enforcing the protection of the nineteenth-century street elevations. This has of course been key to preserving the distinctiveness of late modern Paris. However, whilst the continuous façades of the 9th arrondissement are largely unaltered from the time of their construction, there has been significant change in building use behind them. Though the ground floors of buildings remain typically commercial, nineteenth-century residential apartments have mostly given way to office space. This use is in keeping with the contemporary commercial nature of central Paris. To an extent, the change of use highlights the flexibility inherent in the plan of these buildings, the interior divisions of which have proved to be suitable for alteration without compromise to their façades or structural integrity overall. As in Mayfair, it reflects the quality of the architecture, here designed for bourgeois occupation, incorporating generously proportioned spaces and high ceilings (particularly related to the piano nobile, and diminishing above this). However, it also reflects the scope provided by Haussmann's own brand of 'façadism', which resulted often in a jumble of building at the heart of urban blocks, for ongoing interior transformations and improvements.

c. Environmental

The urban form of the 9th arrondissement provides the density necessary for an efficient transit system. The 9th arrondissement is also well connected through diverse public transport links, and this is considered a key contributor to the area's economic resilience (based on several interviews, 2012). The arrondissement has

19 metro stations and two interurban train (RER) stations, accessing a total of 11 lines. In addition there is a multitude of buses. Whilst tramways have existed since the 1870s, and buses were introduced on a large scale in 1905, a large part of the metro network in the 9th arrondissement was constructed between 1900 and 1914. An agreement between the city of Paris and a train company owned by a Belgian baron led to a major investment project for the construction of the Paris Metro. Extensions and further lines were constructed between 1915 and 1939. Private investment ceased only after the Second World War, when the Metro was nationalised. Buses, trams, and the metro connect the 9th arrondissement not only to other districts in Paris, but also to its hinterland. Bordering the neighbourhood in the west is the train station St Lazare, one of the six large terminus stations in Paris and the second busiest train station in Europe, with 450 thousand passengers transiting a day. In addition the close proximity of urban amenities, from the local bakery to the Opera, help make for a very walkable urban environment. Thus the area is locally, as well as regionally, well integrated into the urban fabric.

The urban form of the 9th arrondissement is clearly lacking in public green spaces. Whilst there are a number of private gardens, especially in the Quartier Saint-George in the north-west, there are only four public squares, none of them larger than 5m2. Only 0.7% of the surface is public green space. Whilst Haussmann redeveloped old and planned new parks, these were not located in the 9th arrondissement. The Grand Boulevards have trees planted along them, which do help to green the neighbourhood. Nevertheless, there is a clear sense of lack of open green space, which impacts on the resilience of the area's urban form. Recreational activities need to be sought elsewhere, outside of the immediate surroundings, and opportunities for resting on a park bench are restricted.

d. Social

The 9th arrondissement's urban form has accommodated a wide range and changing diversity of tenants and uses. It has proved to be adaptable to the new demands of its residents and visitors. At the end of the eighteenth century, Paris' upper class was living in the 9th arrondissement. The Quartier Chaussée d'Antin was a particularly fashionable neighbourhood with the aristocracy and the 'grande bourgeoisie'. However, once Haussmann's work was underway and it became a commercial centre, the upper classes moved to newly developing residential neighbourhoods such

	Professionals in leading positions (% of population)		Workers and employees (% of population)	
	1954	1999	1954	1999
Saint Georges	6	24	22	15
Chaussée d'Antin	5	21	26	19
Faubourg Montmartre	4	22	25	18
Rochechouart	5	23	26	18
9th arrondissement	5	23	24	17

Table 3: Professionals in leading positions and workers and employees as a percentage of the total population in 1954 and 1999 (Source: APUR (2005). Paris 1954/1999. Données statistique. 9e arrondissement. Paris, Atélier Parisien d'Urbanism)

Figure 23: Avenue de l'Opéra with the Paris Opera in the centre

Figure 24: Map of the 9th arrondissement proposing the cutting out of new boulevards (L'Atlas des 20 arrondissements de Paris de Eugene Andriveau-Goujon, 1868, Planche 7 (Source: Bibliothèque Historique de la Ville de Paris)

as Parc-de-Monceau in the north-west of Paris. The four different neighbourhoods then developed their own characteristics: Chaussée d'Antin developed its commercial characteristics; Saint-George in the north-west was preferred by artists; Rochechouart in the north-east was predominantly occupied by blue collar workers; and Faubourg Montmartre became home to Armenian, Jewish, and Greek immigrants who fled their countries. After the First World War, the 9th arrondissement increasingly lost its prestige and the district became more working class (Djergaian, 2007). From the second half of the twentieth century onwards, this trend has however reversed. As Table 1 shows, the percentage of professionals in leading positions has dramatically increased in the four neighbourhoods, whilst the percentage of workers and employees has decreased. There is also comparatively less social rented housing (3.6% compared to 5.9% in the Quartier Parc-de-Monceau and 17% in Paris) and more owner-occupied housing (40% compared to 35% in the Quartier Parc-de-Monceau and 33% in Paris) (Insee, RP2009 exploitation principale) (see Data section).

With Haussmann's redevelopment, the 9th arrondissement became an important business district. Banks such as the Société Générale, railway companies, newspapers such as Le Figaro, and the Grandes Magasins established themselves in the district. Between 1880 and 1910, around half of the companies listed on Paris' stock exchange were located in the 9th arrondissement (Mairie du Neuvième, 2012a). Additionally, the area became renowned for cultural consumption. Charles Garnier constructed the new Opera from 1862 onwards and theatres, later also cinemas, opened their doors, especially along the large boulevards. The commercial activities have, however, always been concentrated in the Quartier Chaussée d'Antin, where Haussmann's intervention was concentrated. The prestigious boulevards and buildings were best suited to accommodate these commercial and cultural activities and continue to do so today. The large cultural institutions have also remained in the neighbourhood. Interestingly however, the banks have increasingly moved away in the past ten years and their premises have been replaced by international retailers such as H&M or Apple. This has been for two reasons: on the one hand, the rents have significantly increased; on the other, banks saw an opportunity to create synergies by moving their departments, which had been previously scattered across the city, into larger office premises in the new business district of La Défense (Guedj, Interview, 2012). Thus, whilst the Quartier Chaussée d'Antin continues to be dominated by employment, with four employers per one resident (APUR, 2001), the companies providing this employment have changed.

Figure 25: View onto Rue de Châteaudun, 2012 (Source: Sabina Uffer)

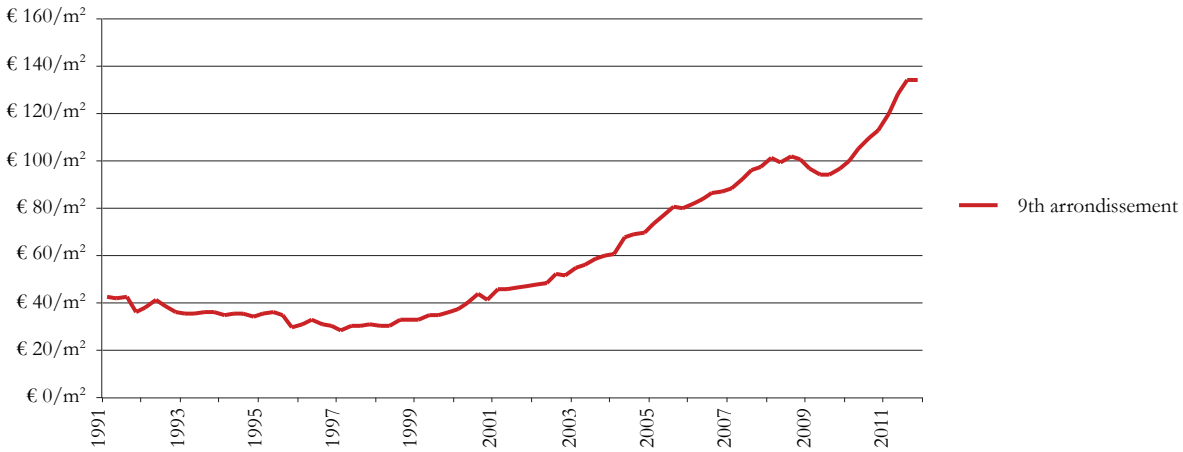
The relationship between urban form and use remains relatively static as a result of long-established planning regulatory frameworks. Other than the Quatier Chausée d'Antin, the neighbourhoods within the 9th arrondissement were mixed with small neighbourhood shops and cafes on the ground floors and residential units above. This situation has not significantly changed today due to the planning regulations in place, which define the uses and where change is relatively hard to achieve. In some streets, the state even determines the particular type of shop in order to protect artisans. Whilst the type of shop has not necessarily changed, the products on offer have started to change. These changes are visible in certain key streets, such as the Rue des Martyrs, an increasingly fashionable street. In number 13, Rue des Martyrs, for example, there used to be a florist. When this closed, the international cosmetic brand KIEHL'S put in an application to open a shop there. When this was rejected on the grounds of protecting artisans, KIEHL'S integrated a barber service into the shop and therefore received approval (Mairie du Neuvième, 2012b). There are thus subtle changes taking place, which are most apparent when tracing the development of the socio-economic diversity within the district.

e. Economic

The 9th arrondissement, especially the Western quartiers of Chausée d'Antin and Saint George, has always been one of the richest areas in Paris and continues to perform well today. A comparative table of annual rent levels in 1897 shows Chausée d'Antin in fourth position (577 Francs per year), just after the four Quartiers of the 8th arrondissement. St Georges is in ninth position (448 Francs per year). The rent levels of the ten most expensive quartiers (between 435 and 1025 Francs per year) are significantly higher than in the ten poorest quartiers (between 55 and 75 Francs per year). The picture of an affluent 9th arrondissement is confirmed when looking at poverty indexes at the time. In 1893, the 9th arrondissement was considered the second least deprived area, just after the 8th arrondissement: out of 1000 residents, only 20 were considered poor and there were 75.2 deaths before the age of one. This compares to 130 poor and 224.1 deaths before the age of one in the poorest arrondissement (20th) (Charle,1977).

In 2008, rent levels for residential units in the 9th arrondissement were slightly higher than Paris' average (19.3 as opposed to 19 Euros/m2). Due to the existence of rent regulations, different valuing systems apply to different apartments. A price of 22.10 Euros/m2 for a new occupant, for example, can be up to 25% higher than for someone who has been living in the apartment for six years. This is especially true for smaller apartments where turnaround is higher (APUR, 2010). During the years 2001 to 2009, square metre prices for residential units increased by 115.8% to 6,520 Euros/m2. This is higher than Paris as a whole, where prices have increased by 106.7%. The 9th arrondissement sits somewhere between the arrondissements of the north-east, where prices are relatively affordable, and the arrondissements of central-west where prices have been the highest (APUR, 2010).

The office market is well situated in the 9th arrondissement for several reasons: the excellent transport links; the central location with some of the most prestigious addresses (e.g. Boulevard Haussmann); cultural and social amenities such as theatres, the Paris Opera, and the Grandes Magasins; renovated and urban scale offices thanks to landowners' efforts to modernise in the 1990s; and lower rent levels than in some of the other business districts such as the 8th arrondissement or the Champs-Elysées. For example, in 2009, rent levels in the 9th arrondissement were 640 Euros/m2 compared to 678 Euros/m2 in Etoile near the Champs-Elysées (APUR, 2010).



Graph 3: Price index for old apartments in the 9th arrondissement (basis 2010) from 1991
(Source: Base Bien, Notaires, Paris -Il-de-France)

f. How resilient?

The 9th arrondissement's urban form has proved to be adaptable to land-use change and Haussmann's buildings have not only proven to be aesthetically popular over the years, but have also created long-term economic value. Its main drawback is the lack of green open space. In the absence of single landownership, a strong regulatory framework was, and continues to be, key to the resilient urban form.

6.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

The 9th arrondissement's urban form is closely linked to the urban transformation implemented by Haussmann. Paris rapidly developed during the industrial revolution from the 1840s onwards, when the creation of railways brought migrants to the city. A decade later, during the Second Empire (1852 – 1870), Paris was developed into the city we know today. In 1853, Napoleon III charged Baron George-Eugène Haussmann with reorganising Paris to promote economic activities by modernising the street networks, to clean up the city through improved sanitation, and make it more beautiful (Chapman, 1953, p. 182). To these problems, Haussmann responded with the much critisised destruction of the slums, the construction of a radial network of boulevards and new large residential quarters, as well as the creation of open spaces, the sewage and water supply systems, and the new Halles Centrales (Chapman, 1953).

Figure 26: Avenue de l'Opéra, 2012 (Source: Sabina Uffer)

Figure 27: Boulevard des Capucines, 2012 (Source: Sabina Uffer)

It was during this time that the 9th arrondissement, and in particular the Quartier Chaussée d'Antin, took the urban form remaining to this day. Haussmann's plan created incisions through the urban fabric in the form of new boulevards such as Boulevard Haussmann and the Rue Aubert. He then expropriated land adjacent to the sites of the boulevards, bulldozed the properties, re-parcelled the land and sold the parcels on for development. The planning regulations and construction guidelines set up for these undertakings had consequences which were much felt at the time, but which created a coherent urban form that has endured over time. These public work projects put public interest over the interest of private property owners, overruling any objections from private property owners.

The governance of this redevelopment was highly controversial. A particularly controversial aspect of Haussmann's urban redevelopment was the way he financed his plans, which promoted financial speculation. There were two ways of financing the expropriation followed by the construction of the new buildings and roads, both of which were used in the redevelopment of the 9th arrondissement. First, la régie: in the beginning, Haussmann used state intervention for the expropriation of land and the construction of his projects, because he initially had the funds available to do it himself. It was, however, also difficult to find private companies that were willing and able to stem the costs for such projects. This was due to the fact that initial investment for expropriation was high and it could take years to realise a profit through redevelopment. Thus Haussmann financed the construction of the new boulevards, speculating on recuperating the costs by selling the undeveloped land plots at a higher value once the street infrastructure was in place (Jordan, 1995, p. 233). He financed these undertakings in different ways: re-evaluating the estimates for revenue, increasing custom tariffs for the required construction material, and raising 'loans, grant subvention, and creating uncovered credits' in a rather unconventional way through a complex and interlocking system of financial institutions (Chapman, 1953, p. 189). Second, la concession: once the national parliament blocked further grants to Paris, but also because landowners and real estate developers wanted to get their share, Haussmann gave out concessions. In these cases, Haussmann defined the areas to be expropriated and the type of streets and buildings to be built. The investor however, had to finance the expropriation and the street building in advance, therefore acting like a creditor to

the state. Once the street was built, the state then paid a subsidy for the land the street was built on (Des Cars & Pinon, 2005). The investor hoped that re-selling the parcels for the development of the buildings would get him a high enough price to cover the expropriation and the construction of the streets, plus a profit. The often speculative nature of these investments led to the bankruptcy of developers.

Landowners and property developers thus increasingly financed Haussmann's street infrastructure projects. They acted however within strong regulatory conditions, which determined the urban form. These regulatory conditions started with the way Haussmann re-parcelled the land. Priority was given to the form of the boulevards. The re-parcelling system was then related to the outlines of the buildings that were to be constructed. The width of the buildings was often restricted. The parcels allowed an aristocratic and bourgeois clientele to build inner courtyards and gardens, already determined when the land was parcelled. Both the streets and the buildings on the newly parcelled land had to be built within a certain time frame. Investors were therefore not able to wait for better market conditions. Haussmann imposed conditions for the construction of the streets, closely monitoring each detail including the design of street furnishings such as gas lamps.

Similarly, the construction of the buildings was guided by a range of regulations. A general building regulation determined the height of the buildings, in proportion to the width of the streets. For example, for a street that was less than 7.8 metres long, the maximum height of the building was 11.7 metres. For the Grands Boulevards of 20 metres width, the height of the buildings could be 20 metres too, but no more than five storeys in addition to the ground floor were allowed. In addition to this general rule, each developer when acquiring a land parcel received construction guidelines accompanied by the contract. These guidelines were always the same and ensured the conformity of each parcel on one block. The buildings had to have the same height, the same principle lines along the façade, the same building block (ashlar), cornice, and ornaments. In some cases, especially along the Grands Boulevards, even the type of stone for ground floors and upper floors was determined (Pinon, 2002). Surprisingly though, apart from the requirement to create a unity on the block, there were no specific design requirements. There was, for example, no regulation to install a balcony on the first residential floor. Almost all buildings constructed during Haussmann's time or after have, however, such a balcony. Pinon argues that after some architects established a model, this was just reproduced based on a 'cultural consensus between architects and developers' (Pinon, 2002, p. 87, author's translation).

These planning regulations played a strong role in creating the coherent urban form that would otherwise not have been possible in the context of fragmented landownership. The relationship between fragmented landownership and strong planning regulation continues to be key to maintaining the urban form.

b. Contemporary land ownership, planning context and financing of infrastructure

In the absence of a single land owner, the government continues to play a strong role in the maintenance of the 9th arrondissement's resilient urban form. The fragmented landownership remains, and has even increased. In the 1930s, individual landlords, often owning not more than a few buildings, owned 90% of Paris' buildings. Today, this number has drastically decreased to 20%. This is mostly due to rapidly increasing co-ownership, where apartments within a building are owned by individual landlords. Co-ownership accounts for 40% of the buildings in Paris. This trend has also been seen in the 9th arrondissement. Table 2 illustrates the contemporary ownership structure in the 9th arrondissement.

The fragmented ownership creates challenges for the upkeep of the buildings or the adaptation to change. In Paris, strong state planning continues to exist to this day and is taking on a stewardship role. There are three levels of regulation that exemplify the role state planning plays. First, the city of Paris has protected around 5,000 buildings, predominantly in the inner city districts such as the 9th arrondissement. Any changes to these buildings or their surrounding buildings have to be approved by a commission of architects and

Ownership Type	9th arrondissement (%)
Co-ownership	41.81
Physical persons	20.74
City of Paris	8.93
Insurance Companies and Pension Funds	3.05
Banks	2.46
Real Estate Companies	2.18
Commercial Companies	8.25
Church	0.05
Civil Real Estate Societies	6.77
State (France)	4.41
Others	1.35
Total	100

Table 4: Ownership structure in 2002
(Source: De Moncan (2002))

planners (Architectes des Bâtiments de France). The style, building envelope, and stone cannot be changed in these buildings. The interior can however be adapted if planning permission has been given. In recent years this has led to what is referred to as 'façadism' – equivalent to 'façade retention' in the UK. Especially in the 9th arrondissement, old buildings have been redeveloped to modern needs. These have been entirely gutted and reconstructed. Only the building envelope with the façade has been kept, in line with planning regulations. These undertakings can be time consuming and costly for the property owner.

The second level of planning regulation is the Plan Local d'Urbanism (PLU) that defines the height, density, and the land use of the block. This ensures the mix between residential and commercial uses. For example, when a block is designated as 'protection for residential units', which most of central and west of Paris is, it is very difficult to turn residential units into office space. The district administration can, for example, require compensation where residential space is transformed to other uses (Revue de l'habitat, 2011). Upgrading existing office space is, however, possible, and changing office space to residential units is simpler. However, in these cases, regulations require that part of the residential units be let as social housing. Whilst in certain areas of Paris, residential units would be much more profitable, these transformations do not take place particularly often. This is for two reasons: First, having to integrate social housing stops owners from doing it. Second, residential units have more constraining rent regulations making it not only difficult to raise rent levels, but also to evict difficult tenants (Moncan, Interview, 2012). The PLU also protects particular streets that are well-known for their artisan shops. In these streets, if an artisan shop closes it cannot be replaced by another type of shop (see KIEHL'S example above).

The third level of regulation is the compulsory restoration of the historical facades. This is to ensure that the buildings remain in good condition and abide by health standards. The city administration sends out inspectors who record the buildings in poor conditions and request property owners to improve these. Usually, the property owners also have an interest in maintaining their properties, especially for office units where the façade forms an important part their image. In addition, residential units are well maintained because generally, it is the better-off people that live in the historical centre of Paris. The most difficult buildings to maintain are the ones in co-ownership. Here, maintenance depends to a great extent on the 'financial health' of the co-ownership (Lhenaff and Mohrt, Interview, 2012).

In the case of Paris, and especially the historical neighbourhoods such as the 9th arrondissement, the drawbacks of fragmented landownership are held at bay by strong planning. The state plays a crucial role in maintaining the district's urban form. The urban fabric of the late nineteenth-century buildings have proved adaptable to different uses. The constraining regulations, however, potentially impair this adaptability. At the same time, the regulations protect the diversity of uses catering for the local residents and the urban fabric that Paris stands for. Interestingly, these constraining regulations seem to be widely accepted, from real estate investors to tenants, because it is generally agreed that the particular urban fabric but also the diversity of uses make a significant contribution to the economic resilience of these districts. Prices for apartments in the 9th arrondissement have almost continuously increased in the past twenty years, with little loss during periods of economic downturn.

6.3 Concluding points

- **Resilience:** the protection of the urban form from redevelopment from the street perspective, combined with redevelopment of interiors, has helped to create value from an economic perspective over time.
- **Ownership:** in the absence of single ownership, strong planning regulations have been key to managing and maintaining the urban form and its resilience over time.
- **Planning:** urban scale planning can be achieved by state intervention, restricting private property interests. More in-depth historical study would provide scope for reflecting on the multiple interpretations of the public benefits resulting from this.
- **Financing Infrastructure:** Debt/speculative financing carries risks for the investor due to the time gap between infrastructure financing and recouping the increased value.

7.0

NEW YORK

Hudson Square

The New York case study is defined by the boundaries of the neighbourhood business improvement district Hudson Square Connection. An area of about 0.3km², Hudson Square forms part of the oldest area of development in Manhattan and is located between Tribeca and the West Village. Originally developed from 1705 for housing and institutions - notably King's College (today's Columbia University) – and following a simple plan of rectangular blocks, it was rebuilt in the early twentieth century for industrial, and predominantly printing, use. Currently, it is undergoing another transformation; this time towards more mixed use occupation. The buildings are typically deep plan and up to 23 storeys high. Hudson Square was originally part of a larger land holding (215 acres or approximately 1km²) owned by Trinity Church. Whilst today landownership is quite fragmented, Trinity still holds 8% of the original land, mostly within the boundaries of the Hudson Square connection. As the largest landholder within this neighbourhood, Trinity plays a major role in the current transformation process. The case illustrates the potential consequences of the piecemeal sale of an original urban scale landholding over time. The study reflects on the consequences of such a disintegration of landownership and on ways in which the original landowners have endeavoured to counteract these, for example through their strong participation in the governance of a Business Improvement District (BID).

Figure 28: Hudson Square (Source: Trinity Real Estate)

7.1 Measures of Resilience

a. Physical: density

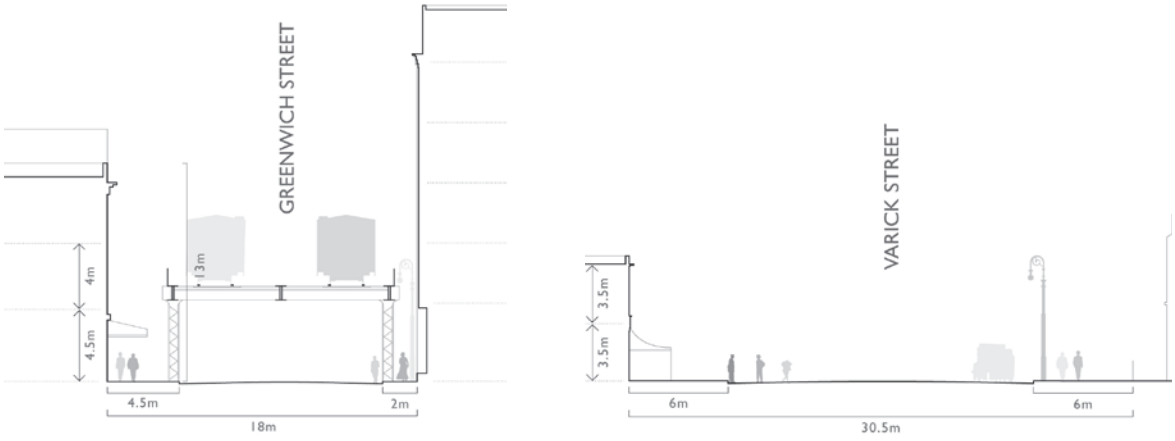
The physical density, in terms of land coverage and floor area ratio, provides Hudson Square with certain preconditions for creating a vibrant urban place. However, due to its industrial past, the area's population density is relatively low and has therefore not (yet) generated a diversity of activities. Hudson Square has a site coverage of almost 50% and a floor area ratio (FAR) of 4.6. The relatively low levels of land coverage by buildings reflects the wide streets and pavements. The area also includes open space, most often used for parking or undeveloped backyards, again an indication of its industrial past. The relatively high FAR figure is a reflection of a combination of the depth of the blocks and the height of the buildings.

Historically, Hudson Square was a residential neighbourhood. At the beginning of the twentieth century, Trinity transformed Hudson Square into an industrial, predominantly printing, area. In the last decade, the area has become more residential again. This transformation is reflected in the historical population density. In 1910, the area accommodated a population density of 100 to 499 residents per acre (between 40 to 200 per hectare). In 1930, the population density decreased to 25-249 residents per acre (between 1 to 100 per hectare) (Department of City Planning, 2012). Today, Hudson Square has a population density of 78 residents per hectare. Compared to other parts of Manhattan with an average of 258 residents per hectare, Hudson Square's residential density is still relatively low. This reflects the on-going light industrial and business uses in the area. However, Lower Manhattan (defined as the portion of Manhattan below 14th street) as a whole is one of New York City's fastest-growing residential neighbourhoods. Throughout Lower Manhattan in general, 15 million square feet of conversions from office to residential units have taken place since 2001 (Downtown Alliance, 2011) and its population has more than doubled since then. This has already had a significant impact on population density in Hudson Square and this is envisaged to continue.

b. Physical: Adaptability of street layout and building type

Hudson Square's urban form is characterised by wide streets up to 31m across and dense built fabric lining plot boundaries and dominated by large commercial and industrial buildings. Hudson Square's wide streets reflect the area's industrial past when they often doubled as routes for elevated railways or accommodated road level cargo train lines. With post-industrialisation and transforming patterns and modes of transportation in the area and across the city more broadly, many of these streets have been adapted over the course of

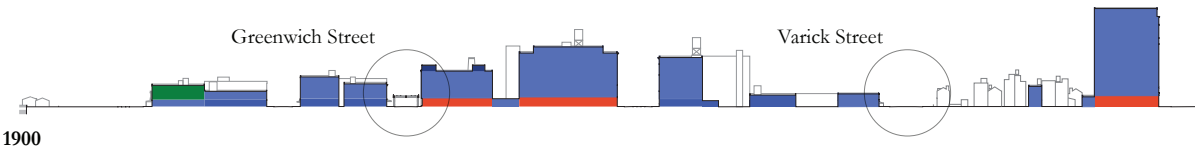
Figure 29: The location of Trinity's original landholding (in blue) and Hudson Square (in red) within central New York (Source: Google Earth)



1900

2012

Figure 30: Diagram illustrating comparative street sections



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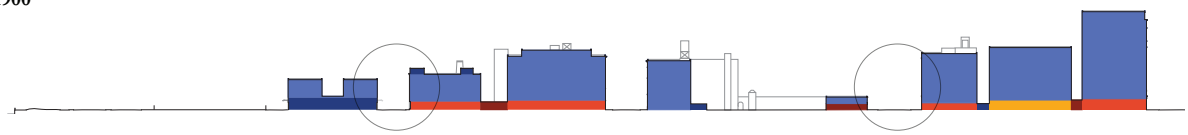


2012

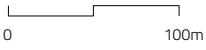


Figure 31: Diagrammatic section illustrating evolving land uses through time

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

Section through Hudson Square

the last century. Figure 20 illustrates this through its comparative sections through Greenwich Street in 1900 and 2012. The pavements tend to be generous at between 2 and 6 metres, though they are not particularly heavily used by pedestrians owing to a lack of shops and services at ground level. This generosity creates the potential for future adaptability as ground level use is transformed through the steady adaptation and renovation of the built fabric. There are already plans in place to implement such changes, which include tree-planting along the pavements and creating seating areas to encourage the more varied and continual use which typifies the urban boulevards of Paris.

Hudson Square is an example of a development which has been radically transformed since its inception. Although the area was first developed in the eighteenth century for residential and institutional use, much of the fabric existing today is a product of late nineteenth and early twentieth century redevelopment. Only three blocks located between Charlton, King and Vandam Streets still strongly betray the hallmarks of eighteenth-century terraced townhouse urban form and include buildings of that era. Overall, the urban fabric is a collection of 2-15 storey buildings. The late-ninetieth to early twentieth century architecture, much of it developed for the printing industry which served the business world of Manhattan up until the 1980s, comprises 6-10 storey buildings. These are typically deep-plan, steel framed structures assembled into urban blocks with large floor plates and the ability to support large floor loads. They have notably high ceilings at 4.5-7.5 m between ground and first floor levels and at 4-5 m between floors above ground, creating scope for accommodating industrial, retail, business or residential uses. Whilst their deep-plans create some challenges for reuse owing to difficulties of accessing natural ventilation and daylight, the open internal layouts and structural bays of around 3 x 6 metres create flexibility for varied arrangements of subdivided or open-plan uses. For the most, changes of use from the days of the printing industry have been limited to new industrial and commercial uses, though there have continued to be issues of high vacancy in the area. Given its Downtown location, high vacancy levels would appear to suggest that the urban form is not particularly adaptable to reuse. Research suggests that building conversions, particularly to non-industrial or commercial uses have been hindered less by the urban form than by Hudson Square's zoning as M1-5 and M1-6 (medium to high density manufacturing and commercial development), which prohibits conversions and developments for other purposes. At the time of writing, Trinity has submitted a proposal to The New York City Department of City Planning for rezoning the area. If rezoning goes ahead, the area could undergo rapid transformation from 2013 onwards (including some redevelopment and densification in the M1-5 areas) reflecting real

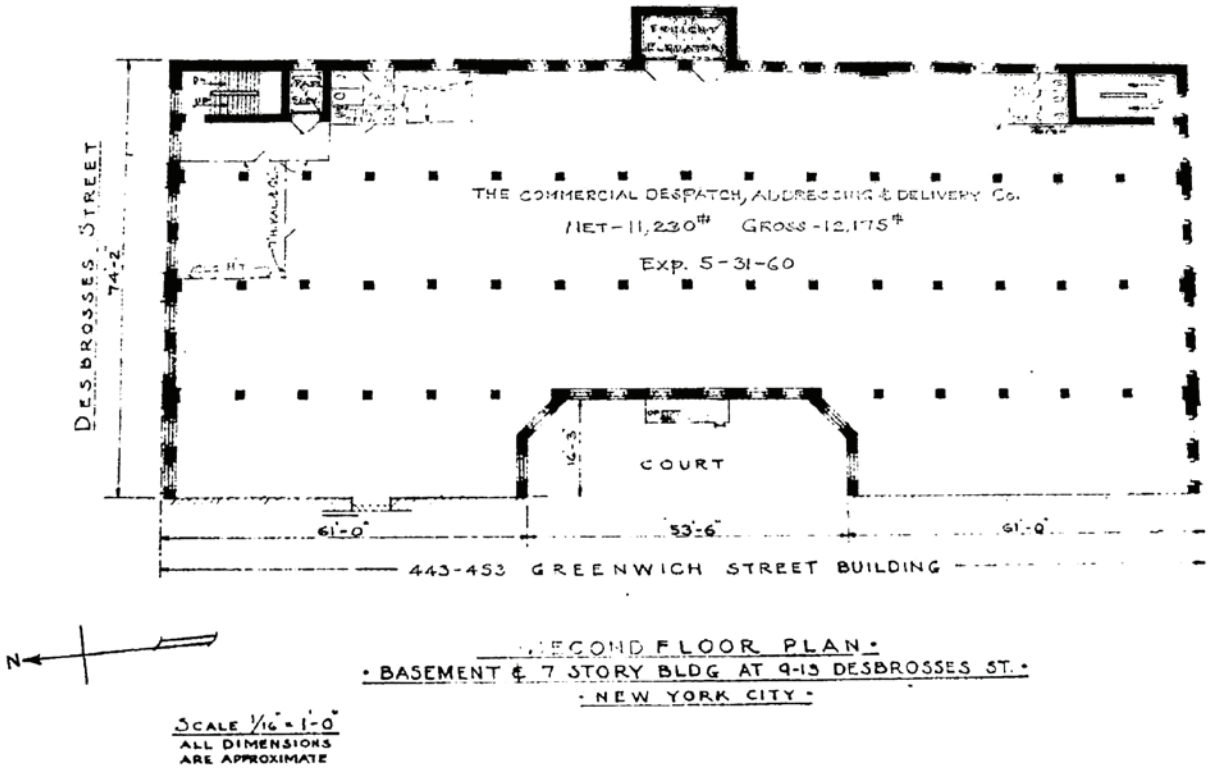


Figure 32: Historical floor plate of the second floor of an industrial building (Source: Trinity Archives)

development pressures, the residential densification of Downtown Manhattan and the current popularity of industrial-era buildings for residential re-use.

c. Environmental

Hudson Square is served by the five subway lines 1, 2 and A, C, E. While none of these are express subway lines, Hudson Square is well connected in comparison to other parts of New York, as shown by maps measuring relative commuting times.

Because of the way in which the case developed historically, including the predominance of industrial use in the twentieth century, the urban form integrates little open space. The tendency to maximise development was a feature of New York's growth during the nineteenth century, reflecting the scarcity of land and the premium value attached to it. St John's Square, forming part of the historical land holding, was one exception to this, although the quality of this open space has been erased over time.

Associated with current efforts (assisted by Trinity) to turn the area into a more mixed-use environment, the Hudson Square Connection has initiated and in part financed four new open spaces: Hudson Square Courtyard, LentSpace, Park at Spring + Sixth and Urban Plaza at Trump. The purpose of these has been to create more recreational outdoor space in the area, including some greening of this traditionally hard landscape (Hudson Square Connection, 2012).

Figure 33: Former industrial buildings that are converted into office space for IT start-ups, 2011 (Source: Juliet Davis)

Figure 34: Former industrial buildings awaiting conversion, adaptation and/or redevelopment, 2011 (Source: Juliet Davis)

d. Social

The industrial buildings provide the opportunity to adapt to socio-economic changes without comprehensive redevelopment. Planning regulations need, however, to allow for this change. Throughout most of the twentieth century, Hudson Square was home to the printing industry. Whilst the general pattern of industrial use (1564 units) continues to this day, the decline of the traditional printing industry provides strong motivation for change. From the 1980s onwards, the printing industry was revolutionised and this created major challenges for Hudson Square. Whilst the rezoning of Lower Manhattan began in the 1980s (Weisbrod, Interview, 2011), Hudson Square was reaffirmed as a manufacturing area which created a lot of vacancy in the Hudson Square buildings. Falling rent levels started to attract creative and high-tech companies of a medium to small scale. In 2011, 28% of the leasing went to technology-driven firms (Agovino, 2012). Office uses have generated a demand for restaurants and shops in the area.

This process of retail development has begun but is still far from complete, as reflected in the ground floor use map where a relatively high percentage of the space is either under construction or vacant. In spite of the successful conversion of industrial to office space, Trinity claims that there continue to be high commercial vacancy rates (see Bubny, 2012). This could reflect the relative impoverishment of the area in terms of restaurants, shops and public space, which office tenants are reported to have complained about (Agovino, 2012). Change of ground floor uses in the direction of more retail is likely to continue apace from 2013. It may be anticipated that, with residential development on the horizon, pressure will be created for the enhancement and multiplication of social amenities which are currently lacking in the area. Amenities in Lower Manhattan as a whole are said to have improved substantially, helping to create a surge of residential development (Downtown Alliance, 2011). Trinity and the neighbourhood BID Hudson Square Connection are pressing for further change towards a more mixed use environment through re-zoning (a public review process began in August 2012) and further improvement of the public realm.

e. Economic

Residential values within the area are high compared to the rest of Manhattan and New York. They have risen almost continuously since 1995 with a small dip following 09/11 and another following the global

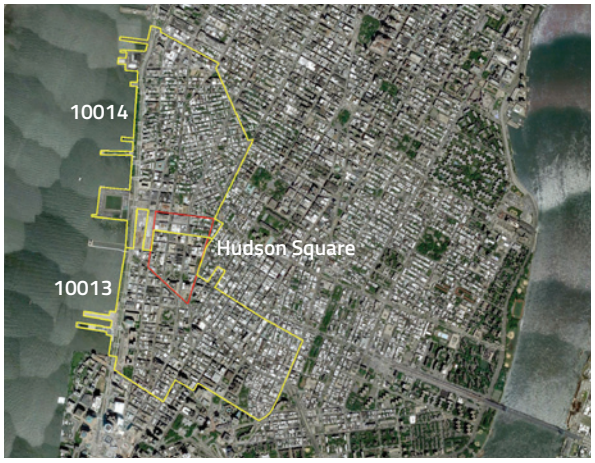
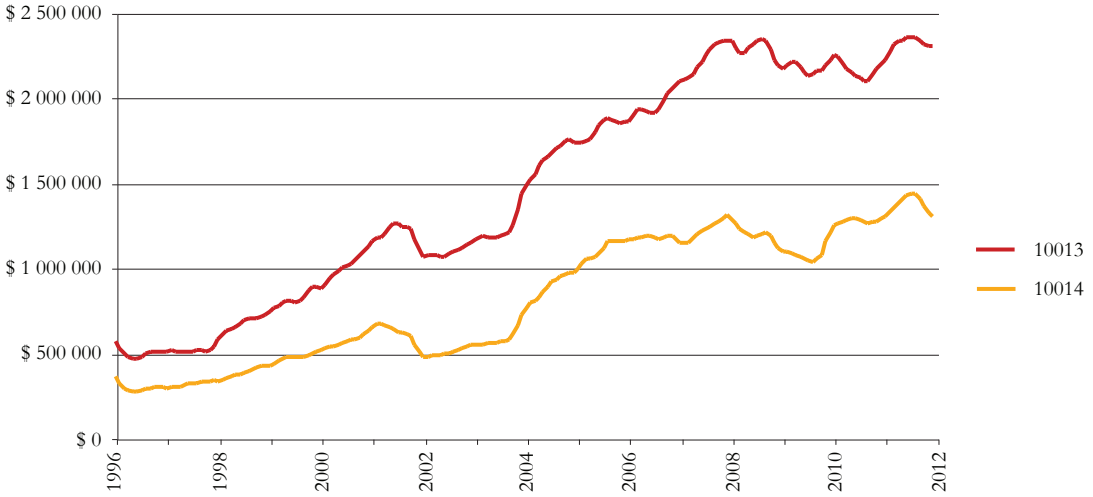


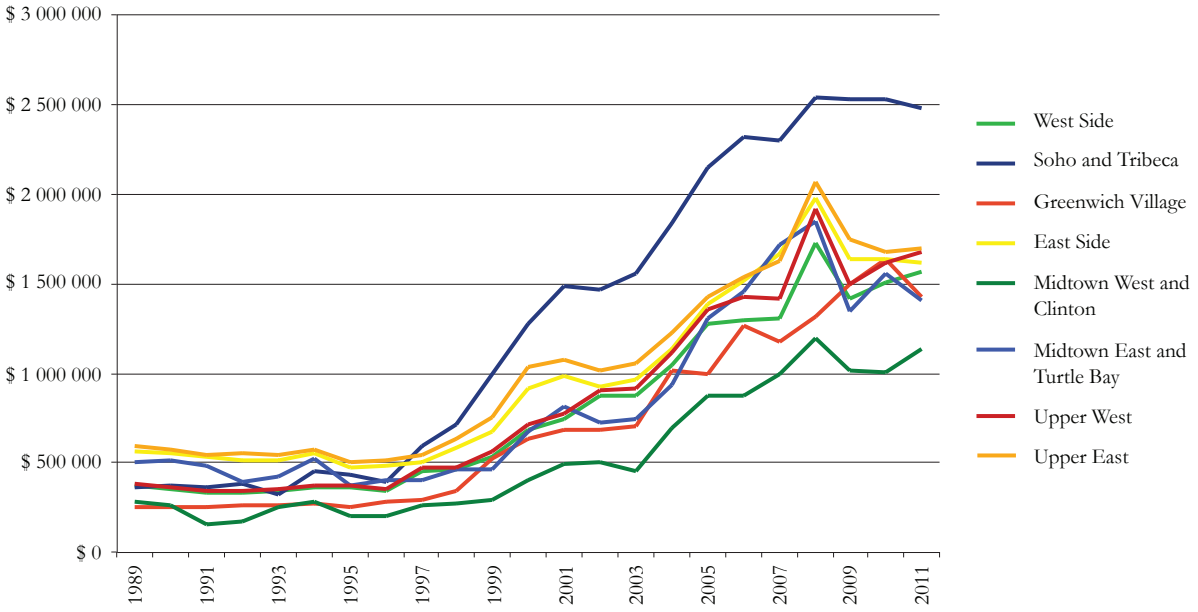
Figure 35: ZIP codes locating Graph 4 data below

financial crisis in 2008 (Zillow Home Value Index, April 2012). All of Trinity's properties are currently leased to businesses, and thus office rental value is an important consideration in this particular case.

The rental values attracted by Trinity for its properties have historically been low for Manhattan – relating to the gradual conversion of industrial buildings into office spaces. Over the past decade, the area has seen a rise in its economic value. Leasing activities more than doubled over this period, occupancy rates rose from 84% to 92% and rents increased by 26%, outpacing the average increase across Manhattan of 5% (Agovino, 2012). Notwithstanding, a 2012 study by Rockwood Capital



Graph 4: Residential property prices for ZIP codes 10013 and 10014 taken annually in May from 1996, see ZIP code areas in Figure 42 above (Source: Zillow Home Value Index)



Graph 5: Average Sales Price for Co-ops and Condos in different Manhattan Area from 1989
(Source: Miller Samuel Inc. Real Estate Appraisers & Consultants Aggregate Data)

suggests that whilst office rental and retail values in the meatpacking district have escalated dramatically since 2007 – exemplified by 111 Eighth Avenue, the building now owned by Google – the value increase of Trinity's properties has been more modest. Arguably, this reflects Trinity's business strategy.

f. How resilient?

Hudson Square's urban form has proven resilient, to a degree, in terms of its capacity to accommodate different uses. However, it lacks the mixed-use activities and public realm that create a vibrant neighbourhood where people want to live and visit. The potential of the site and urban fabric to adapt to socio-economic change and become more vibrant has been hindered by its governance: Trinity's hands-off approach on the one hand and restrictive zoning regulations on the other.

7.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

Hudson Square is part of Trinity's original land holding. Its historical development and the particular form it took over time thus needs to be viewed in the context of Trinity's governance of its land holding. In 1705 Trinity Church received the land as a 'grant in fee' from the New York Governor Cornbury in the name of Queen Anne, although also 'at a nominal rent of three shillings' (The New York Times, 1859). This subsequently created confusion as to the actual land title. In spite of these contestations and the breakup of large landholdings across Manhattan in general, Trinity managed to remain in possession of the land, only divesting itself of some of it during a period of financial hardship. Whilst today Trinity holds just 15 acres – or 8% – of the original land grant, it has managed a significant land holding for more than three hundred years and remains one of the largest and oldest landholders in Manhattan.

The idea behind the grant to Trinity as an Episcopal Church was to have the church play a role in transforming civic life. According to former Trinity president Carl Weisbrod, the grant of land under Queen Anne was made for two key reasons: first, to create an endowment for the church and second, to provide the means to promote British institutions. In the early years, Trinity raised revenues by owning and leasing land. A rational plan of rectangular blocks was developed in 1750 for the purposes of subdividing land for development. This plan was drawn up before the production of the 1811 Commissioners' Plan for New York and thus represents a system of planning by individual land owners rather than the city's authorities (Ballon, 2012, p. 18). Still visible today, Trinity's plan was drawn up in parallel to the Hudson River. Within Trinity's rational plan, some attention was paid to creating a townscape, as illustrated by the creation of St. John's park residential project, which also included a church. In the 1760s and 1770s, Trinity Church, granted nearly two hundred leases for lots on its land holding, many to cart men, carpenters, and mechanics who could no longer compete with merchants for land at the centre of the port (Blackmar, 1979). Trinity also provided land for a number of institutions, notably New York Hospital and King's College (later Columbia University) and several churches, including St Paul's Chapel which survives to this day.

From 1850 onwards, Trinity relied on the income from its leaseholds and collected seventy to eighty thousand dollars a year. However, after the Civil War, Trinity faced a debt crisis and needed to sell land in order to restore its balance sheet. With rising land prices, residential use was pushed out of the area. The space available for any 'non-profit' land use grew more and more restricted and institutions moved out and uptown. At the same time green spaces were disappearing due to market pressures (Scobey, 2002). St. John's Park, which had been a green oasis, was transformed into a freight depot and St John's church, which had presided over the space, was knocked down in 1918. At the beginning of the twentieth century, Trinity's remaining residential units were increasingly criticised for their poor conditions. Trinity did not control the transformation in land use because 'it saw itself as more of a property manager than a developer. It allowed lessees to do what they wanted with the land' (Weisbrod, Interview, 2011). This hands-off approach backfired in the 1920s, when Trinity became liable for the mortgage defaults of ground lessees who had been affected by the Great Depression. After the Great Depression, Trinity leased its properties long-term to developers. The focus became commercial rather than residential and as a result the area was consolidated as a site for manufacturing. Thus Trinity's legacy of incubating institutions, which formed part of the motivation for the original land bequest, was lost through industrialisation and market forces. Trinity's hands-off approach is in stark contrast to other long-term land owners covered as part of this study.

b. Contemporary land ownership, planning context and financing of infrastructure

Interesting in the case of Trinity is the potential tension within the church of running real estate in a non-religious fashion. Trinity, as Weisbrod argues, 'is in the business of making money, but it is not limited by quarterly dividends and has no debt. The only pressure created by the church is to create money for church operations and philanthropic activities'. All the net revenue from its land holding is dedicated to supporting the Church and its charitable activities. This creates the need to continuously address the question of to what extent Trinity is an 'endowment' and to

what extent a 'mission'. The endowment approach would suggest focusing on optimising development, whereas the mission approach would place greater emphasis on the social impacts of different types of investments - tackling issues such as affordability and sustainability. Historically, the mission approach was not a priority for Trinity, as illustrated by the decision not to provide social housing 'just because that's a social good' (Weisbrod, Interview, 2011). However being a church and being expected to reflect a certain ethos makes Trinity sensitive about its public image.

Today, Trinity church owns around 40% of the buildings in Hudson Square. Whilst Trinity has lost control over the whole of the land, it now plays an active role in the development of Hudson Square. Seeing itself as a 'neighbourhood steward' and thinking in the long-term (Trinity Real Estate, 2012), it has started to take a more hands-on approach. Confronted with increasing levels of vacancy after the decline of the traditional printing industry, Trinity adapted its buildings as commercial spaces, demonstrating its new preparedness to be active rather than allowing the market to do what it wanted. It actively participates in the Hudson Square Business Improvement District (BID). The BID is being used to make the neighbourhood 'more inviting, safer, and greener' by creating open space, retail stores, cafés, bookstores and other community staples (Bubny, 2012). Trinity is also placing pressure on the planning authority to re-zone to facilitate residential development. The current zoning does also not have any height restrictions, leading – according to Trinity – to 'Trump-style' developments and 'big-box' stores. Alongside the desire to create a more mixed-use urban environment, Trinity also aims to preserve the small scale creative industry in the area, thus acting in a stewardship capacity with respect to use.

The re-zoning of New York City's single-use zoning map of the 1960s began in the 1980s, but really took off under Bloomberg's administration in the last decade. With this new approach to zoning, state planning moves away from a blanket zoning system towards a place-based approach, taking into account local characteristics when considering redevelopment (Ronderos, 2008). The re-zoning of Lower Manhattan also led to its conversion from manufacturing and commercial space to residential use. Residential values have made this transformation increasingly attractive over recent years (Downtown Alliance, 2011). This is also reflected in the increase in residential density in Lower Manhattan (Department of City Planning, 2012). However whilst Tribeca, just south of Hudson Square, and other areas in Lower Manhattan have been re-zoned, Hudson Square continues to be zoned as manufacturing. This is still impacting on Trinity's efforts to transform the area into a mixed-use neighbourhood. It is also impacting on its economic value. Trinity therefore proposed a re-zoning that would essentially protect Hudson Square's urban scale industrial buildings from demolition and therefore the IT and creative companies that have installed themselves in the area; limit height for new development; allow for residential developments; allow for the development of a school; and prohibit night clubs and large hotels (Trinity Real Estate, 2012). Opposition to the re-zoning plan from the community seems marginal, with concern focused on the consequences for the historical district of the South Village just adjacent to Hudson Square (Hogarty, 2012).

Hudson Square is in the middle of a transformation from its industrial past to a mixed-use urban space. Whilst historically Trinity was not specifically concerned with long-term stewardship, its role has changed considerably over the last two decades. In the absence of control over its original landholding, it has tried to regain influence through a consortium of different landowners. It has been in collaboration with the neighbourhood business improvement district that Trinity has pushed for the area to adapt, to reflect socio-economic changes. Once the zoning restrictions are lifted, it remains to be seen how well the area is able to adapt. However, the preconditions for a successful transformation seem to be in place.

7.3 Concluding points

- **Resilience:** the industrial fabric has the potential to be adapted to different uses, especially once this process is supported by re-zoning. However, the lack of a diverse range of uses, social amenities, and a green public realm continues to impact on economic value and use.
- **Ownership:** selling off the landholding over time results in loss of control over value (economic and wider) management that cannot entirely be made up for by new governance structures such as a BID.
- **Planning:** zoning regulations can impede change and the optimisation of use potentials.
- **Financing Infrastructure:** a consortia of local landowners can become powerful agents in lobbying and financing for the improvement of the public realm.

8.0

IRVINE

Woodbury

Woodbury (5.23km²) is one of the sixteen villages of Irvine, an incorporated city in Orange County, California. The boundaries of the City of Irvine (172km²) have been formed gradually over the last fifty years through the build out of the Irvine Ranch, an extensive former agricultural landholding dating from the eighteenth century. The Irvine Ranch was master planned between 1959 and 1977, gradually resulting in a collection of low-density residential developments, linked to a series of locally and regionally scaled commercial, business, civic and educational centres. Woodbury, which 'opened' in 2004, comprises an orthogonally planned 'village' of two to four storey high residential buildings located around a 'commons' area of social amenities including a school, and with a commercial centre at the north-eastern edge of the village. Owned by the Irvine family from 1864 up until 1977 and managed thereafter by their legacy organisation the Irvine Company, the ranch represents a unique model of continuous land ownership, coupled with the gradual urbanisation of a portion of coastal California. This managed development process has created the possibility of a considered approach to the realisation of urban fabric on a regional scale over time, which is unique in the context of Orange County and Los Angeles.

Figure 36: Domestic architecture and streetscaping in Woodbury, Irvine, 2011 (Source: Juliet Davis)

8.1 Measures of Resilience

a. Physical: density

Around 20% of Woodbury is covered in buildings and the floor area ratio is 0.4. This degree of land cover is low in comparison to the other cases described above, but higher than the average for Orange County with a floor area ratio of 0.3. A large proportion of the land is given over to roads and car parks, revealing the dominance of car mobility in Irvine. The City of Irvine's planning regulations have been key to maintaining a low intensity approach to development. The Zoning Ordinance of the City of Irvine states that in Woodbury, no development should exceed 31.0 dwelling units per net acre. In Irvine this density is regarded as 'Medium' to 'Medium High' density. This density is reflected in various types of 'attached product' and apartments in blocks of up to three storeys. In most other areas in Irvine, dwelling density is however even lower, limited in places to a mere 12.5 dwelling units per net acre. The higher density of Woodbury meant that it was possible to give back land to the public realm in the form of a 'commons' and neighbourhood pocket parks.

Irvine's population is 224,000, spread over an area three times the size of Manhattan Island. Woodbury has a population of just under 8,000. In terms of population density, Woodbury has an average density of 31 persons per hectare. This number is considerably higher than the population density of Irvine as a whole with 13 persons per hectare, and Orange County with 14 persons per hectare. It remains to be seen what this means for the adaptability of the city's urban form and fabric over time as regards the sustainability of mixed uses and values. In terms of the environmental measure of resilience, as discussed below, it signifies the continued dependence of residents on private vehicles in order to access the functions and services of the wider city.

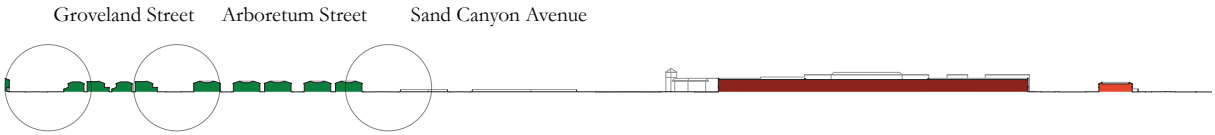
b. Physical: adaptability of street layout and building type

Irvine's road and street network is devoted to car infrastructure. The streets of Irvine vary substantially in width depending on the type and degree of their connectivity. The Ranch is traversed by major arterial highways including The San Diego Freeway, Santa Ana Freeway and the San Joaquin Hills Transportation Corridor. These vast roads are 50-100 metres across and accommodate 6-8 lanes of traffic (not including slip roads and junctions). Even the primary roads which form part of the Irvine masterplan are capacious six lane avenues. Within Woodbury, the road which provides access from each of the main residential portions of the village back to the general Irvine road network and the retail centre is four lanes wide, whilst the secondary streets are all two lanes wide. These highways and roads are difficult for pedestrians to cross and thus serve to reinforce the compartmentalisation of the city's residential areas into compounds rather

Figure 37: The location of Woodbury (in red) within the City of Irvine (in purple) (Source: Google Earth)

2012

Figure 38: Diagram illustrating comparative street sections



2012

Figure 39: Diagrammatic section illustrating evolving land uses through time

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

Section through Woodbury

than porous neighbourhoods. One benefit of the roads, however, is the capacity to integrate other forms of transportation such as buses and bikes in discreet lanes. In some areas, these modes of transport have already been integrated. A network of bike lanes spans the entire land area of the Irvine Ranch and a Rapid Bus Transit system connecting many of the villages to commercial, industrial and educational hubs has recently been developed.

The adaptability of buildings is unproven, since changes of use have not, as yet, occurred very much across the ranch. There are examples however of areas across Irvine where the uses first designated to development have succeeded in economic terms to a greater or lesser extent. This may be regarded as a measure, if not of adaptability, then at least of adequate fit between urban form and intended use over time. For example, retail planned at the heart of residential villages has often struggled to attract tenants in comparison to that planned at the edges (which can pick up passing as well as local customers) (Interview, Lehman, 2011). Aspects of urban form that may impact negatively on adaptability over time include the low density nature of development and a tendency across the city for uses to be segregated. The existence of regulations accompanying the sale of houses to private buyers – which has an impact on their capacity to change the appearance of their properties – also plays a role in limiting the adaptability of homes over time. These regulations may have a positive impact on values, as they protect the townscape of each development - something that the Irvine Company placed enormous emphasis on in their design and marketing. A variety of styles of home were created by different developers to suit different architectural tastes as well as a variety of property sizes and dwelling types. However, long-term, the emphasis on style and architectural unity may stifle change and have a negative impact on values.

c. Environmental

Though the urban forms developed across the Irvine Ranch reflect the dominance of private car transportation, Woodbury itself was designed to be walkable. There is a maximum twenty minute walking distance from any home to the 'commons' at the heart of the village and ten minutes to the pocket parks located at the heart of each 'community'. Woodbury is also accessible via a combination of planned on and off-street bikeways to all the other villages, the University of California at Irvine and Spectrum, the regional shopping centre. Woodbury is connected via the bus network to all other areas of the city, including the two regional train stations that serve Irvine as a whole. The principal

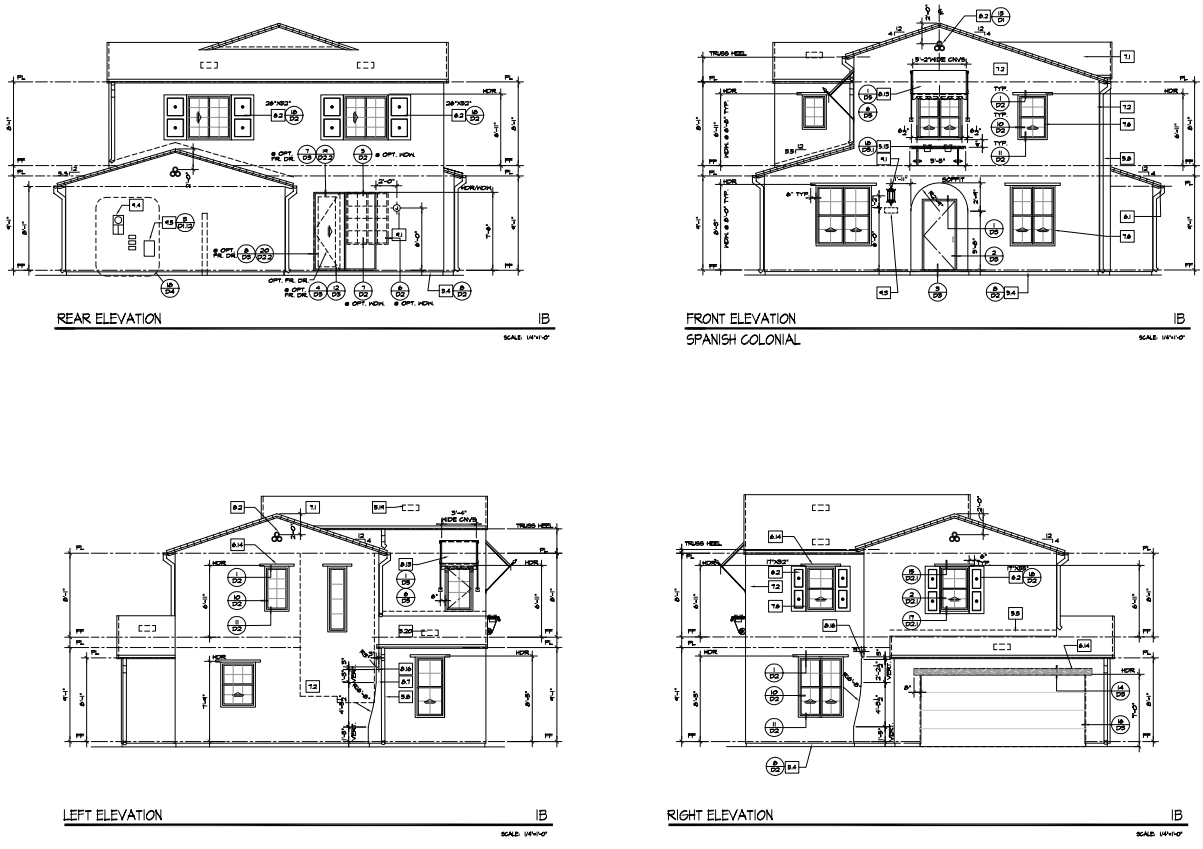


Figure 40: The scale and form of Woodbury's domestic architecture, 2004 (Source: The Irvine Company)

train station is located within the Irvine Transportation Center, a multi-modal hub including rail, bus and local shuttles. Irvine Station is the 14th busiest Amtrak station in the US ahead of Seattle, Portland and the Bay area. Irvine Transportation Center is also a 'Flyaway Lot' for the express bus service to LA's international airport, LAX. In other words, whilst the urban form of Woodbury reflects the dominance of private car-based transportation, it is not impossible to use other forms of transport.

For more than a century, the Irvine Company has made the conservation of its land – for both recreational purposes and the protection of ecologically sensitive habitats – a cornerstone of long-term planning. This approach began in 1897, with a gift of land to the County of Orange which became Irvine Regional Park. Since then, the Irvine Company has worked with municipalities, conservationists and resource agencies to permanently protect more than 50,000 acres of land. Financing this has been made possible by a combination of donations, land sales, development agreements and ballot measures. The result – known as the Irvine Ranch Land Reserve® – is a network of public and private land that is protected in perpetuity as wilderness, greenbelts, parks and recreation areas. According to the Irvine Company urban designer Rob Elliott, the City of Irvine has one of the most extensive urban open space systems of any city in the U.S. Parks and open spaces form not only part of the wider vision for the ranch, but are also embedded in the plans for each village. In Woodbury, a largely open space referred to as 'the Commons' was conceived as the social 'heart' of the village. It includes a primary school set, a sports centre and a park. The Commons is linked by a promenade that connects it to the shopping centre in the northern corner of the development.

Figure 41: The dependence of Woodbury's residents on the private car is reflected in the urban form of lanes serving individual carports, 2011 (Source: Juliet Davis)

Figure 42: Spectrum Shopping Centre, 2011 (Source: Juliet Davis)

d. Social

The city is divided into large blocks dominated mostly by single uses, which has the effect of concentrating activity in different areas at different times of day. Residential areas are to a large degree dormitories as far as the working population is concerned, whilst business and commercial areas are active only during the day. Across Irvine, the population to jobs ratio is between 1:3 and 1:4, a situation which drives real estate values and keeps commuter distances low relative to the rest of the State of California and Orange County. Notwithstanding, Woodbury does contain a mix of uses, geared predominantly to family life. As at the larger scale of the city, different uses are concentrated in specific areas. Social amenities including a school, recreational facilities and club house (9.3 acre recreation centre) are located at the heart of the development whilst retail in the form of Woodbury Town Center, as discussed above, is situated on the edge. The logic of this arrangement relates to the ways in which developers in the U.S. specialise according to use as well as to wider cultural expectations and aspirations connected to suburban lifestyles and development. Though the retail is publically accessible, the recreational facilities are not truly public, being offered as amenities to Woodbury home owners only. The residential areas were designed to integrate a variety of dwelling types and tenures. Woodbury accommodates a total of 4,234 dwelling units of which 2,413 are for sale homes, 1,581 for sale apartments and 240 affordable rental units. The Irvine Company retains the ownership of the affordable units but receives subsidies from the local authority under federal housing assistance legislation (including Section 8). Whilst the Irvine Company stresses its commitment to providing for a variety of income brackets within its developments, it also suggests that cultivating a strong market for local jobs rather than housing benefits should be the principal strategy for driving equality. This helps to explain the tiny percentage of affordable units within Woodbury whilst median home values, as discussed below, fall into the highest category within the U.S. Whilst slightly higher than average (for Orange County) densities have created an economic model for providing high quality amenities to residents and some affordable units, Woodbury is far from presenting a model of how to achieve a mixed income community.

e. Economic

Owing to the fact that Woodbury was completed less than ten years ago, this case cannot be evaluated in terms of long-term economic resilience. However, it is important to note that the development was a success at its inception in terms of attracting the interest of target markets and achieving high sale values. The homes marketed as part of the first phase of development which opened for sale in November 2004 were priced at between $500,000 and $1,500,000. The U.S. average home value is considerably lower than this at $138,000. All the census tracts covering the now fully built out village of Woodbury fall either into a home value category of $220-390k or $390k to $1million (SNL data, 2012). Analysis of property prices across Irvine from 1996 reveals that these rose more or less steadily from 1997 to 2008 but have since tailed off (Zillow Home Value Index). The ongoing success of Woodbury from an economic perspective relies to an extent on continuity of demand for the house types and architectural styles offered. The value of much of the housing built in Irvine in the 1960s and 1970s has held up – with average values in the census tracts covering the 1970s village of Woodbridge, for example, achieving similar levels to Woodbury. Of course this success owes much to Irvine's coastal location and climate, but also to a degree to the quality of the architecture and public realm. The village of Camino Real is noted as one example of where this has not happened. According to one Irvine Company source, lower values in this village are due to lack of investment in the public realm at the inception of development and subsequent weak local governance, which has allowed residents to neglect their properties and bring down the quality of the neighbourhood (Interview, Seccouse, 2011). Woodbury's economic long-term success is also likely to be driven by access to amenities such as schools (which are considered to be particularly good in Irvine) and by the resilience of local industries – including high-tech and pharmaceutical businesses – and associated jobs. The latter are of course dependent and impacted by wider economic forces.

f. How resilient?

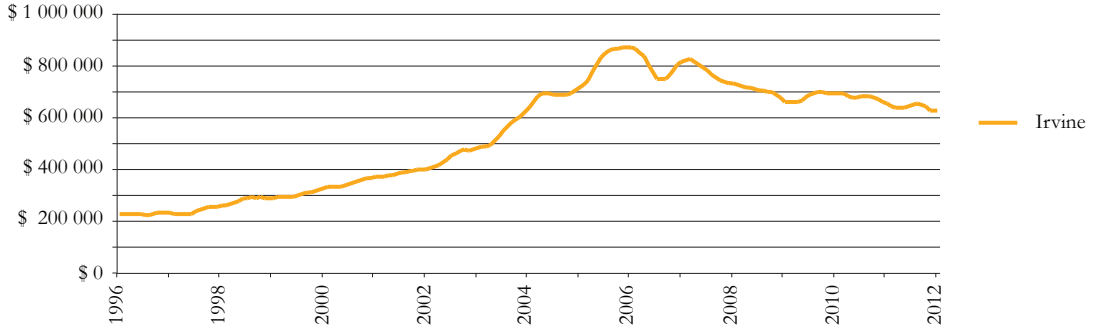
In spite of its low density, Woodbury is showing some resilience according to other measures. The wide pavements have created a village that is walkable. However, low density development constrains possibilities for creating an efficient transport system and the distances between urban functions such as employment, shopping and home are such that car use is unavoidable for most residents. Whilst economic values are high due to factors ranging from climate to jobs availability, there is a risk of long-term failure because of a lack of environmental sustainability, if the public transport situation is not transformed. The continuity of land management and large scale masterplanning would appear to provide opportunities for addressing this pressing issue.

8.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

The form and boundaries of the city of Irvine are connected to the original landholding which the Irvine family acquired in the nineteenth century. The urban form of the city in turn relates to the processes by which an originally mid-twentieth century masterplan covering the vast land area of the ranch was built out over time.

The Irvine family's familiarity with managing rural land, holding it through bad times and not expecting instant profit had a bearing on the future approach to urban development. However, the nature of the ownership of the land has, rather like Grosvenor, evolved over time. In 1937, 51-53% of the ranch was transferred from the holdings of the Irvine family to the non-profit James Irvine Foundation as a means to prevent the splitting of the ranch and avoid estate taxes. Up until 1967, the Irvine Company, owned by the Foundation, developed its coastal residential areas as leaseholds. In 1977, the Company was sold in response to new federal legislation restricting the amount of corporate stock that could



Graph 6: Resdiential property prices for Irvine taken annually in April from 1996 (Source: Zillow Home Value Index)

be held by a non-profit organisation. It was purchased by a consortium of individual investors close to the Irvine Company following a bidding war with Mobil Oil Corporation. The investors were headed by A. Alfred Taubman, a leading developer of regional shopping centres, and Donald Bren, a prominent Southern California homebuilder, financier and arts patron. Under its new owners, the Irvine Company continued to operate as one of Southern California's major land planning, development and property management firms. In 1983, Bren purchased majority interest in the Company and became Chairman of the Board. In June 1996, the Company redeemed all outstanding stock held by the Company minority shareholders, leaving Bren as the Company's sole shareholder. Single if not continuous ownership of the Ranch has been crucial to the development of a consistent masterplan over several decades.

The urban planning of Irvine occurred in several distinct phases (Forsyth, 2005) which are important for resilience in a number of ways:

Phase 1 (1959-1966): the University of California negotiated with the Irvine Company to locate a new campus on the ranch. The Company was simultaneously recognising the need to respond to the rapid urbanisation of Orange County. The planning division of the Irvine Company was established in 1960 to plan the university 'community' and masterplan the southern sector of the ranch at Newport. Reflecting the company's capacity to plan on a regional scale, one of the first areas to be completed was the regional shopping centre at Newport, around which a regional employment hub (becoming an industrial, technical and biomedical research centre of national significance) for high-tech industry has grown. It was thus in this phase that major sources of employment were developed, which have served as significant generators of growth (which in residential terms has been increasingly high-end) and helped to create resilient planning and development processes.

Phase 2 (1966-1977): In 1969, the Irvine Company completed their 'General Plan' for the creation of a long-term, city-scaled 'planned community' of 215,000 residents for the central sector of the ranch. This was presented in Orange County in 1970. The aim was to create an alternative to the urban sprawl that had resulted in the wake of piecemeal sales of agricultural lands to speculators across California – a 'regional city'. The vision was that creating long-term urban integrity would generate greater value than short-term piecemeal land sale. As Woodbury planner Roger McErlane argued, 'the masterplan was developed at a time when planning was in vogue. The decision was influenced by awareness of the development of European New Towns' (Mc Erlane, Interview, 2011). The 'city' was broken down into residential low density 'villages' connected via road, trail and green infrastructure. These were integrated with UC Irvine, the University Town Centre and Irvine Spectrum. The 'signature' village of Woodbridge opened in 1975. The development of Woodbury in 2004 and ongoing processes of village development and addition testify to the resilience of the general plan – the capacity it has demonstrated for both addition and evolution through changing political and economic contexts and over a number of decades.

However, one drawback of planning over such a large scale for the long term is evidenced by the transport infrastructure. According to one Irvine Company source, the circulation was planned from the beginning to support the ultimate build-out of the ranch (Interview, Seccouse, 2011). The company claims to have had to restrict the FAR of new developments in order to complete development on the infrastructural capacity. Thus the infrastructure as it stands, without adjustment to accommodate more public transport options, may be seen as restricting the ability to densify the city over time and hence achieve a more resilient urban form.

Phase 3 (1977-): emphasis on Mediterranean architecture and landscaping under the leadership of Donald Bren.

Landscaping, arguably, will play a role in determining the resilience of later village developments such as Woodbury over time in that it relates to high quality public infrastructure that creates both value and amenity.

b. Contemporary land ownership, planning context and financing of infrastructure

Development allows changes in the ownership of developed parcels of land and residential units. Land parcels identified for residential development are sold 'fee simple' by the Irvine Company. Sales are accompanied with development agreements that allow the Company to retain architectural control through the design development and construction phases (Lehman, Interview, 2011). Following development, Home Owners Associations (HOAs) are formed by the Company under the provisions of the Davis-Stirling Common Interest Development Act. Sales to prospective home owners are made on the condition of membership of an association as well as a range of other restrictions which impact on their ability to adapt or change their property. HOAs own the amenities of the neighbourhood, such as Woodbury's 'commons' and have control over it in the sense that they enforce deed restrictions related to the architecture and its uses. The ownership of properties following development is key

to resilience: structures are in place to safeguard the quality of public amenities and townscape, but at the same time these structures can be detrimental over time since they constrain adaptability and evolution.

Though the Irvine Company has been responsible for masterplanning the ranch for more than fifty years, the City of Irvine will play the major role in ongoing planning and zoning issues relating to the city's urban form, including public transport and accessibility. The private sector in the form of the Company has been crucial to the delivery of coherent and, in its context, visionary development on a large scale. The public sector would not have had the financial facility to achieve the same ends. However, with the fragmentation of ownership on the sale of developed properties and the 'incorporation' of the City of Irvine as a political and administrative municipal entity, the need is created for wider public authority planning frameworks that in turn connect to State and Federal level urban policy.

In California, municipalities invest in infrastructure, raising finances by issuing bonds and using property taxes to realise gains for investors. In the 1970s, property tax based on house prices became controversial in the context of rising house prices and this led to a tax revolt. In 1978, there was a state-wide referendum which resulted in property tax being fixed at 1% of baseline value (the value paid for a property). Proposition 13 (officially named the People's Initiative to Limit Property Taxation), an amendment of the Constitution of California, effectively 'put a lid on revenues for municipalities from property tax and diminished the capacity for municipalities to service bond debts' (Lehman, Interview, 2011). Investing in infrastructure at urban and regional scales became more challenging from the late 1970s on, with implications for strategic planning.

Since the enactment of Proposition 13, Assessment Districts have been used as an alternative method for financing public improvements: Special Assessment Districts (SADs) and Community Facilities Districts (CFD). The Community Facilities District Act (known as Mello-Roos and created in 1982) enabled special property taxes on particular types of real estate to be applied, in addition to the normal 1% property tax. A Mello-Roos District seeks public financing through the sale of bonds for the purpose of funding public improvements and services (e.g. streets, water, sewage, drainage, schools, parks, etc.) which are of evident benefit to that district. The tax is used to make the payments of 'principal' and interest on the bonds (which may run for 20-40 years). Under the dispensations of the CFD Act, you 'can issue a bond and pledge incremental tax revenues to service that bond' (Interview, Lehman, 2011). As Lehman, a former employee of the Irvine Company argued, this tends to work well for small geographic areas' (Lehman, Interview, 2011). Though most property built in Irvine after 1982 is subject to Mello-Roos as this was an important financing mechanism for infrastructure across the Ranch, the Irvine Company were able to use their ownership as a way of overcoming state-led planning at a larger scale. In addition, the Irvine Company was in a position to invest upfront in some aspects of public realm infrastructure such as landscaping, parklands, and cycleways, as well as in social amenities such as schools. Its large capital holdings may thus be viewed as key to the ability to cultivate value across the Ranch gradually, as the Irvine Company is considerably less dependent on the kinds of timescales imposed by investors, funds or loans. The ability to develop long-term perspectives with respect to planning and development is, in turn, key to the resilience the Irvine Company has been able to create to date.

8.3 Concluding points

- **Resilience:** suburban, single use, low density development combined with restrictions on change at the building level creates a poor basis for adaptability, with potential consequences for value creation over the long-term. Notwithstanding, the ability to develop differently scaled open spaces and protect them over time creates a strong basis for resilience.
- **Ownership:** long-term, urban scale, outright ownership creates the capacity to realise a comprehensive vision over time.
- **Planning:** in the absence of a strong state- and municipal-level planning authority, urban scale land ownership can create the possibility for planning on a regional scale.
- **Financing Infrastructure:** upfront patient capital investment enables the creation of durable, high-end infrastructure and amenities and creates value.

9.0

RESTON

Town Centre and Lake Anne

Reston is a 'planned community' located in Fairfax County in the Washington Metropolitan Area of Northern Virginia, USA. Northern Virginia is one of the highest-income sub-regions in the country, owing to an employment base including the Pentagon, CIA, a variety of private government contractors and service providers and a growing high-tech industry sector.

Reston's boundaries were defined in 1961 when developer Robert Simon purchased 6,750 acres of an existing rural property. Reston is between Washington DC and Washington's Dulles International Airport – approximately ten miles from each. It is positioned along what is known as the Dulles Corridor, a strip of land following the Dulles Toll Road link between the airport and D.C. which is a current focus of infrastructural and mixed density sub-urban development.

Reston has grown over time from the basis of a masterplan developed by Simon Enterprises in 1962. Reston was informed by modern European planning approaches and movements, including the British New Towns. The masterplan anticipated a series of mixed-density villages set within the site's naturally wooded landscape and linked via a network of streets, walks and cycleways. Each village was conceived as a 'community' integrating commerce, social amenities and civic functions within residential enclaves. A focus for the collection of villages was provided in the form of a town centre.

Figure 43: Lake Anne Plaza by architect James Rossant, 2011 (Source: Juliet Davis)

Reston is an example of the capacity of urban scale ownership to implement, but also evolve, a masterplan over time – to manage the deployment and also timing of the development of different land uses. Reston also exemplifies the capacity of long-term ownership to control the form and nature of development over time – a process which involves balancing the form and integrity of the masterplan with the continually emerging (and not always anticipated) needs of a growing settlement. In these respects, Reston may be viewed as an example of how a managed development process over time can create a cycle of investment and value creation that is effective in creating resilience over the long-term.

This study focuses on two portions of the larger Reston landholding. The first, Lake Anne, was the first village to be developed and can be viewed as a prototype. The second, Town Center, is the most recent development and illustrates how the masterplan has been adapted over the last fifty years.

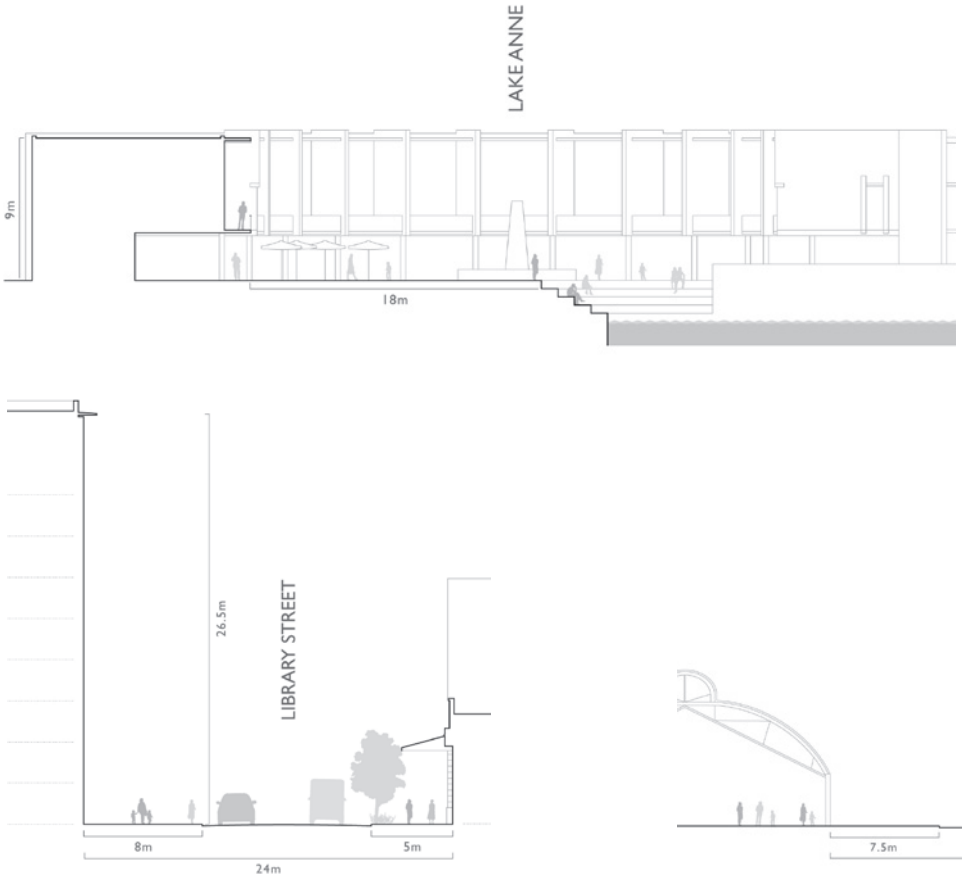
9.1 Measures of Resilience

a. Physical: density
11% of Lake Anne and 38% of Reston Town Center are covered in buildings and the comparative floor area: land ratios are 0.39:1 and 4:1. In Lake Anne, in other words, there is much more open land than built land. In Town Center, by contrast, there is slightly more open space than built floor space on the ground floor, but the density of buildings ensures that built floor space exceeds open space by 400%. At the heart of Lake Anne there is a moderately intense cluster of buildings including a 16 storey tower. However the case study area largely comprises a low rise development of 1-3 storey dwellings which are set back from the streets, located in ample garden plots and positioned around a lake. In contrast, Town Center comprises low to high rise buildings (2-23 storeys) that for the most part fully occupy their plots and front directly onto the streets.

Lake Anne's population density is 27 persons per hectare whilst Town Center's is 62. Though neither of these figures is high compared to other cases in this study, both exceed the average densities of Fairfax County at 10 persons per hectare. In addition, the scale at which density is analysed masks the actual densities achieved by specific building typologies within the overall urban form. The relatively low population density in Town Center area reflects the predominance of office, hotel and retail uses.

Reston was planned for a total population of 75,000, which was anticipated to be in place by 1980. This would have produced an average density across the site of 27 persons per hectare. Robert Simon envisaged a mixed density urban form, ranging from 10.5 persons

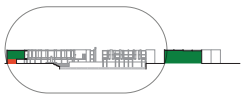
Figure 44: The location of Lake Anne and Town Centre (in red) within Reston (in purple) (Source: Google Earth)



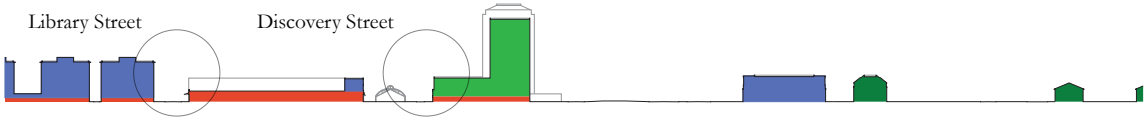
2012

Figure 45: Diagram illustrating comparative street sections

0 10m



2012 Lake Anne



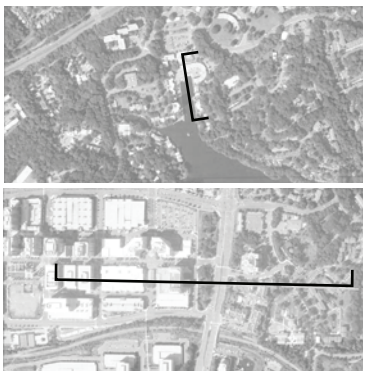
2012 Town Centre

Figure 46: Diagrammatic section illustrating land use mixing and density

0 100m

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction



Section through Lake Anne and Town Centre

per hectare to 178 (Simon Enterprises and Whittlesey and Conklin, 1962) in order to preserve both the site's woodland qualities and create 'villages' rather than a dispersed suburb. The highest population densities were intended to be produced through the development of tower blocks such as the single one built at Lake Anne. With the exception of this single tower, a high density urban form was not realised. Most of the residential development built before the late-sixties was 1-4 storeys and most of that built before the mid-eighties was dispersed at even lower density. According to the 2010 Census, Reston's population was 58,404, a good deal short of the masterplan's target thirty years after this was anticipated to have been met. High density apartment towers recently developed in Town Center suggests that Simon's higher density, more resilient vision may still be realised.

b. Physical: Adaptability of street layout and building type

The urban form of Reston has been in a process of growth and development since 1962. Whilst there is not much evidence of adaptation in terms of existing building stock, the original concept for the settlement has been adapted over time in response to evolving patterns of suburban living and associated forms of development and property markets. Commercial areas have undergone the most significant transformation since the 1970s and this pattern is likely to continue. The first areas to develop for commercial purposes were for the most part low-rise developments including retail and office. Much of the early commercial development was in effect catalysed by the arrival of the Dulles Toll Road in 1984. The 1962 Reston Masterplan accurately anticipated a surge in commercial development related to scientific research and associated manufacturing, as well as in employment areas related to the airport, services and retail. However, it did not anticipate the high technology boom, which in recent years has created the 'Dulles Technology Corridor' and attracted firms such as Google to Reston. The evolving attraction of the area for business has an important bearing on the market for commercial space and on the form of commercial development. Low-rise commercial development appears to be less likely to be adapted than increasingly redeveloped for higher-rise and higher specification offices located in urban rather than business park or campus-like settings. Arguably, this suggests that in terms of office use accommodation, the original development was not particularly resilient.

Figure 47: Reston, Aerial View, 1960s (Source: James Rossant, Conklin and Rossant)

In Lake Anne, the streets are separated from pedestrianised areas at the heart of the village via car parks and buildings. Streets include primary link roads and local cul de sacs around which groups of low-rise housing cluster – including low-rise blocks and single homes. Pedestrian areas weave between a number of different types of higher density housing and open out into a public plaza at the edge of the lake. This plaza has been adapted over time to integrate a farmers market which is open on Saturdays between May and September. This has helped to intensify the usage of Lake Anne's public realm and broaden it to include people from further afield than the immediate locale. Whilst the tree and branch-like layout of streets and dispersed settlement creates a challenge for public transport provision, the separation between pedestrian and trafficked areas arguably reduces the adaptability of each, as pedestrians are kept away from the streets and the retail areas are not able to appeal directly to the flow of road users. These issues have had an impact on Lake Anne's shops, which have struggled to remain economically viable over time (Office of Community Revitalization, 2011).

The streets of Town Center integrate pedestrian and car use for the most part. Planners sought to establish thoroughfares that drew on European precedents, including the Parisian boulevard and the Italianate piazza. Streets such as Library Street – which is at 24m wide in total - incorporate wide pavements ranging from 5 to 8 metres, leaving two lane roads of 11 metres (5.5m per carriageway). These substantial spaces allow for spill out from ground floor restaurants, bars and cultural venues, as well as absorbing pedestrian movement. Once at Town Center, it is not necessary to have a car. However, as the car parks surrounding the centre testify, it remains virtually impossible to reach it without a car.

c. Environmental

Reston was designed around the car and this continues to be reflected in the form of development. Land uses and development patterns have been informed by developments in the road network, including the development of the Dulles Toll Road. The Town Center was sited in the masterplan at the convergence or 'focal point' between approach roads and 'immediate means of access' to the villages' (Simon Enterprises, 1962,

p.2). The size of the roads was calculated to suit the anticipated population of 75,000 which has meant that the population has been able to grow to date without outgrowing the infrastructure. Notwithstanding, the masterplanners did not anticipate the growth in employment which means that Reston currently has a working population of 60,000. Because many of the workers are not local, traffic congestion occurs at morning and evening rush hours. According to Jim Cleveland, former chief executive of the Reston Land Corporation, 'the Achilles heel of Northern Virginia is that lack of [public transport] coordination continues' (Interview, Cleveland, 2011). The Reston bus network connects village centres, Town Centre and prominent public amenities such as some of the larger churches. However, given that much of the population lives outside of these centres, this network is only partially effective. A positive development on the horizon is that the Dulles Toll Road has gradually widened and will by 2020 accommodate the metro in between the lanes. The metro is anticipated to have an impact on land uses by stimulating further commercial and mixed use, high density development. It is likely that with the arrival of the metro, at least some of the spaces in Town centre currently devoted to car parking may become ripe for redevelopment – either by adaptation or replacement. A challenge will be to build on the existing bus network to connect the outlying, older, low density neighbourhoods of Reston to public transport infrastructure, given the complexity of the street patterns and dispersal of the population.

Figure 48: Lake Anne low-rise residential building typology (1960s), 2011 (Source: Juliet Davis)

Figure 49: Town Centre multi-storey car parking over ground floor retail uses, 2011 (Source: Juliet Davis)

As highlighted above, consideration was given to the value of proximity between uses in the original masterplan. The concept of 'villages' was developed in order to create intense focal points for community life and proximity between recreation uses and everyday social amenities and home. Each village centre was designed to be a half-mile walk from most homes and to incorporate the daily retail and community service needs of residents. The masterplan anticipated that pedestrian walks such as those built at Lake Anne 'will have something of the busy life and character of a fine city street, with all of its visual and social interest, without its problems of automobile traffic' (p. 3). However Lake Anne, which failed to attain the population levels anticipated by Simon, points to the difficulties of achieving the levels of intensity that sustain local commercial uses and amenities in the context of a dispersed population and low levels of public transport.

Because Reston was conceived as a whole, it was – at least in part – possible to translate the concept of a city within a rural landscape into practice. The masterplan included 'parks and wilderness areas as well as active recreation areas' (Simon Enterprises, 1962, p. 6). The prime examples of the former are Reston's 55 miles of forest trails and the Vernon J. Walker Nature Education Center – 72 acres (290,000 m2) of hardwood forest which are owned by the community-based institutional 'steward' of the Reston Association which Simon established in 1966. The major recreational areas in Lake Anne are the lake itself, which was planned for water sports as well as to act as a visual focus for the village, and the Hidden Creek Country Club. These are also managed by the Reston Association and funded collectively by Reston's predominantly affluent residents. The masterplan associates the provision of recreational space with post-war ideals of the 'good life' of increased income and leisure time. Simon anticipated that as a result of his proposed concentration of dwellings in villages '[t]he total land area devoted to recreation and open space by all elements of the community [would] be about 20 acres per 1,000 persons within the area of Reston itself' (1962, p. 6). This amount of open space provision almost doubled what was then considered acceptable according to the National Recreational Association Standard, and continues to do so today. Though Town Centre is considerably denser than older parts of Reston, a green open space was incorporated into the framework for development in the form of the Town Square Park (approx. 3,500m2). As discussed below, masterplanning and a long-term view were crucial to the delivery of this space.

d. Social

Though Simon emphasised the virtues of proximity and mixed use in the 1962 masterplan, much of the development built before the late 1980s comprised single-use buildings. Notwithstanding, the curved building that frames the plaza at the edge of the lake forms one element of mixed-use development in the scheme designed for Simon by James Rossant and that survives to this day. It is organised as two layers of apartments over retail which today includes an art gallery, several restaurants, the Reston Historic Trust Museum, and a variety of independent stores (ranging from a handmade chocolates shop to real estate agents, a nail bar, and a senior citizens' 'fellowship house'). Lake Anne includes a variety of social amenities including schools, churches and medical centres.

With the exception of two high-rise apartment blocks, Town Center is almost entirely comprised of mixed-use development. In general, the ground floor is devoted to retail, bars, restaurants, cultural venues and some social amenities, whilst the upper floors consist of office space, hotel or residential use. Town Center is well provided for in terms of medical facilities and cultural amenities and just beyond it are a hospital and several schools. As in Lake Anne, the presence of social amenities in Town Center is a legacy of the original masterplan, which stated that 'in addition to […] commercial [use], many non-commercial uses will occur near this central shopping area […]. Besides the principal shopping facilities and office buildings, this central core area will contain an auditorium, a regional library, a museum and many diverse forms of community space' (Simon Enterprises, 1962, p. 6).

As discussed below, the scale of the landholding was key to the ability of landholder/ developers to create social amenities, as the costs associated with these could be offset through careful management of more lucrative development opportunities. However, cultivating commercial opportunities led to the uneven development of land uses, tenure types and levels of affordability over time. Hunter Richardson, former marketing manager for Reston Development Corporation explained that '[t]o begin with, the development at Reston was more residential than anything else. The affordability of Reston was what attracted people to begin with. Companies began to arrive in the 1970s. The Toll road created an explosion of commercial development' (Interview Richardson, 2011).

Reston as a whole includes a variety of different kinds of private sale and private rental sector housing – from so called 'affordable' through to luxury dwellings. More affordable housing was built in the early years of the development. As the area became more desirable, emphasis moved to high value developments in the form of single-family homes and condominiums. According to Richardson, 'neighbourhoods tended to be built to reflect different eras in the residential market. For example, in the 60s to early 70s, there was a market for subsidised housing, leading to a concentration of this 'type' in certain areas' (Interview, 2011). 62.1% of homes across Reston are owner occupied whilst 33.2% are rented and 4.7% are empty. Owing to a relatively unregulated supply of housing, Reston is not particularly resilient in terms of provision for a variety of income levels. According to Richardson, the impacts of this are

Figure 50: Lake Anne Village Centre, Reston, 1960s (Source: James Rossant, Conklin and Rossant)

that those involved in low-paid service jobs in Reston Town Center cannot afford to live in Reston.

e. Economic

Though Robert Simon's work is regarded as ground-breaking and praised for inspiring a generation of planners in the U.S., including some of the early proponents of New Urbanism, Reston was not an economic success in the early years. This led to the need for Simon to sell his asset on to a more financially powerful player. Arguably the principal factor influencing this was Simon's failure to anticipate the response of the residential market to Reston as a location, and within this to his innovative village and community concepts. Value creation in Reston over time has depended on long-term, more commercially oriented investment strategies relating to the landholding as a whole. It has strongly depended on developments in infrastructure on a regional scale, such as Dulles Airport and the Dulles Toll Road. In terms of the gradual build-out of the town, it has also relied on the strategic management of the relationship between supply and demand in relation to different land uses.

Lake Anne continues to struggle to acheive economic viability, as discussed above, but is currently the focus of a 'Commercial Reinvestment Plan' (CRP) initiated by The Fairfax County Office of Community Revitalization. The CRP includes an assessment of the current conditions – spatial, social and administrative – affecting the non-residential uses in Lake Anne, and 'provides recommendations that can be pursued to stabilize and sustain current establishments' (OCR, 2011). These recommendations include physical adaptations, promotional activities and alterations to the governance of the non-residential use areas in order to strengthen strategic capacities at the local level.

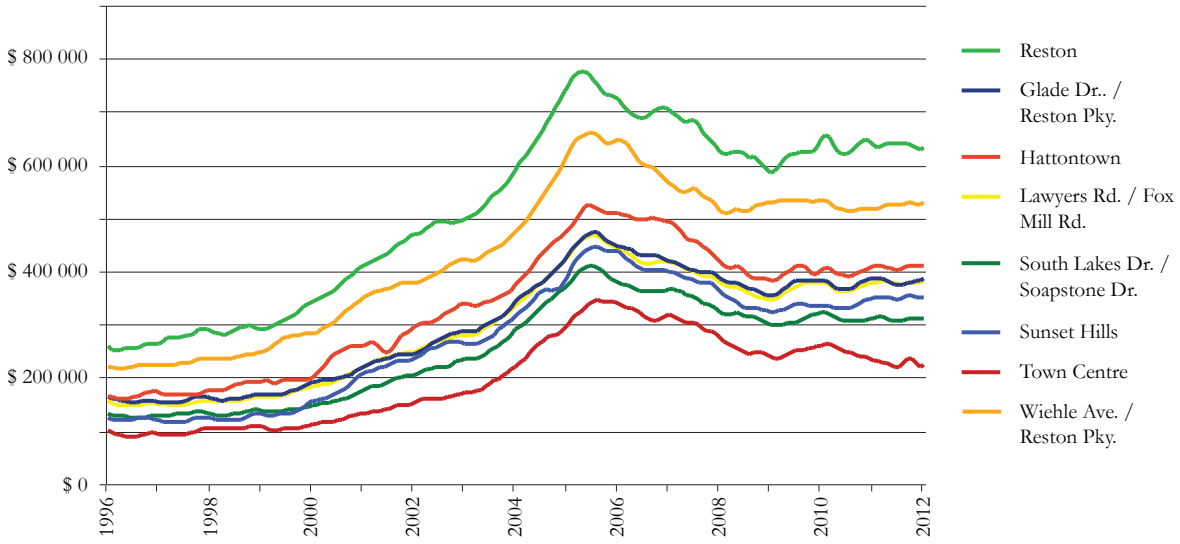
Though Reston Town Centre was completed during an economic downturn, it is regarded today as a commercial success. Average rents are higher than similar office space nearby, and over a period of two decades it has become the second largest office market in Fairfax County (Clark, 2011, p. 19). A value analysis by Jones Lang LaSalle from 2012 indicates that since 1993, Reston Town Center's rental returns have consistently outperformed the Reston-Herndon sub-market (within which it is located) by 34.1%. The proximity of retail and amenities for office workers, access to hotels and conference space strongly influence this economic resilience. Economic resilience is indeed helping to enhance the resilience of the Town Center in other respects – for example by generating a market for denser uses and urban forms and the densities needed to warrant connection to the metro.

9.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

In the seventeenth century, the land which eventually became Reston formed part of a large Virginia land grant known as the Northern Neck Proprietary. In the 1880s a Dr. C.A. Wiehle purchased 7,500 acres of this, for which he initiated a plan and realised some development. The landholding changed hands several times before being acquired by Simon in reduced form in 1961.

Simon Enterprises purchased 6,750 acres (adding to this later to form 7,400 acres) in March 1961 from Lefcourt Realty Corporation. At this time, the potential of the site for development was evident given its location half way between Washington, D.C. and Dulles Airport, which was under construction. Ownership created the



Graph 7: Residential property prices for Reston neighourhoods taken annually in April from 1996 (Source: Zillow Home Value Index)

possibility of not only developing an urban scale vision but also being able to drive it forward. Simon sought to create a new model of ex-urban development, rejecting the sprawl and mass production of 'Levittown' and referring to the development from early on as a 'New Town'. He also sought to pursue an alternative to the development forms implied by conventional zoning ordinances which in Fairfax County, as elsewhere, segregated residential, industrial and commercial land uses. Simon began his planning process by formulating an alternative 'code' for mixed-use development which was presented to Fairfax County at the end of 1961. In July 1962, the Board of Supervisors of Fairfax County not only approved this but in effect adopted it into law in the form of the Residential Planned Community (RPC) zoning framework. The speed of this legal process may be accounted for by the fact that there were already high levels of support within federal government for the idea of 'satellite towns' as a way of managing population growth. These were reflected in a 'Year 2000 Plan for the Washington Area' prepared by the National Capital Planning Commission. The 1962 Reston Masterplan states that '[r]ecognizing the population growth of three million people that can be expected for the region, the [Plan] concludes that the development of new satellite towns arrayed in corridors out from Washington, represents the optimal pattern of population distribution. Between these new towns it will then be possible to preserve open country and a very low density of development. By concentrating the development of the population into distinct new towns, better methods of transportation, better planning for utilities and for schools are made possible' (Simon Enterprises, 1962, p.1). The RPC zoning allowed population densities to be distributed and allowed land uses to be brought into close proximity and mixed within single buildings. Simon Enterprises commissioned Whittlesey and Conklin to develop a masterplan for the staged development of the new town, whilst also drawing on the expertise of a wide range of consultants including planners, architects and sociologists.

Lake Anne was developed as a prototypical village between 1963 and 1967. It included a variety of commercial, recreational and residential properties, facilities and amenities. A variety of tenure types were associated with these different uses, from commercial leases from Reston Virginia Inc to 'fee simple' residential property sales. The Reston Association was established by Simon to take on the ownership and management of recreational areas and to act as a form of watchdog in terms of preserving the appearance of residential and public areas. The Reston Association own the land in perpetuity. Homes were sold on with covenants (between the Reston Association and home owners) relating to a variety of issues, including standards of property maintenance and levies for the upkeep of 'common' areas and resources.

It would appear that whilst the village centre commercial development and facilities such as the Country Club were initially successful – all the commercial space in Lake Anne Village Centre had been leased by early 1965 for example – the residential market was slower to pick up than Simon's financial team envisaged. According to Gulf Oil's records (Simon's major lender) this was in part due to the fact that architect designed houses in Reston were more expensive than the average for Fairfax County, and prospective residents were cautious about paying extra for collective amenities or for the new style of village living which lake Anne presented (Grubisich, 2012). By the end of 1966, Simon had exhausted his financial resources and was forced to sell to Gulf Oil Corporation. Though superficially Gulf adhered to the original masterplan, their business strategy led to the revision of Simon's approach to density and mixed use. Recognising the suburban aspirations and cautiousness of buyers in the area, Gulf generated profits by creating more cost-competitive residential products, less innovative and explicitly modern architecture, building at lower densities and investing less in social amenities and mixed use. In 1979, Gulf sold the land holding on to Mobil who created the Reston Land Corporation as a partially devolved vehicle for managing it. Mobil Land, according to Jim Cleveland, former president of Reston Land Corporation 'was styled as a community developer' (Interview, Cleveland, 2011) and was interested in the long-term opportunity presented by Simon's original vision, the scale of the landholding and broader patterns of economic growth in North Virginia. Though the association of energy giants with resource exploitation might not appear to render them as obvious urban land 'stewards', Mobil's effectiveness in creating economic resilience in particular was derived from the fact that the corporation was affluent enough that it did not need to recoup value in the short term and was able to invest upfront in long-term assets for incoming populations of residents and workers.

According to Richardson, Reston Land Corporation's former marketing manager, the market changed rapidly in the early 1980s. He claimed that 'when the Toll Road was announced, Reston really started to attract business. First it was 2-3 storey businesses. Computer businesses at that stage were just beginning to seek out east coast locations and Reston had the advantage of having great access to the airport' (Interview, Richardson, 2011). Mobil allowed the Reston Land Corporation to pursue an 'optimisation' rather than 'maximisation' strategy in response to these conditions. Through the early 1980s, Reston Land Corporation supplied an

additional 800,000ft2 of office and industrial space per year, much of which was located close to the Toll Road, at the edges of the current town centre. Richardson argued that the alignment of ownership, planning and development facilitated a 'metering out [of] the inventory' and the use of 'metrics in putting it together'. The supply of office and industrial space was calculated to satisfy growing demand but not lead to a situation of 'underselling over-stock' (Interview, Richardson, 2011). The cautiousness implied by this approach was extended further by 'making a requirement about pre-lease rather than [supporting] speculative development'. This enabled the pace of development to be carefully managed. According to Richardson 'the rest of the market in the local area came to have higher vacancies' with negative consequences for value creation over the long term (Interview, Richardson, 2011). Mobil's strategy succeeded in delivering short-term returns as well. Richardson claimed that '18-24 months was enough to recoup the value of land from the purchase date'.

Cleveland argued that Mobil was not merely reactive to development opportunities. In the early 1980s, he claimed, Reston Land Corporation could have developed all of Reston for single-family dwellings. Instead, they developed a 'diversification strategy' involving mixed styles of housing and density (Interview, Cleveland, 2011). This allowed them both to steer the market and play safe at a time of change. Another key facet of Mobil's approach was an emphasis on high-end development, capitalising on new markets for luxury residential development and Class A office space that emerged following the opening of the Dulles Toll Road. A relatively small portion of the original land holding remained with RTC by the late 1990s as this was gradually sold off to home builders who then sold on to residents.

The plan to build Reston Town Center was approved under Mobil's business development plan in 1982. This allowed the RLC team to start negotiating the zoning for the designated areas with Fairfax County in 1983. The concept developed was of a mixed-use area drawing on local precedents including Washington's oldest colonial era settlement, Georgetown. Mobil insisted that Reston Land Corporation 'find a partner who is interested in mixed-use', and this came in the form of the Chicago based developers MKDG. MKDG's vertical mixed-use development in the Michigan area; use of hotels as 'anchors' to new development in Boston; and ability to create links between public transport infrastructure and commercial space all informed the spatial approach to Town Center. Richardson reported that 'the supervisor for the district (at Fairfax county) was supportive of what we were doing' which made for a relatively smooth zoning approval process. As it had done thirty years before, the Reston masterplanning process appeared to serve to stimulate the development and revision of state planning policy. In 1991, a major update of the Fairfax County Comprehensive Plan was launched. This introduced the concept of 'Suburban Centers' defined in terms of mixed uses in a medium-high density setting. 'Place' was an important consideration in planning the Town Center. Richardson argued that a key determinant of Phase 1 of the RTC development was a definition of how much office, hotel, retail and associated street infrastructure and public realm the Town Center had to have to have a 'there there' (to use Getrude Stein's famous expression) . Downtown was opened in 1990, which coincided with a downturn in the property market. Mixed-use development proved to have been a prudent strategy in this context, since with 'mixed use development […] every use runs on a different cycle. Retail was the strongest use when RTC opened' (Cleveland, Interview, 2011) providing the opportunity to recover enough of the investment to be able to wait for the economy to pick up, which it did from 1993.

b. Contemporary land ownership, planning context and financing of infrastructure

By the late 1990s, the energy industry was transforming and before Town Center was fully built, Mobil decided to sell off its landholdings and property development business. What was left of the landholding was sold to Westbrook Partners in 1996. Westbrook created Terrabrook as a special division to run Reston. For part of the development of Town Center, Terrabrook joint-ventured with Boston Properties, a Real Estate Investment Trust (REIT) also concerned with long-term value creation. Thus, whilst the ownership of Reston changed, an ethos of long-termism remained a feature of the development process. The continuous role of ownership enabled the staged development of the town to be managed as part of a relatively continuous plan.

To this day, there is a principle landowner in the form of Boston Properties. According to Cleveland they see themselves as a 'steward'. Notwithstanding, the fracturing of the ownership of Town Center between three firms has had implications for the management of the mixed-use tenure types and tenants. Cleveland argued that 'there's a sense that if the ownership had been kept complete for the Town Center, the management, particularly of the retail offer would have been easier'. Difficulties in developing an overarching strategy for the retail have impacted on the composition of this offer, which is dominated by high-end chain stores and restaurants. This contrasts with Lake Anne which, whilst less successful as a centre for attracting big business and out of town shoppers, is beginning to create a unique offer including independent merchants – which may in time become even more popular and profitable..

Reflecting on the experience of leading the Reston Land Corporation, Cleveland argued that 'it's good to do the right kind of planning, but it's how you react to adversity that determines your success'. He emphasised that relatively few firms are positioned to 'ride long-term' given that this involves upfront investment in long-term goods and a slower pace of value creation. For example, the commitments made by RLC with respect to urban design, high quality green open space and other public spaces and amenities relied on having the capital to invest and the capacity to wait for development to realise the value of these. According to Richardson 'long term investment needs personal investment – good thinking people thinking how best to do it without ego' (Interview, Richardson, 2011). The effectiveness of the value creation strategies developed by successive owners of the Reston development is reflected in economic terms by the fact that whereas Bob Simon originally bought Reston for $2000/acre, today one acre designated for high-rise residential development might fetch $5,800,000.

Reston is still not a city in its own right. In the U.S. 'incorporated cities' have their own public services. According to Cleveland, the people of Reston felt that Fairfax County was serving them well and elected to remain unincorporated. This means that the County continues to have a relatively strong role to play in planning and provides public services including schools and policing. One key implication of this in terms of resilience is the potential for Reston's future development to be more closely tied to public transport investment and strategies at the county and regional scale.

9.3 Concluding Points

- **Resilience:** the adaptability of the built fabric is untested. However, the masterplan has proved adaptable to a number of eras of building and economic conditions, resulting in a diverse built environment underpinned by strong organising principles.
- **Ownership:** large-scale ownership has facilitated the implementation of a masterplan, and the ability to balance land conservation with development as part of a value creation strategy for the entire landholding. Long-term owners have been able to develop cautious approaches to realising value and justify high levels of upfront investment in public assets, including recreational spaces and other amenities.
- **Planning:** the historical planning of the case by long-term owners created a model for local and regional authorities not able to actually implement plans on the same scale.
- **Financing Infrastructure:** this case illustrates a gradual process of investment in infrastructure and development. This appears to be enabling Reston to gradually transition from car dependence to public transport accessibility.

10.0

SINGAPORE

Chinatown

The historic district of Chinatown, today a conservation area, including the four sub-districts Bukit Pasoh, Kreta Ayer, Telok Ayer and Tanjong Pagar, covers 0.72 km². It is immediately adjacent to the core CBD and the newly developing business district in Downtown Central. Chinatown is a mixed-use neighbourhood and an example of adapting a particular urban form – the Chinese shophouse – to new uses. The shophouses are narrow terraced structures, typically built in contiguous blocks, linked by a covered footway to protect pedestrians from heat and rain. The two to three storey buildings accommodate work and dwelling within the same building (Urban Development Authority, 1995). Chinatown is an example of state landownership (combined with long-term planning and development) reconciling growth pressures with the desire to conserve the built heritage. Using regulation and economic incentives for private development, the state achieves this through a combination of redevelopment and adaptation.

10.1 Measures of Resilience

a. Physical: density

Chinatown's density is defined by a high degree of land coverage, providing the necessary activities for a vibrant urban place. Over 50% of Chinatown is covered with buildings, predominantly consisting of low-rise

Figure 51: Renewed Shop houses in Singapore, 2012 (Source: Jesse Rosenstock)

structures separated by small alley-ways. The streetscape allows for open space in the form of small public squares and wider streets running north-south through Chinatown. There is a high degree of site coverage, demonstrating that density does not necessarily equate with high-rise buildings. The area has a FAR of 3.06:1. This relatively high figure is due to the high-rise office buildings and public housing tower at the fringes of the case, and is not attributed to the low-rise structures of the shophouses.

With a decrease in residential use, the area's population density has significantly declined over time, becoming a neighbourhood for visitors and employment. Chinatown has a population of 11,041 people - 153 persons per hectare on average. This population density is significantly lower than it was in the past. In 1923, the Singapore Improvement Trust reports: 'The density of the Singapore (Chinatown slum) blocks is a record – in two blocks recently investigated, respectively 555 and 728 inhabitants per acre per night … the same cubicles being used by different people by day and night … this unprecedented overcrowding in dark and disease-saturated old slums is of a record bad type … The Singapore slums are the worst in the world' (quoted in Xiuxia, 2012, p. 2). These conditions had not improved in 1953, when 'it was not uncommon to have a density of over 100 persons per shophouse' (Siew-Eng & Savage, 1991, p. 325). The lower population density in Chinatown today relates to the improvement of Singapore's housing conditions after independence and changes in the mix of uses that came with it: residential use being effectively forced out by retail and office demand.

b. Physical: Adaptability of street layout and building type
Chinatown's urban fabric has proved to be adaptable over time. The form of Raffle's street grid, and the distinct architecture and scale of Chinatown have all contributed to the renewal of the area and its vitality today. Importantly, the strong relationship between the street level shop and the street, enhanced by the covered five-footways, ensures a living street where for decades salespersons have inhabited the space of the shop and the pavement. The shaded, narrow walkways ensure that pedestrians directly pass stores, thus helping to promote their wares.

The shophouse itself is designed to 'accommodate a set of socio-economic-spatial practices' (Ho, 2009, p. 1194). The ground floor is adaptable to a wide range of commercial purposes, from workshops, to shops, and restaurants. The units on the upper floors are removed from the traffic and noise at street-level, and can usually be accessed from a separate staircase between the units on the ground floor. Between the shophouses are small alleys that serve as 'pedestrian fares linking major roads' (Ho, 2009, p. 1195). Throughout the last century, many

Figure 52: The location of Chinatown (in red) within Singapore's CBD (in purple) (Source: Google Earth)

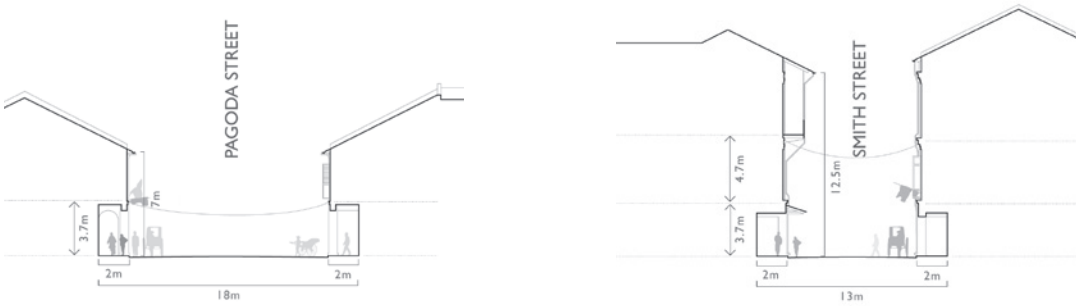


Figure 53: Diagram illustrating comparative street sections

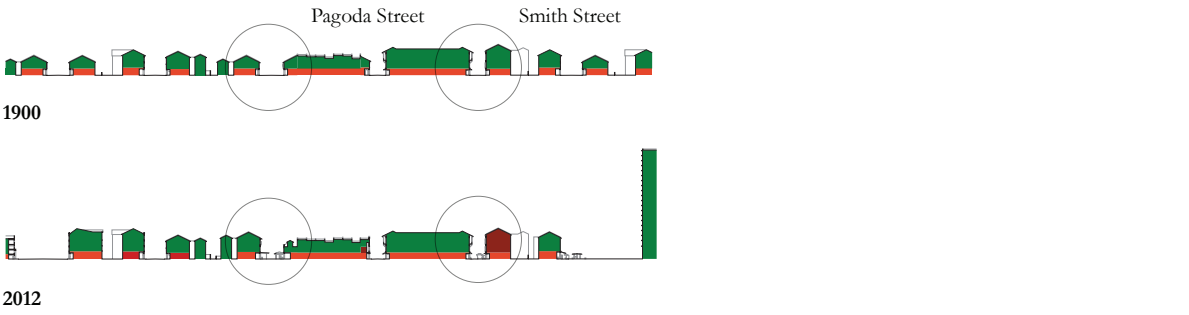


Figure 54: Diagrammatic section illustrating evolving land uses through time

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

Section through Chinatown

of the original shophouses have been replaced by more modern buildings that still adhere to similar principles and include intermittent air wells and the colonnaded five-footways. Basic climatic considerations ensure that both the street and the interiors of shophouses achieve levels of comfort relative to climate. These principles are easily scaleable, and have been included in more modern three storey shophouses too. The linear facades of Singapore's Chinatown are renowned internationally as well as celebrated locally. The ongoing adaptability of the area's built form depends on the preservation of the area's character.

c. Environmental

Chinatown's location in the heart of the city makes it easily accessible - as it has been historically. It is locally as well as regionally well integrated into the urban structure. Its covered footways, with road traffic predominantly concentrated at the fringe, make for a walkable neighbourhood. Over the years Chinatown has been well integrated with the developing public transport network, with Chinatown metro station at the centre, and three further metro stations (Outram, Tanjong Pagar, Raffles Square) within close proximity. This means that three out of four metro lines are reachable within walking distance. With over twenty bus stations in the neighbourhood, residents are also well-connected to a highly efficient bus network. The public transportation network in Singapore continues to expand, which will certainly enhance Chinatown's accessibility further.

In Chinatown itself, green parks are relatively rare (9547m2 or 0.12% of the site consists of green space) and these are located in the southern part. The tree-lined streets, with benches in small squares, at least partly compensate for this. In comparison to other, more recent residential neighbourhoods in Singapore, Chinatown's green space is however more limited, reflecting historical development processes which lacked an overarching vision. Similar densities of built-up structures can be seen in Little India, or the Arab Quarter, also neighbourhoods where the urban fabric of shophouses still dominates. In newer neighbourhoods, built shortly before or after independence, parks have been planned as an integrated part of the neighbourhood. Whilst there is no major park within Chinatown, the Pearl's Hill City Park is however just across New Bridge road and still within the district of Outram. The hill was initially the location of a Chinese-owned spice plantation. In 1822, Lt. James Pearl, Commander of the Indiana, bought the hill to build his house on top of it. In 1828, when retiring to Europe, he sold it back to the government (Cornelius, 2002). At the

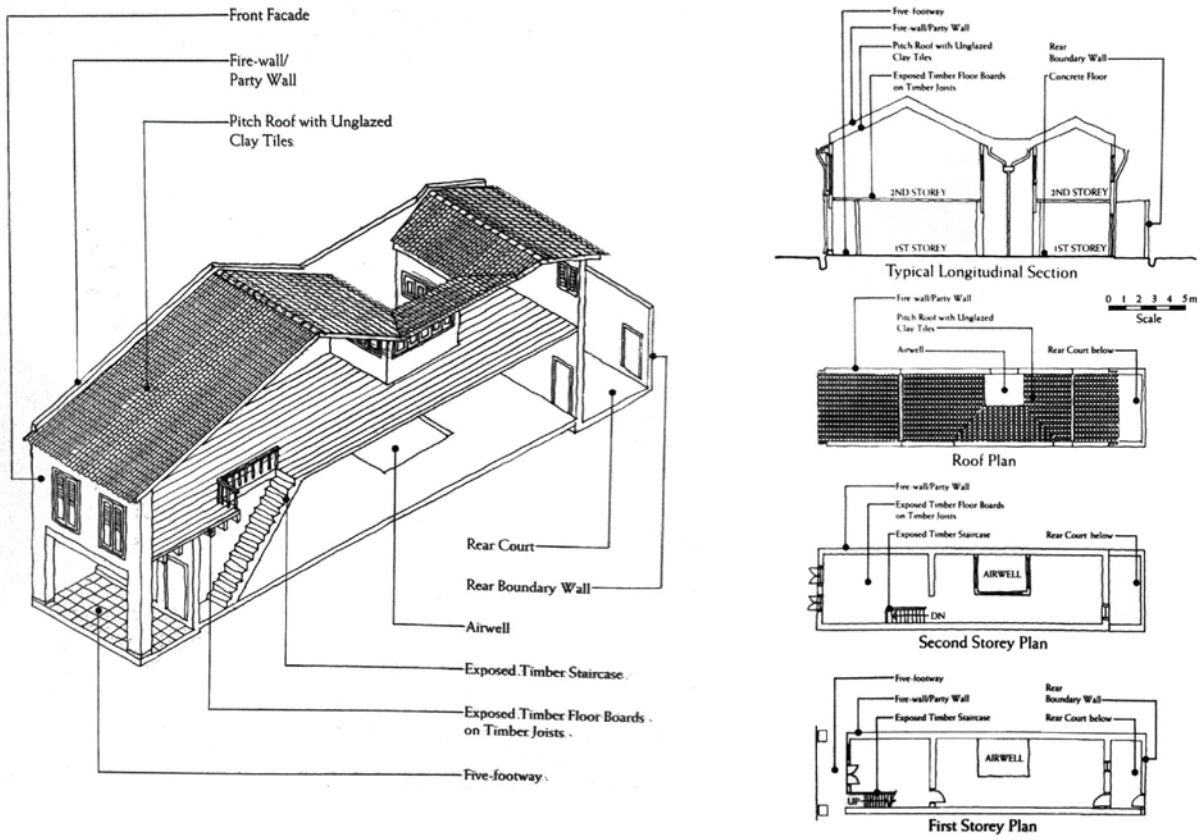


Figure 55: Spatial analysis of a typical shop house (Source: Urban Redevelopment Authority, 1995)

northern border of Chinatown is also Hong Lim Park, a smaller (11m2) park that was donated by a landowner in the early stages of its development.

d. Social

Chinatown's urban fabric has been adaptable to a wide range of uses, which has enabled an urban renewal process that limits demolition and permits the protection of the architectural heritage. Originally, the shophouses in Chinatown incorporated businesses on the ground floor and residential dwellings on the upper storeys. The shophouse was usually occupied by families who operated their small-scale business on the ground floor. Starting in the 1920s, Chinatown struggled with rapid growth due to immigration from mainland China and the shophouses became increasingly overpopulated (Urban Development Authority, 1995). The houses were divided into smaller units to accommodate more families. This resulted in a significant deterioration in living conditions. The small alleys, originally constructed for waste removal, became notorious places for small vendors to ply their goods or entrances to brothels that emerged in Chinatown.

With Singapore's independence and a strong commitment from the government to improve living conditions, Chinatown's population density was reduced through the relocation of families to new-built apartment blocks. Later, shophouses were restored to the original relationship between shops and houses - albeit in adapted form - reflecting market forces. In a study comparing uses in 1978, 1983, and 1994, Lee (1996) shows that traditional trades such as wet markets have moved out and given way to more profitable uses such as restaurants, clubs, or offices. Though residential dwellings still exist within the upper floors, they have increasingly been overtaken by small businesses, such as architecture offices, consultancy firms, or tech start-ups (see Ho, 2009; Lee, 1996). This trend has certainly increased since Lee's last survey in 1994 and contributed to increasing rents and capital value.

Residential use is however still present in the public housing blocks at the fringes of the case study area. Most of the residential units in Chinatown are state housing. This high percentage (95%) is, however, more a reflection of Singapore's system of housing provision, where over 80% of the housing stock is developed and leased by the state, than a reflection of the socio-economic diversity in the area. The area thus still includes local residents. This is also reflected in the range of social amenities, with numerous medical services, including a hospital and cultural centres. Educational facilities are just bordering the area.

Figure 56: Shops catering for tourists, Kreta Ayer Chinatown, 2012 (Source: Jesse Rosenstock)

Figure 57: Shops on the groundfloor of restored shopehouses, Kreta Ayer Chinatown, 2012 (Source: Jesse Rosenstock)

e. Economic

It is difficult to find valid economic data for Singapore, even for the past twenty years. One can however gain an understanding of the area's economic vitality inferred from the socio-economic history of Chinatown. It used to be a socially very diverse neighbourhood, predominantly defined by the different Chinese ethnicities. Businessmen, traders, craftsmen, hawkers and peddlers were all represented in the streets of Chinatown. With the increasing influx of Chinese migrants in the early twentieth century, the area became congested and was even referred to as Chinatown slum. Whilst land value did not necessarily suffer from this development, the area was increasingly occupied by illegal activities such as gambling houses and brothels. With urban renewal and 'the change in use, the rents and property values of the restored shophouses escalated' in Chinatown (Zhu, Sim, & Liu, 2007, p. 2361). The centrality of Chinatown, adjacent to the old and new business districts certainly contributed to this rapid increase in value.

f. How resilient?

The urban form of Chinatown provides a number of ingredients for resilience. The shophouses are adaptable to new uses and whilst lacking in green space, the area has several public squares and street markets. Due to the mixed-use character of the area, activities are taking

place all day, creating a vibrant urban locale. However Chinatown has not always performed at its optimum and this fact, together with the renewal of the area, are closely linked with its historical and contemporary governance.

10.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

Whilst Chinatown's urban form has proved to be adaptable over time, its present existence is due to a state-led initiative to withstand development pressure in the inner city and preserve the architectural heritage. Chinatown is an example of how urban form first governed by community initiatives, was transformed 'into a 'modern' place' (Zhu, et al., 2007, p. 2348) by strong state planning.

The development of Chinatown goes back to 1822, when Sir Stamford Raffles began planning Singapore according to ethnic communities (Urban Development Authority, 1995). The modern development of Singapore begins with the acquisition of the island by the British as a trading post in the early nineteenth century. The city developed along the banks of the Singapore River. In 1822, Sir Stamford Raffles implemented a comprehensive town plan in order to allocate the land in the town to ensure that physical growth happened in an orderly way. The key features of the plan were a grid layout for the road network and a clear segregation of residential communities by ethnic groups (European, Chinese, Indian, Malay, Arab). A Commercial Square (today Raffles Place) was designated for economic activities and another zone for government activities. Shophouses were built in these ethnic neighbourhoods in order to accommodate the rapidly growing population immigrating from China and India. In addition to the plan at the city scale, there were clear guidelines determining the urban form of development. Most notably, Raffles determined the five-foot way, a covered passage on either side of the street.

It is within this context and development guidelines that Chinese immigrants built traditional shophouses and social infrastructure such as schools and cultural centres on land issued to them. By the 1920s, Chinatown with its four sub-districts was fully established. Telok Ayer and Kreta Ayer are the oldest sub-districts and became the commercial centres of Chinatown, with day and night markets that were held until the early 1980s. Tanjong Pagar and Bukit Pasoh in the southern part of Chinatown were the logical areas of expansion at the end of the 19th-century and were residential areas for labourers working in the port nearby (see Lee, 1996; Perry, Kong, & Yeoh, 1997; Urban Development Authority, 1995). Street blocks were divided and individual landowners built the shophouses on their plots (Zhu, et al., 2007). Each of the dialect groups from China built their own temple. The Jamae Mosque and Sri Mariamman Temple are evidence that Muslims also lived in Chinatown. Key cultural and educational associations were established, which built theatres, schools, and recreational clubs. And seeing the lack of green space, one of the community leaders, Cheang Hong Lim, donated a park in 1876. Today, this is the Hong Lim Park, just north of Kreta Ayer.

Chinatown was a 'distinctive locality made of community initiatives' (Zhu, et al., 2007, p. 2348). This example shows that within the context of a lack of formal planning or singular landownership, a community can assume a vital role in developing forms which have stood the test of time and may now be considered resilient, for example social amenities. However, when Chinatown increasingly struggled with overpopulation in the first half of the twentieth century, the community was not able to provide the necessary infrastructure to accommodate growth. Whilst Chinatown possessed 'buildings of great historical significance and architectural value' (Lee, 1996, p. 401), it had a range of urban problems which were identified by the Urban Redevelopment Authority (1988, p. 44), including fragmented landownership, dilapidated structures of good architectural value, tenant properties under rent control, and declining traditional trades.

b. Contemporary land ownership, planning context and financing of infrastructure

The ingredients of resilient urban form - such as capacity of shophouses to accommodate different types of uses and the social amenities put in place at the start of development - were not sufficient to protect Chinatown's architectural heritage and revitalise the area. Governance, and more specifically the State's move away from demolition to heritage protection, were crucial in creating the Chinatown of today.

After independence in 1965, Singapore's government received significant amounts of land from the colonial administration. Through further land acquisitions, the publicly owned land increased to 76.2% of all of Singapore in 1985 (Haila, 2000). The government focused on the improvement of living conditions and undertook slum clearance in inner city areas such as Chinatown. At that time, urban renewal strategies consisted of demolishing shophouses and making space for modern commercial and residential blocks (Urban Development Authority, 1995). In the late 1970s, however, there was an increasing call for preserving and conserving the old shophouse areas. The authorities began to see the country's architectural heritage as

Figure 58: Trengganu street, predominantly frequented by tourists, Kreta Ayer Chinatown, 2012 (Source: Jesse Rosenstock)

Figure 59: Foodstalls on Smith Street creating a lively atmosphere, Kreta Ayer Chinatown, 2012 (Source: Jesse Rosenstock)

important for nation building, and also in order to attract tourists (see Pheng & Wong, 1997; Yeoh & Kong, 1994). The Urban Renewal Authority (URA) was officially appointed as Singapore's national conservation authority and designated ten areas for conservation, including most of Chinatown.

Initially, in the pilot projects in Tanjong Pagar and Kreta Ayer, the URA first restored the shophouses on the land they owned themselves and put them on lease for designated commercial uses. However, around 50% of the land – around 700 buildings in Chinatown – was privately owned (Pheng & Wong, 1997, p. 267), and in these cases the government encouraged owners to restore the buildings. First, in 1989, the government phased out rent control introduced by the British in 1947. This had been intended to fight housing shortage after the Second World War, but was subsequently seen to hinder maintenance and the upkeep of the shophouses. Removing it enabled a more market-driven approach to redevelopment, if at a cost to existing uses and users. Second, the government relaxed planning controls, such as development charges or parking requirements. Third, fragmented private land lots were acquired under the Land Acquisition Act in 1966, which facilitated compulsory land acquisition in central areas. After clearance and resettlement, the government tendered the plots to developers as 99-year leaseholds (Zhu, et al., 2007). At the same time, the government set 'strict guidelines regarding inter alia building material, design characteristics, acceptable trades and services, and the time limit for the completion of any project' (Perry, et al., 1997, p. 265).

The urban form of shophouses, as seen above, is highly adaptable to new uses and therefore exhibits a high degree of resilience. However, despite the adaptability of shophouses, today's Chinatown would not be the renewed, vibrant neighbourhood it is with high value properties, had it not been for the will and ability of Singapore's government to conserve the shophouses and create incentives for redevelopment. The government's control over landownership allows it to plan for the long-term on an urban scale. The concept and masterplans that are revised at regular intervals and look ahead forty to fifty years are proof of a long-term vision that takes into account short-term changes and long-term future needs. Land acquisition makes land readily available for whatever use the government envisions, be that open space, commercial or business hubs, or mixed-use projects. Additionally, it facilitates wholesale conservation or redevelopment, which would be more costly and harder to achieve within a fragmented ownership context. This governance context made it possible to conserve and renovate the old shophouses of Chinatown within a relatively short time span.

Chinatown is thus exemplary of how both urban form and its governance are key to creating resilience. However, the market-oriented approach to the redevelopment of Chinatown carries with it the danger that the conservation of the built environment leads to a change of use to higher orders such as businesses who are able to pay higher rents. As Zhu et al. argue (2007, p. 2348), there is a fine line between urban renewal of architectural heritage and the creation of a 'touristy theme park'. In Chinatown, this is especially visible in the Kreta Ayer area. Shops and businesses are almost exclusively serving tourists' needs, therefore reducing the diversity of uses as well as the use/amenity value for local residents.

10.3 Concluding points

- **Resilience:** the shophouse form has proved to be adaptable over time. However, protection is needed in order for this urban form to remain, when comprehensive redevelopment would create more immediate value.
- **Ownership:** Government land ownership creates the possibility of a long-term planning vision, together with the confidence of being able to implement it.
- **Planning:** a combination of strong regulation and economic incentives enables the regeneration of historic fabric, though at the risk of being dictated by market forces.
- **Financing Infrastructure:** Government investment in the public realm can initiate private investment in the upkeep and renewal of private property.

11.0

HONG KONG

Island East

Island East is an area of 0.46 km², including Taikoo Shing and Taikoo Place, on Hong Kong Island. The case is defined by the boundaries of a 999 year land lease held by Swire Properties since 1881. Island East is located on Hong Kong Island at the north eastern edge, halfway between Central and the endstation of the Hong Kong Island subway line Chai Wan. This area was originally used for industrial purposes and only grew into residential and commercial land with the growth of the city in the 1970s and 1980s. Originally used for a Sugar Refinery and Dockyard, Swire Properties, a wholly owned subsidiary of Swire Pacific Limited, re-developed the area from the 1970s onwards. Swire Properties established a residential neighbourhood including a shopping mall (Taikoo Shing) and a decentralized business hub for Hong Kong (Taikoo Place). The area is characterised by its high density urban environment, with most residential towers between 25 and 28 storeys placed above a two to three storey podium of shops and office towers of 30 storeys and higher. Whilst the residential units have been sold as strata-titles on 99-year leases, the commercial premises remain in the ownership of Swire Properties and are rented out to businesses. The case is an example of long-term land ownership in the context of high development pressure due to Hong Kong's scarcity of developable land.

Figure 60: Cityplaza One Shopping Centre in Taikoo Shing, 2012 (Source: Jesse Rosenstock)

11.1 Measures of Resilience

a. Physical: density

Island East's density in terms of land coverage and floor area ratio, but also population per hectare, is considerably higher than the other cases. This creates the possibility for highly efficient infrastructure, but also reduces the availability of land devoted to public open space. Almost 50% of Island East's area is covered with buildings. Not included in this calculation is the podiums' coverage. In the 1970s, private developers demonstrated how open space could be brought to a podium level in order to fully use the site. This podium form became the generally accepted approach for residential and sometimes also commercial developments (Shelton, Karakiewicz, & Kvan, 2011). The floor area land ratio is 6.1:1, reflecting the high-rise development. This degree of density is typical for developments in Hong Kong from the 1970s onwards. The population pressure – between 1960 and 1980 Hong Kong's population grew by two million people – in the development land-constrained context of Hong Kong, meant that 'every square metre produces a return', which represents a cost in terms of the loss of space available for public amenities and green space. (Cuthbert, 1985, cited in Sehlteon et al. 2011, p. 120).

This is also reflected in Island East's population density. Island East has a population of around 56,500 and an average density of 1,227 residents per hectare. The residential part of the area, Taikoo Shing, consists of 61 towers, containing a total of 13,000 apartments ranging from 54 to 115m2. The population density in this area is around 2,200 residents per hectare. Taikoo Place, which predominantly consists of office buildings, has a much lower population density of around 300 residents per hectare. These residents live in the older 8-15 storey residential blocks remaining between the office towers. Since the development of Taikoo into a residential and commercial area, the population has not changed significantly.

b. Physical: Adaptability of street layout and building type

The historical adaptability of urban form is not measurable in Taikoo, given that the vast majority of its substantial office, retail and residential development was built on reclaimed sites that were previously the ocean, the refinery or dockland. The adaptability of the existing built environment can be assessed only to a degree. Whilst the warehouse buildings Warwick House, Somerset House, and Cornwall House have been adapted from their warehouse functions to different uses such as offices and data centres, the residential towers, the shopping mall and glass-clad office towers pose more of a problem.

The future adaptability of the tall, residential towers is constrained by a number of factors including

Figure 61: The location of Island East (in red) within Hong Kong Island (Source: Google Earth)

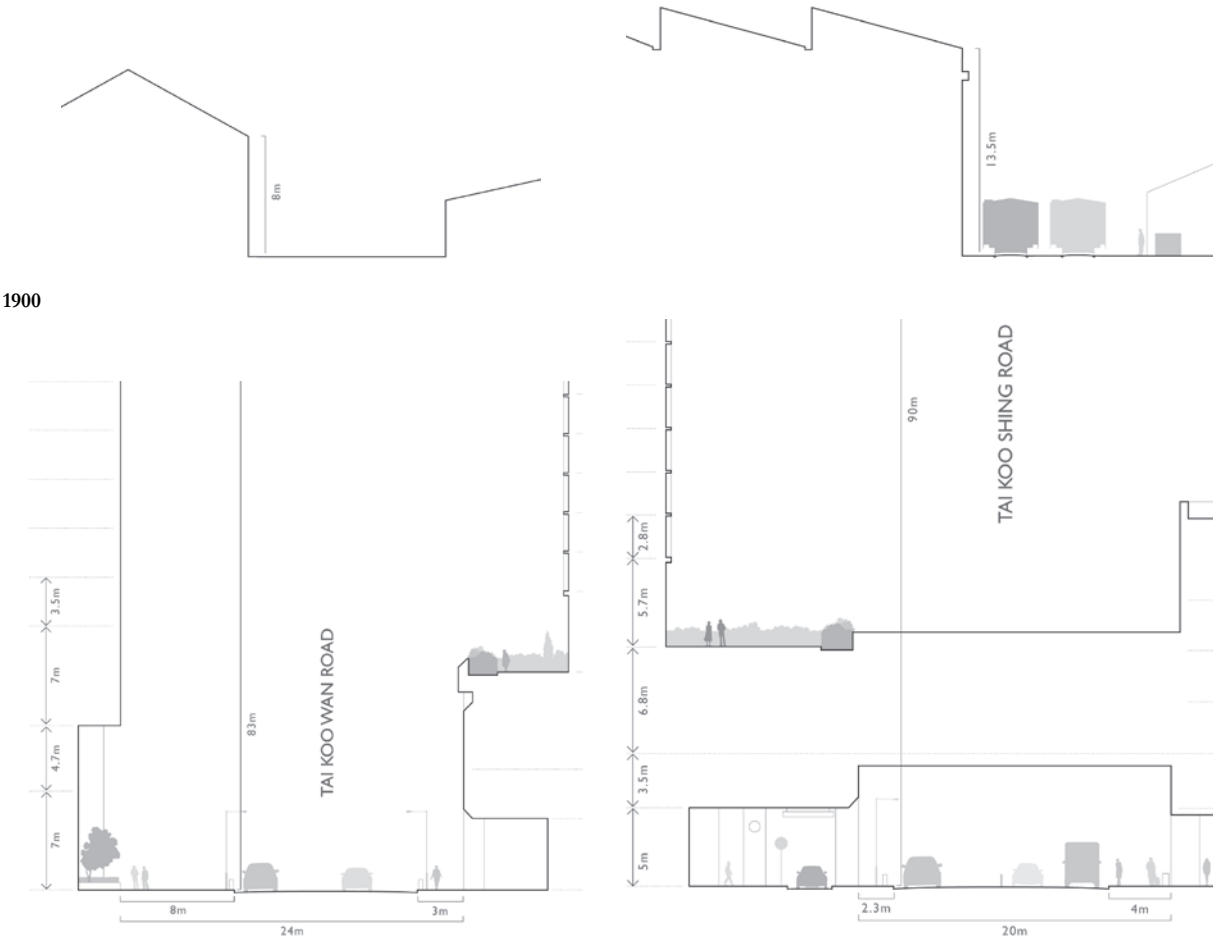


Figure 62: Diagram illustrating comparative street sections as these have evolved over time

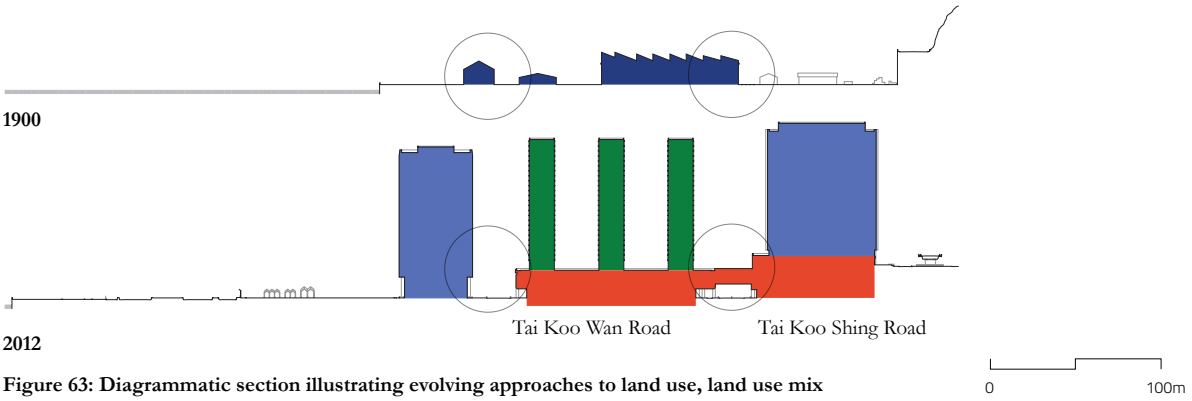


Figure 63: Diagrammatic section illustrating evolving approaches to land use, land use mix and density through time

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

Section through Island East

limited podium-level access, low ceilings and narrow floor plates. These all render the building's floors as unlikely office conversion options and may even limit the appeal of the buildings to future residents. They would be uncomfortable spaces for a number of people to work in, and their repetition does not create the sense of destination and distinctiveness that higher-end commercial uses often require. One interviewee argued that in the 1970s the residential property market, characterised by profit maximisation and particular regulatory conditions, resulted in the design of the cruciform residential towers, as bathrooms were required to have natural air circulation and a minimum size (Interview Barch, 2012).

c. Environmental

Island East's dense activities ranging from living to working to entertainment have created the preconditions for walkability and a highly efficient transport network. Through its two underground stations, Island East is connected to Central Hong Kong and across the Harbour to Kowloon East. The Island Line subway, connecting Island East to Central Hong Kong opened in 1985 after the government rejected plans to extend the tram line. This has created the opportunity for Swire Properties to turn Island East into a secondary business hub, accessible from the central business districts but with lower rent levels. The Tseung Kwan O Line subway, connecting Island East to Kowloon East, opened in 2002 and created connections to a newly developing business hub in Kowloon East. The mixed-use character of Island East means that key amenities are all reachable within a short walking distance. At ground level, wide pavements ensure walkability. This is further enhanced through bridges connecting the podiums. The podiums are, however, also cutting off some of the footfall on the ground level, thereby endangering the vibrancy of the street.

There is little publically accessible green space (approximately 0.01%) in Island East. This consists of the Quarry Bay Park, technically not part of the Swire Properties landholding. The park includes leisure facilities such as tennis courts and a football field. In Taikoo Place, there are several smaller public squares with some greening between the office towers. The lack of green space is a result of land constraints. Green space in the form of the mountain parks of Hong Kong Island is, however, never far away. From the centre of Island East, it is approximately 600 metres to the mountain area. In addition there are open spaces and amenities such as swimming pools on the podium levels. These provide valuable recreational activities for residents, but are not accessible by the general public.

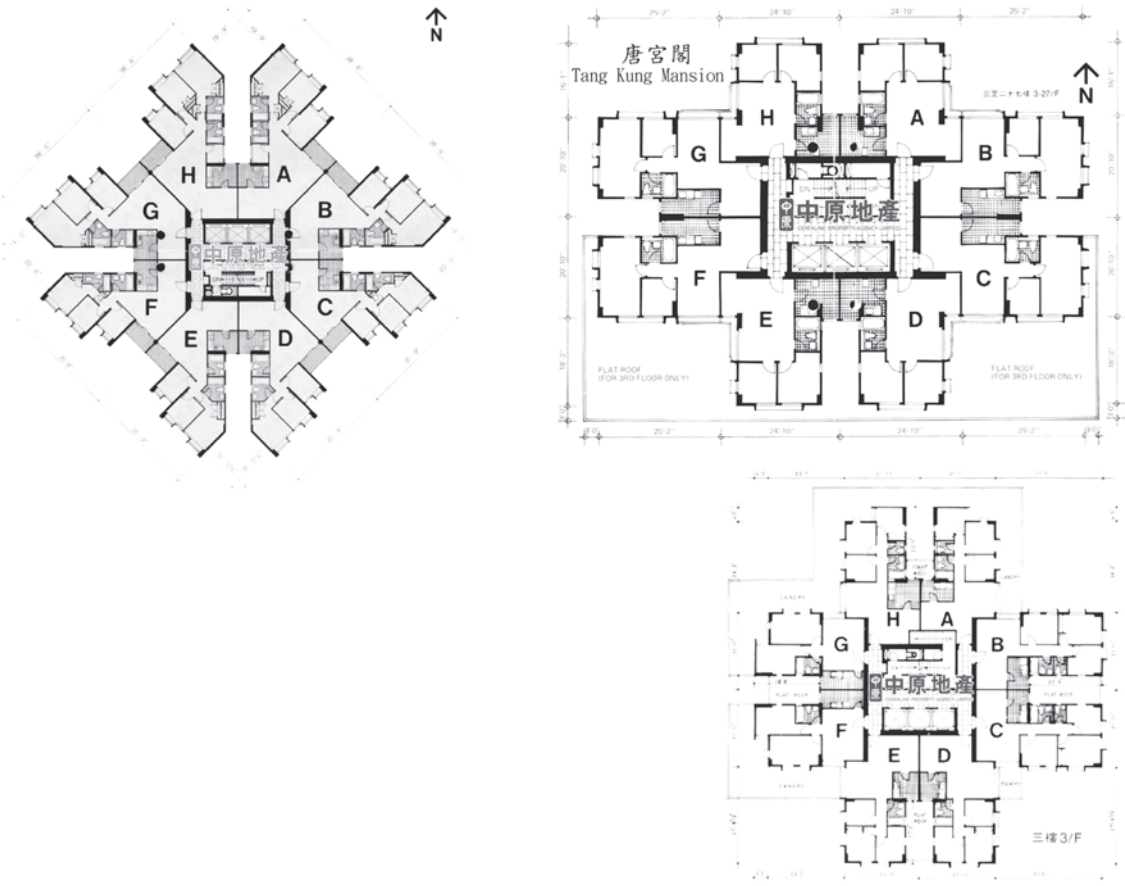


Figure 64: Typical residential tower floor plates illustrating the relationship between flats and service cores (Source: Centadata Hong Kong)

The Hong Kong Planning Standards and Guidelines from 1981 require a mere 1m2 local open space per resident. With over 1 square kilometre of such open space, Taikoo Shing has significantly more than the required amount (Shelton, et al., 2011).

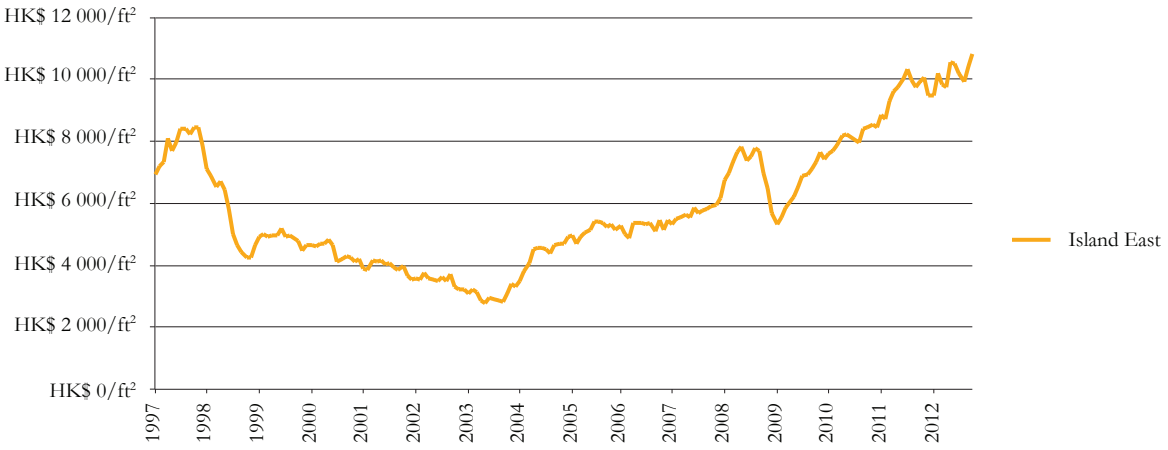
d. Social

Island East is a mixed-use area that generates activity 24 hours a day and 7 days a week. Due to the urban form of the podiums, there is a danger that most of this activity does not take place at the street level but on the podiums and in the mall. This has, however, not impacted on Island East's economic value. Whilst values are below those in the central business district due to its less central locality, they are above other estates in Hong Kong East (see table below). This has also historically been the case. When Taikoo Shing was first built in the 1970s, the area was conceived as a middle-class neighbourhood (Wordie, 2002). This is still the case today, with people paying a higher price in order to live at this address. Around 50% of the residents own their apartment outright, whilst around 30% own it with a mortgage. 2.4% of the residents are socially renting (Census and Statistics Department, 2011).

Island East's land-use is horizontally divided into Taikoo Shing, the residential part with a shopping mall at its centre, and Taikoo Place, the office towers (albeit mixed with old residential blocks in between). Whilst land-use in Taikoo Shing has not changed since its development in the 1970s, land-use in Taikoo Place continues to evolve. Originally zoned as a light-industrial area, Swire Properties first developed warehouse buildings (Warwick House, Cornwall House, and Somerset House). Today, these are no longer used as warehouses but as data centres or office space. The mixed-use characteristic exists not only horizontally, but also vertically. This is closely connected to the particular podium form of the high-rise buildings. The podium with residential towers above is, in a different form and at a larger scale, a continuation of the traditional shop-house (Shelton, et al., 2011). The traditional shop-house had shopping on the ground floor. On the few floors above, there was usually a mix of commercial and residential units. In Island East, the podium is usually two storeys high, containing mostly retail and social amenities. The podium serves to 'enliven the street and provide services and employment in the neighbourhood' (Shelton, et al., 2011, p. 126). The retail activities on the ground floor include a wide range of shops and restaurants, from the neighbourhood noodle-soup place and fruit store to high-end restaurants and international chains such as Starbucks. The shopping mall caters for middle-class residents and visitors from other areas of Hong Kong. It also includes a movie theatre and restaurants, offering a wide range of international and Chinese food. In 2010, Swire Properties also opened an up-market business hotel in Island East. The area includes a medical centre, a primary school and an international school and is therefore well equipped with social amenities.

e. Economic

Taikoo's economic value points to a resilient urban form despite possible difficulties to adapt to new uses over time; there are, however, issues of governance such as the upkeep of the residential high-rise towers that might impact on its long-term economic value. The first high-rise in Taikoo Shing, the Tung Ting Mansion, went on sale in January 1976, twelve months before its opening. All 220 units were sold in a single day at a price of HK$220 per square foot (Swire Properties, 2012). This is very little compared to the prices that buyers pay today. In 2011, prices for residential units were on average HK$9,700 per square foot (Realty, 2012). Taikoo Shing is not one of the most expensive residential estates in Hong Kong Island but it is towards the upper end. Within the district of Quarry Bay, Taikoo Shing is, however, one of the most expensive neighbourhoods.



Graph 8: Average Sales Price (HK$ / ft²) for Taikoo Shing (Source: Midland Realty)

This is also confirmed by Hui, Cheung, & Pang (2010) in a study of property valuation in Hong Kong's residential market.

Due to its more decentralised location, Taikoo Place offers high-quality office units at lower prices than in the old business districts in Central, Wan Chai or also Tsim Sha Tsui in Kowloon. Traditionally, the rents for office space were about half those in Central. Today, rents in Central have gone up at such a rate that Taikoo Place offers the same quality at less than half the rent (Kerr, Interview, 2012).

f. How resilient?

Island East is an urban area within Hong Kong that provides above average quality of living and working. It is an area with a diverse range of activities that keep it lively at all times. This is also reflected in its economic value over time. Due to its relative recent development, it remains to be seen how the urban form evolves over time. There are certainly challenges ahead, be this the area's adaptability to change or – perhaps more importantly – the governance of its residential high-rise towers.

11.2 Governance

a. Historical land ownership, planning context and financing of street infrastructure

Island East's particularly dense urban form needs to be viewed in the context of Hong Kong's development land. The area's urban form also needs to be understood in the context of the long-term ownership of land by Swire Properties, which enabled it to plan the redevelopment of land at an urban scale.

The historical development of Island East is closely linked to Hong Kong's colonial history and its impact on landownership and property development. When Hong Kong was formally passed to the United Kingdom under the Treaty of Nanking in 1842, the British established a crown colony, introducing English law, including English property law. However, in order to make regulating the allotment of land administratively simple, the Crown decided that 'all land in Hong Kong would be held by private individuals on lease from the Crown' (Evans, 1971, p. 23). Leases were usually granted by public auction and for 75 years only. After some campaigning by landlords, leases were extended and newly granted for 999 years up until 1889. After that leases were 75 years again. In 1899 renewable leases of 75 plus 75 were introduced.

Evans argues that though the Crown in Hong Kong would have been 'in a position to play the same role in urban development as that played in London by the large family estates, such as the Bedford and the Grosvenor, it never really attempted to do so' (Evans, 1971, p. 26). The first Surveyor-General A.T. Gordon's plan for setting out areas for housing, administration, and commerce was never implemented and the nineteenth century was largely characterised by a rapid but piecemeal urbanisation process (Bristow, 1984). The government failed to implement any sort of comprehensive urban development policy (Evans, 1971).

Butterfield and Swire acquired the land in order to operate a sugar refinery that went into production in 1883, and the Taikoo Dockyards that opened in 1907. Later, parcels that were no longer required for these business purposes were sold off. In the 1970s, however, Swire owned a large parcel of land in Island East. Whilst technically, Hong Kong Government owns the freehold, the 999-year lease guarantees Swire strong control over the land. Compared to the more usual leases of 75 plus 75 years, the 999-year leases are unrestricted; this means that Swire does not have to apply and – more importantly – pay for a lease modification to redevelop the area for different uses. This puts Swire at a financial advantage, since lease modifications have become increasingly expensive.

At the beginning of the 1970s, Swire decided to close the dockyard in Island East. Taikoo Dockyard merged with Hong Kong's oldest dockyard based at Tsing Yi (Swire, 2012). This opened up land for other uses, which prompted Swire to found a property company, named Swire Properties. In January 1974, the Hong Kong government approved a comprehensive masterplan submitted by Swire Properties to redevelop Taikoo Dockyard, the sugar refinery compound, and various other land parcels in Island East (Swire Properties, 2012). The plan included residential, commercial, and light industrial space. Under these conditions, Swire Properties developed the residential area, including a commercial centre, (Taikoo Shing) and the office and industrial area (Taikoo Place). This also included the financing and development of the public realm, such as streets, pavements and smaller squares.

b. Contemporary land ownership, planning context and financing of infrastructure

As a wholly-owned subsidiary of Swire Pacific Limited, Swire Properties is still a family-controlled business. The family resides in England; the business operates out of Hong Kong. Whilst there is strong communication with the shareholders, the management of Swire Properties runs fairly independently in regards to its day to day business. Today, the commercial properties of Taikoo Place remain under Swire Properties' control and the impact of this is clearly visible. Swire Properties has been able to carve out a public realm in a city where

Figure 65: Taikoo Shing under construction, 1980s (Source: WiNG, published under Creative Commons)

Figure 66: The maintenance of the outside of these residential tower blocks is difficult due to the complex relation between developer, management, and sub-lessees, 2012 (Source: Jesse Rosenstock)

public space is often compromised as land is at such a premium. For example, it invested in public art and strategically integrated a square facilitating indoor and outdoor eating. Swire Properties cultivates an evolving and carefully controlled mix of commercial uses that keep values high relative to the broader city.

Whilst public authorities seem to have had little involvement beyond planning approval when Island East was redeveloped from an industrial site to a commercial and residential area, they take a more pro-active role now, especially focussing on building height and air corridors for ventilation. There is increasing public pressure to control density. There is concern for the appearance of Hong Kong's famous skyline on the one hand and the environmental impacts of development on the other. These issues are usually fought out between the land owner and the planning officials during the planning permission process, and finally decided on by the Town Planning Board which consists of seven public officials and 28 non-officials representing a wide range of professions. At the same time, there is a close collaboration between planning officials and Swire Properties to improve access to open space. Recently, Swire Properties has collaborated on a feasibility study in order to better connect Island East to the Quarry Bay Park and have signalled a financial contribution to possible plans. There is a clear interest in investing in this area in the long term.

Taikoo Place is an established alternative to the CBD in Hong Kong and continues to grow through the redevelopment of older industrial buildings into office towers and new residential units. At the same time, the main challenge in Taikoo Place is the lack of capacity to grow much further. It has become increasingly challenging to assemble more land because the area is built up, and Swire would have to buy 80% of the leases in existing buildings in order to be able to redevelop any of them. Other former industrial areas in Hong Kong such as Kowloon East (Kwun Tong), with more development potential due to their larger scale, could therefore potentially become more important as alternative business hubs to the CBD. This, in turn, could influence Taikoo Place's long-term value.

In contrast to the office and commercial buildings, the residential blocks of Taikoo Shing have been sold off as strata-titles. In Hong Kong's property market, it is usual to build residential units to sell in order to generate cash flow (Interview, Kerr 2012). This means the residential units are no longer under the direct control of Swire Properties. The maintenance of the public realm, such as the private open spaces on the podiums, is undertaken by the property management company Taikoo Shing (Management) Limited. However, major maintenance work or redevelopment is difficult to achieve in this context. One example of this is the recent dispute over the upkeep of the residential towers' external walls. When selling the apartments as strata-titles, Swire Properties remained the registered owner of the external walls. In 1996, the ownership of all external walls was transferred to its subsidiary Taikoo Shing (Management) Limited. Under conditions of purchase, the strata-title owners bear any maintenance and repair costs of the external walls (New People's Party, 2011). A further complication is that 80% of the apartment owners would have to agree to undertake changes and in a high-rise tower of 220 or more units, this is difficult to achieve. The complex relationship between the developer, the management company, and the apartment owners fails to create a model of stewardship which ensures the upkeep of common areas. So far, this has not impacted on the value of Taikoo Shing. This could however change in the longer-term.

11.3 Concluding points

- **Resilience:** in spite of high density and mixed land use, the area's resilience is constrained by the adaptability of its urban form.
- **Ownership:** large scale long-term leasing of land creates the opportunity to plan and manage over time which has benefited the development of the commercial space and public realm but not the residential units.
- **Planning:** in a context where state planning is not particularly strong, an alternative long-term perspective becomes important for creating resilient urban form.
- **Financing Infrastructure:** the long term leasing of land enabled the integration of public infrastructure parallel to the growth of the residential and commercial development site.

12.0

OUTCOMES

The main outcome of the project in the first phase of research is an understanding of some of the key development and governance mechanisms that enabled the eight case studies to be built and to endure. Between them, the case studies provide the material to demonstrate that certain mechanisms facilitate the creation and ongoing maintenance of more or less resilient urban form. Understanding these mechanisms in a comparative sense enables us to draw provisional conclusions about the relationship between urban form resilience and the governance of urban form. Based on these conclusions, the final section of the report consists of a more propositional discussion presented in the form of tools and principles for building future resilience.

Resilience clearly depends on the interaction of forces operating at a number of scales and not only on development and decision-making processes that pertain to specific areas. Over the course of the last century, cities have undergone fundamental transformations. The shift from manufacturing to services as the main source of employment and income has shaped the role of cities in the developed world, as numerous commentators and theorists have argued. Cities have become centres for the production of services, including financial, government and consumer services. In this new context, cities have become the nodes of economic growth. Not all cities have managed this shift equally successfully. Many former industrial cities have declined with the relocation of their production centres to peripheral areas or the developing world. The resilience of any one area of a city depends on the 'success' of the city within which it is located. Notwithstanding, it is clear that different areas within cities which become recipients for concentrated investment and development can improve their performance relative to their broader urban contexts. The resilience of any one area of a city thus also depends on the resources and advantages it is able to generate within its broader urban context.

The following conclusions are structured to address the questions and hypotheses formulated in the early sections of this report. Bringing in the evidence from the cases, the first section. The second section argues how and why long-term perspectives, urban-scale planning, and 'stewardship' are key concepts for building resilience over time.

12.1 Urban Form

a1. Physical: density

Resilience reflects a 'sufficient' density of living and working occupants to sustain local amenities, plus to help support a mix and concentration of mobility infrastructures, uses and tenures.

Though very high population densities, as exemplified by the Berlin and Singapore cases at earlier periods in their histories, may be indicators of deprivation and/ or decline rather than resilience, the low population densities exemplified by Woodbury create challenges in terms of situating other uses in close proximity. Most of the commercial uses in Woodbury cannot be sustained by the local population itself, but need to be able to draw on the population of a far wider geographic base.

Sustaining the high levels of commercial use versus relatively low population density of the London case relies on the central location of Mayfair and Belgravia and the broad appeal that these areas hold for visitors to London from far and wide. Sufficient population can, as exemplified by the Berlin case, generate the basis for local commercial uses and social amenities within walking distance alongside those with wider appeal.

In order to achieve sufficient residential population densities and provide commercial and social amenities within walking distance, there needs to be a high enough degree of land coverage. However, higher forms of land cover often correspond to lower levels of public space provision. The 9th arrondissement in Paris, Hudson Square in New York and Taikoo in Hong Kong are examples of urban forms involving high levels of land cover. Public space provision in all is compromised as a result, with knock-on consequences for public life. In New York, this is being addressed through a programme

of retrofitting open public spaces in order to appeal to incoming creative industry users as well as future residents.

Population density and the intensity of use more generally concentrated in localities also provides a motivation for capital investment, such as for the improvement of public transport and the provision of social amenities. For example, the recent density that has come with the development of Reston Town Centre has finally created the incentive to extend the subway out from Washington DC. In contrast, the low density in Woodbury, Irvine has hampered – and arguably will continue to hamper - the development of public transport infrastructure.

a2. Physical: Adaptability
Sustaining value and use requires the capacity to adapt the urban fabric, be it the streets, buildings or both. Streets are adaptable when they are generously proportioned so as to integrate different forms of transport, from pedestrians to cycles to private cars to buses, tram ways or rail. The wide streets of Mayfair, for example, have been able to cope with increases of traffic over the course of the nineteenth and twentieth centuries and the enhancement of the public realm. The same kind of potential would appear to be latent in Hudson Square, New York. The porosity of the gridded layouts of Mayfair in London, Hudson Square in New York and Chinatown in Singapore additionally promote accessibility within and across the urban form, thereby encouraging the flow of people as well as social and economic activities through it. However, not all local streets need to be of the same order and scale. The Paris and London Mayfair cases suggest the potential for different kinds of adaptability, value and reuse related to a loosely-defined hierarchy of major and minor routes – which may reflect different design intentions and provide scope for varying urban experiences.

Important pre-conditions for adaptability would appear to be simplicity of structure, internal layouts that can be reconfigured whilst maintaining access to natural lighting and ventilation. Berlin's tenement blocks are an example of this type of building adaptability: the simplicity of their floor plans has allowed for the combination of several small apartments into larger ones or to create space for new uses, such as small offices, restaurants or shops. At the same time, the form of block has proved adaptable in the light of evolving densities of population. The originally mixed use topography of Mayfair exemplifies how a diverse urban fabric can yield opportunities for incremental redevelopment or adaptability at the neighbourhood scale, whilst the repetitive form of the terraced townhouse with its high ceilings and simple configuration of rooms has provided numerous opportunities for reuse over time. In contrast to this flexibility stand single family houses in Woodbury, Irvine that do not easily allow for a different density or type of use and are additionally constrained by governance. The larger former industrial buildings in Hudson Square, New York do not easily facilitate conversion to residential or smaller scale office use owing to the difficulties of drawing natural light into a deep plan. The high-rise apartment blocks in Taikoo, Hong Kong have so far not proved to be adaptable to different uses, and one may speculate that the form of the blocks combined with their circulation renders them relatively inflexible.

b1. Environmental: Transport
Resilience appears to correspond to the openness of (distinctive) local areas to access to and from the widest array of other places, both near and far. Transport infrastructure, as stated in the introduction, plays an important role in the development of parts of the city as key locations for social and economic activity. In addition, enhancing public transport accessibility is an important strategy for reducing energy consumption and pollution.

The case studies exhibit different levels of accessibility, measured by the number and variety of public transport options in each case and the degree of their connection to other places within their broader cities and beyond. Though Woodbury is well connected with the city, region and beyond by means of a road network, as well as incorporating cycle and pedestrian movement options and considerations, it is the least connected in terms of public transport and thus the least resilient case according to this environmental measure. The research suggests a correlation between lower levels of public transport accessibility and value growth over time. For example Hudson Square, New York, which is situated at the margins of Manhattan's primary lines of public transport infrastructure, has remained at a lower value than surrounding urban areas. Conversely, Reston highlights the relationship between increasingly diverse transport options increasing connectivity at a range of scales and growth – in terms of both use and property value. London's Mayfair also supports this argument, with Crossrail at Bond Street opening up new advantages for this location in terms of accessibility. The diversification of modes of transport arguably forms an important aspect of building resilience, enabling everyday users to choose options best suited to their journeys – according to distance and direction.

b2. Environmental: Green open space
The cases indicate that there is often a relationship between the presence of green open spaces and the highest economic values in local areas. In the historical example of Hudson Square in New York, green open space was created in the context of luxurious residential

developments; and its demise signified the withdrawal of that wealthy population. Grosvenor Square in London and Parc Monceau in Paris have historically been associated with higher levels of prestige and value than surrounding addresses. The delivery of green open space and its maintenance over time relies on the existence of planning and financing instruments to both fund and maintain it, given that it represents land from which immediate profit-generating opportunities through development are withheld.

In some of the cases, the prospect of attracting higher economic values is being actively cultivated through the retrofitting of green open space within existing urban form. For example, in Hong Kong, the public authorities and Swire Properties are working together to improve access to the Quarry Bay Park, recognising the use and amenity value of public open space for residents in a dense urban environment, as well as its economic 'asset value'. Similar processes are at work in New York's Hudson Square, led by the Business Improvement District.

c. Social

How land uses are deployed and distributed is key to the maintenance of urban places over the long-term. To be resilient, urban form needs to be able to concentrate diverse land uses including social and public amenities and resources.

The cases have shown that several characteristics of land use are important for this resilience. First, mixed use areas are less vulnerable than single use areas because change rarely affects all economic bases at the same time or in the same way. Growth opportunities become available in the wake of declined uses and vacancies in some areas are compensated by continued use and activity in others. The same principal holds true for different forms of tenure, which evolve over time in response to changing market conditions and political contexts. Diverse uses and forms of tenure thus help make neighbourhoods more resistant to economic shocks or socio-political changes. Second, the original land use of an urban place is key to its long-term adaptability. Industrial uses appear to be more short-lived and their accompanying buildings thus more prone to redevelopment than residential uses, as illustrated in the case of Hong Kong compared, for example, to Mayfair and Belgravia. Notwithstanding, some industrial urban forms such as medium scale warehouses have proved to be adaptable to a wide range of uses, as illustrated at least in part by Hudson Square, New York.

The resilience of a land-use mix depends on how well the nature of the mix is managed over the long-term. Both public authorities and landowners need to be able to anticipate and work with change in order to maintain the vibrancy and viability of uses. The instruments they deploy for this include adapting planning regulations to facilitate changes of use or rezoning, the development of long term strategic development plans and future-oriented investment strategies and leasing arrangements. Grosvenor, in the case of Mayfair and Belgravia, has continuously managed the evolution of use and occupancy across its estate in negotiation with the local planning authority. The case of Hudson Square, New York, which is still zoned as a manufacturing area long after the core industry which sustained it left, illustrates some of the detrimental effects of resisting rather than managing change. Notwithstanding, restrictive planning regulations can also protect the diversity needed for a vibrant urban place. In Paris, for example, planning regulations prevent the 9th arrondissement from becoming entirely commercial.

d. Economic

The economic value of a part of the city, and of the individual properties within it, is dependent on property cycles and other external influences. Given the relatively short period for which it has been possible to collect data, it is difficult to draw specific conclusions on the relation between urban form and economic value over time or on the performance of the cases relative to their surrounding urban contexts. Notwithstanding, a few key points can be made. First, resilience appears to be reflected by those areas which show the steadiest forms of growth and least volatility in terms of economic value over time, in comparison to their surrounding contexts. Hudson Square in New York is an example of an area in which value collapsed as a result of the buildings becoming redundant due to the demise of a specific industry, and which still underperforms relative to neighbouring areas. Chamisso in Berlin is an example of an area in which value was depressed for many decades as a result of broader political and economic contexts which discouraged capital investment across the city in general. Mayfair and Belgravia, in contrast, are examples of areas which, for the most part, have weathered changes impacting on property value in London more broadly, enabling them to outperform equivalent developments of a similar age and in a similar location. Second, development controls that enforce building upkeep, protect uses (as in zoning), restrict changes affecting the architectural integrity of buildings or determine the preservation of built heritage can play important roles in either creating or depressing value, depending on context. For example, the preservation of the Georgian fabric of Mayfair clearly plays a role in perpetuating its lasting value (which is cultural as well as economic), whereas the zoning of Hudson Square as manufacturing is helping to depress economic value. It remains to be seen whether the restrictive covenants affecting Woodbury's home owners' abilities to adapt their properties will impact negatively on the value

of their property over time. Third, the adaptability of buildings can increase property values within a relative short period of time. The Singapore and Berlin cases both underwent relatively rapid processes of regeneration where existing buildings played an active role and which resulted in dramatic property price increases. Fourth, as mentioned above, the public realm can contribute to the value of the urban area, as can access to public transport. Fifthly, diverse uses (including variability within broad use categories) and forms of tenure reduce risk associated with unforeseen change – including high vacancy rates and dereliction. Trinity's assets are arguably historically the least resilient as a result of the single-use zoning regulations impacting on their property. Though as yet unproven, the resilience of Woodbury in the future may depend to a degree on the diversity of dwelling types - the varied appeal that these create and mix of people they attract.

12.2 Governance

The key question addressed in this section is as follows: are there certain forms of governance that promote the creation and maintenance of resilient urban form more than others? Governance, as stated in the introduction, is understood in terms of the relationship between landownership, planning, and financing. The varied contexts of land and property law across the cases make for rich cross-comparisons, but also create challenges in terms of the capacity to determine which forms of governance are best placed to create resilience internationally. As a result of a shared context of English land law, London, Singapore, and Hong Kong all exemplify models of long-term, urban scale freehold landownership accompanied by leasing arrangements for the purposes of development and/or occupation. In the United States, a feudal heritage from Europe was abandoned following independence, and this has resulted in more short-range ownership perspectives and the tendency for large holdings to be broken up with development. In Berlin and Paris, post-feudal land law has also tended to create systems of small-scale land ownership.

Acknowledging these differences, we argue that across the different types of relationships between land ownership, planning, and financing, there are three aspects of governance which are particularly relevant for the creation and maintenance of resilient urban form, which connect to the hypotheses outlined in the introduction:

a. Long-term perspectives
b. Urban scale planning
c. Stewardship

These are discussed in the sections that follow:

12.2.1 Long-term perspectives

a. Long-term land ownership

Long-term land ownership is usually associated with mechanisms that enable landlords to lease land for development and/or use. Leasehold systems imply a long-term perspective in the sense that landlords looking to improve the capital value of their properties between lease periods – often for the benefit of future heirs – need to develop strategies for cultivating value over at least these periods (which may last for several decades). These strategies may include setting lease terms which favour the freeholder by, for example, enabling a steady income to be generated and/or development risk to be displaced. They may also include routine investments in the upkeep of specific buildings under lease, as well as in the enhancement of the broader urban context of leased properties. Hudson Square in New York and Mayfair and Belgravia in London were developed by landlords who leased their land over long periods, though London's landlords showed more consistent commitment to this as a strategic approach to value management. This has had demonstrable consequences for the varying successes of each. Whilst Grosvenor has held onto its land over the centuries, at least for the most part, Trinity largely divested itself of its land at the beginning of the twentieth century. As a result, Trinity surrendered its strategic long-term control over the larger landholding and thus the ability to influence the evolution of the larger piece of city. If Trinity still had control over its original landholding, it might have been able to encourage it to adapt more rapidly and it would have been able to exert a more forceful presence in recent debates about the area's rezoning. We conclude that long-term land ownership can increase the resilience of an area's urban form.

In contrast, in the cases of Berlin and Paris, land holding at the time of development had a more short-term, speculative character. In Paris, for example, land owners developed their parcels in order to sell. There was a short-term profit to be made. Often, however, they developed on a speculative basis with high debt financing. This means that they were more vulnerable to property cycles. It is then also in Paris that property companies went bankrupt because they could not repay their debts. Berlin's land owners also developed their properties speculatively. The emphasis on the short-term promoted the maximisation of profit. The consequences were dense and congested areas with poor living conditions. Today, these neighbourhoods are, however, vibrant and economically valuable. This is in part due to the adaptability of their buildings that were in fact able to accommodate change, but also due to the long-term planning strategies of public authorities over the last few decades, which has compensated for the lack of a long-term ownership structure.

b. Long-term state planning
The analysis of the cases has shown that public authorities can also develop a long-term perspective through strategically planning ahead. The best examples of long-term public authority planning within this study are Singapore and Berlin.

In Singapore, planning authority is strongly connected to land ownership as the state owns almost 80% of the land. This powerful combination enabled the government in the case of Chinatown to control the development of the public realm and, like a private landlord, promote private investment through 99-year leases of individual buildings. Whilst it remains a matter of controversy to what extent the area has become a theme park for tourists or a genuinely local, mixed-use urban area, the government has clearly achieved its goals over the last thirty years.

West Berlin's government played a similarly strong role in urban planning in the 1960s and 1970s. While a long-term perspective from private landowners was completely lacking in the context of Berlin's political situation, the government provided a powerful alternative. With an urban renewal programme unfolding over several decades, the government used the neighbourhood's resilient urban form to recreate a vibrant and economically valuable place. It is now up to private landowners to continue to manage that form. The future will show how well this can be achieved in the absence of a single landowner responsible for the area overall. The government's withdrawal of long-term investment in the area shows that over the longer term, there is always a risk of changing policies. However, this is not dissimilar from the evolving investment strategies of a private landlord.

c. Long-term investment in infrastructure
In addition to long-term land ownership and/or state planning, a long-term finance strategy is needed for infrastructure investment. In this study, we focused on investment in the public realm, including streets, pavements and open recreational spaces such as squares and parks. Infrastructure is expensive and it takes a long time for it to pay back because usually it relies on the development it facilitates to be completed and to generate necessary returns. Investments in infrastructure are thus unlikely to yield returns in the short to medium term and additionally carry risk given difficulties of predicting the evolution of the property market over the long-term. Nonetheless, investment in infrastructure can, under the right circumstances, yield returns over the long term.

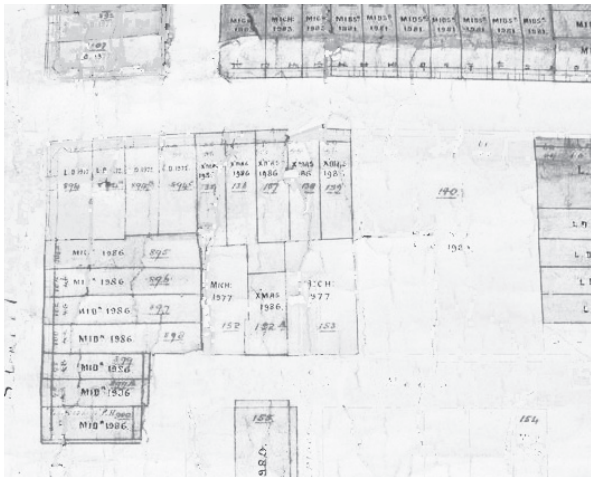


Figure 67: Grosvenor Lease Map, early twentieth century
(Source: Westminster Archives)

Public and private forms of capital are often used in conjunction to make the costs of infrastructure bearable at the outset of development. Public authorities, as illustrated in the case of Irvine, may use financial instruments such as bonds to pay for infrastructure. In instances where only private capital is used, several investors are often involved, amongst whom risk is apportioned. The key mechanism for this apportioning of risk in London was the building agreement between ground landlord and developer leaseholders, which constituted a form of planning obligation and set the terms of responsibility for bearing costs or debt financing. In both Paris and London, loans and mortgages became the key means of financing development, but the pace of value creation in both proved too slow for many of those most at risk, and they subsequently became bankrupt.

In the unusual case of Irvine, capital was available from the Irvine Company for upfront investment in the high quality landscaping and amenities which define the primary urban framework of Woodbury. This made it possible for development to proceed at an optimal pace in relation to the economic cycle – with less emphasis on the need to service debts within a tight timeframe. This case suggests that there are great advantages to being able to invest equity. Alternatives might otherwise include long-term investment funds, perhaps including pension or trust funds. There is always the risk that the opportunity to recoup funds and opportunities to capitalise on investment will come too late for investors, given the disjuncture between the time it often takes for urban places to become established and the length of a fund, a career or even a human life. However, long-term, patient capital is vital to the resilience of urban form.

12.2.2 Urban-scale planning

Development which proceeds in a piecemeal fashion, if not adequately regulated, has a tendency to result in profit maximisation strategies at the level of individual plots and the failure to deliver public amenities, which can themselves create a range of values.

The creation of resilient urban form requires a regulatory planning framework to set the terms for balancing private and commercial development opportunities with public benefits and goods. These benefits include public infrastructure, the public realm and social amenities. Planning frameworks can be used to guide the evolution of a land-use mix over time – a careful balance between a response to market forces, social and local opportunities and needs, and a marketed vision. Such frameworks can be developed by landowners in possession of relatively large tracts of urban land and/or public authorities that have not only the ability to create strategic frameworks and visions for their areas, but also the power to implement public objectives.

Within the London, New York, Reston, and Irvine cases, private landowners created long-term economic and use value by giving up potentially developable land for amenities including parks and other open spaces, libraries and churches. Owing to the vastness of the territories occupied by Reston and Irvine, a framework for development was created by landowners on the scale of a whole city. Grosvenor and Trinity in contrast developed their far smaller sites in relation to existing urban settlements, though in the absence of state-led planning controls which were developed in both New York and London during the nineteenth century. Today, government (at the city and local levels in particular) plays an important role in strategic planning, operating in conjunction (though not always in alignment) with the original landholders.

In Berlin and Paris, public authorities played an important role right from the inception of the cases – the planning of Berlin and nineteenth century remodelling of Paris. Haussmann's Grands Boulevards and public parks were cut through the existing urban fabric in a manner which reduced developable land (and carried with it well documented social costs) but created high value over the long-term, as can be seen in the case of the Parc de Monceau in the 17th arrondissement or the Boulevards around the Opera in the 9th arrondissement. In Berlin, Hobrecht developed an entire masterplan for the land to be developed around the core city. However, in contrast to Haussmann, Hobrecht did not have the power to implement the plan. Planning was in the power of district authorities. This resulted in some of the areas planned for parks not being developed due to pressure from landowners who had considerable influence within the district authorities.

Whilst the empirical examples clearly demonstrate that long-term and urban scale can be achieved by private landlords or public authorities, or most often as a combination of both, we argue that this is not sufficient for creating resilience. The management of land requires an additional ethical orientation which can be defined in terms of principles of stewardship.

12.2.3 Stewardship

The concept of stewardship encompasses understandings of 'sound' management of land with appreciations of what is 'good' for human development long term (Lucy and Mitchell, 1996; Nelson, 2011). The following are key emerging ideas about the relationship between stewardship and our ideas about 'building resilience'. Stewardship implies:

- Taking strategic decisions in the interests of the long term – conceived in physical (building quality for example), environmental, social and economic terms.
- Taking responsibility for maintenance and upkeep beyond initial development and first sale in order to cultivate opportunities for enhancement, adaptation and adaptability.
- Learning from the past – from management modes, roles and traditions developed over time - and acting for the present and future in the light of these historically informed understandings, as the management of Grosvenor's London Estate highlights.

Grosvenor's management of land use over time may be interpreted as a form of stewardship in the sense that this protected residents in the eighteenth and nineteenth centuries from pollution by 'noxious' industries, provided for a social mix which has evolved over time, and balanced commercial uses with the provision of amenities. Grosvenor's approach can be understood in the context of a tradition of philanthropy, which informed its understandings of its role as a landlord. The regulatory measures developed by Paris' public authorities to control land uses and the maintenance of historical buildings in the 9e arrondisement can be interpreted as indicators of a form of stewardship, in the sense that these have respectively built a vibrant, liveable neighbourhood balancing a range of values. In Irvine, the use of integrated economic and spatial planning to allow vast tracts of wilderness to be protected in perpetuity and to form an asset of national significance also exemplifies a stewarding approach to development control. These three cases all contrast from the situation evident in the Hong Kong case, where the relationship between the land owner/developer and strata title holders is complex and responsibilities for the upkeep and maintenance of buildings are unclear. The absence of a steward here has resulted in the decline of the shared fabric of residential buildings, with significant consequences for resilience.

Most importantly, stewardship implies an attitude of 'care' for the future, which suggests the need for further research to engage with literatures highlighting the importance of understanding the role of conceptions of time and temporality situated within existing sustainability and resilience discourses for building resilience for the future (see for example Adam and Groves, 2007).

12.3 Tools and principles

Based on the conclusions set out above, this last section establishes a set of provisional and preliminary conclusions about some of the preconditions for resilient urban form that emerge from the research to date.

Urban form principles

1. Urban form should be designed to be able to accommodate lower and higher population densities who are able to create the need for services and amenities concentrated in the same location, as well as demand for mixed transport options.

2. Urban form should be designed at levels of land coverage sufficient to achieve high population density but without eroding the resources and adaptability of the public realm.

3. Design for future adaptability:

   a. Streets should be laid out in a porous, simple arrangement incorporating a loosely defined hierarchy of generously proportioned major and minor routes.

   b. Building structures should be designed to enable internal layouts to be configured quite differently, without the need to undermine structural integrity or invest large sums in reconstruction.

4. Green and other forms of public space infrastructure should be designed at the outset of development, alongside strategies for managing this as a public resource over time.

5. Urban form should be designed with an evolving topography of mixed uses and tenures in mind, which may be distributed vertically and horizontally through buildings and across neighbourhoods.

Governance principles

1. Long-term perspectives are crucial. These may include:

   a. New forms of long-term land ownership, including mechanisms for establishing community and state ownership and enabling these bodies to create new great (public) 'estates' and generate returns for future society rather than individuals as 'heirs'.

   b. Planning for anticipated and as yet unknown or unknowable forms of growth and change - developing strategies for planning for uncertainty.

   c. Developing financial mechanisms to enable upfront investment in public infrastructure for the long-term in order to overcome the risks associated with urban value creation.

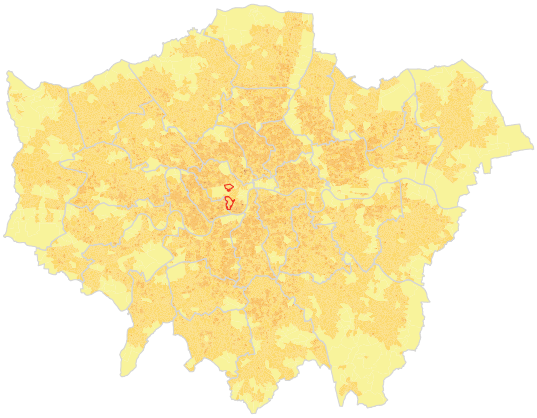
2. Detailed planning at the urban scale to create a balance between private and public interests and between short and long-term profits.

3. Develop principals of stewardship which relate to the long-term management of uses, the preservation of amenities, natural resources and diverse populations.

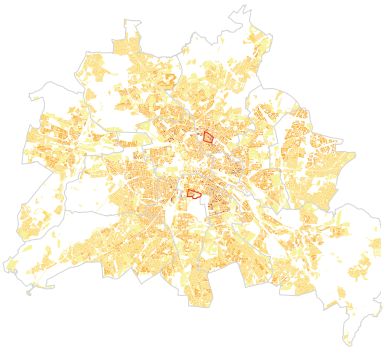
Figure 68: Map of Paris in 1889, illustrating strategic road works carried out between 1871 and 1889 (Source: Bibliothèque Historique de la Ville de Paris)

DATA

Physical: Density

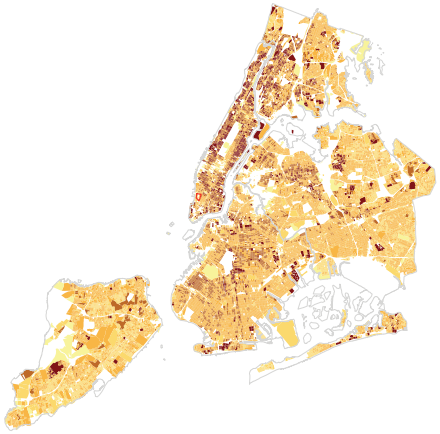


London



Berlin

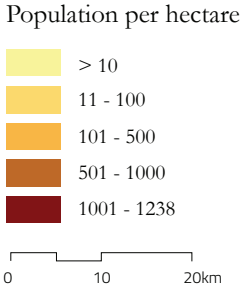
Paris



New York

	London[1]	Berlin[2]	Paris[3]	New York[4]
Population	7,172,,091	3,357,938	2,211,297	8,175,133
Density (pop/ha)	46	42	210	104

Sources:
1. 2001 Census Data United Kingdom
2. Senate Department for Urban Development and Environment
3. Institut national de l'information géographique et forestière
4. 2010 Census Data United States



Physical: Building Height

Mayfair

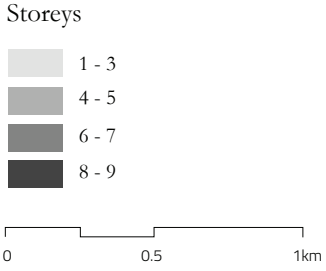
Belgravia
London

Chamisso
Berlin

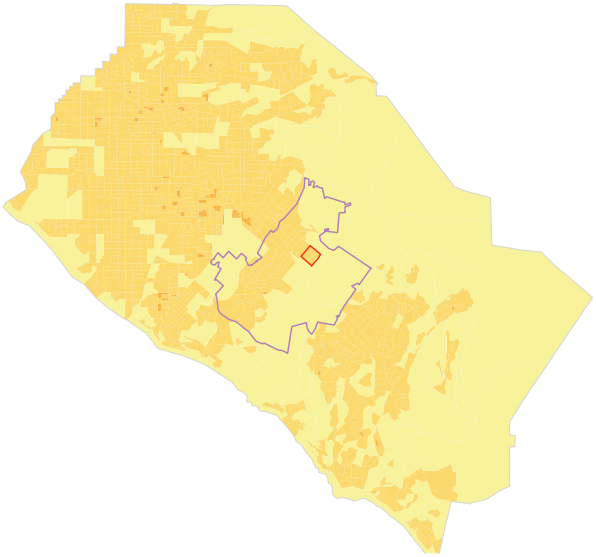
Opéra
Paris

Hudson Square
New York

	London Mayfair	London Belgravia	Berlin Chamisso	Paris Opéra	New York Hudson Sq.
Site Area (m^2)	464,326	905,000	940,000	2,200,000	260,000
Built Area (m^2)	206,931	347,087	255,854	1,268,479	113,351
Coverage Ratio	0.4	0.38	0.27	0.58	0.44
Floor Area (m^2)	1,137,502	1,644,918	1,208,101	5,759,758	1,184,097
Floor Area Ratio	2.4	1.8	1,29	2.62	4,55



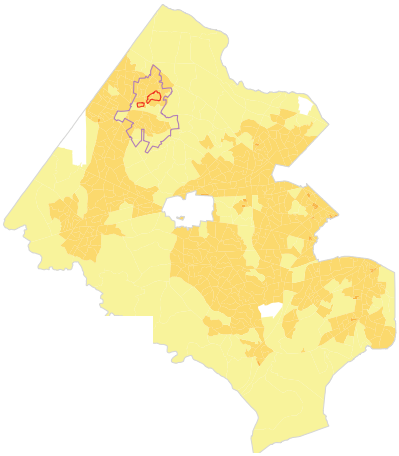
Physical: Population Density

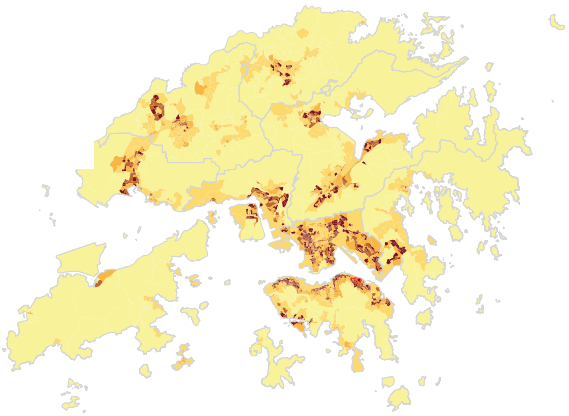


Data not available

Irvine

Singapore





Reston

Hong Kong

	Irvine[5] Orange County	Singapore[6]	Reston[7] Fairfax County	Hong Kong[8]
Population	3,010,232	5,183,700	1,081,726	6,861,280
Density (pop/ha)	14	74	10	62

Population per hectare

- > 10
- 11 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1238

0 10 20km

Sources:
5. 2010 Census Data United States
6. 2010 Census Data Singapore
7. 2010 Census Data United States
8. Hong Kong Planning Department ,Hong Kong Census and Statistics Department, University of Hong Kong

Physical: Building Height

Woodbury
Irvine

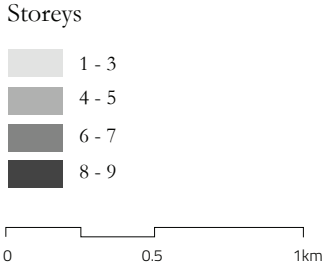
Chinatown
Singapore

Lake Anne

Town Centre
Reston

Island East
Hong Kong

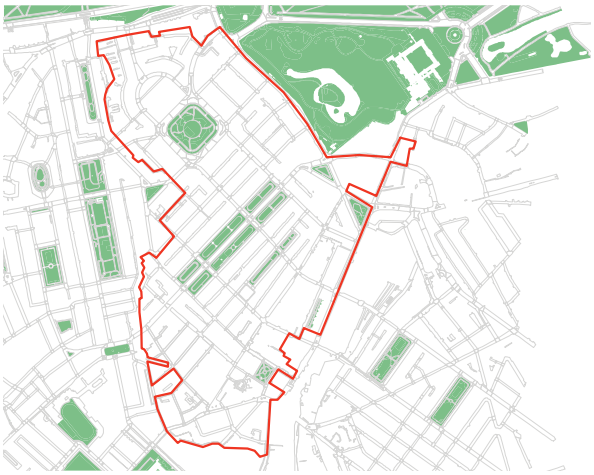
	Irvine Woodbury	Singapore Chinatown	Reston Lake Anne	Reston Town Centre	Hong Kong Taikoo Shing
Site Area (m^2)	2,490,000	720,000	1,150,000	300,000	460,000
Built Area (m^2)	471,106	405,506	126,280	113,280	110,864
Coverage Ratio	0.19	0.56	0.11	0.38	0.24*
Floor Area (m^2)	984,796	NA	449,597	1,205,357	2,795,472
Floor Area Ratio	0.4	NA	0.39	4.0	6,1



**Only building data is included here, not podiums or muli-storey parkades*

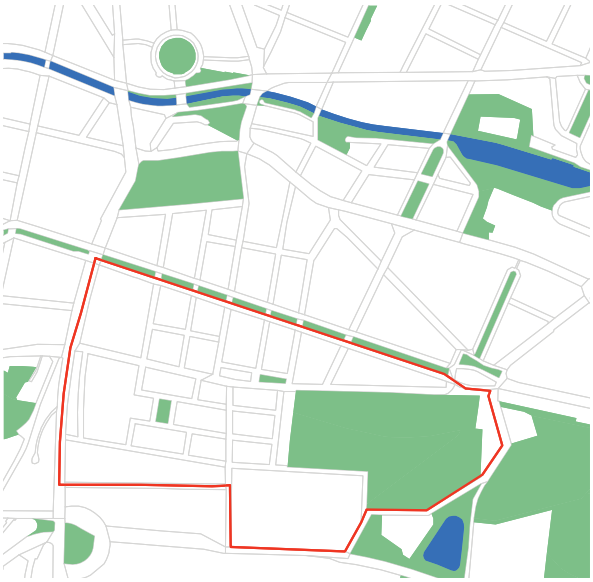
Environmental: Green Space

Mayfair



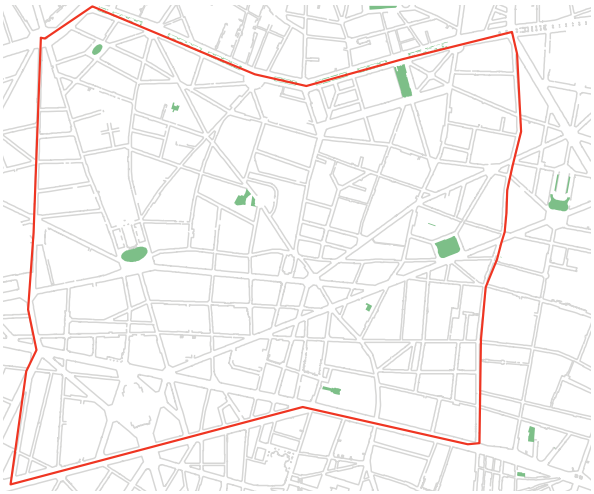
Belgravia

London



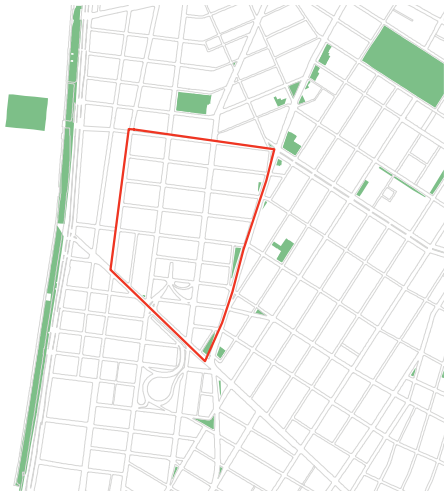
Chamisso

Berlin



Opéra

Paris



Hudson Square

New York

Feature

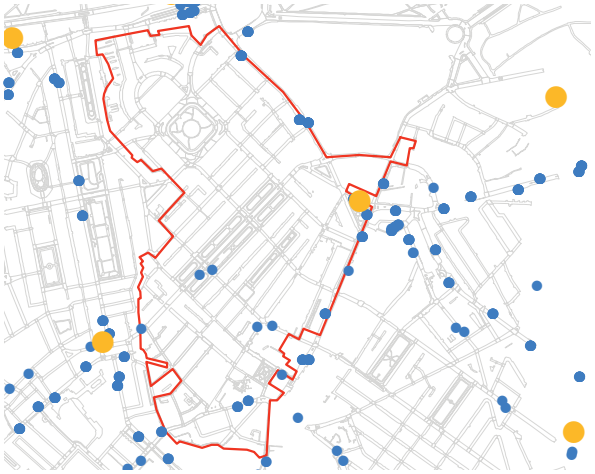
Green Open Space

Water

0 0.5 1km

Environmental: Public Transport

Mayfair

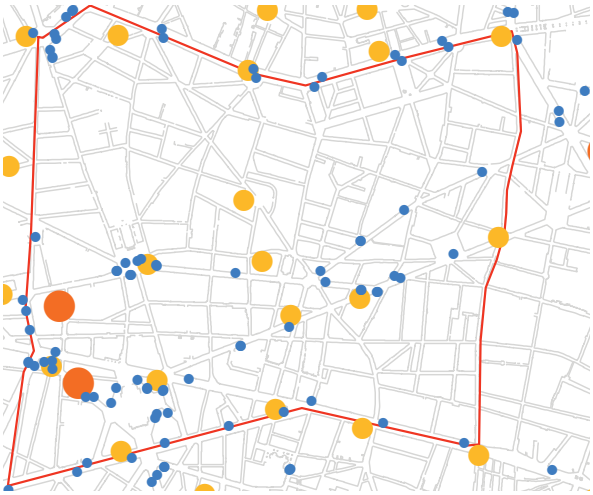


Belgravia

London

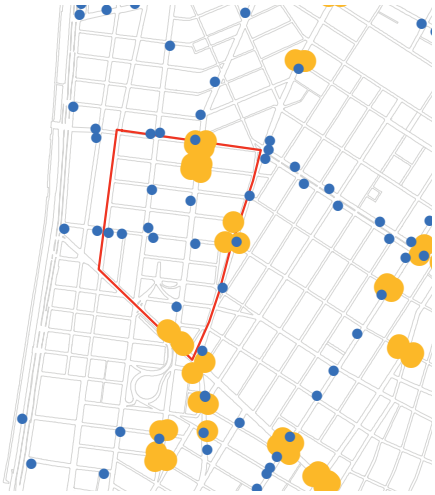
Chamisso

Berlin



Opéra

Paris



Hudson Square

New York

Mode

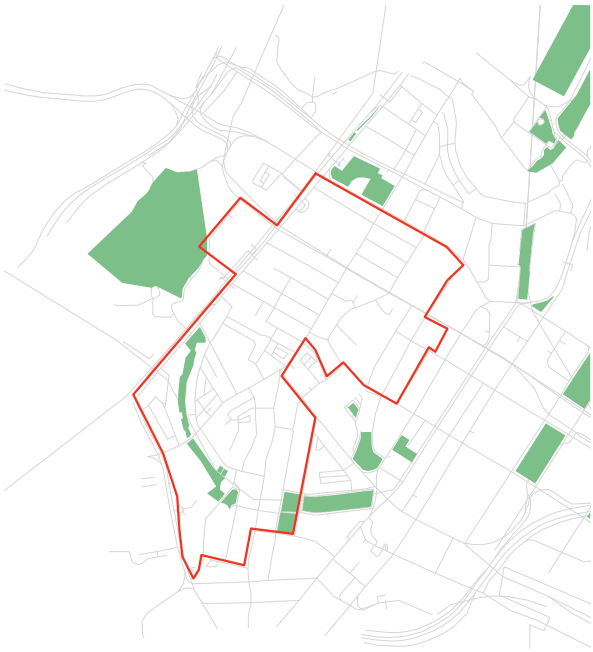
- Bus Station
- Tram Station
- Subway Station
- Train Station

0 0.5 1km

Environmental: Green Space

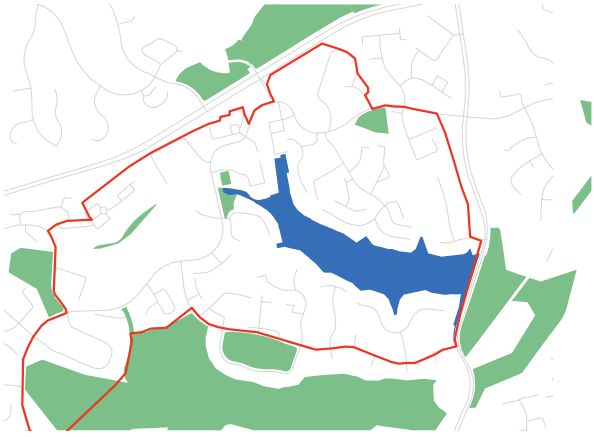
Woodbury

Irvine

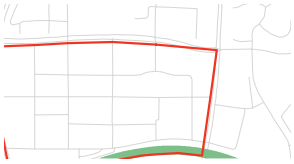


Chinatown

Singapore

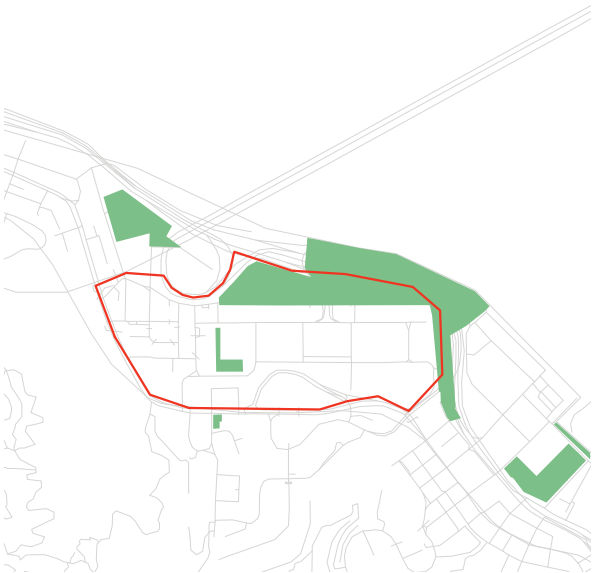


Lake Anne



Town Centre

Reston



Island East

Hong Kong

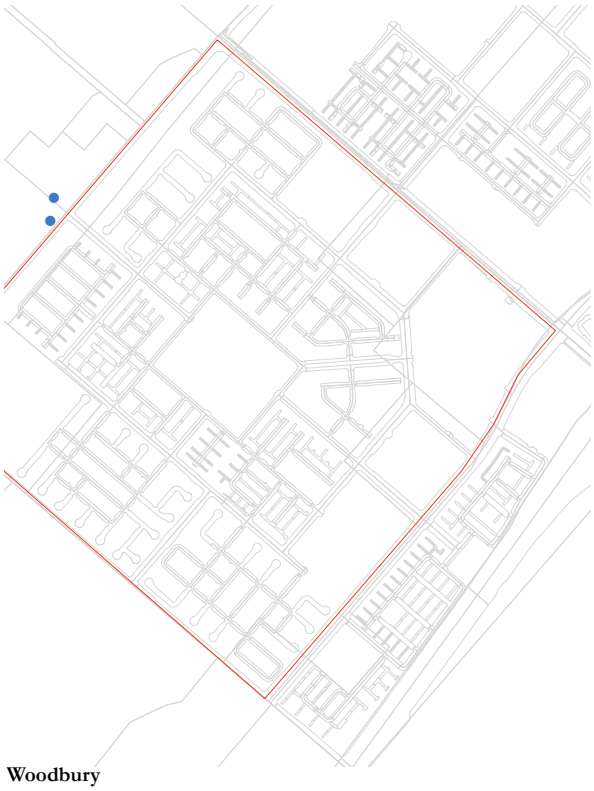
Feature

Green Open Space

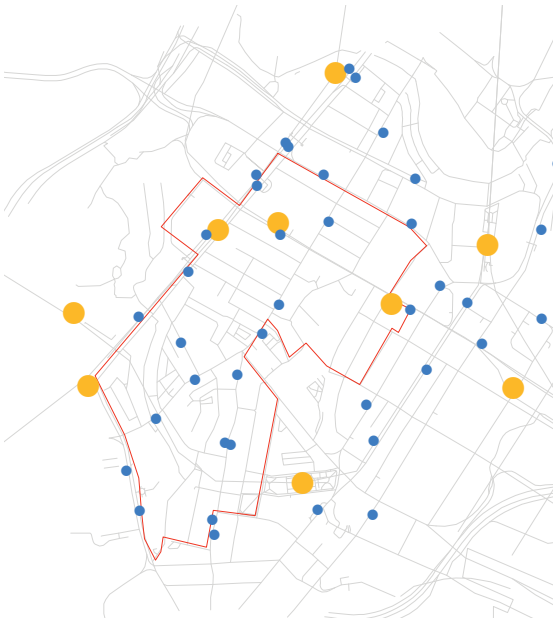
Water

0 0.5 1km

Environmental: Public Transport



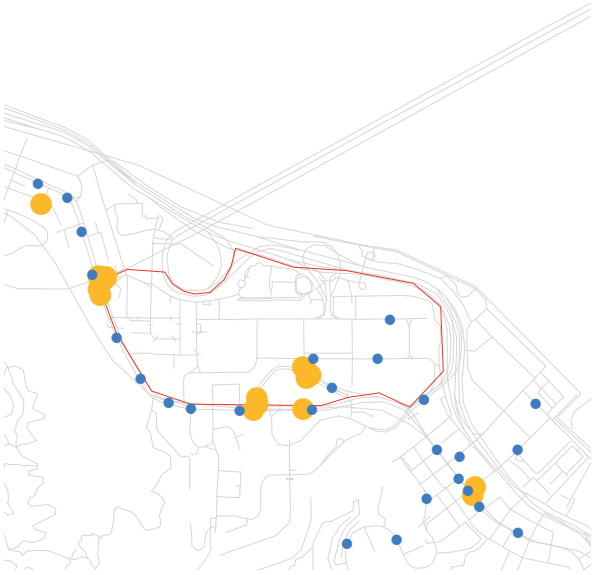
Woodbury
Irvine



Chinatown
Singapore

Data not available

Reston



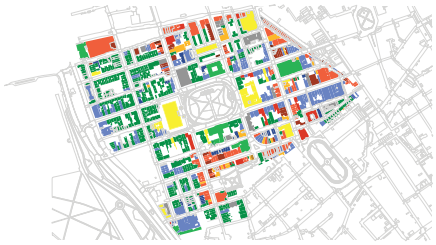
Island East
Hong Kong

Mode

- Bus Station
- Tram Station
- Subway Station
- Train Station

0 0.5 1km

Social: Ground Floor Use



Mayfair

Data not available

Belgravia
London

Chamisso
Berlin

Opéra
Paris

Hudson Square
New York

Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

0 0.5 1km

Social: Amenities

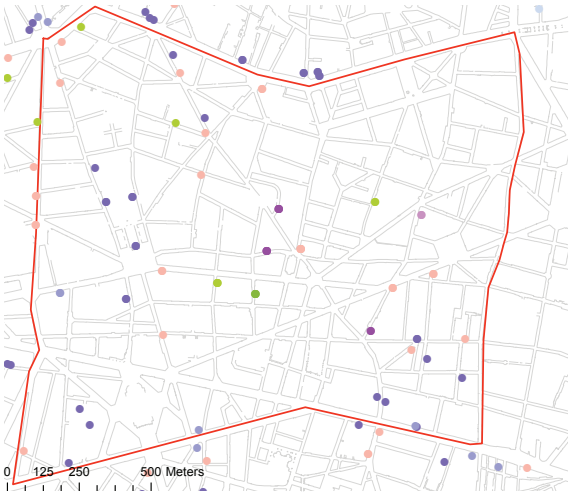
Mayfair

Belgravia

London

Chamisso

Berlin



Opéra

Paris

Hudson Square

New York

Amenity Classification

- Pharmacy
- Dentist
- Doctors
- Hospital
- Kindergarten
- School
- College
- University
- Library
- Place of Worship
- Call Centre
- Cinema
- Theatre

0 0.5 1km

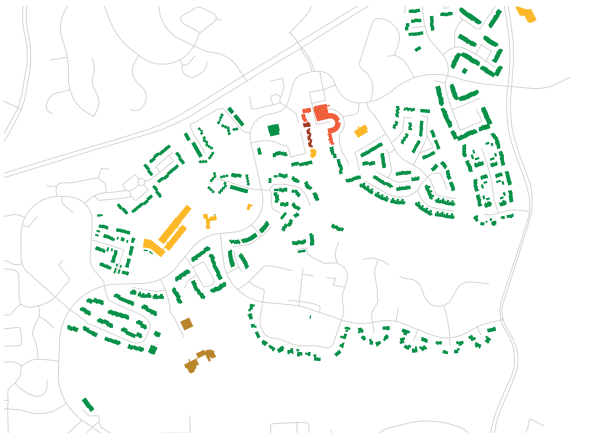
Social: Ground Floor Use

Woodbury

Irvine

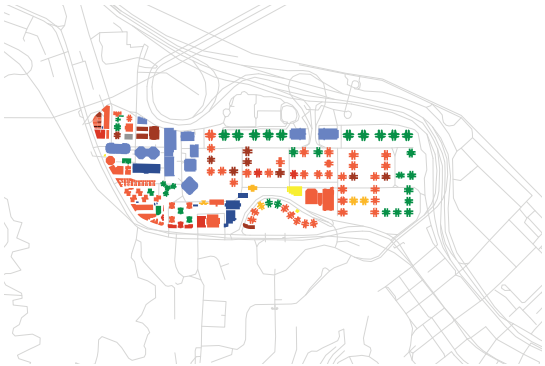
Chinatown

Singapore



Lake Anne

Reston



Island East

Hong Kong

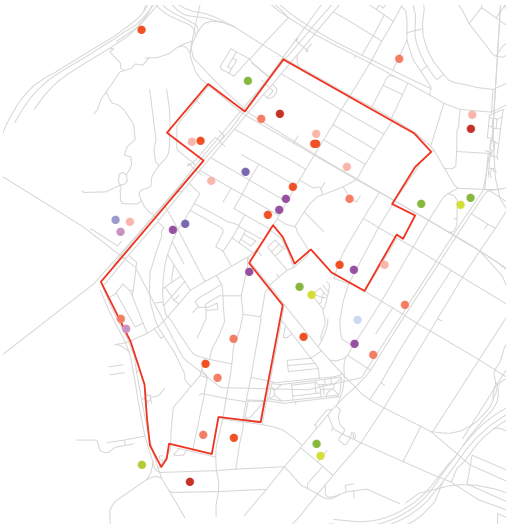
Use Classification

- Shops
- Financial and Professional Services
- Restaurants and Cafes
- Drinking Establishments
- Hot Food Takeaways
- Business
- General Industrial
- Storage or Distribution
- Hotels
- Residential Institutions
- Non-Residential Institutions
- Assembly and Leisure
- Sui Generis
- Vacant
- Construction

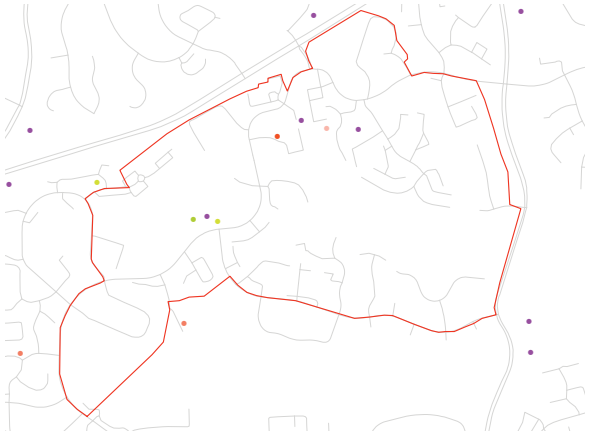
0 0.5 1km

Social: Amenities

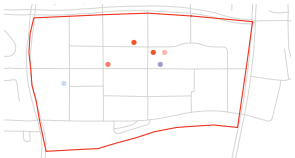
Woodbury
Irvine



Chinatown
Singapore



Lake Anne



Town Centre
Reston

Island East
Hong Kong

Amenity Classification

- Pharmacy
- Dentist
- Doctors
- Hospital
- Kindergarten
- School
- College
- University
- Library
- Place of Worship
- Call Centre
- Cinema
- Theatre

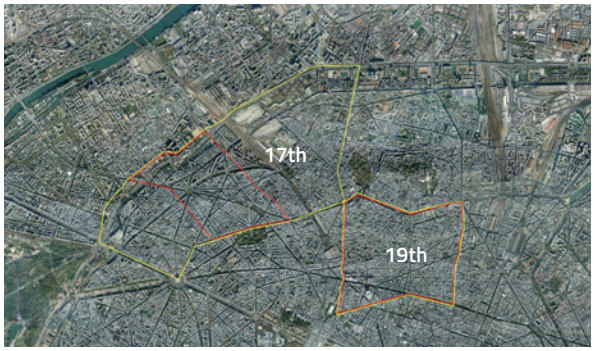
0 0.5 1km

Social: Tenure Mix

	Belgravia Ward	West End Ward	London
Total Households	4,231	4,183	3,015,997
Owner Occupied (O) (%)	24.51	12.91	22.05
Owner Occupied (M) (%)	14.8	14.5	33.51
Private Rented (%)	31.81	35.14	14.34
Social Rented (%)	13.85	28.69	26.21
Other (%)	14.02	8.82	2.93

Source: Neighbourhood Statistics 2001

London



	9th arrond. Opéra	17th arrond. Monceau	Paris
Total Households	31,801	89,281	1,159,952
Owner Occupied (%)	40.0	35.0	33.1
Private Rented (%)	50.0	45.8	44.4
Social Rented (%)	3.6	13.3	16.9
Not Paying Rent (%)	6.5	5.9	5.6

Source: Insee, RP2009 Exploitation Principale

Paris

	Pankow	Friedrichshain Kreuzberg	Berlin
Total Households	206,203	146,694	1,880,990
Owner Occupied (%)	10,7	2,0	12,7
Rented (%)	82,0	89,7	78,5
Vacant (%)	7,3	8,3	8,7

Source: Wohneinheiten in Wohngebäuden in Berlin im Jahr 2006, Amt für Statistik Berlin-Brandenburg

Berlin

	Trinity Census T.37	Manhattan	New York City
Total Households	1,564	847,090	3,371,062
Owner Occupied (%)	39	21	29
Rented (%)	53.2	70	64
Vacant (%)	7.8	10	8

Source: New York City Census Track Finder. 2010 Census Profiles for New York City

New York

Aerial images are not to the same scale, their purpose here is purely diagrammatic, and no direct scalar comparisons should be made.

Social: Tenure Mix

	Irvine City	Orange County
Total Households	83,899	1,048,907
Owner Occupied (%)	47.3	56
Rented (%)	46.9	38.6
Vacant (%)	5.9	5.4

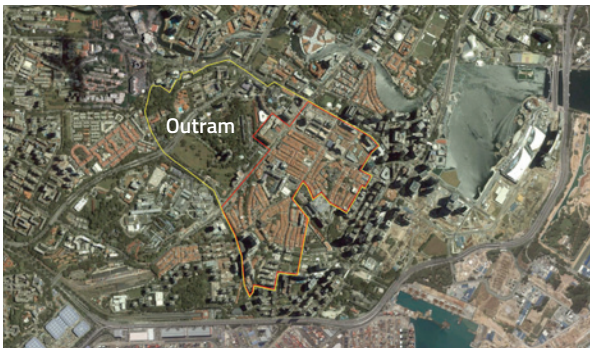
Source: U.S. Census Bureau 2010 Demographic Profile Data

Irvine

	Irvine City	Orange County
Total Households	27,787	407,998
Owner Occupied (%)	62.1	66.7
Rented (%)	33.2	29.3
Vacant (%)	4.7	4.0

Source: U.S. Census Bureau 2010 Demographic Profile Data

Reston



	Chinatown & China Sq.	Outram	Singapore
Total Households	12,800	21,700	3,789,300
HDB (State Housing) (%)	95.3	88.9	82.4
Private Flats (%)	3.1	8.3	10.0
Landed Properties (%)	0	0	6.6
Other (%)	2.3	2.8	1.1
Total Resident Households			1,145,900
Home Ownership (%)			87.2

Source: Department of Statistics, Singapore, Population Trends 2011

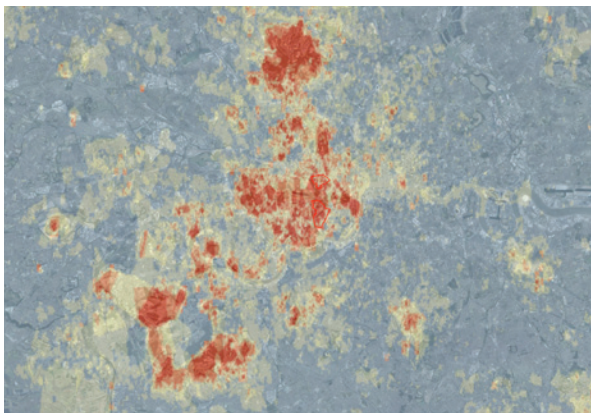
Singapore

	P.U. 155 Quarry Bay	P.U. 157 Sai Wan Ho	Hong Kong
Total Households	7,959	17,378	2,368,362
Owner Occupied (O) (%)	53.8	44.6	31.3
Owner Occupied (M) (%)	17.7	27.1	20.8
Private Rented (%)	25.4	22.0	14.0
Social Rented (%)	0.0	2.4	30.4
Other (%)	3.1	3.9	3.5

Source: 2011 Census Data Hong Kong

Hong Kong

Aerial images are not to the same scale, their purpose here is purely diagrammatic, and no direct scalar comparisons should be made.



Property Value, 2012

- £46,625.5
- £46,625.6 - £396,021
- £396,022 - £745,416
- £745,417 - £1,094,810
- £1,094,820 - £1,444,210
- £1,444,220 - £2,143,000
- £2,143,010 - £89,142,500

Source: Zoopla, 2012

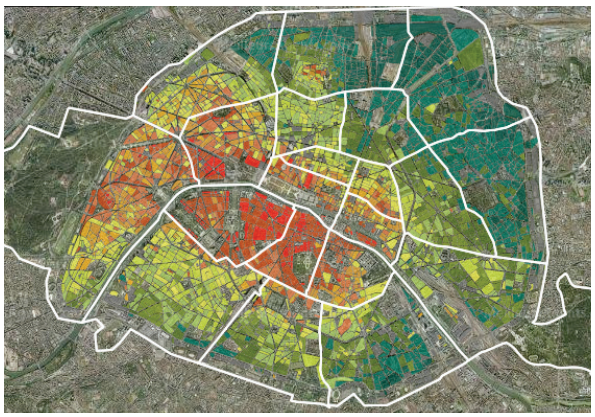
London

Property Value, 2012

- €150,000 - €240,000
- €180,000 - €320,000
- €280,000 - €550,000
- €500,000 - €1,800,000

Source: Immobilienkompass by Capital 2012

Berlin



Property Value, 2012

- < €6,080/m²
- €7,700/m²
- €8,600/m²
- €9,850/m²
- €10,590/m²
- > €13,710/m²

Indice Notaires-INSEE, Notaires Paris-Ile-de-France, 2012

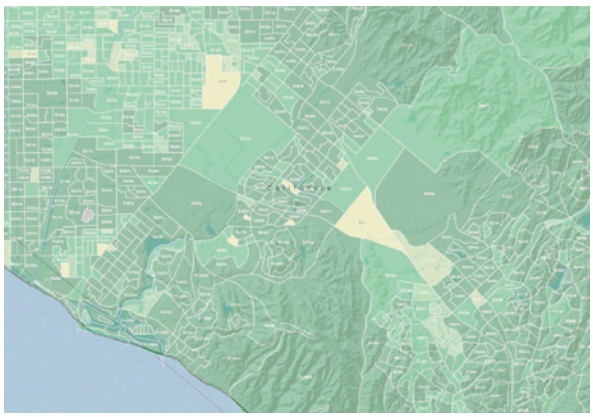
Paris

Property Value, 9th Arrondissement, 2012

Aerial images are not to the same scale, their purpose here is purely diagrammatic, and no direct scalar comparisons should be made.

This section demonstrates a research process, the beginnings of which are included here. This will become more developed in Phase II.

Economic: Heat Map

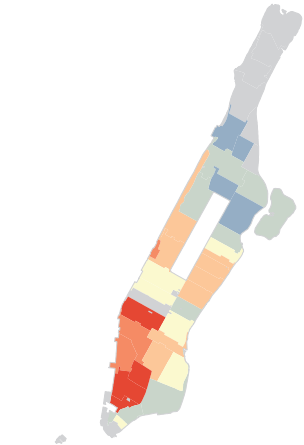


Property Value, 2010

- No Population
- $0 - $60,000
- $60,001 - $120,000
- $120,001 - $220,000
- $220,001 - $390,000
- $390,001 - $1,000,001

Source: SNL, 2012

Irvine



Manhattan Property Value, April 2012

- No Value
- < $584,200
- $584,201 - $812,600
- $812,601 - $967,900
- $967,901 - $1,183,700
- $1,183,701 - $1,561,600
- $1,561,601 - $2,313,100

Source: Zillow Home Value Index, 2012

New York

Data not available for Reston, Singapore and Hong Kong

Aerial images are not to the same scale, their purpose here is purely diagrammatic, and no direct scalar comparisons should be made.

This section demonstrates a research process, the beginnings of which are included here. This will become more developed in Phase II.

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