1 Introduction

This study identifies the challenges and suggests possible solutions to improving the sustainability of city centre core historic areas using the Soho area as an exemplar. The aim is show how such areas can progressively and systematically move to meet current mandatory and voluntary standards and targets through 'retrofitting', which, in the context of this study, means the sustainable renovation of buildings, streets and other infrastructure.

Study outline and purpose

1.1 This is an area-based study that highlights the challenges and opportunities that confront 'retrofitting' in all existing mixed use, historic areas. It illustrates these through case studies and examples of good practice.

1.2 'Retrofitting', in the context of this study, means the sustainable renovation of buildings, streets and other public and private infrastructure through modification (including adding to) 'some time after construction incorporating or substituting more up-to-date parts'.[1] In our usage, the term implies upgrading to improve sustainability and is widened to include 'software' (methods and techniques, new forms of management, changes to policies and guidance, training and awareness raising) as well as new or improved 'hardware' (technologies).

1.3 How city centres operate is of vital importance. In London, the West End as a whole is a huge focus of economic activity through shopping, leisure, media, professional and financial services. It is also interlaced with institutional, residential and community uses. It acts as a trendsetter not just for the rest of London, but for the UK and internationally.

1.4 The visible performance, or non-performance, of sustainability plays a crucial role in informing public attitudes over environmental issues. The West End, whilst a leader in all areas of the cultural industries and centre of business and government, has yet to demonstrate a decisive stand on issues of sustainability. If the centre of London gives the appearance of giving little weight to such issues then the public's willingness to embrace real sustainable change is also affected.

1.5 This study is intended to open up an opportunity for London to take the lead on a systematic strategy for sustainability and retrofitting across its central core. An exemplar demonstrating how greater sustainability can be achieved and put into practice in the West End would, by the visibility of the location, quickly disseminate such best practice widely. A 'Sustainable Soho' project would build on public perception of Soho as a place of innovation.[2] Soho's strength's in the creative industries should be drawn upon in raising awareness of sustainability issues and solutions, both within and beyond the district.

1.6 Our key aim has been to define the constraints which inhibit the adoption of such technologies in Soho, and therefore more generally, as well as the opportunities for promoting or, in other ways, driving the take up of retrofitting measures.

1. Davidson, G.W. et. al. 1994.
2. In this study, the term 'Soho' is used as a short-hand for Soho and Chinatown. The Study Area is defined as the area of historic Soho that existed before the construction of Shaftesbury Avenue in the late nineteenth century separated Soho proper from what is now Chinatown to the South (see 2.1).

1.7 At a local government level Westminster City Council already has a number of policies and guidance documents that relate to the study area of Soho (including Soho-specific conservation policies and guidance) whilst central Government has the leading role in directing policy on climate change and sustainable development as it affects the built environment. A focus of this study has been to identify good practice in ''retrofitting' technologies and techniques that respond to the relevant Westminster, Greater London Authority (GLA) and UK Government policies, as well as to highlight the tensions between different policy objectives and priorities.

Methodology

1.8 This study was initiated by the Soho Community Environment Fund (SCEF) and has been directed by a Steering Committee comprising representatives of SCEF, Westminster City Council, The Crown Estate, Shaftesbury PLC, English Heritage and members of the research team at the University of Westminster. Six Steering Group meetings were held over a period of more than a year and were formative in shaping the brief and content of the study (Appendix 1).

1.9 A focus group/workshop was held on 14th January 2008 and was of considerable help in informing our survey of the opinion of other key actors in Soho (Appendix 2). This was augmented with semi-structured interviews with representatives of Soho Housing Association, The Crown Estate, Soho Estates and Shaftesbury PLC (Appendix 3).

1.10 The study involved visual and photographic surveys of the Soho area but otherwise the research was desk-based drawing on data provided by Westminster City Council and other Steering Group members.

1.11 An estimate of the number of businesses and postal listing was provided by Peter Bibby in the Department of Town and Regional Planning at the University of Sheffield. We made extensive use of the LECI (London Energy and CO_2 Emissions Inventory 2003)[3] data provided by Julius Mattai, former Environmental Data Manager at the Greater London Authority. We also drew on the London Carbon Scenarios to 2026 published by London Energy Partnerships and authored by SEA/RENUE (Sustainable Energy Action/Renewable Energy in the Urban Environment).[4] Comment and suggestions on environmental services solutions were provided by Brian Mark of Fulcrum Consulting.

1.12 We have reviewed a large range of literature relating to the subject area including policy documents, web pages and reports, for the most part available online and drawn from a wide range of commercial, governmental and non-governmental advisory, research, academic and professional bodies. This has thoroughly convinced us of the need for a focused approach to providing information targeted to the needs of property owners and occupants in mixed use areas such as Soho and Chinatown.

3. LECI 2003 is The London Energy and CO_2 Emissions Inventory 2003 that holds geographically referenced datasets of energy consumption and the resulting carbon dioxide (CO_2) emissions for the Greater London area, compiled and maintained by the Greater London Authority (GLA) as part of the delivery of the London Mayor's Energy Strategy and the Climate Change Action Plan (CCAP) (Greater London Authority. 2006a).

4. Now called Carbon Descent.

Box 1.1: The Study Brief

- Outline the sustainability issues and energy use trends as they are likely to affect the risks and uncertainties that condition investment by property owners in retrofitting measures
- Review the main sustainability concerns of key stakeholders including public agencies, the local community and major property owners in the area, in particular in relation to conflicts between sustainability and conservation interests
- Outline the EU and Government policy context as it affects investment in retrofitting and sustainability in historically sensitive core areas
- Summarise current policies for sustainability and retrofitting in Soho (i.e. existing City of Westminster policy & guidance) and identify areas where there are gaps and tensions between different policy objectives and priorities
- Where there are conflicts, tensions and clear policy choices to be made, describe and define these and develop potential ways of moving forward
- Examine what strategies have been implemented in terms of use and building type
- Determine what technologies and techniques/approaches can be applied in historically sensitive mixed-use areas and city centres
- Examine 'best practice' and innovation in retrofitting in the UK (including Central London) and other developed western economies, as they relate to the context of the study area
- Analyse potential solutions in terms of cost-performance, implications for day-to-day and life-cycle management and user behaviour and indicators for assessment, monitoring and evaluation
- Synthesise our findings into an easily accessible report for the use of decision makers, central city planners and managers, resident and community groups, and employers
- Provide a guide to how property owners, developers and occupiers in Soho could take a decisive and leading step in initiating nation-wide retrofitting technologies and approaches for historic city centres.

Key issues

Historic urban form and cultural heritage

1.13 Despite the headline-grabbing about new zero carbon developments and new plans for 'eco-towns', most buildings already exist and new buildings are said to add to or replace only about 1.5% of the overall building stock each year.[5] Existing buildings are variously estimated to account for about 44 to 48% of all of the UK's carbon emissions.[6] Estimates put residential buildings in use as accounting for around 28% of the UK's carbon emissions (48% from gas, 42% from electricity and 10% from other fuels)[7] and non-residential buildings (excluding uses related to production within them) for nearly 20%.[8]

1.14 Some of the highest levels of carbon emissions are to be found in the centres of our cities, resulting from the very high energy use in commercial buildings – shops, offices and restaurants – the high level of waste they produce[9] and the high level of traffic on the streets. Existing policies, regulations and guidance rarely, if ever, take account of the fact that carbon emissions are so heavily concentrated in existing commercial core areas, or that, as in the case of Soho, these are historic and mixed use. Headline attention with regard to the sustainability of buildings has focused on new buildings, and more particularly on new housing. Where the profile of retrofitting has increased, again it is primarily in relation to the retrofitting of existing residential buildings.

1.15 Most historic towns and cities have central cores laid out on cramped and constrained street patterns from earlier centuries. The built form is typically a mixture of ages, architectural styles and uses. Many buildings are listed as places of historic interest; large parts are also conservation areas. Such areas have high tourist value and are much loved by local communities and are intrinsically sustainable because they concentrate a wide variety of activities within easy walking distance.

1.16 The built heritage of Westminster is clearly one of its most important socio-economic assets. The urban variation and distinct identity that such a historic environment provides for local people and visitors underpins London's unique and powerful place in an increasingly globalised world. It is central to the city's social and economic sustainability. The scale, morphology and built fabric of Soho represent physical and cultural capital of a special kind, which is described in *Background paper 1: The history and character of Soho.*[10] Maintaining this fabric is an essential element of any sustainability strategy for the area.

1.17 However, the demands of heritage and conservation place strong constraints on what can be done to retrofit buildings to improve their performance in terms of environmental sustainability. Wholesale redevelopment of such areas is not desirable or acceptable and so any change will inevitably be piecemeal. Identifying solutions that are environmentally sustainable will be required, at the least, to avoid damage to the historic environment and, where possible, should be aiming to enhance it.

5. Roger Harrabin, BBC Environmental Correspondent suggests 1% homes are replaced a year and 2% of offices (Harrabin, R. 2006).
6. Westminster City Council. 2007a. Harrabin, R. 2006. According to Westminster City Council, around 1.8m non-domestic buildings and 24 million dwellings account for 44% of CO_2 emissions, 62% of waste generated and 60% of water used (Westminster City Council. 2007a, 'Issues and options relating to the Core Strategy'. p11).
7. Energy Saving Trust. 2004.
8. Department for Communities and Local Government. 2008. p3. RICS quote a figure of 18% of all emissions from the non-domestic sector and 26% for the domestic sector. McAllister, I and Sweett, C. 2007.
9. Waste from commercial sources in Westminster represented 60% of the 190,000 tonnes collected in 2005-6 (with 30% from household sources and 10% from street cleansing). Soho is an area with a concentration of catering premises there is a lot of food waste is produced that needs frequent and regular collection. Westminster City Council. 2007a. 'Issues and Options relating to the Core Strategy'. p13.
10. See interview with Jonathan Lane of Shaftesbury PLC, Appendix 3.

Intensity of land, infrastructure and resource use

1.18 In historic core areas, land has usually been developed to a high density. Public space (and outdoor space in general) is limited and at a premium. Streets are narrow and often congested. Pavements tend to be narrower than more modern ones. Town and city centres display a complex mixture of differing uses built up over centuries. They operate close to a 24/7 pattern and yet the infrastructure to serve such uses is itself complex, congested and often old.

1.19 Central city areas face particular environmental issues, for example, as regards micro-climate. Soho is a 'central core area' within London's entertainment district with its night-time economic activities and acts a 'heat island within a heat island'. In some streets there is as much activity at three in the morning as there is at three in the afternoon.

1.20 Such historic central areas also have high levels of direct and indirect resource use and high levels of waste and present great problems in terms of achieving higher levels of sustainability of resource use and waste management. High density of land use increases accessibility and enables highly efficient use of transport and other infrastructure. However, it can present major challenges to recycling because of the limited space to store recyclate and the disincentive to carry separated waste down from upper floors.

Tenure, community cohesion and dynamism

1.21 At the same time, with property prices at a premium, intensive high value use is made of costly and often culturally valued building infrastructure. There is potentially a relatively rapid turnover of small business and private tenants with resulting maintenance, conversion and rehabilitation cycles being short and resource intensive.[11]

1.22 While this may offer opportunities for increasing the sustainability of the building fabric, including retrofitting low environmental impact technologies, the very diversity and complexity may present major hurdles to positive action. Such areas can have weak community structures and businesses may be reluctant to face up to the external impacts of their activities. Buildings in multiple occupancy, with complicated mixed tenures, can add to the difficulties of managing change. Developing and implementing sustainable practices in such areas thus present a major challenge.

1.23 With a policy and management focus on individual buildings and properties, the possibilities of finding shared technical solutions to conflicts, in particular between sustainability and conservation requirements, at a larger scale, may be missed. As a consequence of such factors, the brief for this study has been to look at the district as a whole and be 'area-based'. Other issues such as distribution and logistics also need to be approached on an area wide basis.

1.24 Soho has a dynamic business community. It contains the largest cluster of creative industry activity in Westminster and probably, therefore, in the capital and country as a whole.[12] The centrality and high profile of Soho as a cultural and knowledge economy district is a key strength that could be drawn upon.

11. This is a surmise but indicates an area where further research may be carried out to indicate the potential for retrofitting in such areas.

12. GVA Grimley LLP. 2007. p15.

Environmental sustainability

1.25 This project specifically addresses a high-density, historic building retrofitting agenda and the issue of how Soho can achieve sustainability with limited opportunities to build major new buildings (see Chapter 2). The key concern is how buildings in Soho can be adapted, retrofitted and used to reduce the existing high energy use and resulting carbon emissions impacting on climate change. In what ways can this be done which is acceptable in terms of conserving the quality of the historic townscape?

1.26 A further major sustainability concern, second only to energy use, is waste management. As noted, commercial activities in Soho produce large amounts of waste, the disposal of which contributes to the movement of traffic in its narrow streets. Waste storage can be an immediate environmental hazard. The possibilities for storage and separation for re-cycling are severely constrained in such a densely developed milieu. The disposal of biodegradable waste in landfill sites is in itself a major contributor to climate change through the related emission of methane, although the City Council disposes of just 14.1% of its waste to landfill, and this figure is falling.

1.27 A secondary issue, but one which could be of larger significance in the longer term is water management. There is limited potential for retrofitting sustainable urban drainage to Soho's heavily used streets and narrow courtyards. Adapting buildings internally and externally offers the better chance of managing the flow of water, through rainwater storage, grey water recycling and more efficient fittings. Water use also has related carbon emissions.

1.28 Soho suffers high levels of transport movement, much of which relates to commercial activities in the area.[13] As well as contributing directly to carbon dioxide emissions, street traffic creates noise and air pollution affecting the environmental well-being and quality of life of residents, occupiers and visiting pedestrians alike.

1.29 Soho could be more pedestrian and cycle-friendly. Pedestrians and cyclists are in competition and sometimes in conflict with motorists in the area's narrow streets. Noise and pollution from vehicular movements, along with the noise from people leaving licensed premises at night, as well as causing nuisance, can have a knock-on effect on the use of windows in buildings, and therefore on their thermal performance.

1.30 Green space within Soho is at a premium and there are limited opportunities for increasing biodiversity in the public realm. However, with at least 65% of the surface area in Soho being roof, and a surprisingly large proportion of this being flat roofs, there is potentially a large opportunity for increasing biodiversity at roof level through the construction of 'living roofs', explored in Chapter 6 of this study.

1.31 With regard to climate change, both mitigation and adaptation aspects need to be considered. There has been an increasing public policy emphasis of sustainable development in general and latterly on mitigating climate change and reducing carbon emissions in particular. There is now a growing concern with planning for adaptation to the predicted climate change impacts including rising temperatures, rising sea levels and increasingly erratic weather patterns with higher risk of flooding. Central London, as a heat island, is already experiencing a 'rush to air conditioners'.

13. According to the LECI 2003 data, carbon emissions from transport sources are three times greater in the area than in Greater London as a whole. Greater London Authority. 2006a. See pp3-15.

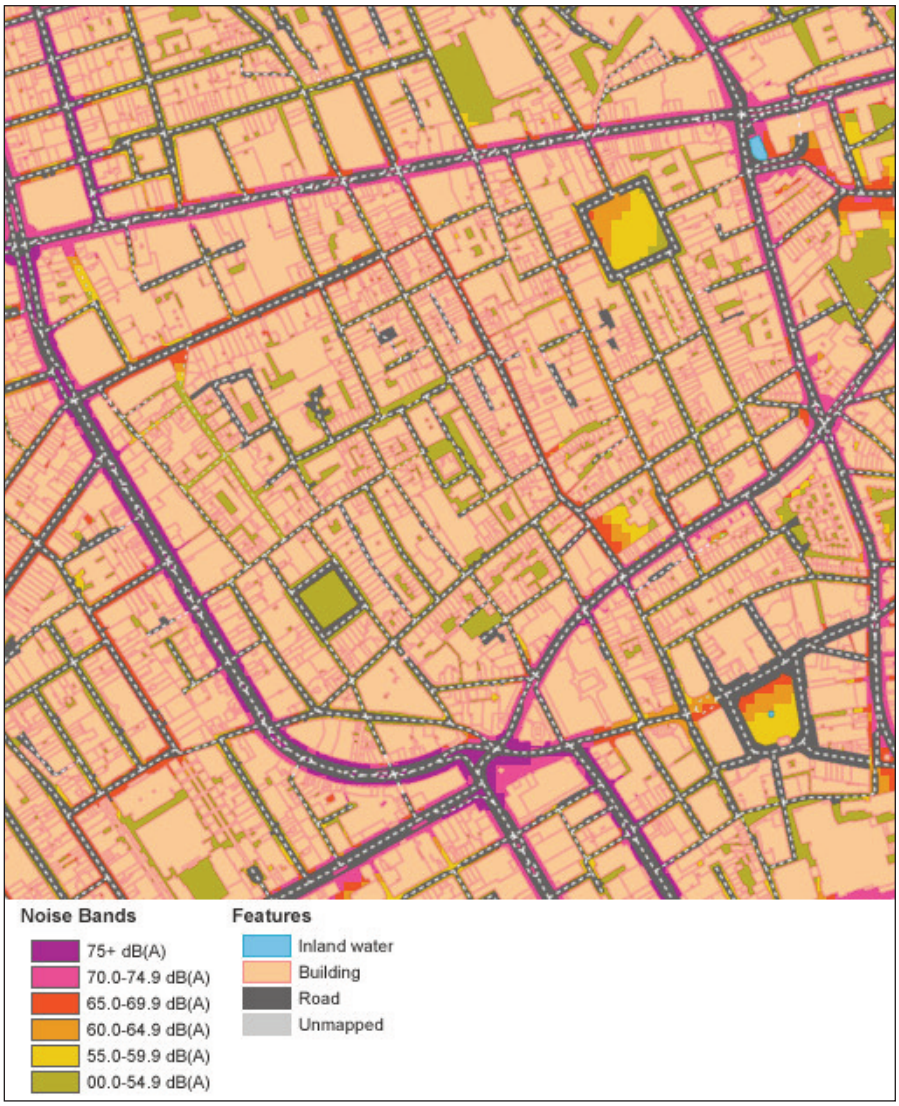

Figure 1.1: Soho Noise Map
(Source: Defra b)

Stakeholders and management practices

1.32 Our particular interests are those areas of action that can be addressed through the policies and practices of major stakeholders such as major property owners and landlords, developers, professional and business associations, within an evolving local government policy framework (in particular, planning, urban design, conservation, transport and environment).

1.33 In many cases, however, the necessary measures involve changes in the daily practices of individual householders and businesses. Consultation, awareness raising and promotion of innovative ideas will all be necessary and the implications in relation to any particular measure should be noted. The role of the media industries and information and communications technologies will be critical.