

Hildebrand Frey

Urbanising Suburbia
Summary Report on Research Project

Preface

The project *Urbanising Suburbia*, the responsibility of the University of Strathclyde's Urban Design Studies Unit (UDSU) at the Department of Architecture, was part of the investigation of the *CityForm (Sustainable Urban Form) Consortium* funded by the Engineering and Physical Science Research Council (EPSRC) under its Sustainable Urban Environments Programme (Grant number GR/520529/01).

The Consortium comprised a multi-disciplinary team based at the Universities of De Montfort, Heriot-Watt, Oxford Brookes, Sheffield and Strathclyde. The key task of the core research was to investigate to what extent and in what way urban forms impact social, environmental, ecological and transport sustainability. Information on the consortium's work is available on the *CityForm* page, www.cityform.org.uk.

Urbanising Suburbia was one of the satellite projects. It examined ways in which (sub)urban areas – housing developments often but not always at the city fringes considered to be unsustainable due to their low population and dwelling densities and their lack of local amenities – can be transformed into become more sustainable settlements.

The research team members and their responsibilities were as follows:

- **Hildebrand Frey**, retired Senior Lecturer and Director of UDSU at the Department of Architecture, University of Strathclyde; *CityForm* Co-Investigator
He held overall responsibility for the project, but specifically for the development of a *Tool* with the help of which levels of sustainability of urban areas can be assessed on the basis of threshold, average and target values of sustainable urban form. He was also responsible for the application of the *Tool* in a number of theoretical and concrete urban regeneration and development projects to measure their performance values and, based on this, formulate regeneration programmes.
- **Samer Bagaee**, Research Associate April 2004 to October 2006
He carried out the review of all relevant literature and related research projects; area surveys, including land and building uses, built form, transport infrastructure; processing and mapping of primary data (survey data of case study areas) and secondary data (the Valuation Roll, Census Statistics and information provided by the Glasgow City Council) using MapInfo and ArcGIS.
- **Charalampos Giachis**, Research Associate November to December 2006
He generated a base map and a three-dimensional model of the existing conditions of Glasgow's Greater Govan area, using a number of software packages.
- **Pedro Faria**, Research Associate June to September 2007
He developed three dimensional models of three neighbourhood areas of Govan as existing and as proposed, following the regeneration programmes based on the comparison of the areas' existing (largely 2001) values with the threshold and target values generated for the *Tool*.

The research was informally supported by the Glasgow City Council Department of Regeneration Services (DRS) that specifically influenced the choice and investigation of Glaswegian urban areas on either side of the central River Clyde corridor, specifically the areas of Glasgow-Govan. The research team has generated a number of publications and has presented its work and findings at a number of occasions; details can be found on the *CityForm* web page www.cityform.org.uk/publications_plus.html. However, at no stage during the development of the project has

it been possible to present a holistic summary of the research objectives, the theoretical and methodological underpinning of the project, the *Tool* and its underlying target and threshold values, the application of the *Tool* in specifically selected case studies in Glasgow and the other four Consortium cities as well as a number of best practice cases, and the assessment of the *Tool's* viability and usefulness for the systematic development of regeneration programmes. To present such an overview is the purpose of two parallel documents, the *Summary Report* and *The Handbook* briefly outlined below.

Hildebrand Frey (June 2010) *Urbanising Suburbia: Summary Report on Research Project*

The paper in hand presents an overview of all stages of the project including its application in selected urban areas and the achievements and problems that were encountered in this process.

Hildebrand Frey (June 2010) *Urbanising Suburbia: The Handbook – establishing threshold, average and target values for sustainable urban quarters*

This parallel document explains in some detail how the target and threshold values were formulated, what sources of research projects, publications, and best practice cases they are based on and what arguments lead to their adoption.

Introduction

This *Summary Report* explains in some detail the individual work stages of the *Urbanising Suburbia* research project. The project was initiated from the investigation of suburban residential areas at or beyond the city fringes. These areas generally have very similar properties: low development and population densities and a population too small or too thinly spread for local services and facilities and public transport to become economically viable. Inhabitants are therefore dependent on amenities either in more central areas or at out-of-town retail centres, and the only way of getting children to school, going to work, to shops and other facilities is by car. The consequence of car-dependent travel is pollution and congestion caused in more central areas of the city. There is general agreement such characteristics render suburbs unsustainable despite the generally good residential and environmental conditions.

The declared interest of the research team was to investigate how suburban areas can be transformed into more sustainable settlements. However, when reviewing the discussion on capacity studies and the intensification of urban areas to respond to the growing need for additional housing, it became clear that simply building more residential units on disused or subdivided sites is not the right approach because this might make suburbs even more unsustainable if more people travel by car to amenities elsewhere. The regeneration of suburbs, or generally of urban areas with similar characteristics, would be only viable and successful if urban areas were created that support their own local services and facilities and public transport. The team's explicit goal was to develop an approach to urban regeneration that was supported by a strong urban theory and a strong methodology with the help of which levels of sustainability of urban areas could be systematically measured and appropriate regeneration programmes formulated.

The first research task was to generate a theory that underpins urban development and regeneration. In its physical manifestation, the city is seen as a 'modular construct' with the urban quarter as the module that clusters to form urban districts, towns, cities and city regions. This structure is typical for pre-industrial towns and cities, and can still be found in the more central areas of today's cities. The urban quarter is seen as the smallest building block that supports the same social, economic, even cultural and political activities as the city at large, only on a much smaller scale. If it was possible to specify the properties of the urban quarter that render it in physical, social, economic and environmental terms sustainable, then urban districts, towns and cities – and even city regions - that are formed by clusters of sustainable urban quarters are likely also to have properties that make them sustainable.

The next task research was to develop a methodology that would allow measurements of the levels of sustainability of existing urban areas and compare them with sustainability target values. This involved first the specification of urban form, social, socio-economic and environmental threshold and target values that are generally believed to render an urban quarter sustainable. The way in which target and threshold values are selected from available research publications and papers, governmental recommendations and best practice case studies is explained in some detail in the parallel document *The Handbook* and only summarised in this *Summary Report*. *The Handbook* also explains why time and resource constraints allow only urban form, social and socio-economic target and threshold values to be formulated; environmental values are, however, introduced when investigating two best practice cases in Freiburg, Germany in this report.

Once sustainability targets are formulated, values of existing urban areas can be matched up to them. The difference between existing and target/threshold values leads to the formulation of regeneration programmes that, when implemented, raise the level of sustainability of the scrutinised urban areas.

The next research task was to test the sustainability tool by applying it in selected areas to examine its applicability and viability. Preliminary investigations are carried out in five peripheral areas selected by the CityForm core programme. The *Summary Review* illustrates the Glasgow-Darnley suburb that is symptomatic of the problems discussed at the beginning of this introduction. However, the area is not suitable for regeneration. On advice by the Glasgow City Council DRS, a second preliminary investigation focused on the River Clyde corridor and involved all northern and southern riverfront areas between the city centre and the Clyde Tunnel. The investigation showed that all areas except those of Govan score reasonably well and do not need further investigation. The urban areas of Govan, however, showed considerable problems and were therefore fully investigated on the basis of the sustainability tool. The detailed investigation of one of the areas is covered in the *Summary Report*. After surveys and scrutiny of primary data the urban form, social and socio-economic values and value profiles of Govan-Drumoyne were established and compared with the target and threshold values. The area's scores do not even get close to most of the threshold values below which an area is considered to be unsuitable for regeneration. Two options were developed.

The more modest regeneration option investigated a small rise of the population to the target value of an urban quarter in intermediate location (between centre and edge of the city). Due to the rather large area of Govan-Drumoyne the effect was insignificant. Therefore a more substantial rise of the population, resulting from the partial development of underused land, was examined and this option scored better and achieved almost all average values of the sustainability tool. The more intense regeneration of the second option investigated the development of a second urban quarter on the northern part of Govan-Drumoyne site and the disused riverfront site north of Govan Road. This option achieved all target values of the sustainability tool. Both options were diagrammatically modelled to show the potential impact of the regeneration options on the built form of Drumoyne and the surrounding areas.

The final test used the sustainability tool to investigate two new urban quarters at Freiburg im Breisgau, Germany: Vauban and Rieselfeld. The existing built form, social and socio-economic profiles of the two urban quarters were compared with the target values and profiles and show some minor discrepancies as a result of different priorities for the two urban quarters, but otherwise the scores of both areas were rather high as one would expect. Generally, the built form target values were rather similar to those of the research team. The Freiburg schemes are both based on built form, social and socio-economic sustainability concepts as suggested by the research team but include also ecological concepts, which are spelled out in the *Summary Report*.

The conclusions drawn from the experiences with the research project suggest that the tool is a viable instrument despite the lack of empirical evidence for many of the adopted target values. The recommendation is a systematic investigation by a follow-up research project of all European best practice cases of urban development based on sustainability frameworks like Vauban and Rieselfeld to distil values that are underpinned by empirical evidence. The tool, however, meets considerable barriers and makes it unlikely that it will be applied in practice before the new RTPI type of planning approach that includes spatial planning will produce professionals that can cope with a more strategic, and in the end also design-based, routine.

Acknowledgement

I would like to thank Roland Veith, head of the Vauban Office at the Building Department of the City of Freiburg im Breisgau, for valuable information on the planning frameworks for the urban quarters Vauban and Rieselfeld and for the provision of Vauban land use data. Without your help I would not have found it easy to understand the motives behind and concepts for these inspiring new urban quarters.

I am grateful to eRich Lutz, Büro für naturnahe Freiflächenplanung, Freiburg–Vauban for providing much needed information on Vauban that helped overcome the lack of time for own surveys and that unavailability of some statistical material.

Many thanks to Daniel Schoenen, Photographer, Freiburg im Breisgau, for his kind permission to include a selection of his rather beautiful Vauban photographs in this *Summary Report*.

I would like to dedicate the two reports to my late cousin Charles.

Apologies

I wish to apologise for the late publication of the two documents *Final Report* and *The Handbook* on the *Urbanising Suburbia* Research project. The enormous delay is due to family problems and a bereavement that made it extremely difficult for me to concentrate on academic work after moving to Alsace in 2008. This made it also difficult to update information on the Freiburg Vauban and Rieselfeld case studies and to edit the reports.

Apologies to the readers for any mistakes that may have crept into the reports or have not been ironed out.

Apologies to Herrn Veith at the Vauban Office in case of any misinterpretations of the information and data provided for me; should you have any misgivings, let me know and I will make the necessary corrections and changes.

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Chapter 1

Objectives and work stages of the research project

According to the report of the Urban Task Force (1999, rsh-p), there are a number of urgent tasks both government and the planning system have to deal with:

- To translate principles of sustainable urban development into strategic concepts of sustainable urban form.
- To accommodate the growing number of small households.
- To halt and reverse urban decline specifically of inner-city areas and communities.
- To halt and reverse suburban sprawl responsible for social and economic decline of inner-city areas.

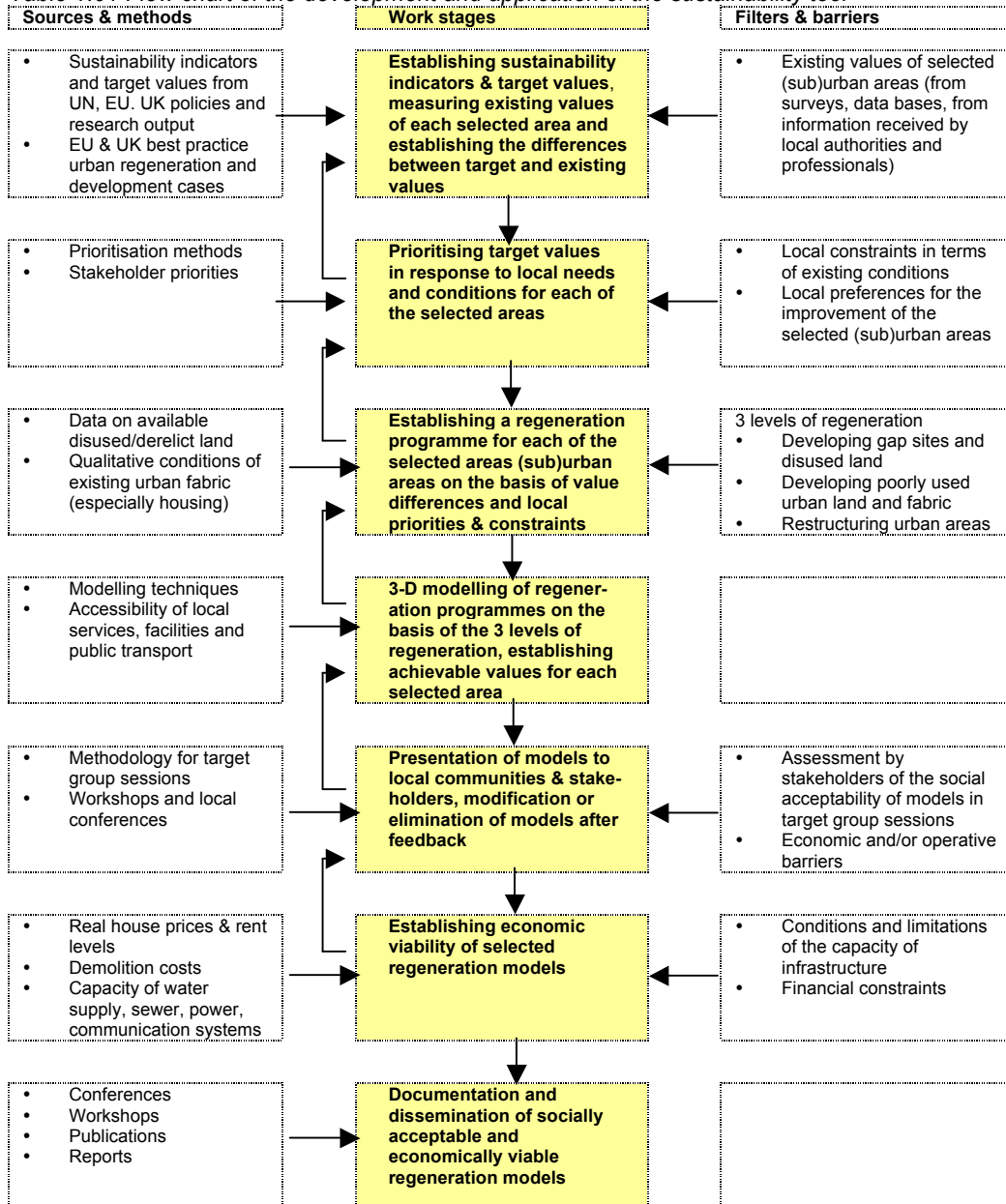
In response to these tasks, the main objectives of this research project were to develop a theoretical underpinning of, and a methodology for, urban development and regeneration that would help transform currently unsustainable urban areas into sustainable urban quarters (neighbourhoods, villages). The key mission of the research project was accordingly to find ways of translating the notion of sustainable development into strategic concepts of urban expansion and regeneration. Once this key task was achieved the other tasks of dealing with urban growth as well as restructuring inner-city and urban fringe areas would follow suit. The main tasks of the research team were accordingly:

- To scrutinise the emergence of indicators of sustainable urban development.
- To critically investigate current approaches to urban regeneration and their likely achievements.
- To analyse the implications of the growing demand for additional housing, the pros and cons of urban intensification, and the development of new housing on green-field or brown-field sites.
- To develop a theory of sustainable urban form and a methodology for the regeneration of existing urban areas.
- To generate a tool for the systematic measurement and assessment of levels of sustainability of urban areas.
- To apply the tool for the assessment of the existing values and deficiencies of selected urban areas at Glasgow and other consortium cities and formulate regeneration programmes for these areas.
- To translate the regeneration programmes into two and three-dimensional regeneration models and to test their achievements and viability.

Table 1.01 illustrates the original work stages for the development and application of the sustainability tool. Unfortunately, for reasons outlined in the concluding part of this report, the Glasgow-Govan community and stakeholder consultations could not be carried out. This meant that it was not possible to test the social and economic viability of the regeneration programmes developed with the help of the tool for three of the urban areas of Glasgow-Govan.

Consequently a detailed simulation of the application of the tool at two new urban quarters of Freiburg-Vauban and Freiburg-Rieselfeld in Germany was worked out to have at least some evidence that the tool is working with the right kind of threshold and target values, is able to respond to individual needs, and is capable of detecting the strengths and weaknesses of ongoing or planned urban development projects and guide them towards more sustainable strategies. The Freiburg case study is presented in chapter 5 of this Summary Report.

Table 1.01 Flow chart of the development and application of the sustainability tool



References

- CityForm: Sustainable Urban Form Consortium web page: www.cityfrom.org.uk.
- Jenks M., Jones, C. (eds.) (2010) *Dimensions of the Sustainable City, Future City 2*. Dordrecht Heidelberg London New York: Springer.
- rsh-p (Rogers Stirk Harbour & Partners) web page: <http://rsh-p.com/render.aspx?siteID=1&navIDs=1,4,22,545>.
- Urban Task Force (1999) *Towards an Urban Renaissance: Final Report of the Urban Task Force*. London: E & FN Spon.

Chapter 2

The theoretical and methodological underpinning of the research project

The theory and methodology that underpin urban development projects and regeneration have to respond to the urgent tasks listed at the beginning of chapter 1. How responses can be formulated and tested will be discussed next.

2.1 Emergence of indicators of sustainable development

The intense global discussion on sustainability and specifically sustainable urban development started in the early 1970's when the destructive impact of human development on the environment could no longer be ignored. The United Nations organised a number of world conferences at which characteristics of sustainable development were discussed. The most important of these were: the Stockholm Conference on the Human Environment in 1972 (UNEP 1972); the General Assembly in 1987 in New York and the launch of the report *Our Common Future* by the Brundtland Commission (WCED 1987); and the Earth Summit at Rio de Janeiro in 1992 and the publication of Agenda 21 (UN 1993). Many of the participating countries committed themselves to develop their Local Agenda 21. For a detailed investigation of UN frameworks for sustainable development and Agenda 21 see Frey, H. and Yaneske, P. (2007) *Visions of Sustainability: cities and regions*, chapter 1, pp.3-33.

Agenda 21 was hailed to be a considerable break-through in the search for a common approach to the assessment of the sustainability of regions, nations and cities. The Rio Summit explained that

'Indicators can be defined as statistics, measures or parameters that can be used to track changes of environmental or socio-economic conditions. Indicators are developed in synthesising and transforming scientific and technical data into fruitful information. It can provide a sound base for decision-makers to take a policy decision on present as well as potential future issues of local, national, regional and global concerns. It can be used to assess, monitor and forecast parameters of concerns towards achieving environmentally sound development' (UNEP RRC.AP, 2004, p.9).

There is, however, a problem with Agenda 21: the vagueness of its action programmes. Indicators are said to help establish profiles and trends of social, economic and environmental conditions in a region, nation or city. But each indicator is assessed separately and no mechanism is provided to establish the interdependence of indicators and their data profiles. Furthermore, no guidelines are given for the interpretation of the collected statistical data; no threshold values or benchmarks are made available against which current conditions and performance values of urban areas or regions can be assessed. The interpretation of the 'goodness' or 'badness' of current conditions and the decision what action to take to achieve 'environmentally sound development' is therefore left to the value judgement of regional, national and local authorities. Most of them cannot be expected to be specialists in matters of sustainable development; for their assessment of conditions they have, therefore, to rely on more or less intelligent guesswork. On that basis, the effect of chosen action programmes on the environment is unpredictable: they may achieve environmental improvements, but they may also do significant and potentially irreversible harm to the environment. To try to overcome these deficiencies was understood to be one of the major tasks of this research project.

2.2 Response to the current practice in urban development and regeneration

Of the many urban development and regeneration projects investigated over the last years, many have used Local Agenda 21 lists of parameters but, as was expected, very few were based on a thoroughly worked out set of objectives and targets to be achieved. In comparison with other disciplines generating products for public use and consumption, current planning and urban design seem to be working towards a 'product' largely without classifying clearly what kind of performance qualities it ought to have in order to work efficiently and economically for the user and the public at large, and to prevent any environmental damage.

In the current planning approach, these performance targets are the result of negotiations between planners, developers and builders and, at least sometimes, communities or concerned groups of people. There are quite a few projects, specifically those focusing on the improvement of social housing areas, that involve the community (the people living in the area), the client (a Housing Association or Co-operative), the planning system (planning and building control) and the developer and architect in the discussion of the qualities that the urban area under investigation ought to have, and this is appreciated. But even then there is always some doubt whether those who actively participate in the process fully reflect the need to protect the environment from damage, and whether they holistically represent the needs of the entire population of an urban area. Furthermore, the list of indicators of sustainability used in the discussion is rarely comprehensive and focuses frequently on either environmental, social or economic sustainability alone with the inevitable consequence that whatever regeneration programme is formulated is leading at best to a partial and temporary rather than a sustainable, durable outcome. Another observation is that frequently, at least in Scotland, both the area and its population the discussion focuses on are too small to be successfully transformable into a sustainable urban quarter. The recurrent outcomes of such projects are accordingly at best uncertain, at worst counterproductive.

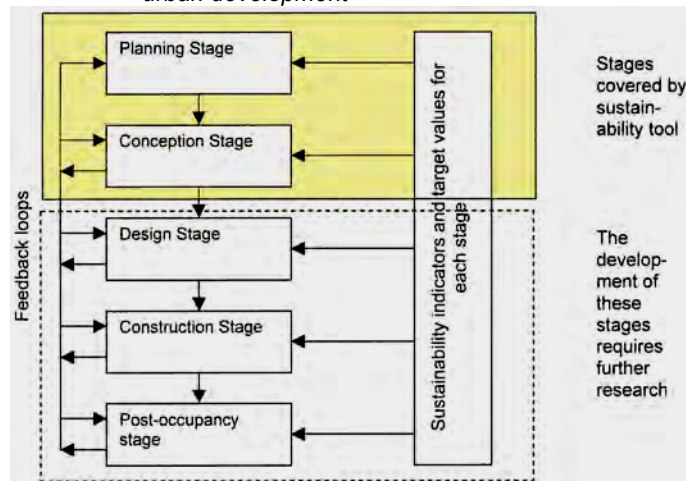
To achieve durable urban regeneration, it would be much more appropriate to establish a sustainable urban development framework with generally applicable threshold and target values for any urban project first and then discuss with developers, stakeholders and communities how their needs and aspirations fit the framework and, if not or not to the full, how a commonly agreed sets of compromise goals and benchmarks for a particular project can be achieved that respect the sustainability goals set by the framework. The key goal of this research project was to develop a systematic approach to the formulation of a generally binding framework for the regeneration and restructuring of urban areas that involves a comprehensive set of relevant physical, social and socio-economic indicators as well as threshold and target values for each of them.

Due to time and resource constraints, the investigation of a full set of physical, social, economic and environmental parameters was impossible and the research team therefore decided to focus on the formulation of parameters and values of importance to the strategic planning and conception stages of urban regeneration programmes (Figure 2.01) as all important strategic decisions about urban form, social and socio-economic conditions of an urban area are made in these two stages. Other economic and environmental parameters and values of importance to the design and construction stages can be extracted from best practice case studies and relevant publications and research output.

The limitation to strategic issues is considered to be no disadvantage to the user of the sustainability tool. Most of the currently available guidance on sustainable urban development focuses on the choice of materials, construction and design principles as well as sustainable mobility, energy and water management concepts, and a considerable amount of information on these principles and concepts is readily available. There are also quite a few best practice cases in the UK and continental

Europe that illustrate the implementation of such sustainability concepts as will be shown towards the end of this report when applying the sustainability tool of the research project for the assessment of the achievements of the new urban quarters Vauban and Rieselfeld at Freiburg im Breisgau, Germany. In contrast, few guidelines are available on sustainable urban quarters in terms of the overall area and population, land use patterns and local amenities, socio-economic population profiles and a balanced mix of dwelling and tenure types¹. The research project therefore provides a useful expansion of sustainability criteria and values that help develop a suitable strategic planning framework for more detailed design and construction considerations at a later stage.

Figure 2.01 Limitation of research project to strategic issues of sustainable urban development



Source: Author.

2.3 The promotion of an urban renaissance and sustainable urban quarters

The Urban Task Force was formed in 1998 to respond not only to the call for sustainable urban development promoted by the United Nations and the European Council through Agenda 21, but also generally to promote the halt and reversal of urban decline, to accommodate the growing number of small households, and to halt and reverse suburban sprawl. The report's main recommendation is the return to a design-based approach of urban development, but it also calls for the return to the compact city and the review of urban densities to achieve urban neighbourhoods with viable local amenities and public transport nodes. These recommendations were to yield a new approach to the planning, design and building of new urban villages and sustainable communities, generated on the basis of sustainability criteria. Of importance was the development of models of urban capacity: the report makes it clear that viable local amenities and public transport stops in urban neighbourhoods require a threshold population of 7,500 people, given a socially mixed community and a minimum density of 100 persons per hectare (Urban Task Force, 1999, p.61). To achieve this, existing urban areas that do not meet this threshold population size need to be intensified. These recommendations reflect a clear awareness that at the time was rarely understood: that planning for sustainable urban development had to focus on entire neighbourhoods as smallest building blocks of the city with a minimum required population (compare Frey, H. 1999, Chapter 3.1 The Microstructure of a More Sustainable City. pp.38-45).

The response of central government to the recommendations of the Urban Task Force report was the publication of the Department of Communities and Local Government's White Paper *Our Towns and Cities: The Future* (DCLG, 2000). The Paper sets out a comprehensive plan for social, economic, environmental and physical improvement programmes. As the Urban Task Force recommended, a

¹ For a definition of 'urban quarters', see section 2.5 below

programme of Millennium Villages and Sustainable Communities was started even before the publication of the Urban Task Force report in 1999. It is accordingly possible to see the direct impact of Government policies and Urban Task Force recommendations in community pilot projects carried out on the basis of a sustainable development framework which can be upgraded using the feedback from the monitoring of the pilot villages projects. This provides governments and researchers with a rare chance: if monitoring of development and of outcomes is consistent then it might be possible to generate values backed up with the currently missing empirical evidence that their application will lead to sustainable, or at least more sustainable, development. Unfortunately, most of the target values employed in these Urban Villages and Sustainable Communities projects deal with matters of energy, water management, sustainable materials, emissions reduction and so forth, matters of concern largely in the design and detailed design stage of a project. Targets such as a threshold population size for urban neighbourhoods or villages, dwelling densities, socio-economic profiles of urban communities and other characteristics important for the strategic planning and conception stages are often not consistently used. Consequently, the investigation of these projects cannot be expected to establish an embracing set of strategic threshold and target values of sustainable urban quarters.

2.4 Implications of the growing demand for additional housing

One of the main reasons for the growing need of new housing is the shrinking size of households in the UK. In 1961, the average household size was 3.1 persons; in 2001 the average household size had shrunk to 2.4 persons per household (Office for National Statistics, Spring 2001). In 2003, the Chancellor and the Deputy Prime Minister set up the review of the supply and responsiveness of housing in the UK. The Barker Review was published in 2004 (Barker, 2004). Based on the projection of household numbers up to 2021 and on the level of private sector build in 2002-03, the report estimates that by 2021 an additional 3.8 million new dwellings would be needed to reduce the trend in house prices to the European average and increase the supply of social housing to meet the needs of new households and reduce the backlog of needs (*ibid.*). Two questions arose and are still intensely debated by those for and against intensification of urban areas: at what densities should the new housing be built, and where should it be built.

Arguments pro urban intensification

The supporters of urban intensification argue that it is very unlikely that the Government's proposed dwelling densities of 30 to 50 dwellings per hectare (PPG3, 2000) would generate the population density required to support local services and facilities. Inhabitants would therefore be dependent on amenities elsewhere and, without viable public transport, on the car to get there. In addition, low-density development would cause a loss of undeveloped land, particularly in the southeast of England where pressure for new dwellings is greatest. The Urban Task Force recommended densities of 100 or better, 150 people per hectare for urban neighbourhoods to achieve fully viable public transport and local amenities, all accessible on foot (Urban Task Force, 1999, p.61). At the average UK household size of 2.4 persons in 2001, this equates to a development density of 42 to 63 dwellings per hectare; the average household size of 2.2 persons used by Barton et al. (Barton et al., 2003) would equate to a density of 45 to 68 dwellings per hectare.

Dwelling density is, however, considered to be only one important factor for new housing development. PPG3 on housing (*ibid.*) expects local planning authorities to provide sufficient housing land but, in favour of the protection of undeveloped land, gives priority to reusing previously developed land within urban areas, bringing empty homes back into use and converting existing buildings. Planning Policy Guidance Note 13 (PPG13, 2000) suggests furthermore that development, including housing development, should be co-ordinated with public transport planning and provision

to improve access to, and consequently a more intensive use of, public transport. The UK government's better practice guide *Tapping the Potential* (DETR, 2000) provides guidance on undertaking Urban Housing Capacity Studies (UHCS), and identifies capacity sources including intensification of existing areas, redevelopment of car parks, and conversion of commercial buildings.

Travers (2001) states that there are good reasons for pursuing greater density within existing urban areas and points at the following factors: higher densities mean that more people can be housed or can work close together requiring shorter lengths of cables, pipes and sewers, bus routes, roads and also fewer local facilities such as libraries and schools; reclaimed land can use the existing infrastructure and facilities such as schools and public transport whereas new homes on greenfield sites require all this to be built from scratch; density makes it possible to achieve viable public transport, and higher densities tend to mean lower home energy use per person.

Newman and Kenworthy (1999, p.102) argue that density increases could be best achieved if focused in nodes along public transport corridors. They call this approach 'transit-oriented urban villages' with high-density nodes accommodating a mixture of workplaces, housing and services preferably in walking and bicycling distance to people's homes, linked to the rest of the city by an efficient transit system. They propose that intensification would be achieved in stages: the first stage would deal with the revitalisation of the central and inner-city areas; then attention would focus on existing and underused transit-oriented locations; growth management strategies would discourage urban sprawl; finally, transit systems, especially rail systems, would be extended and associated villages with their own core areas would be built.

Newman and Kenworthy suggest an approach to urban development that is already employed for at least one and a half decades in many cities in continental Europe. The City of Freiburg im Breisgau in Germany, for instance, in collaboration with the Regional Planning Authority, has extended its tram routes to the city boundary and beyond into the region. Along the transit corridors existing villages are intensified and new urban villages, for instance Vauban and Rieselfeld, are built to encourage the use of the tram. In parallel walking and cycling path systems are developed. According to a survey of the Freiburg Planning Department, walking, bicycling and public transport trips make up almost 60 per cent of all trips in the city (bicycle trips 17.8%, walking 20.8%, public transport 20.8%) and only just over 40 per cent of all trips are made using the motorcycle (1%), the car as driver (29.7%) and the car as passenger (9.9%) (Stadt Freiburg i. Br., 2007). Developing good, fast, reliable and integrated public transport systems, in parallel with safe bicycle paths and walkways, and perhaps in combination with disincentives to use the car in more central urban areas might well sway people in the UK as well to leave the car at home and use public transport instead. However, the structure of the city and its urban quarters has to be adjusted first to achieve viable public transport.

There are two other important arguments in support of the prevention of urban sprawl urban intensification (compare Frey, H. and Yaneske, P. 2007):

- the necessity to preserve as much of the countryside and biologically productive land as possible in order not only to maintain and strengthen biodiversity, but also to be able to use the land for the production of food, wood and materials and clean, renewable energy in order to become more self-sufficient and reduce as a result the unsustainably large ecological footprint of our towns and cities;
- the necessity to drastically reduce the use of cars in more central areas of the city not only to reduce congestion and to give the public streets and squares back to the people but also to reduce fossil fuel consumption and pollution levels.

Arguments against higher housing densities and barriers to achieving them

The need to tie development with accessibility appears to be a well-supported policy in the UK. The government's focus on transport – signalled by PPG13 (2000) already mentioned and reinforced by the Revised PPG13 (2001) – has encouraged developers to put greater emphasis on the accessibility of public transport and greater collaboration between developers, local transport authorities and transport providers. But there is also considerable resistance to the increase of housing densities. According to the PPG3 Implementation Study of the Office of the Deputy Prime Minister (ODPM, 2003, p.24) a majority of developers had increased the density of housing applications in response to PPG3, but two-thirds of the developers indicated that they had encountered barriers in raising density: local political concerns (73%), spacing standards (61%) and parking standards (59%). Other findings of the ODPM study suggested that higher densities tended to be resisted:

- in lower-density suburbs – because they were felt to be inappropriate in terms of design and character, leading to 'town cramming' and to the intensification of traffic;
- in weaker market areas – where the policy objective is to increase the number of low-density higher-value dwellings to meet perceived aspirations;
- in some parts of northern regions – where local authorities sought new development to compliment the existing high density stock of older terraced housing and to increase the range of type and size of dwellings, and meet modern housing aspirations.

The issue of the feasibility of compaction in economic, technical and political terms is analysed by Breheny (1997, pp.210-13). The main economic doubts about compaction appear to be the degree to which the compaction logic defies the market and the degree to which the market can or will bend as compaction suggests that decentralisation must be halted, even reversed. Breheny points out that, although stronger urban regeneration will make the city more attractive, the implication of continuing decentralisation is that the compaction movement will still contradict the market.

In a later writing Breheny argues that the problem with the high-density approach is that it is generally unpopular with both residents and local politicians (Breheny, 2001, p.41). Surveys of housing attitudes suggest that the large majority of households in the UK wish to live in a house, not in a flat, and preferably in a house with a garden, preferably in a suburb, small town or rural area (Hunt et al., 1994). And as far as the relationship between density and travel is concerned, Breheny notes that higher densities appear to be only weakly associated with less travel (Breheny, 2001, p.44). On the relationship between densities and travel behaviour, he refers to studies that find that economic aspects and employment location were stronger factors than density in changing travel behaviour. Handy (1996) looks at the relationship between urban form and travel behaviour and finds that, although many in the U.S. are pushing the concept of the Compact City and the New Urbanism as a way of combating sprawl and reducing automobile dependence, closer examination of the evidence suggests that the relationships are more complex and the answers are not as clear as they may, at first, seem.

Katie Williams (1999) points at two sources of contradictions and problems regarding intensification: the content of the policies and their implementation. She argues that there is little agreement on whether the policies for intensification will have the planned outcomes, and that there is little agreement on whether these outcomes, if achieved, are sustainable for all elements of the urban environment. For example, the assumption that higher densities will automatically result in reduced car use is disputed. Williams points out that research in London Boroughs that have been intensified showed no reduction in car use. In some areas, residents reported overcrowding, increased environmental wear and tear and problems with parking, traffic and noise. With regard to implementation, Williams questions the power of the planning system to ensure intensification.

The need for urban intensification in order to preserve the countryside is frequently regarded as a false argument due to the relatively low percentage of land overall in the UK that is developed and the massive land reserves available for further urban development (compare the footnote by Professor Sir Peter Hall to recommendations in chapter 3 of the Urban Task Force publication *Towards a Strong Urban Renaissance* (Urban Task Force, 2005, footnote on front cover). Statistical evidence seems to support this: according to Defra (Oct. 2006) only 16.9% of all UK land is developed, whereas 83.1 per cent of the land is undeveloped. The land needed to build 3.8 million new dwellings, including the land for the minimum required amenities, is only 0.29% of the total developed and undeveloped land of the UK or only 0.35% of the total undeveloped land. There are accordingly large land reserves that do allow development on greenfield sites.

Review of arguments

That there are large land reserves is a spurious argument. The 'massive undeveloped land reserves' referred to above are largely not land reserves that can readily be available for urban expansion, they are used for agriculture, grazing, forests and woodlands, predominantly for the production of food, wood and other materials that support villages, towns and cities.

Looking at the ecological footprint of our cities it becomes abundantly clear that there is no profusion of biologically productive land; there is actually a growing shortage in the UK as in other developed and developing countries. Towns and cities in the UK consume far more resources than are produced in the UK. To give an example, the consumption levels of the residents in the southeast of England require resources from 55 million global hectare bio-productive space, 29 times the physical land area of the region equivalent to an area of the size of France (Taking Stock). Any loss of own land useable to reduce our cities' ecological footprints would make us even more dependent on land elsewhere. Furthermore, as a result of over-consumption, the bio-productive capacity of developing countries is more and more eroded through overproduction. A growing global population and rising consumption levels in many developing countries will inevitably increase pressure on resource production considerably and, unless the trend is reversed, eventually beyond the global bio-productive capacity and this will have increasingly serious consequences in terms of resource shortfalls that can already be noticed now. It is therefore paramount that resource consumption levels are considerably reduced if only by reducing waste of resources and that all local biologically productive land is used to help increase local production (Frey and Yaneske, 2007).

But leaving aside economic, energy consumption and environmental arguments that may well be true but may not change people's attitudes towards denser housing, it is quite obvious that intensification of urban areas in itself, for the mere purpose of producing more housing on brownfield sites, is a questionable approach to urban regeneration, not least because it clearly does not automatically reduce vehicular traffic. It may do just the opposite in cases where an increase of housing in urban areas without local amenities and public transport will inevitably lead to more car-dependent travel for access to amenities in other more central or peripheral areas of the city. Intensification is therefore only feasible and viable if through it an urban area is transformed into a more self-sufficient urban quarter with viable local amenities and public transport. Then intensification is driven, not primarily by the need for more housing, but by the catchment population required to support local amenities. This, however, is only attainable:

- if, first, the achievable population size is large enough and is socially sufficiently mixed to support local services and facilities catering for daily needs, which potentially reduces the need to travel to amenities further away;

- if, secondly, the distances between one's home and local amenities are walkable to increase accessibility by all inhabitants, specifically by those less mobile (such as, the elderly, the disabled, mothers with young children);
- if, thirdly, the intensified area is located around an existing public transport node in walking distance to people's homes or, if this is not the case, the installation of such a public transport node becomes viable due to the local population size.

If urban regeneration, and with it intensification, does not achieve these three conditions it should not be attempted as it will result in an increase of vehicular transport in and out of intensified urban areas as more people will live there but, due to the lack of local amenities and viable public transport, will need the car to travel to work and service outlets and schools outside their living area. This will generate more exported traffic and congestion as well as pollution in more central urban areas. If anything, such areas might best be deurbanised.

2.5 Conclusions regarding the theoretical underpinning of and methodology for urban regeneration

Today, the overriding principle behind any kind of urban development and regeneration is its physical, social, economic and environmental sustainability. The major task for all those involved in urban development and regeneration is the translation of the concept of sustainable urban development into practice.

This sounds much easier than it actually is. Sustainable urban development can be described to be principally '... *the development and improvement of the human environment, specifically the environment in which we live and work, without irreversibly damaging the natural environment*' (Frey, H. and Yaneske, P., 2007, pp.3-4). This is clear. But when further probing what specific characteristics this human environment has, or ought to have, to provide us with better living and working conditions without damaging the environment, all we find are lists of indicators but no specifications of the physical, social, economic and environmental characteristics of that human environment. On that basis, it is anything but easy to translate a vaguely defined concept of sustainable urban development into a working programme for its practical achievement. Evidently missing is a definition of the key characteristics and values of a sustainable urban settlement, town or city that would guide the development of effective and viable regeneration programmes.

The lack of empirical evidence that would support target and threshold values

A loose framework for such a definition of key characteristics of a sustainable settlement is Agenda 21; it has been widely adopted and further developed according to local needs (Local Agenda 21). It offers a reasonably comprehensive and expandable list of indicators. It does not, however, specify the physical, social, economic and environmental characteristics and values of sustainable urban development. It also does not provide a mechanism for the investigation of the interdependence of indicators, and it fails to offer a method with the help of which the 'goodness' or 'badness' of measurable values of the built environment can be assessed. It follows, therefore, that measurable or clearly describable targets or benchmarks are needed for each indicator. This research project has the objective to specify such values. In order to have these targets supported by empirical evidence, or at least by sound arguments, UN, EU and UK recommendations as well as best practice cases of urban development are investigated.

Orthodox researchers might query the use of threshold and target values that lack the support of empirical evidence. Undoubtedly it would be better to have such support, but values portray a view shared by many of what sustainable urban development is. Any approach that lacks common

indicators and values of a 'good city', even when only supported by strong arguments and general agreement rather than empirical evidence, would mean the continuation of current practice at disparate and uncoordinated urban development projects by different groups with different demands on the city. Figure 2.02, a 1960s aerial photograph of the centre of Glasgow north of the River Clyde, presents a vivid example of this: the city becomes the expression of a multiplicity of competitive priorities such as traffic management, mass social housing, business interests, energy provision, the conservation of historical urban fabric and the like, that generate little more than a chaotic collection of disparate, uncoordinated urban development projects based on competition for resources to respond to the needs of individuals and groups of people. Clearly such an approach is unacceptable in view of the pursuit of sustainable urban development goals.

Figure 2.02 Glasgow city centre and beyond, 1960s – the consequence of the lack a common understanding of what a 'good' city is



Source: Scottish Development Agency

The urban quarter as key module of urban districts, the town and city

The question that needs to be answered is for what spatial, physical and social urban entity such sustainability indicators and values ought to be formulated. It must be small enough to be grasped, imaged, planned and built (though incrementally, project by project) in its entirety, but large enough to be a model of the town or city at large. What we are looking for is an entity that is, if not morphologically identical with, then at least similar to, the town or city at large and has the potential of accommodating the socio-cultural, economic and political processes and decision-making so characteristic of a town or city. Such an entity is the urban village, urban neighbourhood or whatever the name used today for what once was a 'guild quarter' or 'parish' or 'le quartier urbain' of the traditional city. The term used here is the 'urban quarter' that symbolises the part of the city that accommodates housing, workplaces, and amenities for the day-to-day life, as well as basic socio-political and economic activities. A traditional urban quarter was semi self-sufficient, it had its own viable services and facilities and public transport stops accessible on foot. Many argue that the

concept of an 'urban quarter' or 'neighbourhood' is outdated and no longer applicable as the inhabitants of urban areas today have no longer any social ties and frequently do not even know their immediate neighbours. Today, they would argue, social links are not tied to a common space but to personal networks within the city and far beyond. Nevertheless, there are common needs of inhabitants in any urban area: a) access on foot to local services and facilities that cater for daily needs, and b) access to transport systems that allow mobility to amenities and workplaces at district, town and city locations that provide for an increasingly larger catchment population and area. The urban quarter today functions primarily as a unit of convenience, a functional unit.

The physical form of the city as a 'modular construct', where it still exists and where it was lost or had never developed

Traditionally, the city, at least its physical form, was a construct of urban quarters. The Merchant City of Venice, for example, grew through the agglomeration of guild quarters, each with its own church, market place, fountain, and guild hall. In Venice, canals separate these quarters, but the boundaries of urban quarters are not always so clear, more often fussy, i.e. overlapping. Nevertheless, inhabitants belonged to specific parishes and administrative districts.

In today's city the central area and the surrounding 'historical suburbs' still show clear signs of traditional modularity; we talk of London's villages with the steeples of the parish churches still clearly visible from St Paul's cathedral. The urban settlements developed in the inter-war period and the 1960s new towns in the UK still adhere to a neighbourhood structure but their centres are poorly defined and generally provide only the most basic services and facilities. Urban sprawl areas of 'car suburbs' and beyond have generally never developed a neighbourhood structure and do not provide any local services and facilities, least of all public transport, and travel is therefore by car. These urban sprawl areas are those most in need of urban restructuring as they generate many of today's urban problems, especially dependency on vehicular traffic and on amenities in more central areas of the city. The regeneration of suburbs and areas at the city's edge into sustainable urban quarters with their own amenities and public transport nodes would not only solve some of these problems but also re-establish, or newly establish, the city's modular structure and with it a series of hierarchically differentiated amenities as well as integrated transport systems. The conclusion:

The key objective of the regeneration of urban areas is not their intensification for the sake of more housing but to re-establish the mixed-use, public transport-supporting urban quarter, and to re-establish the physical form of the city as a construct of urban quarters wherever this structure has been abolished, or to set it up in fringe areas where it has never, or never fully, developed. The urban quarter is thus seen as the model for, and the smallest physical, spatial, social and economic module of, the city. The transformation of urban sprawl into a network of linked urban quarters is the true meaning of urbanising suburbia, the title given to this research project.

Reinstating urban modularity and the resulting urban form

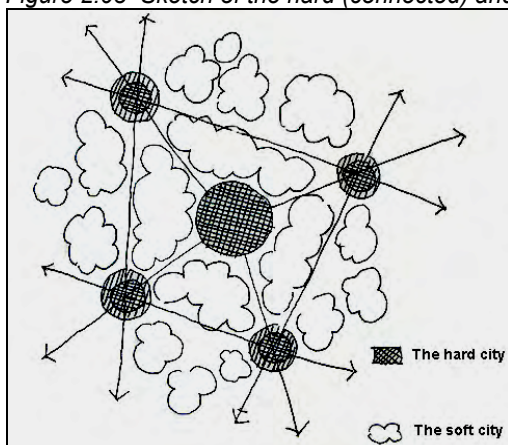
The Urban Task Force deplores the dispersed nature of urban areas and the poor definition of local centres in today's cities and proposes the return to urban modularity (Urban Task Force, 1999, pp.52-3). It suggests using neighbourhoods with their own central amenities as building blocks of urban districts, which in turn form towns and cities. This would overcome the problems of outer urban areas and would also allow instating or reinstating a clear movement hierarchy. Overall, so the Urban Task Force suggests, a compact city would result.

Needless to say, that in the sprawl of suburbia it may not be possible to transform all areas into urban quarters due to either the lack of development opportunities or the lack of a viable public

transport route. In that case any further housing development in such areas ought to be resisted, as it would make them even less sustainable, as already explained earlier. The choice of viable places for the restructuring of suburbia, the *'soft (disconnected) city'*, depends therefore not only on the place-specific potential of establishing urban quarters – the availability of development sites, a potential of attracting people to settle and local amenities to develop, and the like – but on the regional network of existing or potentially new public transport routes that tie these urban quarters into the town, city and regional network. It is therefore likely that a structure of linked urban quarters, the *'hard (connected) city'*, may be established, but that the structure of the city may include fragments of the *'soft (disconnected) city'* (Figure 2.03).

A previous investigation of Greater Glasgow has shown that the *'hard city'* in the form of nodes and transport links of different sizes does already more or less clearly exist, that this structure does not need to be newly formed but strengthened and completed as far as possible (Figure 2.04). The mobility network links up the nodes (such as city, town and district cores; compact urban quarters; retail parks and entertainment parks; sports centres and fields; hospitals, universities and colleges) and generates an overall irregular network structure. This structure of the *'hard (connected) city'* has no finite form or shape; the city continuously transforms by expanding or shrinking, diffusing or condensing. But the process of transformation of the hard city is slow, whereas that of the soft city that fills in gaps within the network structure without connecting up to it, is fast. This is why in contrast to the soft city the hard city can be planned and designed as it has continuity despite slow change.

Figure 2.03 Sketch of the hard (connected) and soft (disconnected) city



Source: Author

The Urban Task Force proposal of a hierarchical set of services – in core areas of urban quarters and districts, town and the city – does not cause any categorical problems other than its achievability. There is also no problem with a hierarchical mobility system from walking and cycling to using a bus, LRT, railway, or car. Due to the large-scale diffusion and decentralisation of the once compact city with its relatively clear edges to the countryside, the return to modularity of today's city is not, however, likely to generate a compact city as a whole. It is more likely that the resulting form of the city will resemble a more or less irregular network with compact urban quarters, districts, maybe even towns but a non-finite, non-compact and in places non-hierarchical overall urban form. Glasgow's city and city region shows the result of urban diffusion and decentralisation, a process that is still ongoing and seems to be irreversible. The plan shows clear signs of modularity and hierarchy within an overall irregular and loose urban structure with the city centre, existing and potential town and district centres and existing and potential urban quarter centres.

Figure 2.04 Greater Glasgow's structure of nodes and linkages



Source: Author (from *Designing the City*, 1999, London: E & FN Spon and New York: Routledge, figure 5-15, p.115; compare also figure 5.03)

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Chapter 3

Developing a tool for the measurement of levels of sustainability of urban areas

This section summarises the development of the tool with the help of which levels of sustainability of urban areas can be systematically established. The tool allows the measurement of the performance values of existing urban areas and the comparison of these values with the tool's threshold and target values for sustainable indicators. The difference between existing and threshold/target values forms the basis for the formulation of regeneration programmes that aim at the improvement of the performance values of urban areas under investigation. A detailed account of establishing threshold and target values is given in the parallel document *Urbanising Suburbia: The Handbook*.

3.1 The relevant key indicators for the planning and conception stages of urban regeneration

The key indicators relevant for the planning and conception stage of urban regeneration are those concerned with the physical, operational, social, and economic viability of urban areas that in turn generate an essential part of the quality of life of those who live and work there. Therefore, the development of threshold and target values should not only respond to housing needs, but has to focus on sustainable urban quarters with their own services and facilities and public transport. As explained earlier, the smallest planning entity and building block of the city for which such targets can be developed is the urban quarter, the equivalent of a small market town. There are three categories of sustainability indicators for which values are formulated:

Built form characteristics of a sustainable urban quarter

- Access to the minimum required services and facilities and public transport.
- The required population size, as well as the minimum and optimum population and dwelling densities, to support local services and facilities and public transport.
- The size, area and development density of a walkable quarter (with optimum to maximum distances and walking times from edge to central area).
- Graded densities from edge to centre of the urban neighbourhood (to achieve a suitable mixture of dwelling and tenure types).
- Graded densities of urban neighbourhoods from edge to central location in a town or city and accessibility of core areas of neighbourhoods, districts, towns and the city (to achieve an overall suitable mix of dwelling and tenure types).

Characteristics of a socially balanced and inclusive urban quarter

- A balanced population age profile.
- A balanced mixture of household types and sizes and an equivalent mixture of dwelling and tenure types.
- A socially balanced population, expressing itself in a balanced mixture of levels of qualification of people of working age, as well as the health condition of the population and indicators of deprivation.

Socio-economic characteristics of a sustainable urban quarter

- A balanced range of economically active and inactive people of working age.
- A balanced range of property prices and rent levels as key to a socially inclusive urban neighbourhood.

Arguments that support the choice of these sustainability indicators, threshold and target values can be found in *the Urbanising Suburbia Handbook*.

3.2 Establishing threshold and target values for the relevant indicators

This section summarises the process of establishing threshold and target values for indicators of urban form, social and socio-economic sustainability of urban quarters. As the *Urbanising Suburbia Handbook* covers the development of indicators and threshold/target values in detail, only a general outline is provided here and the resulting tables of values are presented without detailed comments on individual values. However, the following interpretations of the terminology used should help avoid any misinterpretations:

- *Target values* of urban development and regeneration are deemed to be values a city should have to achieve a high level of physical, operational, social, economical and environmental sustainability.
- *Threshold values* of urban development and regeneration are regarded as minimum acceptable values for urban development, and generate a city with the lowest acceptable level of sustainability.
- *Average values*, proposed in some cases, are values that achieve a city with an average level of sustainability.
- *A sustainable city* is one that is able in a balanced way to respond to, and cater for, the multiplicity of needs and interests of all its inhabitants while at the same time doing no irreversible harm to the environment while preserving irreplaceable natural resources. It cannot be expected that urban development and regeneration generates a city that achieves all target values of all indicators. Decisions have to be made of which targets to pursue in full and which values, if any, to compromise. The prioritisation of indicators and target values helps achieve compromises, but only if all individual and group needs and interests, and all the needs of the environment and its ecosystems, are reflected in such compromises.
- *The specification of target, average and threshold values* of urban development and regeneration is a complex and continuous process that requires feedback from urban development projects (best practice cases) that have used these values so that they can be modified and improved or replaced with the help of a steadily growing base of empirical evidence.

Threshold and target values of built form and socio-economic characteristics

Regarding the process of establishing threshold and target values, there is a small range of publications that recommend values for urban form characteristics – government guidance notes and White Papers, the Urban Task Force Report and a number of research publications, specifically the already mentioned *Shaping Neighbourhoods* by Barton et al. (2003). There are also some recommendations on economic characteristics of urban quarters. It is therefore a little easier to formulate values for urban form and socio-economic characteristics that are important for the strategic planning and conception stage and are genuinely believed to lead towards more sustainable urban quarters (Tables 3.01, 3.02 and 3.04). It is much more difficult to formulate threshold and target values for social characteristics of the urban quarter (Table 3.03).

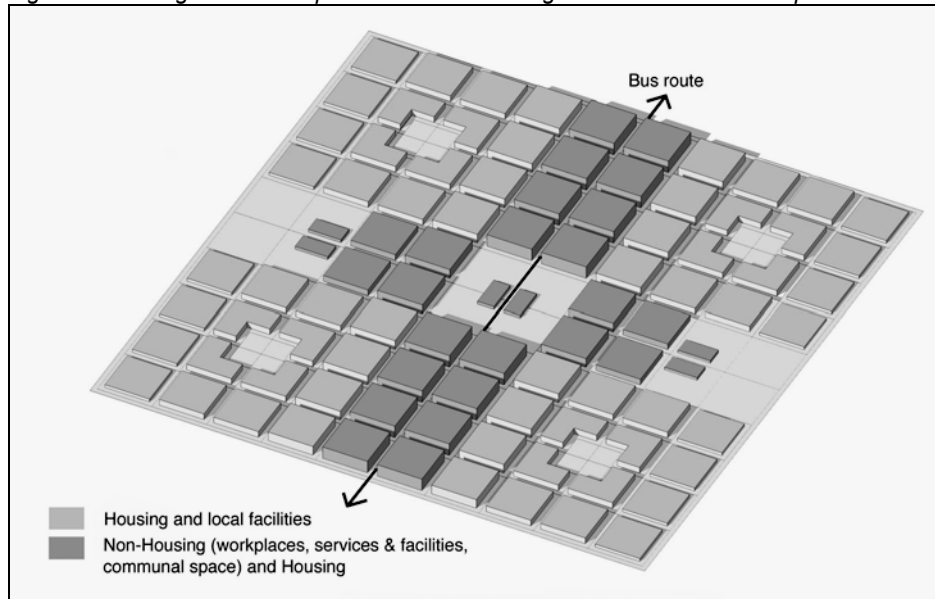
Table 3.01 lists the required services and facilities or ‘target uses’ of urban quarters as well as the urban district, town and the city cores. The list also specifies the target (maximum) distances between people’s front door and these target uses. The urban quarter amenities are expected to be accessible from all parts of an urban quarter on foot or by bicycle; other district, town and city core amenities are expected to be accessible by public transport.

Table 3.01 Services and facilities at urban quarter, district, town and city cores

indicators	target distances	target uses	sources	
Access to local hub amenities (4 local hubs form an urban quarter)	150-250 m walk	Primary school (shared by 2 hubs)	Urban Task Force (UTF) 1999, p.31; Research Team	
		Medical surgery		
		Corner shop		
		Nursery school		
		Community park		
		Playground		
Access to urban quarter amenities	400-600 m walk	Public house / inn / café	UTF 1999, p.31; Barton et al. 2003, pp96-9; Research Team	
		Group of shops / convenience store		
		Post office		
		Community office		
		Community centre and square		
		Access to public transport stop		
		Youth meeting place		
		Adventure playground		
		Sports fields (football, volleyball etc.)		
		Connectivity to other NBHs, district, town and city centres and beyond		
		A permeable street internal network		
An integrated public transport system				
Access to district amenities	1,500 m	Secondary school	Barton et al. 2003, pp.96-9, Research Team	
	2,000 m	Playing fields		
		District Centre		
		Superstore / larger shops		
		Leisure Centre		
		Nature space		
		Integrated public transport system		
		Health centre		UTF 1999, p.31; Research Team
		Library		
Sports centre				
Access to town amenities	5,000 m	Cultural / entertainment. centre		
		Higher education		
		General hospital		
		Integrated public transport system		
Access to city amenities	up to 20 km	Stadium		
		Cathedral		
		City Hall		
		Key museums		
		Major theatre + public facilities		
		University		
		Regional exhibition centre		
Integrated public transport system				

Following recommendations by the Urban Task Force (1999), Barton et al. (2003) and other sources, the urban quarter is composed of four ‘local hubs’ with amenities at the hub level accessible at a distance of 150-250m from people’s home. Each local hub will have a medical surgery, corner shop, nursery school, community park and playground. Two local hubs share one primary school. Figure 3.01 illustrates this structure. The hubs are the ‘housing and local facilities’ areas, each of which has a small central community space or park that also accommodates the local hub amenities.

Figure 3.01 Diagrammatic representation of the organisation of an urban quarter



Source: The Research Team

The urban quarter's amenities should be within a range of 400-600m; the target (maximum) distance value is 530m, the average value is 600m, the threshold value 670m. Urban district amenities should be accessible within 1,500-2,000m, town centre amenities within 5,000m. City amenities may require a travel of up to 20km. The diagram illustrates the amount of space needed to accommodate the non-housing uses, including workplaces, amenities, open spaces of the urban quarter and the infrastructure systems. It shows furthermore the (graphically exaggerated) graded densities of the urban quarter from edge towards the centre and the high street with the bus route; density grading serves to increase the variety of dwelling types.

Table 3.02 lists those characteristics that are most important for viable local amenities and public transport:

- The total land area – divided into housing and non-housing or mixed use land, i.e. the land area required to accommodate housing (including local access roads, car parking, gardens, community greens/parks and playgrounds of the local hub areas), and the land area required for amenities, workplaces, public spaces/parks, schools, and the primary transport infrastructure. In reality, land uses ought to be mixed, i.e. the two land use categories overlap: the housing land also accommodates amenities and the non-housing land also accommodates housing.
- Distances between edge and centre of the urban quarter influencing accessibility of local amenities on foot and by bicycle.
- The target population required for the support of local amenities and public transport. It depends on the location of the urban quarter in the town/city as the development and population density increases from town/city edge to the central core area.

Table 3.02 Built form characteristics (strategic planning stage) of urban quarter (UQ)

indicators	target / average / threshold values				source / comments
		UQ at city edge location	UQ at intermediate location	UQ at city centre location	
Population	target ^{1,2}	7,500 ¹	9,000 ²	10,500 ²	1) Urban Task Force (UTF) 1999, p.61 2) Research Team
Distance edge to centre	target ²	530 m	530 m	530 m	scales: m metre ha hectare ppha persons per ha dpha dwelling per ha
	average ²	600 m	600 m	600 m	
	threshold ²	670 m	670 m	670 m	
Total area	target ²	88 ha	88 ha	88 ha	
	average ²	113 ha	113 ha	113 ha	
	threshold ²	140 ha	140 ha	140 ha	
Size of housing land (including local open space & local access roads) 60% of total land)	target ²	53 ha	53 ha	53 ha	
	average ²	68 ha	68 ha	68 ha	
	threshold ²	84 ha	84 ha	84 ha	
Size of mixed-use land (communal area, amenities, workplaces, major transport routes + housing) 40% of total land)	target ²	35 ha	35 ha	35 ha	
	average ²	45 ha	45 ha	45 ha	
	threshold ²	56 ha	56 ha	56 ha	
Gross population density (population over total land)	target ²	85 ppha	102 ppha	119 ppha	
	average ²	66 ppha	80 ppha	93 ppha	
	threshold ²	54 ppha	64 ppha	75 ppha	
Net population density (population over housing land)	target ²	141 ppha	170 ppha	198 ppha	
	average ²	110 ppha	132 ppha	154 ppha	
	threshold ²	89 ppha	107 ppha	125 ppha	
Net dwelling density (at 2.1 persons per household (Glasgow average; to adjusted for other towns and cities)	target ²	67 dpha	82 dpha	97 dpha	The average dwelling density of urban neighbourhoods needs to reflect local conditions
	average ²	52 dpha	63 dpha	73 dpha	
	threshold ²	42 dpha	51 dpha	60 dpha	
Graded target net dwelling density ^{1,2,3} (increased net dwelling density from edge of NHB to NBH centre; average density -15, +/-0 and +15 dpha gives the grading)	overall density ²	67 dpha	82 dpha	94 dpha	1) UTF 1999, p.53 (urban capacity, relative density scale) 2) Research Team 3) Barton et al, 2003, p.123 (principles of public graded density)
	at edge ²	52 dpha	67 dpha	82 dpha	
	at intermediate location ² (50% of housing land @ +/-0)	67 dpha	82 dpha	97 dpha	
	at centre ² (25% of housing land @ +15 dpha)	82 dpha	97 dpha	112 dpha	
Indicators	targets				
Connectivity targets ^{1,2,3} (links to other urban quarters, to district, town and city centre and beyond)	Connectivity within urban quarter	<ul style="list-style-type: none"> A permeable street pattern (no cul-de-sacs, all streets connected) Traffic-calmed residential streets (keeping vehicular traffic to the edge of the urban quarter; giving priority use of residential streets to people and children; placing public transport stops at the core and sub-core areas) 			1) UTF 1999, p.53 (movement hierarchy from city centre to the home) 2) Research Team 3) Barton et al, 2003, p.123 (principles of public transport planning)
	Connectivity of urban quarter with other areas of the city	<ul style="list-style-type: none"> An integrated roads & public transport system linking the urban quarter to other urban quarters, to district, town and city core areas (achieving full mobility on foot and the use of bicycle, local bus, LRT, railway, car with direct links between core areas) 			

From these values the gross and net population and net dwelling densities are tabulated. Further urban form characteristics listed in Table 3.02 are:

- The pedestrian and vehicular permeability of the street pattern, which influences the distances between people's homes and amenities considerably, and accordingly the accessibility of amenities, even where the distance between edge and core of the urban quarter is optimal.

- An integrated roads and public transport system that allows links between all urban quarters, districts, and towns of the city and beyond as well as public transport based mobility throughout the city and beyond.

Where appropriate, target, average and threshold values are formulated for sustainability indicators. The reason is that in specific urban, political, social and economic contexts, and in varied geographical and topographical conditions, not all urban areas have the potential of achieving target values. Average and threshold values are fallback positions in case optimum values are unachievable. Prioritising indicators and values can help making the appropriate choice of values.

Social characteristics, threshold and target values of a socially balanced and inclusive urban quarter

When it comes to social indicators, one encounters an astonishing lack of research publications and government guidance notes that specify threshold and target value proposals for sustainable population profiles. Although the call for socially inclusive urban neighbourhoods and communities is supported by virtually all political institutions, from the United Nations to the European Council and the UK governments, and by virtually all relevant academic institutions, social balance and inclusion seem to be the concepts of sustainability most difficult to describe, let alone to achieve.

There are two main factors responsible for the difficulty to overcome social segregation and exclusion. The first factor is the well-intentioned development of the UK, as well as most other European Union member states, into welfare states. In the UK, the national governments have made local authorities responsible for those with the lowest incomes, who tend to be heavily dependent on housing benefits. This necessitates the provision of social housing to respond to housing needs. The Urban Task Force states:

‘The statutory homeless obligation of local authorities for rehousing vulnerable families and individuals combines with the 100% housing benefit system to create ever greater pressures towards polarisation and poverty within social housing’ (Urban Task Force, 1999, pp.296-7).

The second factor is the way in which, until recently, social housing has been provided: it was concentrated in social housing estates rather than integrated into mixed tenure areas, adding to the social the physical/spatial segregation of the marginalised.

To achieve social inclusion requires the transformation of social housing estates into mixed tenure areas. In the report *Towards a Strong Urban Renaissance* published by the Urban Task Force (Urban Task Force, 2005) it recommends that a target should be set ‘... to transform all social housing estates into mixed tenure communities by 2012’ (ibid., p.11) to ensure mixed tenure, income and ethnicity communities. This necessitates, however, dealing with the current responsibilities, particularly of Scottish Housing Associations and Cooperatives, for the maintenance and improvement of most of the social housing estates. Only in the last decade or so have some of the Associations or Cooperatives invited the private sector house builders to develop housing in their social housing areas to their improved quality standards. Nevertheless, as long as they have little other remit than improving the social housing stock in their areas, and as long as the Glasgow Housing Association remains outside the control of local authorities, it is virtually impossible to transform social housing estates into mixed tenure areas. A viable, balanced and well functioning community is only achievable if, in addition to housing provision and quality, all other human needs and aspirations – access to workplaces, education and training, local shops and community facilities, schools, open spaces, recreation facilities, and access to public transport – are covered and responded to. To achieve this, Housing Associations and Cooperatives need to be transformed into something like ‘community councils’, fully supported by their local communities and local authorities,

with a full remit of responsibilities and the required public and private funding to achieve not only social inclusion, but all other urban form and economic characteristics of a sustainable urban quarter. Furthermore, achieving social inclusion necessitates the availability of dwellings at price and rent levels affordable to lower income groups not qualifying for social housing and housing benefits, as suggested by Planning Policy Guidance Note 3 on Housing (PPG3, 2000).

The research team decided to attempt to formalise appropriate profiles for the communities of urban quarters. There are enormous differences of existing conditions in rural and urban areas as well as in post-industrial cities and towns compared to those that had never seriously industrialised. It became clear that the social target profile depends much on the current conditions of towns and cities as a result of historic development factors. A city like Glasgow has, decades after the disappearance of large-scale production places, still to cope with the remnants of unemployment and poverty caused by the close down of traditional industries. In contrast, many towns and cities, which never industrialised to the degree of cities like Glasgow, are not likely to have the same grave unemployment and deprivation rates, although there are notable exceptions. Compare the Glasgow Region's social profiles with those of the southeast of England: they are profiles of a different world. While new executive housing areas have sprung up in the Glasgow river area and elsewhere, there are still serious levels of social exclusion and deprivation in the city as well as the region, while the south-eastern region of England is suffering from excessive economic growth, escalating house and land prices and a general shortage of land as a result of the attraction of people into the region.

Social population target profiles need therefore to be developed on the basis of local and regional conditions. In view of the need for a detailed investigation of four Govan case study areas, the development of social values focuses on Glasgow; the recommended value profiles are predominantly based on statistical analysis of Scotland and Glasgow averages. References to other regions and cities in the UK are made in the Handbook to indicate what some of the regional differences are, and to show why specific profiles need to be based on existing local characteristics.

The only general recommendation the research project makes is that in order to overcome the physical/spatial segregation of marginalised households, the concentration of social housing in estates needs to be overcome by a balanced distribution of social housing and low income households throughout the town or city. This does not mean a salt and pepper approach - that is believed to be unachievable and socially unacceptable - as people with similar socio-economic backgrounds tend to form clusters. One way of achieving a viable social mix in a neighbourhood is to provide housing with different tenure and dwelling types that correspond with the needs and aspirations of different social and income groups. If the quality of housing is similar in all groups, if not the same standard, the visual differences of social-rented, private-rented and owner-occupied housing, so evident in many urban areas today, will disappear. In addition, social-rented residential units have then the same access to local amenities and to public transport as owner-occupied ones. Thus not only the visual, but also the locational stigmatisation of the lower income levels can be overcome. An interesting example of this kind of grouping can be studied in the already mentioned urban quarter *Rieselfeld* at Freiburg im Breisgau, Germany.

Table 3.03 presents the established threshold and target values for social characteristics of a sustainable urban quarter. A detailed account of the formulation of these values is provided in the *Urbanising Suburbia Handbook*.

Table 3.03 Characteristics of a socially inclusive urban quarter

indicators	location	target values	threshold values	sources / comments
Population age profile		18.5% of pop. age 0-15		UK and England average; close to Scotland average
		65.0% of pop. age 16-64		
		16.5% of pop. age 65 +		
Mixture of dwelling types for graded density in urban quarters	at city edge location	34% flats		The principal distinction is between family houses with gardens and flats
	at intermed. & location	66% family homes		
	at intermed. & location	44% flats		
	at centre location	56% family homes		
Sizes of Households		54% flats		Glasgow average suitable for Govan areas to be investigated
		46% family homes		
		42.0% 1 person households		
		29.5% 2 person households		
		14.5% 3 person households		
Mixture of tenure types (for equitable distribution of households in need of social housing provision)		9.5% 4 person households		The target profile is based on the Glasgow average and the survey of property prices in the Govan area of Glasgow, 2006
		4.5% 5+ person households		
		39% social rented		
		49% owner-occupied of which 29% upper market owner-occupied 20% affordable owner-occupied		
		7% private rented		
Qualifications of people in working age 16-74		5% other		Target profile is the Scottish average, threshold profile is the Glasgow average
		34.5% without qualification	42.5% without qual.	
		25.0% with level 1 qualific.	21.0% level 1 qual.	
		15.0% with level 2 qualific.	13.5% level 2 qual.	
		6.5% with level 3 qualific.	6.0% level 3 qual.	
		19.0% with level 4 qualific.	17.0% level 4 qual.	
Other indicators of poverty and deprivation	% of population with LLTI			LLIT = limiting long-term ill-health SIMD = Scottish Index of Multiple Deprivation
	% of population income deprived			
	% of persons in working age claiming benefits			
	SIMD ranking of neighbour-hood population			

Comment: Most of these target values need to be adjusted to local conditions outside Glasgow and Scotland

Socio-economic characteristics, threshold and target values of a sustainable urban quarter

Table 3.04 lists the socio-economic characteristics of the urban quarter. Only two economic indicators are important at the strategic planning stage: the percentage of those economically active and inactive, and the range of property prices and rent levels. In preparation for the Glasgow-Govan investigations, the target profile for the first characteristic has been set at Scottish average as no other recommendations could be found. Different targets have to be selected for areas outside Scotland. The target profile for the second characteristic has been established after surveying property prices and rent levels in the Glasgow-Govan area. For other urban areas and cities values have to be selected that respond to local socio-economic conditions.

Table 3.04 Socio-economic characteristics of a sustainable urban quarter

indicators	target values	threshold values	source
Percentage of economically active and inactive people aged 16-74 (for Glasgow)			
Economically active	65%	56%	Scottish average is target, Glasgow average is threshold
Economically inactive	35%	44%	
Range of tenure types in an urban neighbourhood (for Glasgow)			
A balanced range of tenure types (based on property prices) as key to social inclusion	39% social housing		Based on survey of property prices and rent levels in the Govan area of Glasgow, 2006 (Research Team)
	49% owner-occupied housing , of which 29% upper market owner-occupied 20% affordable owner-occupied		
	7% private-rented housing		
	5% other		

Comment: Target value profiles need to be adapted to areas and towns/cities outside Scotland

References

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PPG3 (Planning Policy Guidance Note 3): Housing, 2000. London: DETR.
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Chapter 4

Application of the tool for the measurement of levels of sustainability of urban areas

The tool for the measurement of levels of sustainability of urban areas, the development of which was briefly summarised in the previous chapter and is prescribed in detail in *Urbanising Suburbia – The Handbook*, is now applied to the investigation of selected urban areas.

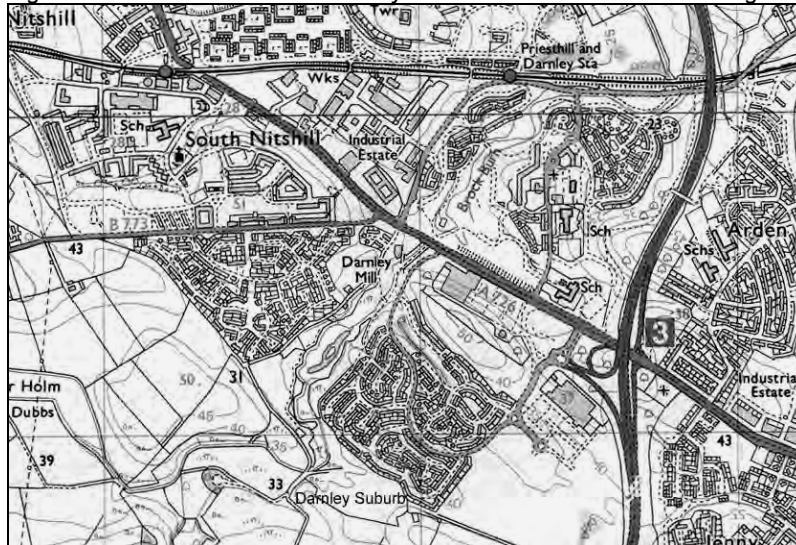
The objective of this investigation is to establish: the expediency of the tool and its target and threshold values; the levels of sustainability of the selected urban areas; the regeneration programmes that can be established on the basis of the difference of existing performance values of the selected areas and the tool's values; and the viability of the regeneration programmes thus generated. The first areas scrutinised in a preliminary investigation are those selected at the periphery of the five CityForm cities Edinburgh, Glasgow, Leicester, Oxford and Sheffield of which Glasgow-Darnley will serve as example. Then follows the preliminary investigation of the urban areas along the central River Clyde Corridor at Glasgow and the detailed investigation and remodelling of the Glasgow-Govan areas with Drumoyne presented in detail as example for all other areas. The selection of these river corridor areas was suggested by the Glasgow City Council Department of Regeneration Services in order to establish ways in which the deprived and long forgotten Govan areas south of the river could benefit from the prime development projects along the river waterfront such as the Glasgow Harbour development scheme (executive housing), the Scottish Exhibition and Conference Centre (SECC), both at the northern waterfront, and the Science Museum and the BBC and ITV headquarters along the southern waterfront. At the end of the chapter the viability of the tool and the usefulness of its target and threshold values will be assessed.

4.1 The investigation of the suburbs of the CityForm Core Programme with Glasgow–Darnley as typical example of a 'car suburb'

The first urban areas to be selected for a preliminary investigation are those located at the urban fringes of the Core Programme cities. All except the area in Oxford are typical 'car suburbs' with very low net dwelling densities between 12 and 20 units per hectare, single-use development (housing) throughout, and without any local amenities and public transport. It suffices that Glasgow's Darnley suburb stands as an example for all the other areas (Figure 4.01).

The suburb is located at the very south-western fringe of Glasgow immediately south of the east-west A726 expressway and immediately east of the M77 linking the city to the south-western region. The location at two major traffic routes is significant as will be seen shortly. There is a shopping centre along the expressway northeast of Darnley, but no foot or bicycle path that would link the suburb with the shops. There is a train station on the north side of the expressway, but the distance of about 1,500m and the difficulty of a level crossing of the expressway do not encourage walking or cycling. Standing well isolated by the A726 to the north, the M77 to the east, open countryside to the south, and a small river area to the west, and having no access to a bus route, the inhabitants are dependent on the car to travel to work, shops, schools and other amenities.

Figure 4.01 Location Plan of Darnley Suburb at the south-western edge of Glasgow



Source: The Research Team, based on OS map

This suburb adheres to the 'garden city' type layout with urban blocks and curvilinear road patterns. Urban blocks are clearly visible but roads end frequently without joining up and this results in a considerable loss of permeability (Figure 4.02). The total area of the suburb is 27.6 hectares, but all of the area is actually housing land. Nonetheless, the area accounts for only 52% of the target housing land. The suburb's population is only 1,625 (2001 values, GRO Scotland 2003), a fragment of the target population of 7,500. There is a similar suburb to the north-west, separated by a small river area, which is likely to have a similar size and population; added up the two suburbs form close to 100% of the target housing land of an urban quarter, but with an estimated population of less than 3,500, less than 50% of the population target. The net dwelling density would then be about 61 persons per hectare (ppha) compared with an expected 89 ppha (threshold value) to 141 ppha (target value).

Figure 4.02 Figure-ground of Glasgow's Darnley suburb



Source: The Research Team

It becomes abundantly clear that Darnley does not even get close to threshold values. It is one of the 'soft city' areas for which intensification would not be viable without considerable restructuring; due to the relatively tight packing of family house units on relatively small plots of land this is not possible. The net dwelling density is 20 units per hectare, also way below the threshold density of 43

dwellings per hectare. Due to the low population size and density it does not surprise that there are no local amenities and there is no public transport stop at the suburb. Table 4.01 presents measured values of the Darnley suburb in comparison with the sustainability tool's target values. Car ownership is over 90%, and more than 40% of households have more than one car. Over 96% of the family houses are owner-occupied and built on relatively small plots of land; intensification is therefore not an option. The population is very young: 30% of all people are aged 0-15 and only slightly more than 4% are aged 65 and over. The average household size is 2.9 persons, considerably above the Glasgow average of 2.1 persons (ibid., 2003). Due to these characteristics, the car suburb at Darnley is a prime example of a completely unsustainable but 'desirable' residential area. It will be interesting to note later in chapter 5 that the best practice cases of Rieselfeld and Vauban at Freiburg, Germany, have also a rather young population profiles and that Vauban has also a high but less extreme rate of owner-occupied dwellings; but rather similar to the research project both have taken the view to developing compact urban quarters, in complete contrast to Darnley.

Table 4.01 Built form, social and socio-economic characteristics of the Glasgow–Darnley Suburb in comparison with target values of a sustainable urban quarter (UQ)

Indicators	Glasgow–Darnley 2001 values	Target values for UQ at city edge location	Comments	
area ⁽¹⁾	27.6 ha	88 ha 100%	area is far too small	
population ⁽²⁾	total	1625, 100%	7,500, 100%	
	aged 0-15	29.7%	20.0%	9.7% above target
	aged 16-64	65.9%	64.0%	1.9% above target
	aged 65+	4.4%	16.0%	11.6% below target
households ⁽²⁾	total households	558, 100%	3571, 100%	
	av. household size	2.9 pph	2.1 pph	0.8% above target; young families with children
housing types ⁽²⁾	total dwellings	558, 100.0%	3571, 100%	
	detached	40.4%	68.0%	overwhelmingly owner-occupied 2 storey detached, terraced & semi-detached family housing; the suburb is socially exclusive
	semi-detached	46.5%	68.0%	
	terraced	11.4%	68.0%	
	purp.built flat	1.7%	32.0%	
other	0.0%	0.0%		
tenure ⁽²⁾	total dwellings	558, 100.0%	3571, 100%	overwhelmingly owner occupied; the suburb is socially exclusive
	owned	96.4%	49.0%	
	social rented	0.7%	39.0%	
	private rented	2.9%	7.0%	
	other	0.0%	5.0%	
car/van ownership of households ⁽²⁾	total households	558, 100.0%		92% of households own 1 or more cars; car dependent mobility due to lack of connection to public transport
	no car	7.9%		
	1 car	49.6%		
	2 cars	3		
net density ⁽²⁾	population density	58.9	89-141 ppha	very low population density
	dwelling density	20.2	42-67 dpha	very low dwelling density
SIMD ⁽³⁾	ranking 0-6505	3990 - 4660	3252	high ranking
	ranking 0-100%	61.3%–71.6%	50.0%	high socio-economic profile, 11.3-21.6% above Scottish average
property prices ⁽⁴⁾	G53 7 average	145,000 to 175,500	mixed price & rent levels to achieve social mix	1.4 to 1.6 times average Glasgow price; suburb is socially exclusive
	G53 7 highest	193,000		1.8 times average Glasgow price

Scales

ha hectare
% percentage of total
ppha persons per hectare
dpha dwellings per hectare
pphh persons per household
rank SIMD rank

Source

(1) GIS
(2) Census 2001 (GRO) Scotland
(3) Scottish Executive 2004
(4) www.nethouseprices.com

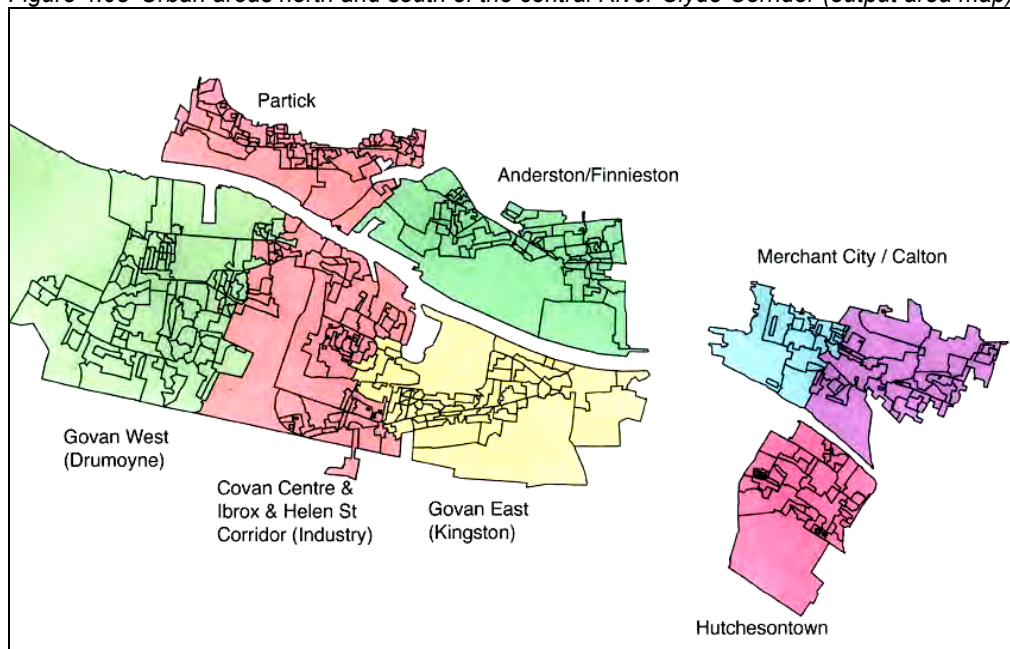
The existence of such relatively new housing areas that defy any sustainability objectives and targets shows the complete lack of understanding of our current planning system as to how to generate sustainable urban development, and a complete lack of control over private housing development. The fact that urban areas much closer to the city centre are in need of regeneration begs the

question why car suburbs with insufficient population size and density should be built at the very fringes of the city in the first place if as a result of the form and size of these developments there is no chance of access to, and no potential to sustain, local amenities and a public transport node in walking distance to people's homes.

4.2 The River Clyde Corridor between Glasgow City Centre and the Clyde Tunnel

The second investigation of urban areas in Glasgow focuses on the central stretch of the River Clyde corridor, selected on suggestion of the Glasgow City Council Department of Regeneration Services (DRS) (Figure 4.03). The development of the riverfront areas both north and south of the central section of the Clyde are part of a strategic plan to develop the river as central linear space of considerable importance. DRS is concerned that the large-scale flagship developments along that stretch of the Clyde are spatially and socially segregated from the existing urban areas immediately north and south of the new corridor development. The research team was encouraged to investigate how the existing communities could be linked to and benefit from the new development.

Figure 4.03 Urban areas north and south of the central River Clyde Corridor (output area map)



Source: The Research Team

A preliminary investigation of the key characteristics of the areas north and south of the river Clyde showed that in 2001 all northern areas (Partick, Anderston/Finnieston, the Merchant City and Calton) had relatively high densities, mixed use development and reasonably good socio-economic profiles and had seen a good deal of new projects. The areas would not require major regeneration. They offer a good range of local services and facilities and good access to public transport. A detailed investigation was therefore unnecessary.

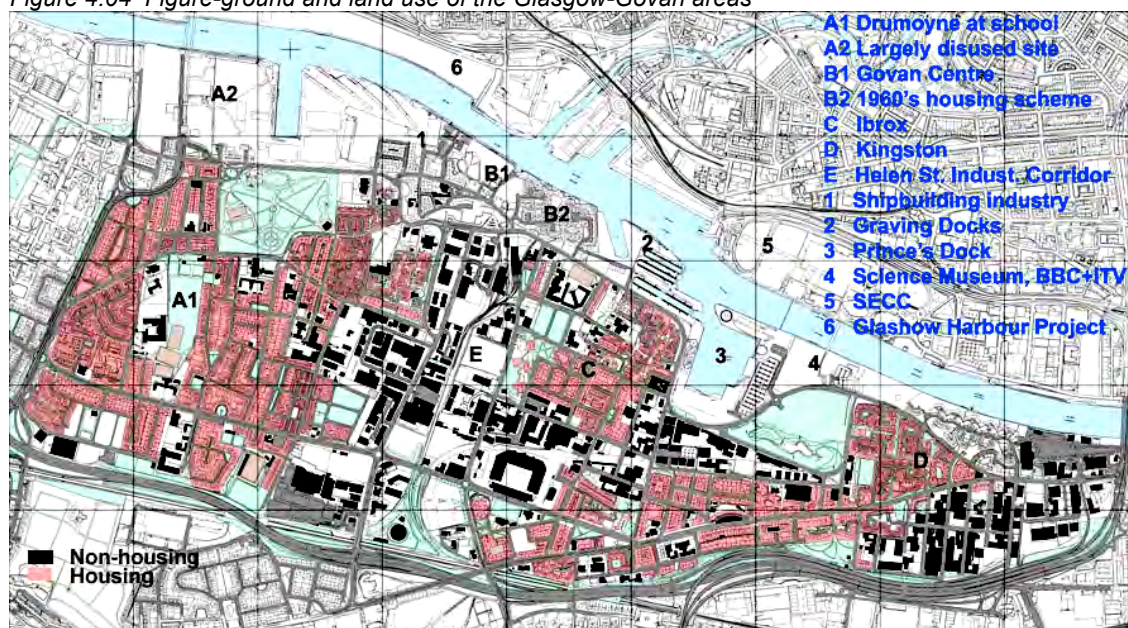
Of the areas south of the Clyde, Hutchesontown had undergone, over the last two decades, considerable change. Work started with the Crown Street Regeneration Project, was then successfully extended east and has now reached the Oatlands east of Hutchesontown. Again, densities are high, in the Crown Street Project around 105 dwellings per hectare. There are local services and facilities albeit not centrally located which causes access difficulties from areas east of Crown Street; the socio-economic profile of the population had much improved as the result of a high percentage of new housing with about 72 per cent owner-occupied flats and some family houses. A more detailed investigation was therefore unnecessary.

In contrast to Hutchesontown, the Govan area has until recently not seen any major redevelopment projects. Somehow in all the strategic thinking on the River Clyde Corridor as major central space of the city, Govan seems to have been forgotten or, more likely, avoided, although it flanks the predominant part of the southern stretch of the corridor just south of some of the most notable development projects like the SECC (Scottish Exhibition and Conference Centre), the new Transport Museum, and the Glasgow Harbour Development. Compared with these flagship projects, Govan's presence at the river is noticeable only for a few largely fragmented historical remnants and becomes more and more separated from the river through other flagship projects to the south of the river like the Science Museum, the new BBC and ITV headquarter area and, perhaps, soon also by the redevelopment of the Graving Docks. It seems that the city wants to hide Govan's most deprived urban areas. Even first impressions of Govan show that it is most urgently in need of urban regeneration. The project team's decision was therefore that the research project had to focus on the Govan areas in order to test its tool for the measurement of levels of sustainability and the development of regeneration programmes that promise to render urban areas more sustainable.

Preliminary investigation of the Govan areas

A first investigation of the built form of the Govan areas (Figure 4.04) showed a considerable incoherence of development and a very high percentage of the land used for industry that fragments the existing housing areas and potential neighbourhoods.

Figure 4.04 Figure-ground and land use of the Glasgow-Govan areas



Source: The Research Team

Of all areas, *Drumoyne* to the west (Figure 4.04 A1) shows the most continuous development of housing, but most of it at rather low densities. With 8,240 inhabitants in 2001, the population size is above the threshold value, but the total area (excluding the Southern General Hospital area) is with 157 ha almost twice as large as two best scenario neighbourhoods with 88 ha each, and this results in a net density of 39 dwellings per hectare which is way below the threshold value of 67 dwellings per hectare. There is reasonably good access to public transport in the northern part of the urban quarter where also most services and facilities are located, but for the southern parts access on foot is difficult. The centre of Drumoyne, where amenities would best be located to achieve even access, is a void: a large secondary school and oversized playing fields and a run-down park have little to offer the school and the local population. But the potential of this area to form a new neighbourhood centre is high. The most problematic characteristic of Drumoyne is the very high level of deprivation.

With the exception of the 1960s housing scheme immediately east of Govan Cross (Figure 4.04 B2), *Govan–Centre* (compare Figure 4.04 B1, B2) is an area of considerable historic and in small fragments architectural importance. It also acts as town centre and offers a shopping centre and small high street shops and many cultural and social amenities. There is good access to public transport (bus, underground). But with only 42-hectare housing land, the area is considerably short of the target value; the population below 4,000 is less than half of the target population. Industry to the south (in the Helen Street Industrial Corridor (Figure 4.04 E) and the river to the north prevent expansion of the area. Access and connectivity in east-west direction is good but rather poor in north-south direction; without a bridge at Govan Cross the river is a barrier. The most problematic characteristic of the centre is again the very high level of deprivation.

Ibrox to the east of the central north-south industrial corridor (compare Figure 4.04 C) has, like Drumoyne, an overall area of 158 hectare but only 56 ha are housing land, large enough, however to form one viable neighbourhood; the rest of the area is used by industry and the Ibrox Park complex. For an urban quarter in an intermediate location the population of 7,140 in 2001 (ibid., 2003) was slightly below the threshold value. Services and facilities exist but are dispersed into a number of locations and this causes access to be uneven. Development density of the housing land is reasonably high and there is a potential of replacing some poor quality housing with new build. Access to public transport is reasonable but it could be improved by rerouting the existing bus route to link all existing and potential community centres across the industrial corridor. The deprivation level of Ibrox is again very high.

Of all Govan areas *Kingston*, the eastern part of Govan, has the most coherent urban form (compare Figure 4.04 D), the highest densities and the best socio-economic profile. It also has good amenities and public transport (bus, underground) despite a rather small population size of just above 4,400. Much of the area is again taken up by industrial uses and this make population increase impossible without large-scale displacement of industry, which forms a buffer between the motorway and the mixed-use community area.

Relationship of Govan with new river front development

Figure 4.04 also shows that much of the river front area west of Govan Centre is industrial (1) or disused industrial land (A2) the latter of which has a considerable potential for new mixed use development. Except for the 1960s housing estate immediately east of Govan Centre (B2), the river front areas further east are already or being developed – like the area east of Prince’s Dock (3) with the Science Museum, the BBC and ITV Television headquarters, new executive housing and a new bridge across the Clyde (4) – or is earmarked for development – like the Graving Docks (2) west of Prince’s Dock (3) for which a high-density housing scheme has been proposed. It seems a pity that, with the exception of the Govan Centre area (B1) for which a master plan has been developed, the potential reuse of other river front areas to the west of the Graving Docks and just opposite the Glasgow Harbour Development (6) is not yet explored (Figure 4.05).

Against this kind of high-density urban form of executive housing and high-tech architecture, the Govan area’s urban fabric and riverfront development just across the Clyde looks dated and low key (Figure 4.06). Urban regeneration of the Govan areas has to attempt to make new development look and function like being part of the river corridor.

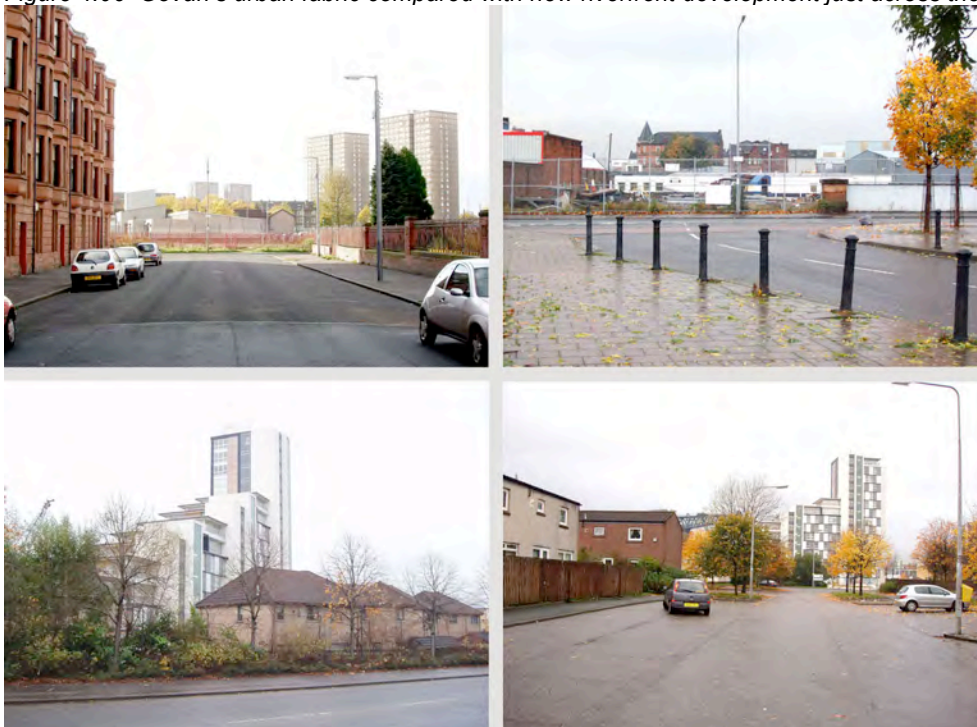
Figure 4.05 Prime development projects north and east the Govan area



Glasgow Harbour Development
Source: Author

Glasgow SECC & pedestrian bridge

Figure 4.06 Govan's urban fabric compared with new riverfront development just across the Clyde



Top left: Typical housing mix in Govan. Top right: River front area of Govan with low-key industry.
Bottom left and right: Low-key housing close to Govan's riverfront & new executive housing at the Clyde.
Source: Author

The lack of permeability and connectivity of the Govan area

The investigation of the road network in Govan (Figure 4.07) also shows that its central area and specifically the Helen Street Industrial Corridor has a fragmented street network to a degree that the areas west and east of the Corridor are completely separated except for east-west roads north and south at a distance of around 1,000m. The industry has become an impermeable barrier, and it needs to be investigated how this barrier can be bridged. Also obvious is the lack of pedestrian and vehicular links from the central and western areas of Govan to areas north of the River Clyde, specifically between Govan Cross and Partick Cross. There used to be a ferry link between these historically important areas but it was closed down. This contributes to the physical isolation of Govan and to the socio-economic divide of the well-to-do north and the marginalised south of the river. If Govan is to become a part of what was called the 'hard (connected) city', it has to be reconnected to other parts of Glasgow. Furthermore, Govan requires more than just to be regenerated into a number of sustainable urban quarters. In order to be on a par with the flagship

development along the Clyde, Govan's waterfront has to have the equivalent socio-economic profile and its urban fabric has to be scaled to fit the dimensions of the river space that, with the exception of Govan Centre, should maintain the scale of one of Glasgow's most important historic 'towns'. For these reasons it is vital to investigate the Govan areas in considerable detail. To establish the connectivity of the 'hard city' requires: first that all Govan community areas are linked to one another by roads and by public transport, ideally connecting all central areas of the communities; secondly that all Govan community areas are connected to the surrounding community areas as specified earlier in Figure 4.03. A concept of such road and public transport links needs to overcome two barriers in particular: the River Clyde and the Helen Street Industrial Corridor (Figure 4.08).

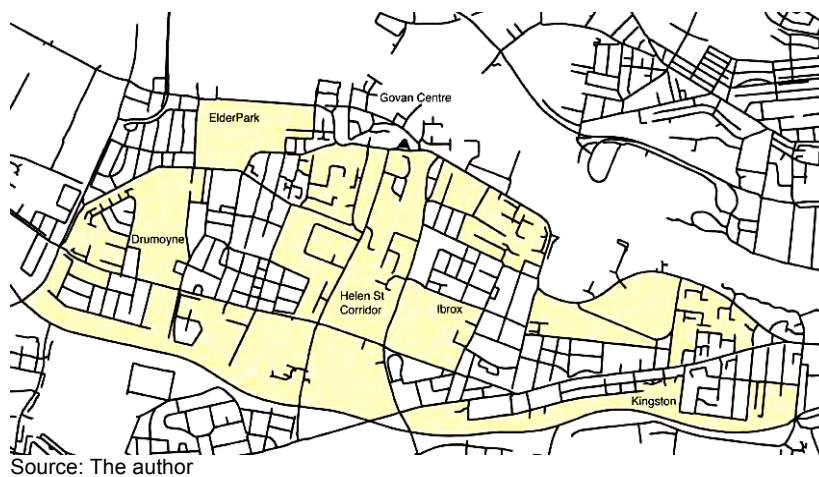
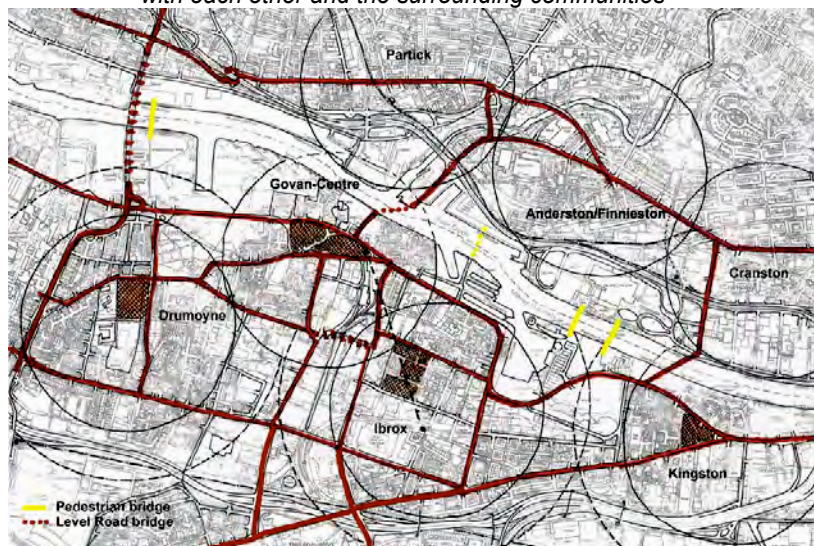


Figure 4.07 Greater Govan road map: fragmentation and disconnection of urban fabric

Source: The author

Figure 4.08 Conceptual sketch of a road and public transport network linking the Govan communities with each other and the surrounding communities



Source: The author

The conceptual sketch for direct linkages of all Govan communities introduces a road across the Helen Street Industrial Corridor between Drumoyne and Ibrox to connect the core areas of these two communities. This road will have to be bridged over the railway line that is still in use to test the Glasgow Underground carriages. Regarding links from Govan to the surrounding areas specifically north of the Clyde, a new bridge has already been built between Broomielaw to the south of Anderston/Finnieston and Kingston to connect the Science Museum and the new BBC and ITV headquarters east of Prince's Dock (area 4 of Figure 4.04) to the city centre. A further bridge

between Govan-Centre and Partick/Yorkhill has been debated for decades but was never built. This link is essential for Govan as a whole, but specifically for Govan-Centre to be connected to Glasgow's west end and to reconnect the cultural facilities both north and south of the river. The Clyde Tunnel links Drumoyne to the areas north of the Clyde, but this link is not suitable for pedestrians. An additional pedestrian bridge would help connecting potentially new riverfront development at Drumoyne North to the Glasgow Harbour Development scheme. This will be investigated as part of the Drumoyne regeneration programme in the following section.

4.3 The detailed investigation of the Govan-Drumoyne area

Overall, the preliminary investigation of Govan shows, that with regard to threshold and target values, there are serious problems that require more detailed investigation. Therefore all areas of Govan were surveyed, generating secondary data by using Mapinfo, the Valuation Roll, Census statistics, ArcGIS, and information provided by the Glasgow City Council DRS. Additional primary data on housing conditions, the quality of services and facilities and their location and catchment populations, were collected in a number of site visits. The data was collated in built form, social and socio-economic characteristics sheets. It is not possible to include all this material in this summary report; therefore the Govan-Drumoyne area stands as example and its investigation is presented in detail. The characteristics of Govan-Centre, Govan-Ibrox and Govan-Kingston are summarised. Nonetheless, for the reader to be able to understand the interconnection between the regeneration programmes the remodelling of all four areas is illustrated.

Govan-Drumoyne: investigation of its current urban form, social and socio-economic characteristics and the available regeneration options

The Govan area is virtually an island located south of the River Clyde, its northern edge, and delineated by the motorway M8 to the east and south and the Moss Road, an expressway from the Clyde Tunnel to the M8 (compare Figures 4.03 and 4.04). Apart from the Clyde Tunnel, the connections across the river are limited to a pedestrian bridge between the Science Museum area and the SECC (Figure 4.04, 4 & 5) and a new road bridge connecting Finnieston to the BBC/ITV area (figure 4.04, 4).

Regarding the location of Govan in the city, all its areas can be classified as being in an intermediate location between core and edge of the city. Therefore a population of 9,000 for an urban quarter at Govan seems to be the appropriate target. However, Drumoyne's overall area of about 157 hectare is 69 ha above one best scenario urban quarter (88 ha) but only about 20 hectare short of two best scenario urban quarters (176 ha) and that makes a population target of 9,000 appear insignificant. A rough calculation indicates that with a gross population density of 85 persons per hectare, the target for an urban quarter in intermediate location, the population ought to be over 13,300. It can be assumed with some certainty already at this stage that with its large area and an insufficient population size Drumoyne's density values will be below threshold, i.e. unacceptably low; this may lead to the conclusion that the area is not suitable for regeneration (Table 4.02a). It can also be assumed that with the skewed relationship between area and current population, social and economic targets are completely out of reach; it would already surprise to see threshold socio-economic targets being met. Table 4.02a summarises the effect of the size of the area, the current population of 8,240 and the impact of a fictive increase of the population to 9,000.

Table 4.02a Govan–Drumoyne: key built form, social & socio-economic characteristics – comparing the impact of current and modestly raised population values for 1 urban quarter

(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South. General. Hospital.)

Indicators	Curr. popul. of 8,240	Popul. raised to 9,000	Target, average & threshold values	Comments / regeneration options	
total area ⁽¹⁾	156.57 ha 100%	156.57 ha 100%	target value average value threshold value	88 ha 113 ha 140 ha	The existing area is 16.57 ha larger than the threshold value.
housing land ⁽¹⁾ (target: 60% of total area) ⁽⁴⁾	104.12 ha 66.5%	104.12 ha 66.5%	target value average value threshold	53 ha 68 ha 84 ha	The housing land is 20 ha larger than threshold value.
population	8,240	9,000	at edge location at intermed. loc. at centre location	7,500 9,000 10,500	The current population is 740 people larger than the edge location target; raised to 9,000 it meets the intermediate location target, as it should.
total households / dwellings ⁽²⁾	4,076 at 2.02 pphh	4,438 at 2.03 pphh	at 2.10 pphh at 2.02 pphh	4,286 4,455	The current household number is below the target at 2.1 pphh; when raised to accommodate 9,000 people it falls between the 2.10 and 2.02 pphh values.
gross population density ⁽²⁾	52.6 gppha	57.5 gppha	target value average value threshold value	85 gppha 66 gppha 54 gppha	The current gross population is below threshold value but just supersedes it at a population of 9,000.
net population density	79.1 nppha	86.4 nppha	target average threshold value	141 nppha 110 nppha 90 nppha	The current net population density is considerably below threshold, but gets closer at a popul. of 9,000.
net dwelling density	39.2 ndpha	41.2 ndpha	target value average value threshold value	67 ndpha 52 ndpha 42 ndpha	The net dwelling density is below threshold even with population raised to 9,000.
dwelling types: • family houses • flats	34.8% 65.2%	40.1% 59.9%	target values • fam. homes • flats	56.0% 44.0%	The population rise to 9,000 will not meet the target profile.
popul. age profile • age 0-15 • age 16-64 • age 65+	19.4% 20.8% 59.8%		age 0-15 20% age 16-64 64% age 65+ 16%		To balance the profile would require 1,030 add. people aged 0-15 and 16-64. With only 670 add. people the existing profile cannot be balanced.
% of households per tenure type	existing profile own.-occ. social-rented private-rented + other	42.7% 50.5% 6.8%	target owner-occupied target social-rented target private-rented + others	49% 39% 12%	The current social-rented dwellings are over target by 390. With only 210 to 380 additional households the target remains unachievable.
qualifications	existing profile none: grade 1: grade 2: grade 3: grade 4:	50.1% 24.7% 10.6% 1.0% 13.6%	target profile none: grade 1: grade 2: grade 3: grade 4:	34.5% 24.7% 15.0% 6.6% 19.1%	To balance the qualification profile would require a reduction of those with no qualification by 220 and 980 add. people with grades 1 to 4. With only 740 add. people, the existing profile cannot be balanced.
economically active / inactive	existing profile active inactive	52.1% 47.9%	threshold profile active inactive target profile active inactive	55% 45% 65% 35%	The existing profile is close to the threshold profile. To achieve the target for econ. active would need an increase by 1,130 economically active people. With only 740 add. people, the existing profile cannot be balanced.
Scales	ppha	persons per hectare	nppha	net persons per hectare	
	gppha	gross persons per hectare	ndpha	net dwellings per hectare	

Table 4.02a shows that with its current population Drumoyne fails to meet all key built form threshold values and all social and economic profiles. With the population modestly increased to 9,000, Drumoyne's built form characteristics get close to but are still below the thresholds values and

all social and socio-economic target profiles are unachievable. This scenario is therefore hardly worth pursuing as it does not generate a commendable improvement of Drumoyne's conditions. Table 4.02b assesses Drumoyne's environmental quality and the distance to key amenities. The analysis shows that the quality of housing in the area is poor to good, and that of the design of open spaces and parks is poor, but there seem to be no structural problems. The study of the walking time from people's homes to some of the key facilities confirms that accessibility is considerably uneven. This problem is also highlighted graphically in Figure 4.09 which indicates that overall there is a sufficient range of services and facilities, but many of them are in unsuitable locations. Of all urban areas in Govan, only Govan–Centre and Kingston have services and facilities largely located at a central place and therefore easily accessible from people's homes. In Drumoyne most amenities are located to the north along Govan Road, the old high street linking with Govan–Centre, and on the north-eastern edge of the southern area. Access from within is therefore overall, poor to very poor. The recommendation for Drumoyne (as well as for Ibrox) is, therefore, that all services and facilities should be relocated to a new central community space, as then all parts of the urban quarter would have similar distances to amenities.

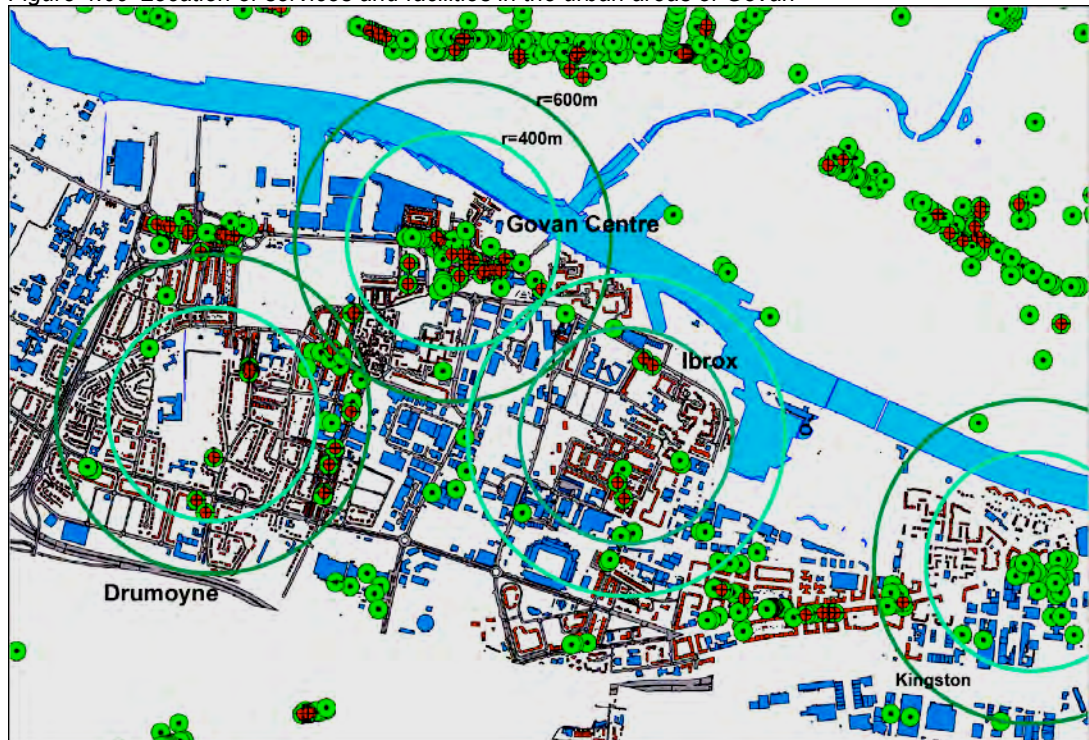
Table 4.02b Govan–Drumoyne: built form characteristics – current accessibility, environmental quality and connectivity

(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South.Gen.Hospital)

		Value	Scores	
access on foot to local services / facilities in minutes	access to general practitioner ⁽¹⁾	17.5 min.	v.poor	There are all required local services and facilities; they are, however, scattered all over the area except for older and rather poor quality shops in Govan Road many of which are closed. Access is therefore poor to very poor except for primary schools. Action required: <ul style="list-style-type: none"> generating a new core area in central location of Drumoyne (east of the secondary school) and relocate all existing services and facilities to the new core to improve local access and generate a focal point; upgrading and revitalising the old high street at the north of Drumoyne (Govan Road), and improving the quality of the local amenities.
	access to post office ⁽¹⁾	12.0 min.	poor	
	access to primary school ⁽¹⁾	10.0 min.	good	
	access to supermarket ⁽¹⁾	17.0 min.	v.poor	
	average time for GP, PO, PS, SM	14.0 min.	poor	
	access to community centre/park ⁽²⁾	–	poor	
	access to public transport ⁽²⁾	–	poor	
	total average		poor to very poor	
environ. and built form quality	quality of urban design and connectivity		poor to very poor	The modest redevelopment of Drumoyne offers an opportunity to improve the design quality of the area up to and including Govan Road. Recommendations: <ul style="list-style-type: none"> forming a well-designed north-south boulevard to link Drumoyne–South with Govan Road; developing the new core area and the boulevard to become attractive mixed-use communal spaces.
	quality of housing		poor to good	
	quality of open space / landscaping		poor	
	quality of community parks (excluding Elder Park as district facility)		mostly poor	
connectivity	inside, between and beyond Drumoyne's urban quarters		poor to good	Recommendations: <ul style="list-style-type: none"> generating a permeable street pattern (no cul-de-sacs, all streets connected) to connect all areas of Drumoyne to the new boulevard and core area; improving the link between the core area to Govan Centre and Ibrox (compare Figure 4.08).

Sources (1) 2001 Census GRO (Scotland), converted from driving time
(2) Local survey, average walking time estimated

Figure 4.09 Location of services and facilities in the urban areas of Govan



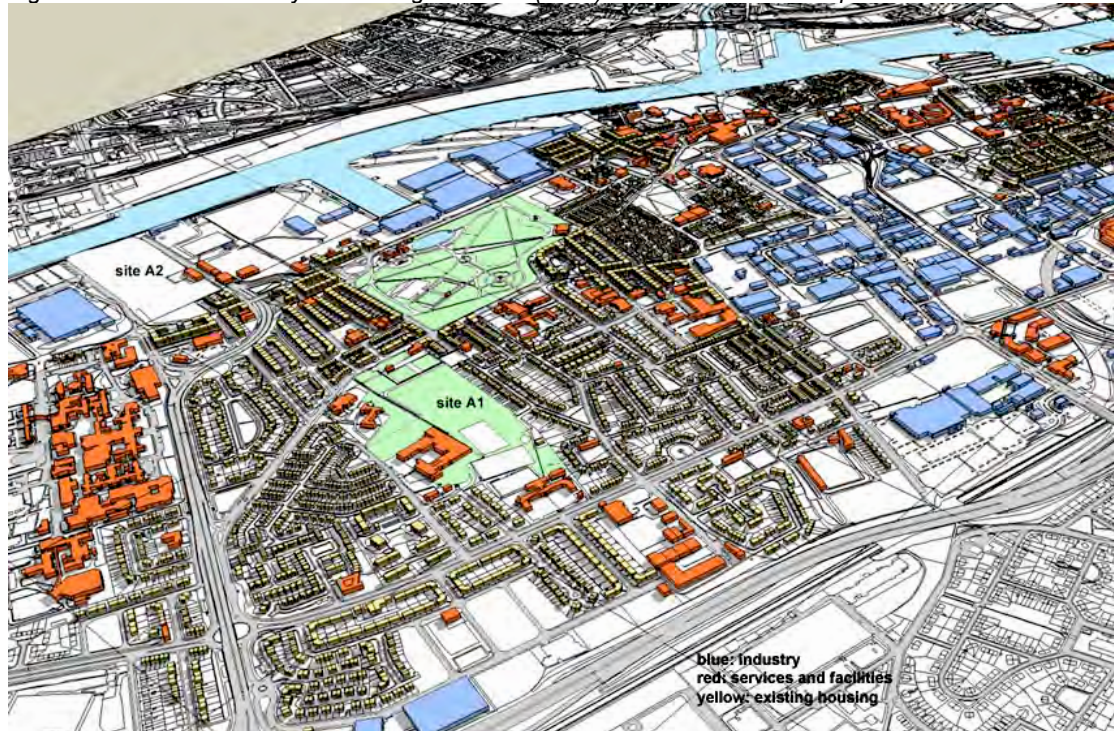
Source: The Research Team

The conclusion that can be drawn from the analysis of Drumoyne's existing conditions is that a modest increase of its population to 9,000 raises the key built form values close to the threshold but achieves virtually no improvement of the social and socio-economic values, which remain below the recommended profiles. Efforts are therefore made to find the best possible ways of dealing with the Drumoyne area.

- The first option investigated is a modest **one-urban-quarter scenario** in which Drumoyne's current population is increased considerably beyond the 9,000 already investigated in order to surpass the recommended built form threshold values, perhaps even meet the average values, and to improve the social and socio-economic profiles of the area. This scenario involves the development of site A1 as shown in Figure 4.10. It is likely, however, that the level of sustainability potentially achievable by this regeneration option is at best average.
- The second option investigated is a more extensive **two-urban-quarters scenario** in which the extension of both Drumoyne's area and population is investigated in order to achieve two urban quarters meeting all key target values. This scenario involves the development of site A2 as shown in Figure 4.10. It is obvious that the required population and dwelling increases have to be considerable, but it can be expected that the level of sustainability potentially achievable by this regeneration option is rather high.

These options are developed in such a way that the *one-urban-quarter* scenario, the implementation of which would take a good number of years, will stand as first stage of the *two-urban-quarters* scenario that may or may not be viable pending future socio-economic conditions. There is recognition that the first scenario overlaps considerably with the second and – due to the uneven land resources for both as the first urban quarter covers virtually all currently available land – will have to take on a share of the second scenario in terms of population and dwelling density.

Figure 4.10 Govan-Drumoyne: existing condition (2006) with additional development site A1 and site A2



Source: The Research Team

Investigation of the modest 'one-urban-quarter' regeneration scenario for Govan-Drumoyne

The first investigation attempts a modest regeneration of Drumoyne without any major restructuring of the area and without major replacement of old urban fabric by new build. The main objectives of the 'one-urban-quarter' scenario are made explicit in Table 4.03:

- To increase the overall population in order to achieve for the urban form, social and socio-economic characteristics at least threshold, at best average values. Figure 4.11 outlines the 'one-urban-quarter' scenario and shows the considerable dimension of that urban quarter – the plan includes a 500 metre grid – that will inevitably cause some problems with excessive distances between edge and core area where the services and facilities are supposed to be located. How bad accessibility is has to be investigated.
- The population increase is partially achievable through the development of disused sites and plots and the refurbishment of unoccupied housing units or, more likely, their replacement by new build.
- A further more substantial increase of the population is achievable through forming a new mixed use centre for the urban quarter at the central open space (site 4 of Figure 4.04) to accommodate, next to additional housing, all already existing key services and facilities – except those at Govan Road to the north – that are currently located at the periphery. This should improve the accessibility of amenities from all parts of the urban quarter and generate a focal point.

Figure 4.11 Govan–Drumoyne: diagrammatic outline of the ‘one–urban–quarter’ scenario



Source: The Research Team

Table 4.03 shows the current population and the total number of dwellings and attempts to increase the population close to 10,500 and the number of dwellings to over 5,000.

Table 4.03 Govan–Drumoyne: built form characteristics – further increase of area, population and dwelling numbers for the one–urban–quarter scenario

(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South.Gen.Hospital)

Indicators	Population		Dwellings			Comments / regeneration options
	addition	sum	new	hh size	sum	
Existing values		8,240⁽²⁾		2.02 pphh	4,307	231 unoccupied dwellings (interwar stock) to be demolished
Replacing unoccupied dwellings	+485	8,740	–/+231	2.1 pphh ⁽³⁾	4,307	Replacement of 231 unoccupied dwellings by new units.
Developing disused and underused plots	+275	9,000	+131	2.1 pphh ⁽³⁾	4,438	Developing disused / underused plots to increase population to 9,000, the target value for urban quarters at intermediate location.
Developing part of the open space at the central school to form a new mixed-use and imageable centre of the urban quarter with all amenities at a central community square/park	+1,470	10,470	+700	2.04 pphh	5,138	Of the disused Pirie Park (9.27 ha ⁽¹⁾) 60% is housing land; half of the 40% mixed use land houses services & facilities on ground level and flats above; this raises the housing land to 7.42 ha to be developed at 94 ndpha, the core density of an urban quarter at intermediate location.
TOTAL		10,470		2.04 pphh	5,138	Increase: +2,230 people, +1,062 dwellings (incl. 231 replacements)
Sources	(1)	ArchGIS value		Scales	hh	household
	(2)	Census 2001 GRO (Scotland)			pphh	persons per household
	(3)	Average Glasgow household size of 2.1 persons				

Of the current housing stock of 4,307 residential units, 231 units, all in seriously dilapidated interwar tenement blocks, are unoccupied and most likely already listed for demolished. The 231 replacement units would house an additional 485 people and thus raise the total population to 8,740. Further 130 dwellings are likely to be attainable by developing gap sites and disused or underused plots of land or buildings. This would raise the population to 9,000 and the number of housing units to around 4,440. A further increase of population and dwellings is achievable by

developing part of the central open space (Figure 4.04 A1). The size of the area that can be developed is 9.27 ha, 60% or 5.56 ha of which is the housing land and 40% or 3.71 ha the mixed use land. Of the latter, 50% are needed for infrastructure and open spaces, 50% to accommodate services and facilities. If housing would be built above the services and facilities as in the traditional high streets, the 'on ground' and 'above ground' housing land would have a size of 7.42 ha. Developing 7.42 ha at a net dwelling density of 94 dwellings per hectare, the target value for the core area of an urban quarter at intermediate location, would result in 700 more housing units accommodating about 1,470 people. This would raise the total population of the 'one-urban-quarter' scenario to 10,470 and the total number of dwellings to around 5,140.

For this scenario, Drumoyne's potentially achievable built form, social and economic values are established. Table 4.04a shows the area, land use, population and dwelling densities and the dwelling type profile for the one-urban-quarter scenario resulting from the population increase as outlined in Table 4.03.

Table 4.04a Govan–Drumoyne: built form characteristics – area, land use, density, dwelling types, and regeneration options for the one–urban–quarter scenario
(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South.Gen.Hospital)

Indicators		Existing / proposed values		Target, average & threshold values		Comments / regeneration options
total area⁽¹⁾		156.57ha		for 1 urban quarter: (1) target 88 ha (2) average 113 ha (3) threshold 140 ha		The existing total area is way above the threshold value for 1 urban quarter. As the area cannot be reduced, an attempt is made to increase the population beyond 9,000.
land use⁽¹⁾	total land	156.57 ha	100%	1) 88 ha	100.0%	The existing land use profile considerably diverges from the suggested profile. Excluding more extensive restructuring, an increase of the total population may help achieve at least threshold values.
	housing land	104.12 ha	66.5%	1) 53 ha	60.0% ⁽⁴⁾	
	increase by mixed-use land	52.45 ha	33.5%	3) 84 ha	35 ha 40.0% ⁽⁴⁾	
current population		8,240		target for 1 urban quarter: at edge location 7,500 at interim loc. 9,000 at centre loc. 10,500		To raise Drumoyne's social and economic profile, an increase of its population to around 10,500 is vital. The required action is outlined in Table 4.03. This population size gets close to the target for an urban quarter at central location, but Drumoyne-South has to compensate for the much smaller area available for the Drumoyne-North development, should it become viable.
total achievable population		10,470				
average household size		2.02 pphh (Drumoyne average)		2.1 pphh⁽³⁾ (Glasgow average)		The existing household size is slightly below the target and may modify to 2.04 pphh only.
total households / dwellings⁽²⁾		5,138 @ 2.04 pphh		for a popul. of 10,500 5,000 @ 2.10 pphh⁽³⁾ 5,150 @ 2.04 pphh⁽³⁾		The potential total number of households and dwellings is very close to the target at 2.04 pphh and above target at 2.1 pphh.
gross population density⁽²⁾ (on total land)		for a pop. of 10,470 66.9 gppha		1) target 85 gppha 2) average 66 gppha 3) thresh. 54 gppha		The projected gross population density slightly exceeds the average value; this is a considerable improvement.
net pop. density	pop. 10,470	100.6 nppha		1) target 141 nppha 2) average 110 nppha 3) thresh. 90 nppha		The projected net population density is well above the threshold, the important net dwelling density is close to the average value; this too is a considerable improvement in comparison to the version with a population rise to 9,000 only.
net dwell. density	dwell. 5,138	49.3 ndpha		1) target 67 ndpha 2) average 52 ndpha 3) thresh. 42 ndpha		
dwell. types⁽²⁾	total dwell.	5,138	100%	5,150	100.0%	Assuming that all 1,062 additional housing units (including the 231 replacement dwellings) are family units, the % of family houses is about 8% below target and this is a respectable improvement.
	fam. houses	2,480	48.3%	2,884	56.0%	
	flats & other	2,658	51.7%	2,266	44.0%	

Sources	(1) ArchGIS value	Scales	ha	hectare
	(2) Census 2001 GRO (Scotland)		gppha	gross persons per hectare
	(3) Average Glasgow household size of 2.1 persons		gdpha	gross dwellings per hectare
	(4) Research team proposal		nppha	net persons per hectare
			ndpha	net dwellings per hectare
			pphh	persons per household

The population and dwelling increase results in the gross population density now slightly exceeding the recommended average value. The projected net population density is now well above the threshold value, the more important net dwelling density gets close to the recommended average value. These improvements of the built form are respectable. The resulting dwelling type profile does not meet the target profile, but the number of family units is only 8% below target. This too is a considerable improvement.

Table 4.04b assesses Drumoyne’s environmental quality and the distance to local key amenities. The study of the walking time from people’s homes to the assumed centrally located facilities shows that the large area still results in distances in the fringe areas of the urban quarter larger than the threshold value; but these distances cannot be corrected without unacceptably large restructuring of the existing urban fabric. However, for about 70% of the area the distances meet target and average walking distance values and this is likely to increase local support of the central amenities.

Table 4.04b Govan–Drumoyne: improved built form characteristics – accessibility, environmental quality and connectivity of the one–urban–quarter scenario with a population of 10,470
(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South Gen.Hospital)

	Indicators		Existing Values		Targets & Regeneration Programme
	area in ha	% of total	distance to walk	score	
access on foot to local services / facilities in m distance	88.0 ha (inner area)	56.2%	0 – 530m	very good (target)	Assuming that all required local services and facilities are located in a centrally located area, the distances vary from almost nothing to 710m: <ul style="list-style-type: none"> • 56.2% of the total area meets the target value of a maximum walking distance of 530 m. • 14.0% of the total area meets the average value of a walking distance between >530 and 600m; • 19.2% of the total area meets the threshold value of a walking distance between >600 and 670m. • 10.6% of the total area, the outer fringes of the urban quarter have walking distances above the threshold value but the area, and with it the distances, cannot be reduced.
	22.0 ha (intermediate area)	14.0%	530 - 600m	good (average)	
	30 ha (outer area)	19.2%	600 - 670m	poor (threshold)	
	16.6 ha (fringe area)	10.6%	670 - 710m	very poor (above threshold)	
	156.6 ha	100%		good (slightly above average)	
environm. and built form quality	quality of urban design and connectivity				The environmental quality depends on design carried out on the basis of these recommendations: <ul style="list-style-type: none"> • forming a well-designed north-south boulevard to link Drumoyne–South with Govan Road; • developing the new core area and the boulevard to become attractive mixed-use communal spaces. Design recommendations: <ul style="list-style-type: none"> • improving the design quality of housing and public spaces, especially local parks and the new north-south boulevard; • new housing around the new core area should be of high quality design and landscaping.
	quality of housing				
	quality of open space / landscaping				
	quality of community parks (excluding Elder Park as district facility)				
connectivity	inside, between and beyond Drumoyne’s urban quarters				Design recommendations: <ul style="list-style-type: none"> • generating a permeable street pattern (no cul-de-sacs, all streets connected) to connect all areas of Drumoyne to the new boulevard and core area; • improving the link between the core area to Govan Centre and Ibrox (compare Figure 4.08).

Without a design scheme, the assessment of the improvement of the built form and the environmental quality is not possible; therefore design recommendations are formulated that should raise the quality of the urban fabric and the public spaces.

Table 4.05 presents the social profile of Drumoyne, and this is now the testing ground for this regeneration scenario. To achieve one urban quarter with a population of about 10,500 requires an increase of the housing stock to roughly 5,140 units. To achieve the tenure targets requires increases of about 780 owner-occupied and 340 private-rented dwellings units, i.e. a total number of 1,120 additional dwellings. The achievable number of dwellings is about 1,060, around 60 short of the target. The social-rented units are 56 units over target. If these surplus social housing units could be converted into owner-occupied and/or private rented units, the target profile could be met in full.

Table 4.05 Govan–Drumoyne: social characteristics and regeneration options for the one–urban–quarter scenario with a population of 10,470

(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South Gen.Hospital)

		Existing/proposed Values		Target Values ⁽⁶⁾		Regeneration tasks to balance the social profiles
		no/rank	%	proposed values	target %	
population age profile ⁽²⁾	total population	8,240	100%	10,470	100%	To achieve the target value profile requires <ul style="list-style-type: none"> • 497 add. people age 0-15 • 1,772 add. people age 16-64 With 2,230 additional people of these age groups the achievable profile is 40 people short of the target profile.
	aged 0-15	1,598	19.4%	2,095	20%	
	aged 16-64	4,928	59.8%	6,700	64%	
	aged 65+	1,714	20.8%	1,675	16%	
% of households / dwellings per tenure type ⁽²⁾	total dwellings	4,076	100%	5,138	100%	To achieve the targets requires <ul style="list-style-type: none"> • 778 add. owner-occupied units, all upper-market level, • 339 add. private-rented units The social-rented dwellings are over target by 56 units. With 1,058 additional dwellings the achievable profile 59 dwellings short of the target profile.
	owner occupied	1,740	42.7%	2,518	49%	
	upper marked	E 311	0.0%	1,490	29%	
	affordable	E 1,429	42.7%	1,028	20%	
	social rented	2,060	50.5%	2,004	39%	
private rented & other	277	6.8%	616	12%		
% of household / dwelling sizes ⁽²⁾	total households	4,076	100%	5,138	100%	To achieve the target requires <ul style="list-style-type: none"> • 340 add. 1-person dwellings • 334 add. 2-person dwellings • 178 add. 3-person dwellings • 154 add. 4-person dwellings • 56 add. 5+ person dwellings With 1,062 add. units these targets can be fully met.
	1 person	1,818	44.6%	2,158	42.0%	
	2 persons	1,182	29.0%	1,516	29.5%	
	3 persons	567	13.9%	745	14.5%	
	4 persons	334	8.2%	488	9.5%	
	5+ persons	175	4.3%	231	4.5%	
qualifications ⁽²⁾ all aged 16-74	all aged 16-74 (72.9% of tot.pop.)	6,006	100%	E 7,633	100%	To achieve the target requires <ul style="list-style-type: none"> • a reduction of 376 people with no qualification • 402 more with grade 1 • 508 more with grade 2 • 444 more with grade 3 • 649 more with grade 4 With 1,627 additional people of that age group there is a shortage of 376 people to achieve the target profile. If 376 of the existing group with no qualification could achieve at least grade 1 the result would be closer to the target profile (Scottish average).
	no qualification	3,009	50.1%	2,633	34.5%	
	O/Standard Grade (grade 1)	1,483	24.7%	1,885	24.7%	
	Higher Grade (grade 2)	637	10.6%	1,145	15.0%	
	HND,HNC,RSA (grade 3)	60	1.0%	504	6.6%	
	First/Higher Degree (grade 4)	817	13.6%	1,466	19.2%	
SIMD ^(1,2) overall rank of 1222 Wards	68		(a)	(b)	The overall level of deprivation in the area is very high and is supported by evidence of poor education, health and income. Regeneration should offer education and training to reduce deprivation levels. Then the population increase to 10,470 might be sufficient to get closer to the target qualification profile.	
SIMD ^(1,2) rank of Education domain	106		thresh. value:	target value:		
SIMD ^(1,2) rank of Health domain	27		305	611		
SIMD ^(1,2) rank of Income domain	82					
% of population with LTI ^(2,4)		32.4%	(a)	(b)		
% of population income deprived ^(2,5)		38.8%	thresh. values	target values		
% of persons in working age claiming benefits ^(2,5)		42.0%				

Sources (1) SIMD (Scottish Index of Multiple Deprivation) rank out of 1222 Wards (5) Scottish Executive 2004
 (2) Census 2001 GRO (Scotland) (a) Glasgow average 2001
 (4) Long Term Illness (b) Scotland average 2001
 E Estimate

Table 4.05 indicates furthermore that the required modification of dwellings for 1 to 5+ person households seems to be possible through the increase of residential accommodation by about 1,060 units. To achieve the target age profile is more difficult; the population increase by 2,230 people is 40 people short of the target profile. It is well understood that the exact number of people in specific age brackets cannot simply be selected; these people need to be attracted by the appropriate dwelling types and sizes and the suitable mix of tenure types and local amenities. The same goes for the achievement of the target profile of qualifications; people cannot simply be filtered out to meet requirements. Again the right quality and mixture of dwelling and tenure types and the appropriate local amenities need to be on offer to attract people with higher educational achievements and higher income levels to Drumoyne. This in turn helps to produce a more balanced socio-economic mix and to reduce the high levels of deprivation in the urban quarter. Overall, the 'one-urban-quarter' scenario seems to be able to achieve a considerable improvement of the socio-economic profiles of Drumoyne's population closer to the target profiles.

Table 4.06 Govan-Drumoyne: socio-economic characteristics and regeneration options for the 'one-urban-quarter' scenario with a population of 10,470

(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South.Gen.Hospital)

Indicators		Existing Values		Research values		Explanations
		no/rank	%	no/rank	%	
economy	all people aged 16-74, 72.9% of total population	6,006	100%	E 7,633 (a) ⁽²⁾ threshold	100% (b) ⁽²⁾ target	The percentage of the economically active is well below the Scottish average, considered to be the target, and below the Glasgow average, considered to be the threshold value. To achieve the threshold of the economically active would require an increase of <ul style="list-style-type: none"> 1,069 economically active people which is easily achievable with an increase of that population group by 1,627 To achieve the target for the economically active would require an increase of <ul style="list-style-type: none"> 1,659 economically active people, a figure close to the target value (- 32 people) and achievable if 2% of those in working age and currently economically inactive get back to work after training and/or education courses.
	all economically active	3,129	52.1%	55% 4,198	65% 4,788	
	all economically inactive	2,877	47.9%	45% 3,434	35% 2,578	
SIMD rank income domain ^(1,2)		82		(a) ⁽¹⁾ threshold value 305	(b) ⁽¹⁾ target value 611	Very low income and employment ranks. Attracting economically active people with higher educational achievements (grades 3 and 4) would help improving the SIMD ranks. Training and education packages are needed for those not economically active. But overall, the targeted raise of the population is close to achieving the target.
SIMD rank employment ^(1,2)		13				
car/van ownership per household ⁽²⁾	total households	4,076	100%	(a) ⁽²⁾	(b) ⁽²⁾	The low car ownership in the area is indicative for low employment and income levels. A better mix of social/income levels is needed, e.g. Glasgow if not the Scottish average values. But the actual target is to reduce car ownership for environmental reasons.
	no car		65.3%	56.2%	34.2%	
	1 car		29.2%	34.3%	43.4%	
	2 cars		4.8%	8.2%	18.6%	
	3+ cars		0.7%	1.3%	3.8%	
average house price / rent level (based on survey)		low		mix of high, medium & low cost/rent levels		Regeneration should achieve mixed dwelling types and mixed price / rent levels. The impact of an increase of households / dwellings by 831 helps getting close to target profiles.

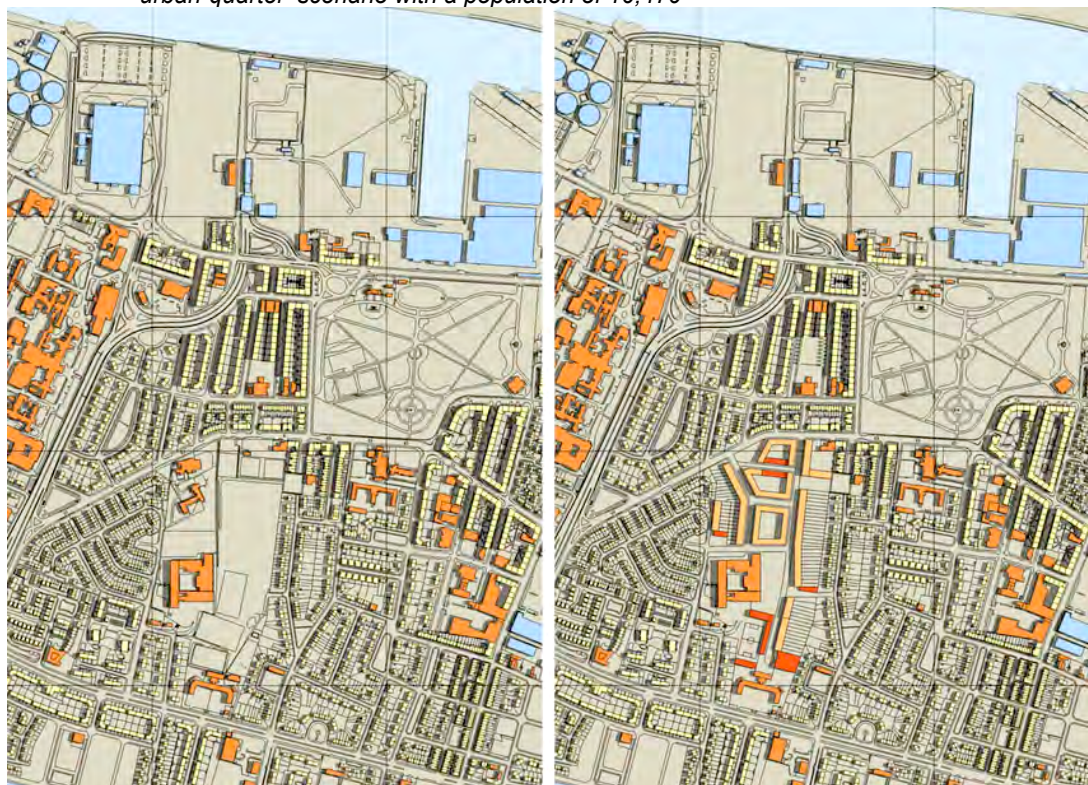
Sources (1) SIMD (Scottish Index of Multiple Deprivation) rank out of 1222 Wards
(2) Census 2001 GRO (Scotland)

(a) Glasgow 2001 average (2001 Census GRO Scotland)
(b) Scotland 2001 average (2001 Census GRO Scotland)
E Estimate

Table 4.06 documents Drumoyne’s projected economic characteristics. It indicates that Drumoyne’s current percentage of the economically active is well below the Scottish standard, even below the Glasgow standard, and this needs some correction. The very low SIMD (Scottish Indicators of Multiple Deprivation) ranking in both the income and employment domains are clear signs of considerable problems. This is to some degree also highlighted by the high percentage of households without a car. The average house price and rent levels of accommodation are low. With over 70% social rented and 80% low cost / low rent tenements there is a lack of a mix of dwelling types and of price and rent levels. The increase of the population to 10,470 generates, however, a real chance to achieve a better balance of economic activity and inactive people close to the target profile, and this would have a considerable impact on the quality and image of the area as well as the support of local amenities.

It can be concluded that this account clearly demonstrates how strongly threshold and target values guide regeneration briefs, and how the potential outcome of regeneration can be assessed against the target values and profiles. The first attempt to increase Drumoyne’s population modestly to 9,000 produced only a minor improvement of urban form characteristics and is insufficient to impact upon the social and socio-economic problems. The ‘one-urban-quarter’ scenario with a population of 10,740 proved that the modest increase of Drumoyne’s area, the more substantial increase of its population and the number of dwellings, as well as the formation of a new core in central location, would have a considerable impact on the quality of the quarter’s urban form (Figure 4.12), the accessibility of amenities, and the social and economic profiles. The shortfalls could be overcome if a relatively small percentage of people currently without qualifications and economically inactive would get retrained to achieve at least grade 1 qualification and become economically active. The achievable urban form, social and economic values of Drumoyne’s one-urban-quarter scenario would substantially raise the level of the area’s sustainability.

Figure 4.12 The potential change of Drumoyne’s built form through the implementation of the ‘one-urban-quarter’ scenario with a population of 10,470



Drumoyne, existing condition
Source: The Research Team

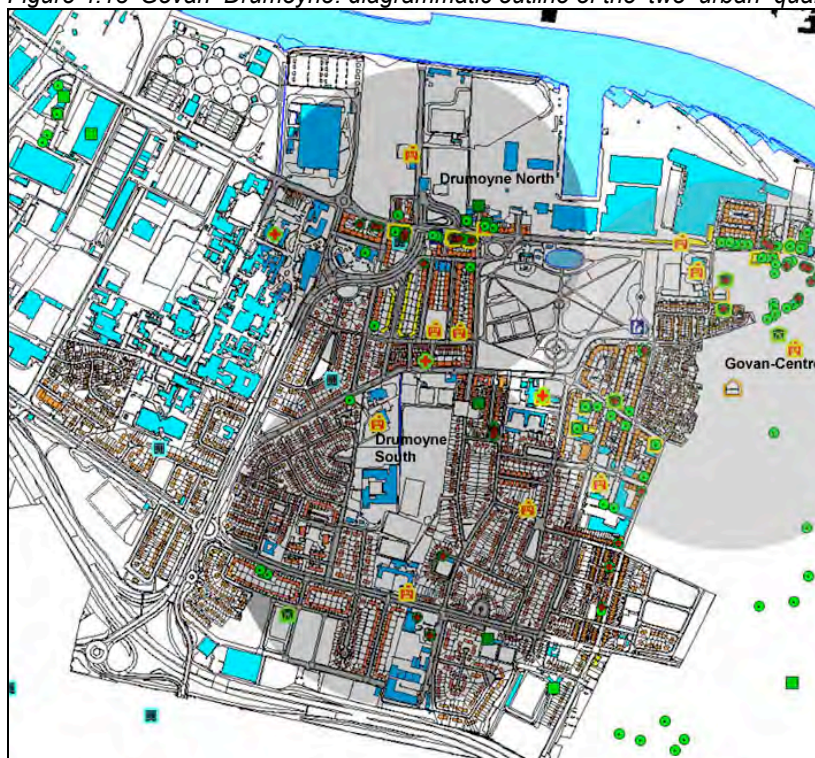
Implementation of the ‘one-urban-quarter’ scenario

Figure 4.12 illustrates diagrammatically the remodelling of the central area of Drumoyne to form a mixed-use community core area and achieve more readily accessible amenities and the increase of the population to the level required for the improvement of Drumoyne's social and socio-economic profiles.

Investigation of the more extensive 'two-urban-quarters' regeneration scenario

This regeneration option is based on the understanding that the 'one-urban-quarter' has an excessively large area that could be used to develop two urban quarters, each of target area size, if the area was expanded by a little less than 20 hectare. Figure 4.13 shows a diagrammatic representation of the 'two-urban-quarters' scenario. Drumoyne's existing urban fabric would be split at the line of the change of housing from 3 to 4 floor tenement blocks at the north to more suburban units at the south. The southern and historically younger part would be developed along the lines of the 'one-urban-quarter' scenario with the central open void developed into a mixed-use core area of 'Drumoyne-South'. The northern and older part would be extended north by developing the waterfront site, with the old high street as core area for 'Drumoyne-North'. With an area of 88 hectare, both urban quarters meet the target value. Distances from edge to centre would become all walkable, thus increasing access to local amenities on foot.

Figure 4.13 Govan-Drumoyne: diagrammatic outline of the 'two-urban-quarters' scenario



Source: The Research Team

The 'two-urban-quarters' scenario adopts the moderate regeneration of the southern area of Drumoyne described above as the 'one-urban-quarter' scenario. The northern area, of traditional Glasgow tenement development at higher densities compared to the southern area, expands at even higher densities into the riverfront area north of Govan Road to generate the second urban quarter. The northern expansion responds to the scale of the river space and the scale of new development opposite the river by adopting a higher than usual net dwelling density of 139 dwellings per hectare (Table 4.07).

Table 4.07 Govan–Drumoyne: built form characteristics – further increase of area, population and dwelling numbers for the ‘two–urban–quarters’ scenario

(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South.Gen.Hospital)

Extension to form the first urban quarter (as Table 4.03)

Indicators	Population		new	Dwellings		Comments / regeneration options
	addition	sum		hh size	sum	
TOTAL 1st URBAN QUARTER		10,470		2.04 pphh	5,140	Increase: +2,230 people, +1,062 dwellings (incl. 231 replacements)

Extension to form the second urban quarter

Indicators	Population		new	Dwellings		Comments / regeneration options
	new	sum		hh size	sum	
Developing the largely disused riverfront area north of Govan Road and east of the Clyde Tunnel as extension of the northern and older part of Drumoyne	+4,530	4,530	+2,160	2.1 pphh ⁽³⁾	2,160	Developing the riverfront area 19.43 ha ⁽¹⁾ . This increases the total area to 176 ha (2 times 88 ha). The housing land (on ground and above services & facilities) is 80% of total land or 15.54 ha. The net dwelling density is 139 ndpha. The 2 nd urban quarter is formed around Govan Road, the old high street linking Drumoyne with Govan–Centre. A new mixed-use boulevard will link the core areas of Drumoyne–South and –North.
TOTAL RIVERFRONT DEVELOPMENT		4,530		2.1 pphh ⁽³⁾	2,160	Increase: +4,530 people. +2,160 dwellings.

The two-urban-quarters scenario

TOTAL	Population: 15,000		Dwellings: 7,300		Each of the two urban quarters has a target population of 7,500 (chosen instead of 9,000 to prevent excessive densities at the waterfront site, the only place where the additional 4,530 people can be accommodated). Each urban quarter has a target area of 88 ha. This means that target population and dwelling densities will be achieved in full and it is likely that also social & economic profiles will be achievable in full.
urban quarter Drumoyne–North area: 88 ha	Population: 7,500		Dwellings: 3,650		
urban quarter Drumoyne–South area: 88 ha	Population: 7,500		Dwellings: 3,650		

Sources	(1) ArchGIS value	Scales	hh	household
	(2) Census 2001 GRO (Scotland)		pphh	persons per household
	(3) Average Glasgow household size of 2.1 persons		ndpha	net dwellings per hectare

Both urban quarters have on average a target value population of 7,500 people (to stay with the 9,000 target would require excessive densities at the waterfront area). Table 4.07 adds to the ‘one-urban-quarter’ scenario with a total population of 10,470 the development of the waterfront site. The site is 19.43 ha large, of which 60% is the standard housing land. Half of the 40% mixed-use land is for infrastructure and open spaces, the other half for services and facilities. As before, at the Pirie Park site, the area over the services and facilities is used as housing land (the ‘living over shops’ scenario of the traditional high street), which increases to 15.54 ha. At a net dwelling density of 139 dwellings per hectare the waterfront population is 4,530 and the number of dwellings 2,160 (at 2.1 persons per household Glasgow average). The total population of both urban quarters is thus 15,000 and the total number of dwellings 7,300 at an average dwelling density of 2.05 persons per household over both urban quarters.

Overall, the total area of the ‘two-urban-quarters’ scenario (176 ha) is based on, and therefore meets, the target value (two times 88 hectare); the percentages of housing land and mixed-use land are also based on the target values. The total population (15,000 people) meets the target of two urban quarters (at 7,500 people each). Furthermore, both urban quarters have a central public space that accommodates all required services and facilities; the edge to core distance of both will therefore also meet the target distance of 530 metres and access to amenities. As the area of each urban quarter corresponds with the target area of 88 hectare and the population size with the target

population of 7,500 for each urban quarter, it is obvious that both the average population and dwelling densities will also meet target values in full, although there are variations between the net dwelling densities in Drumoyne–South and Drumoyne–North as the latter compensates for the lower overall density of the first. It is also likely that in average both communities will achieve social and economic target profiles, although there are obvious differences between the areas north and south. The southern area’s social profile is more like that of the ‘one–urban–quarter’ scenario. Table 4.08 reviews the average social characteristics of the ‘two–urban–quarters’ regeneration option. It shows that the population age profile, the percentages of dwellings per tenure type, the percentages of dwelling sizes, and the qualifications profile of the population all meet the target profiles in full. This is a good improvement in comparison to that of the ‘one–urban–quarter’ scenario.

Table 4.08 Govan–Drumoyne: social characteristics resulting from the expansion of the ‘one–urban–quarter’ scenario with a population of 10,470 into a ‘two–urban–quarters’ scenario with a population of 15,000

(included data zones: S01003346, 3349, 3364, 3375, 3384, 3386, 3396, 3411, 3424; excluded: 3436 South.Gen.Hospital)

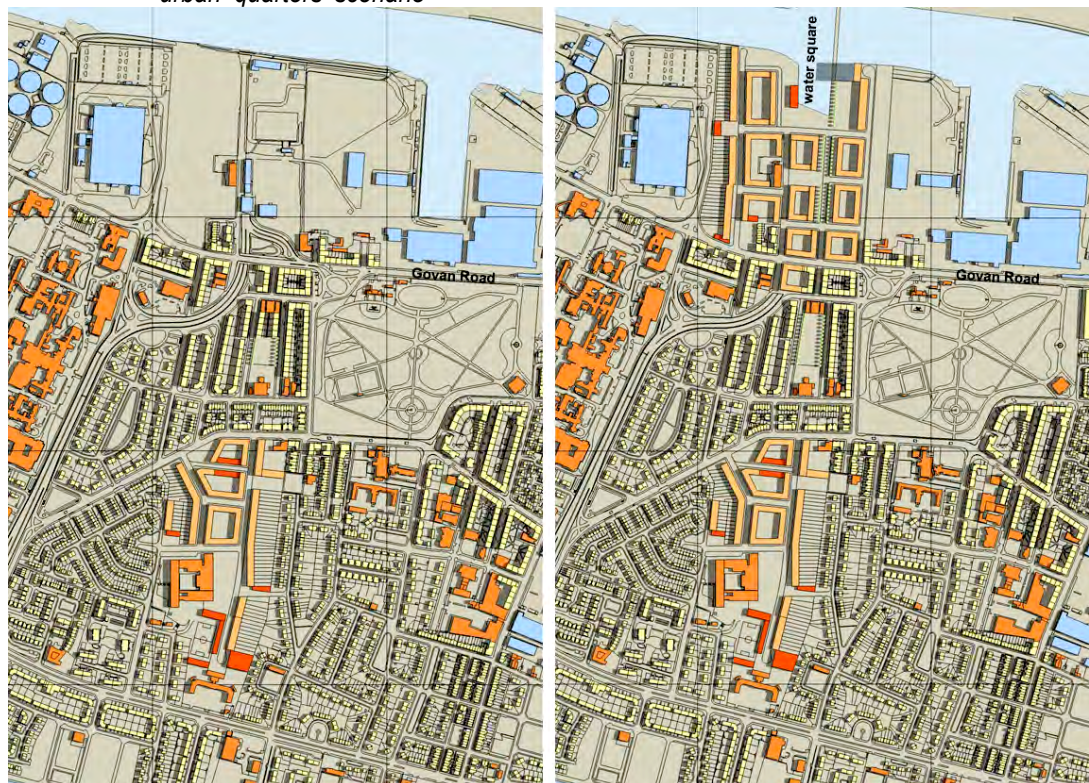
		Values achieved by the 1 UQ scenario		Values achieved by the 2 UQs scenario		Regeneration tasks to balance the social profiles
		no/rank	%	proposed values	target %	
population age profile⁽²⁾	total population	10,470	100%	15,000	100%	To achieve the target value profile requires <ul style="list-style-type: none"> • 905 add. people age 0-15 • 2,900 add. people age 16-64 • 725 add. people age 65+ With 4,530 additional people of these age groups the achievable profile meets the target profile.
	aged 0-15	2,095	20%	3,000	20%	
	aged 16-64	6,700	64%	9,600	64%	
	aged 65+	1,675	16%	2,400	16%	
% of households / dwellings per tenure type⁽²⁾	total dwellings	5,138	100%	7,300	100%	To achieve the targets requires <ul style="list-style-type: none"> • 1,059 add. owner-occupied units, • 843 add. social-rented units, • 260 add. private-rented units. With 2,160 additional dwellings the achievable profile meets the target profile.
	owner occupied	2,518	49%	3,577	49%	
	upper marked	1,490	29%	2,117	29%	
	affordable	1,028	20%	1,460	20%	
	social rented	2,004	39%	2,847	39%	
	private rented & other	616	12%		12%	
% of household / dwelling sizes⁽²⁾	total households	5,138	100%	7,300	100%	To achieve the target requires <ul style="list-style-type: none"> • 908 add. 1-person dwellings • 637 add. 2-person dwellings • 313 add. 3-person dwellings • 205 add. 4-person dwellings • 97 add. 5+ person dwellings With 2,160 additional units the achievable profile meets the target profile.
	1 person	2,158	42.0%	3,066	42.0%	
	2 persons	1,516	29.5%	2,153	29.5%	
	3 persons	745	14.5%	1,058	14.5%	
	4 persons	488	9.5%	693	9.5%	
	5+ persons	231	4.5%	328	4.5%	
qualifications⁽²⁾ all aged 16-74	all aged 16-74 (72.9% of tot.pop.)	E 7,633	100%	E 10,935	100%	To achieve the target requires <ul style="list-style-type: none"> • 1,139 more people with no qualification (at worst) • 815 more with grade 1 • 495 more with grade 2 • 218 more with grade 3 • 634 more with grade 4 With 3,302 additional people of that age group the achievable profile meets the target profile (Scottish average).
	no qualification	2,633	34.5%	3,772	34.5%	
	O/Standard Grade (grade 1)	1,885	24.7%	2,700	24.7%	
	Higher Grade (grade 2)	1,145	15.0%	1,640	15.0%	
	HND,HNC,RSA (grade 3)	504	6.6%	722	6.6%	
	First/Higher Degree (grade 4)	1,466	19.2%	2,100	19.2%	
SIMD ^(1,2) overall rank of 1222 Wards				(a)	(b)	With all achievable social profiles meeting the target profiles, the SIMD ranking is likely to achieve if not exceed the Scottish average. In parallel, the % of LTI, income deprived and benefits claimants is likely to meet Scottish average.
SIMD ^(1,2) rank of Education domain				thresh.	target	
SIMD ^(1,2) rank of Health domain				value:	value:	
SIMD ^(1,2) rank of Income domain				305	611	
% of population with LTI ^(2,4)				(a)	(b)	
% of population income deprived ^(2,5)				thresh.	target	
% of persons in working age claiming benefits ^(2,5)				values	values	

Sources (1) SIMD (Scottish Index of Multiple Deprivation) rank out of 1222 Wards (5) Scottish Executive 2004
 (2) Census 2001 GRO (Scotland) (a) Glasgow average 2001
 (4) Long Term Illness (b) Scotland average 2001
 (5) Estimate

Clarification regarding the socio-economic characteristics of the 'two-urban-quarters' scenario is still required. In the 'one-urban-quarter' scenario the increase of the population to 10,470 achieves socio-economic profiles well above the threshold profiles (Glasgow average) and closer to the target value profiles (Scottish average). In the 'two-urban-quarters' scenario, the further increase of the population by 4,530 to 15,000 raises the number of people aged 16-74 by slightly more than 3,300 and this means that the target value profile is met in full, even exceeded. A table with the actual data is therefore not necessary. It is, however, clear that the social and socio-economic profiles of Drumoyne-South is only average, that of Drumoyne-North above target; the difference is not avoidable unless people from the south would voluntarily move north.

It remains to illustrate the potential impact the 'two-urban-quarters' scenario on Drumoyne's urban form. Figure 4.14 juxtaposes the potential plan configuration of the 'one-urban-quarter' scenario with that of the 'two-urban-quarters' scenario. It illustrates diagrammatically an urban block structure of the southern central area and the waterfront area north. A suggestion is made to eliminate the curved ramp between the tunnel and Govan Road in order to achieve a more continuous spatial enclosure of Govan Road and to reduce traffic in the 'high street'; alternative links from the tunnel into Govan and vice versa exist further south.

Figure 4.14 The potential change of Drumoyne's built form through the implementation of the 'two-urban-quarters' scenario



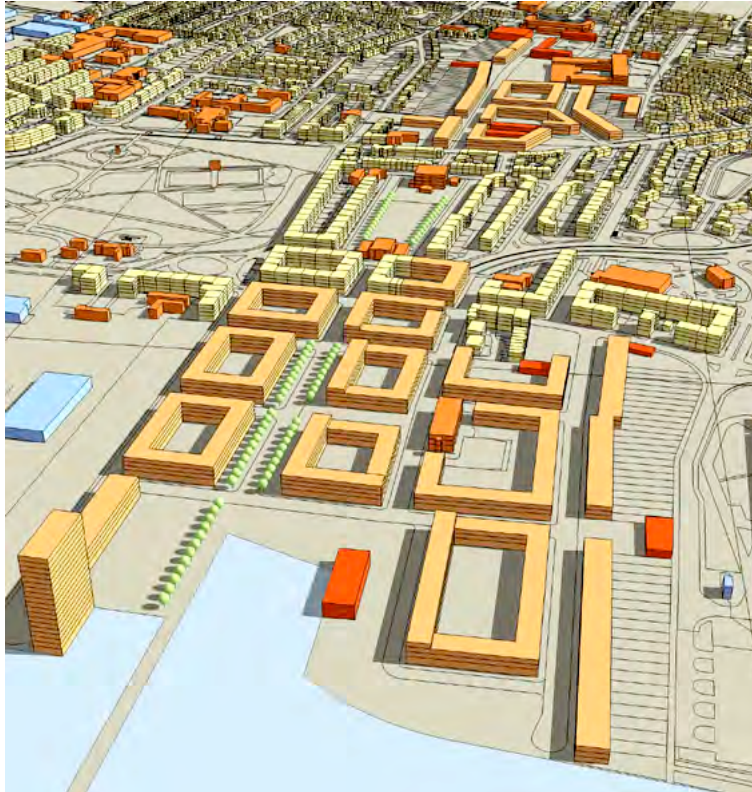
Drumoyne: the 'one-urban-quarter' scenario
Source: The Research Team

Drumoyne: the 'two-urban-quarters' scenario

A north-south boulevard links the central areas of the two urban quarters; it extends to the river space and via a new pedestrian bridge to the Glasgow Harbour Development north of the river (Figure 4.15). Along the boulevard an open area is proposed, flanked to the north and south by two public buildings (school and church). This open linear space is suggested to serve as recreational area for both urban quarters, maybe also offer children and youngsters sports facilities. Where the boulevard crosses Govan Road it accommodates services and facilities, as would Govan Road, as part of the new core area. The 'water square' is proposed to accommodate amenities beyond the local needs, for instance a stop for water taxis, a restaurant, café and pub for local people as well as for

people from other parts of Glasgow, specifically also for those living in the Glasgow Harbour Development across the river that has no local services and facilities at all. This would increase the viability of the 'water square' as social space for a wider catchment population.

Figure 4.15 View of the diagrammatic layout of the two urban quarters of Drumoyne seen from the north



Source: The Research Team

Figure 4.15 indicates a rising scale of development from south to north that is suggested for two reasons: to achieve the target population for two urban quarters, and to respond to the existing and proposed scale of new development at the River Clyde.

4.4 Summary of findings and of the regeneration programme for Govan Drumoyne

The presentation and illustration of the use of target, average and threshold values for the development of regeneration programmes is not aimed at convincing the reader of the appropriateness of the design proposals for Drumoyne – these are only diagrammatic sketches generated in the last few funded weeks of the research project – but tries to convince that a target-based approach to urban development and regeneration, based on a list of key built form, social, socio-economic (and ideally environmental/ecological) sustainability indicators, threshold and target values, is by far preferable compared with a number of largely ill coordinated individual projects based on loosely formulated objectives. The presentation shows how more modest and more extensive scenarios can be explored on the basis of different assessments of the political, social and socio-economic viability of regeneration programmes. The considerable advantage of the presented approach is undoubtedly that at each stage of the development of scenarios there is a clear knowledge and control of the potentially achievable built form, social and socio-economic conditions and population profiles and there is no danger that important issues and goals are either ignored or forgotten to be responded to.

The presented approach also tries to encourage those dealing with urban regeneration to think more strategically, and always to see individual projects as part of a larger spatial and structural framework. It is important to understand the physical form of the city as a modular construct of urban quarters, and urban quarters as the smallest modules of a town and city that need to respond in the same way as the city to the needs and aspirations of individuals, groups of interest and the population at large. It is likely that many of those who focus on individual projects for different clients with their very specific purposes will not easily accept such a broad strategic view, and this is a barrier to the application of the approach of this research project to urban regeneration. They should be encouraged to look again at Figure 2.02 and read again the comments made to the aerial photograph of the central area of Glasgow as it developed in the 1960s.

In the next chapter two of Germany's best practice cases of urban expansion will be investigated to show how the developed list of sustainability indicators and threshold/target values will cope with a real project that has been hailed as of the most convincing approaches to the development of sustainable urban quarters. The city is Freiburg im Breisgau, and the best practice urban quarters are Freiburg–Vauban and Freiburg–Rieselfeld.

References

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Chapter 5

The investigation of two best practice cases at Freiburg im Breisgau, Germany: the development of the urban quarters Vauban and Rieselfeld

Up to this point the *Tool* for the measurement of levels of sustainability of urban areas has been tested in selected urban areas in the UK, and specifically in Glasgow. These tests investigated hypothetical cases of urban regeneration, i.e. have not addressed 'live projects' and – due to the express wish of the City of Glasgow Department of Regeneration Services and the Glasgow Housing Association not to upset ongoing negotiations with the Govan communities – have not been carried out in collaboration with local stakeholders and communities. Nevertheless, the tests have established that the rigorous application of target and threshold values of the tool leads to credible urban regeneration programmes and models based on sustainability criteria and values.

This chapter investigates two best practice cases of urban development, the new urban quarters of Freiburg–Vauban and, due to constraints unfortunately to a lesser degree, Freiburg–Rieselfeld in Germany. The *Tool's* methodology is employed for the measurement of the urban form, social and socio-economic characteristics and achievements of the two urban quarters and compares them with the research project values. The main objective of this comparison is to test the general validity and establish the level of practical applicability and feasibility of the research project *Tool* and its threshold and target values. As the two best practice cases have not only been planned and conceived, but also designed and built, the additional advantage of this investigation is that new target and threshold values for the design and construction stage of sustainable urban regeneration and development are likely to emerge, and this would help to expand the *Tool*.

The chapter first introduces the City of Freiburg im Breisgau and the history of the urban quarter Vauban, specifically the range of sustainability criteria responded to and the involvement of the local population in the planning, design and construction processes. Following this, the chapter investigates the key characteristics and the values achieved by the best practice cases in Freiburg and compares them with the research project target and threshold values. The investigation first focuses on the 'urban form characteristics' of the areas (their principal urban design features, gross and net population and dwelling densities, and the level of provision of local services and facilities), the social characteristics of the areas (their population age profiles, the mix of dwelling and tenure types), and the socio-economic characteristics of the areas (income levels, the proportion of economically active and inactive persons).

The investigation then focuses on the environmental concepts developed for and implemented at Vauban, specifically the transport, energy and heating concepts, and the rainwater, grey water and sewer management concepts. The chapter ends with an illustration of the design and landscape features of the urban quarter Vauban. The conclusion of this chapter is a critical assessment of the research project and the developed *Tool*.

To make it easier to understand where data and other information, including illustrations, come from, the sources are always quoted directly in the text and at the bottom of illustrations and tables.

5.1 An introduction to Freiburg im Breisgau and its new urban quarters

Freiburg is a city in Baden-Württemberg, Germany. It is the hub of the Breisgau region on the western edge of the Black Forest in the upper Rhine Plain, roughly half between Strasbourg/Kehl and Basel (Figure 5.01).

Figure 5.01 The location of Freiburg in the Rhine valley



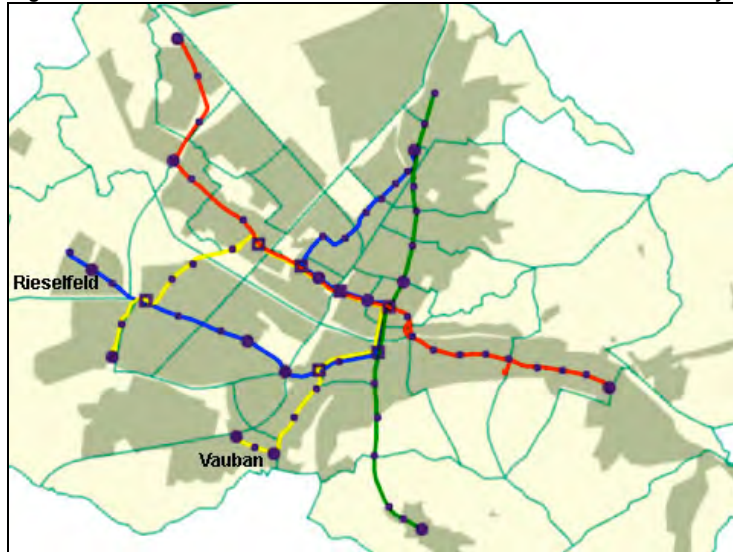
Source: [online] www.buero-magenta.de

Freiburg is one of the famous old German university towns as well as a major commercial, intellectual, and ecclesiastical centre. It is known for its ancient university, its gothic cathedral (Münster), its high standard of living, and its enhanced environmental practices. Freiburg is the sunniest and warmest city in Germany – frequently called the ‘green city’ because of its location at the foothills of the Black Forest and because of its care for environmental quality – situated in the heart of a major wine-growing region and serves as primary tourist entrepôt to the scenic beauty of the Black Forest. (Source: http://e.wikipedia.org/wiki/Freiburg_im_Breisgau).

Freiburg has a population of about 220,000 (2008), the city region of Freiburg, including the city, a population of about 620,000 (2008). Freiburg is well known for its extensive pedestrian zone in the car-free city centre, its excellent public transport system with a continuously expanding web of tram routes and feeder buses. The city is on the main Frankfurt am Main - Basel railway line and close to the A5 Frankfurt a.M. - Basel motorway. (Source: FR.ITZ, Stadt Freiburg, Amt für Bürger Service und Informationsverarbeitung [City of Freiburg, Office for Citizens Service and Information Processing] online statistics).

During the last two decades Freiburg has planned and built two new urban quarters, Vauban and Rieselfeld, both at the edge of the city and both located at one of Freiburg’s tram routes (Figure 5.02).

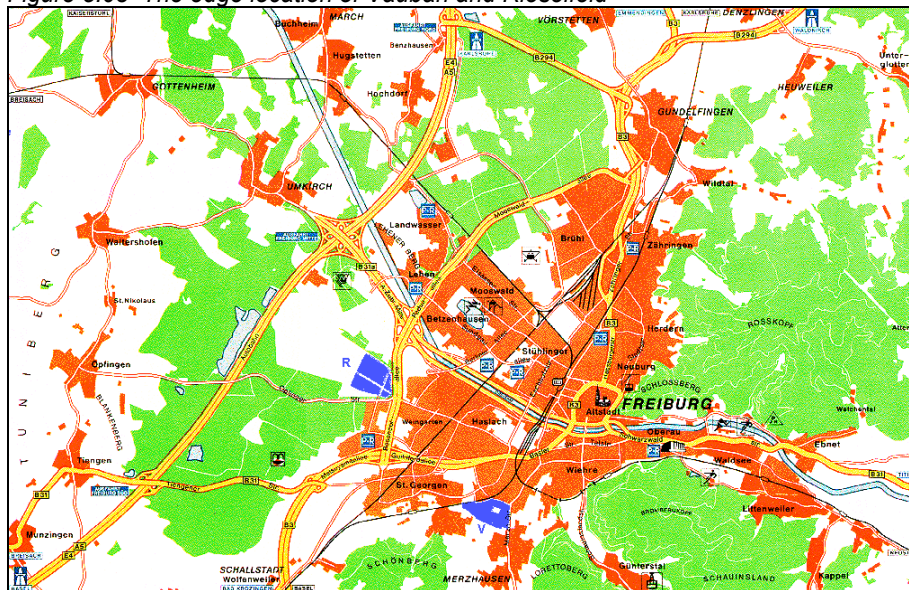
Figure 5.02 Vauban and Rieselfeld connected to the tram routes system



Source: [online] www.freiburg.de/servlet/PB/menu

Vauban, located south of the city centre at a distance of about 2.5 km, is on its northern edge attached to the city fabric, on its southern edge it opens up to the countryside. Rieselfeld, by comparison, is somewhat isolated from the city by an expressway (Padua Allee) to the east and surrounded to the north and west by forests and the 'Freiburger Rieselfeld', a former sewage treatment area (Figure 5.03).

Figure 5.03 The edge location of Vauban and Rieselfeld



Source: [online] maps.google.co.uk/maps (R=Rieselfeld, V=Vauban, emphasis by the author)

These new settlements are of particular importance in the discussion of sustainable urban development. The focus of this investigation will be primarily the urban quarter Vauban, but a comparison of its built form, social and socio-economic characteristics with those of the urban quarter Rieselfeld, and the City of Freiburg is useful when weighing the achieved values against the research target values.

5.2 A short summary of Vauban's development history

Within the constraints of this investigation it is not possible to offer more than a short summary of events that started the history of Vauban, and Vauban will have to stand as example for both new urban quarters. Those interested in a more detailed account should visit the website www.vauban.de/info/ on which the information of this summary is based. In 1990, the French military presence in Freiburg came to an official end; in 1992 the last soldiers left the Vauban barracks. At a time of a housing shortage, people started to talk about 'barracks into dwellings'. The tree-lined area of just over 41 hectares, the property of the Federal Republic of Germany, was bought by the City of Freiburg with the aim to build a new urban quarter (Figure 5.04).

Figure 5.04 The Vauban Barracks in 1990



Source: [online] www.vauban.de/bilder/zinnkann/index

Between 1992, the year the city bought the site, and 1998 when building works started, the site was used by a strange mixture of different groups and people (Figure 5.05). There were no mentionable conflicts, but problems arose, when squatters occupied two of the garrison blocks.

Figure 5.05 Temporary use of the garrison



Source: [online] www.vauban.de/bilder/zinnkann/index.html

SUSI² started in 1990 to generate ideas of a special housing project: students and working people of different income groups should live together and have the space for cultural and social activities. The

² At the beginning of the 1990s, SUSI – standing for 'Selbstorganisierte unabhängige Siedlungsinitiative' (self-organised independent settlement initiative) – was formed by a mixed group of students, low income and single parent households. SUSI,

aim was to build as economically as possible, and this was to be achieved through DIY and specifically through the conversion of existing buildings. In 1992, the City Council decided to leave SUSI 4 garrison blocks for its special housing project and 6 blocks for student accommodation (today's student village). SUSI bought the blocks with subventions by the Social Housing Programme, bank loans, subsidies for student accommodation by The Ministry of Science, and loans by individual supporters of the project. Conversion work started in 1992.

In 1993, the first planning objectives were developed: ecological concepts of construction and energy provision; the participation of inhabitants in the planning process; car-free living in a substantial part of Vauban. In 1994, the Vauban Forum, the local citizens association, was founded. In the same year, the City of Freiburg organised an urban design competition; the winning scheme by Büro Kohlhoff, Stuttgart, suggested predominantly east-west orientation of buildings (row housing). In 1995, the city decided to include citizens extensively in the planning process. The coordination was handed over to the Vauban Forum. A more detailed development framework for the urban quarter was developed: a transport concept with extensively reduced car traffic; walking distances within the urban quarter; an ecological district heating concept; social mix; the priority allocation of development plots to private builder groups and cooperative self-help initiatives over investors. In 1996, the marketing of plots started. In 1997, the final development plan, including the citizens' centre and market square, was adopted. In 1998, building works started.

The Vauban project structure & planning approach

The main acting bodies/institutions of the Vauban project structure included the Project Group Vauban (the administrative coordination of the City Council departments involved in the Vauban project), the Community Council Working Group (a committee of the City Council with representatives of political parties, of the administration and consultative members such as the Forum Vauban) and the Forum Vauban (the 'local citizens association', by 1995 a legal body of the extended political process and the social work at Vauban, financially supported by the Federal German Environment Foundation).

The planning approach embraced a) sustainability concepts, especially in the fields of traffic and energy, b) community involvement, central to the project and to a level far beyond legal requirements, and c) community-based building projects rather than a developers/investors approach, involving Baugruppen (individual and groups of people forming builder cooperatives), Genova (a private enterprise building cooperative pursuing ecological concepts of solar installations for publicly co-financed housing), and SUSI (the self-organised independent settlement initiative, pursuing some degree of social mix). The key planning goals for Vauban and the values pursued were:

- a population of 5,000;
- intensely car-reduced vehicular traffic: priority to walking, the use of bicycles and public transport;
- walking distances to local amenities and transport stops;
- a sustainable energy concept;
- an ecological heating system;
- social mix.

The project soon attracted international attention. In 1996, Habitat II in Istanbul selected Freiburg-Vauban as Germany's 'Best Practice Project' mainly due to the cooperative planning process; in 1997, the CEC provides 1.4 million € from the LIFE-Programme to support concrete ecological concepts for

as other organisations, aimed to provide a mix of dwellings for low and higher income groups, as well as the development of open space for cultural and social activities, at the lowest possible cost.

solar installations and car sharing.

5.3 Comparison of the key urban form characteristics of Freiburg's urban quarters Vauban and Rieselfeld with research project target values

This section compares the values pursued in the Vauban project with the research target and threshold values. As the Vauban project was carried through all stages of an urban development project, the planning framework included environmental/ecological concepts not investigated by the research team. These concepts expand the list of characteristics, threshold and target values beyond the framework of *Urbanising Suburbia* and are therefore of particular interest for the research team. The Vauban and Rieselfeld data are from the following sources:

- Vauban District, Freiburg: Part 4: Setting New Standards. [online] www.vauban.de/info/abstract4.html
- Vauban District, Freiburg: Part 5: Achievements. [online] www.vauban.de/info/abstract5.html
The problem with these Forum Vauban sources is that they appear to be written around the year 2000. The account of achievements and measurable impacts in Part 5 offers only provisional figures that seem to have not been updated.
- Öko-Institut (Institut für angewandte Ökologie e.V.), Forschungsprojekt Nachhaltige Stadtteile auf innerstädtischen Konversionsflächen: Stromstoffanalyse als Bewertungsinstrument. Endbericht, Dezember 2002 – überarbeitete Version August 2003. ([online]: <http://www.oeko.de/service/cities/>). This report provides data and information up to 2002 that may be accurate, but inevitably exclude information on development later than 2002.
- FR.ITZ, Stadt Freiburg, Amt für Bürger Service und Informationsverarbeitung. [online] http://www.freiburg.de/servlet/PB/menu/1156915_11/index.html.
The city data are reliable as far as they are accessible online but do not offer any accounts on the environmental impact of the Vauban project.

The principal urban design features of the Vauban and Rieselfeld schemes

Figure 5.06 shows that the layout of Vauban is characterised by a main central axis, the Vaubanallee, which accommodates the tram route and local services and facilities, and largely perpendicular north-south rows of houses on either side of the boulevard. The ends of the rows are frequently open and allow, at least on upper levels, through views from the housing rows to the Vaubanallee and the landscape beyond the urban quarter's boundaries, and this on both the semi-public entrance and the private garden side of residential units. This arrangement is reminiscent of early modernist settlement forms built between the mid 1920s to early 1930s in which the traditional 'closed' urban block structure was replaced by an 'open' urban block structure to allow for better environmental conditions. This layout allows for a better exposure to daylight and sunshine of dwellings that are predominantly east-west oriented, but it also results in a looser definition of public spaces other than the residential streets and a weaker distinction between semi-public and semi-private space, especially in places where the landscaping is still too young to take up the function of spatial definition. Mature trees and five linear north-south green spaces are particularly prominent features. The 'green wedges' allow the southern open landscape to penetrate the urban quarter.

Figure 5.06 Aerial photograph of Freiburg–Vauban, 2008



Source: [online] www.freiburg.de/servlet/PB/1160662_11/index.html

As in the ‘Quartier Vauban’ scheme, the layout of Rieselfeld is also characterised by a main middle axis, also accommodating the tram route and local services and facilities (Figure 5.07).

Figure 5.07 Aerial photo of Freiburg – Rieselfeld, 2007



Source: www.freiburg.de/servlet/PB/1160662_11/index.html

The axis opens up into a central public square, accommodating the urban quarter’s main amenities. To the north the square opens into sports facilities and a park. In contrast to Vauban, the Rieselfeld layout shows a clear ‘closed’ urban block structure with public streets fronted by buildings and with predominantly enclosed landscaped courtyards accommodating meeting places and play areas for children and underground car parking below. Again in contrast to Vauban, which is more linked with

the surrounding built areas to the north and east, a boulevard-like linear green space to the south (a secondary east-west traffic route linking suburbs with the city) and the Rieselfeld Park to the north and west bound the urban Rieselfeld. This urban quarter is therefore somewhat detached from the urban areas to the south and east.

The key built form characteristics of Vauban and Rieselfeld

This part of the investigation of Freiburg’s new urban quarters focuses on the *urban form characteristics* of specific importance in the planning and conception stage of an urban development or regeneration project: population and development densities and local services and facilities.

Built form characteristics: population and development densities

Table 5.01a documents Vauban’s total area, a division between ‘residential’ and ‘mixed use’ areas, the total population as well as the total number of households and dwellings. From these data the gross population and the net population and dwelling densities can be established. Population and density values are of considerable significance for the functional-operational and socio-economic viability of an urban quarter, particularly the viability of local services and facilities and public transport on which so much of the accessibility to amenities and the reduction of car-based transport depends (see Tables 5.01a and b).

Table 5.01a Built form characteristics of Freiburg–Vauban: gross and net densities compared with research project target values

Establishing land-use groups of Vauban

Total land	41.3 ha³⁾	3) From Freiburg online statistics 2008.
New build area (excl. old build)	33.0 ha ⁴⁾	4) From Planz V90 Flächenwerte Vauban 2005 for new build areas; the housing land, roughly 60% of the total area, includes the residential streets, the residential building footprint and private gardens the values for which are taken from Flächenwerte Vauban.
• Housing land new build	23.7 ha ⁴⁾	
• Housing land SUSI (approx.)	E 1.5 ha ⁵⁾	5) The housing land of SUSI, not included in the Flächenwerte, is a rough calculation to establish an approximate figure for the total housing land of Vauban. Student housing is considered a special use category, which is included in the calculation of the gross population density only.
Total housing land	25.2 ha⁵⁾	
Total non-housing land	E 16.1 ha⁵⁾	

Establishing the built form values of Freiburg–Vauban

Indicators	Vauban projected values 1994/5	Research targets for neighbourhoods located			Vauban achieved values by 31.12.2008
		near city edge	between city edge & centre	near city centre	
Total land (100%)	38 ha	88.0 ha	88.0 ha	88.0 ha	41.3 ha
• Housing land (60%)		52.8 ha	52.8 ha	52.8 ha	(61%) 25.2 ha
• Non-housing land (40%)		35.2 ha	35.2 ha	35.2 ha	(39%) 16.1 ha
total population	5,000	7,500	9,000	10,500	incl. students 4,903 E excl. students 4,435
total number of households²⁾		7,500	9,000	10,500	(incl. students?) 2,174
total number of dwellings²⁾	2,000	3,261	3,982	4,038	(incl. SUSI) 1,706
at average household size	at 2.5 pphh	at 2.6 pphh	at 2.6 pphh	at 2.6 pphh	at 2.6 pphh
gross population density	130 ppha	85 ppha	102 ppha	119 ppha	excl. students 107 ppha
net population density	E 219 ppha	142 ppha	170 ppha	199 ppha	excl. students 176 ppha
net dwelling density	E 95 dpha	62 ppha	75 dpha	86 dpha	excl. students 68 dpha
		at 2.6 pphh	at 2.6 pphh	at 2.6 pphh	at 2.6 pphh

Scales ha hectare
 pphh persons per household
 ppha persons per hectare
 dpha dwellings per hectare
 E estimate

Sources 3) Stadt Freiburg, Amt für Bürger Service und Informationsverarbeitung, online statistics.
 4) Stadt Freiburg, Amt für Projektentwicklung und Stadterneuerung, PlanzV90

Comments to 2):
 Establishing the values of the urban quarter Vauban is compromised by what seems to be the inclusion of students in the household statistics. The statistical number of 2,174 households exceeds the statistical number of 1,706 dwellings (figures above highlighted in blue) by 468.

In the calculation of the average household size and the net population and dwelling densities, the estimated number of students – the 1,706 dwellings (equal to true households) deducted from the statistical number of 2,174 households (containing 468 ‘non-true’ households) – has therefore been left out to achieve a true representation of the new build area.

Flächenwerte 24.11.2005.
5) Author's approximate calculation

Rieselfeld's characteristics make an interesting comparison (Figure 5.01b). With 95.5 ha its total area is only 7.5 ha larger than the research target value. Its population size is well above the target value for an urban quarter close to the city edge and quite close to the target value of an urban quarter in an intermediate location. Accordingly, the gross and net population and the net dwelling densities are comfortably between the edge and intermediate target groups. It can therefore be expected that Rieselfeld's population size close to 9,000 (in 2008) and the compactness of its layout – a distance edge to centre larger than 530 but smaller than 600 m and thus slightly better than that of Vauban – support viable services and facilities and public transport.

Table 5.01b Built form characteristics of Freiburg–Rieselfeld: gross & net densities compared with research project target values

Indicators	Rieselfeld projected values 1995	Research targets for urban quarters located			Rieselfeld achieved values by 01.12. 2008
		near city edge	between city edge & centre	near city centre	
total land (100%)	78 ha	88.0 ha	88.0 ha	88.0 ha	95.5 ha
• housing land (60%),		52.8 ha	52.8 ha	52.8 ha	E 57.3 ha
• non-housing land (40%)		35.2 ha	35.2 ha	35.2 ha	E 38.2 ha
total population	12,000	7,500	9,000	10,500	8,744
total number of households / dwellings	4,200	2,852	3,422	3,992	3,325
at average household size	at 2.86 pph	at 2.63 pph	at 2.63 pph	at 2.63 pph	at 2.63 pph
gross population density	154 ppha	85 ppha	102 ppha	119 ppha	92 ppha
net population density	E 256 ppha	142 ppha	170 ppha	199 ppha	153 ppha
net dwelling density	E 90 dpha	54 dpha	65 dpha	76 dpha	58 dpha
		at 2.63 ha	at 2.63 pph	at 2.63 pph	at 2.63 pph

Scales ha hectare
 pphh persons per household
 ppha persons per hectare
 dpha dwellings per hectare
 E estimate

Source Stadt Freiburg, Amt für Bürger Service und Informationsverarbeitung, online statistics

Comments:

The net population and dwelling density is calculated by dividing the total population and the total number of dwellings by the 'housing land', which includes the building footprint, the front, side and back gardens and the local access roads including pavements and on-street parking spaces (roughly 60% of the total land) but excluding the 'mixed-use land', land for workplaces, amenities, the major parks and transport infrastructure (roughly 40% of the total land).

Built form characteristics: local services and facilities at Vauban and Rieselfeld

The next task is to investigate the local services and facilities at Vauban and Rieselfeld (Tables 5.02a and b). The information on Vauban's local services is accessible online on the Vauban-Register (www.vauban-im-bild.de/infos-register.html). eRich Lutz at Freiburg–Vauban kindly provided further information by email. For Rieselfeld the Rieselfeld Project Group has published information on local services (Stadt Freiburg, January 2009).

Tables 5.02a and b show that in the research project the urban quarter is subdivided into 4 'local hubs' with some services being located in the hub centres for better access, others at the neighbourhood centre as they cater for the entire population of the urban quarter. The tables also explain the two-primary-school scenarios, the research project target for an urban quarter with a population 7,500.

The list of Vauban’s amenities (Table 5.02a) shows a surprisingly large variety of local services and facilities close to those listed as target values in the research project for a much larger population. Particularly impressive is the list of shops and other community services. The Table also indicates, through the number of day nurseries plus a kindergarten, that Vauban also has a local hub structure. However, with only close to 60% of the research project threshold population, it cannot be expected that Vauban would be able to support 2 primary schools unless, again, a further school would also offer places to children in surrounding areas. It is likely, therefore, that there has been, and still might be, growing pressure for school places.

Table 5.02a Built form characteristics of Freiburg–Vauban: services and facilities compared with research project values

Research project threshold services & facilities	Research project target distances	Vauban according to the Vauban Register (15.03.10) and comments emailed by eRichLutz	Vauban achieved accessibility (estimate)
Local Hub level amenities			
2 primary schools, 1 per 2 hubs	150-250m	1 primary school, located at eastern edge of NBH	up to 850m
4 medical surgeries, 1 per hub	4 local hubs forming the urban quarter	?	
4 corner shops, 1 per hub	(All amenities located around a hub’s central place / park)	listed under neighbourhood level, group of shops	
4 nursery schools, 1 per hub		3 day nurseries 1 kindergarten 2 play groups	up to 400m
4 playgrounds, 1 per hub		5 playgrounds 1 children adventure farm	up to 400m
4 small ‘parks’, 1 per hub as central community place		5 green ‘brackets’ / community places	up to 400m
Urban quarter level amenities			
Local pub	400-600m	1 pub	up to 850m
Group of shops	to additional urban quarter amenities	6 cafés / bistros / restaurants 1 bakery 1 food & wine shop 2 delicatessen shops a weekly farmers market 3 stationer’s / book shops 1 bicycle shop with self-help workshop 1 bicycle delivery service 1 music shop 2 trade centres 1 pharmacy 1 bank, 2 cash machines 1 hotel	up to 600m up to 850m up to 850m up to 850m
Post office	(All amenities located in a central NBH square or ‘high street’ with public transport stop)	?	?
Community office		Vauban community office	up to 850m
Community centre and square		Vauban community centre with market square	up to 850m
Access to bus, LRT		3 tram stops, 2 bus stops	LRT up to 400m, bus up to 700m
Youth meeting place		1 youth meeting place 3 small sports fields (football, volleyball) a riding stable	up to 850m
Connectivity: road links to surroundings, city		connectivity limited to 4 links at periphery of urban quarter	
Permeability of internal street network		pedestrian permeability is good, but vehicular permeability is much reduced through traffic calming measures	
Integrated public transport system		bus and LRT with good links to railway	

Sources Plan of Freiburg–Vauban and information provided by eRich Lutz, Büro für naturnahe Freiflächenplanung, Freiburg-Vauban
The Vauban Register [online] www.vauban-im-bild.de/infos-register.html

Riesefeld also shows a good array of local services and facilities way beyond the research project threshold services (Table 5.02b) . The number of schools is impressive, although the secondary school and the grammar school clearly cater for a much larger catchment population than Rieseldeld’s. That a senior residence has been provided indicates a demand for such a place, but that demand is likely to come predominantly from surrounding areas as Riesefeld’s percentage of people in retirement age is only 5.3% as will be seen shortly. No detailed information on local shops,

markets, pubs and cafés / bistros / restaurants at Rieselfeld was readily available and no local survey by the research team was possible, but the report by the Rieselfeld Project Group, on which this account is based, talks of numerous units being under construction in the central stretch of the main boulevard. The lack of a map with services marked disallows the measurement of the accessibility of facilities, but overall the compactness of the settlement should keep maximum walking distances at around 600m.

Table 5.02b Built form characteristics of Freiburg–Rieselfeld: services and facilities compared with research project values

Research project threshold services & facilities	Research project target distances	Rieselfeld according to the City of Freiburg's Rieselfeld Project Group (January 2009)	Rieselfeld achieved accessibility (estimate)
Local Hub level amenities			
2 primary schools, 1 per 2 hubs	150-250m 4 local hubs forming the urban quarter (All amenities located around a hub's central place / park)	1 comprehensive secondary school (Kepler), all-day school with 4 tracks 1 two-part grammar school (Sepp-Glaser-Gymnasium) 1 primary school (Clara Grunwald, 8 classes, 2 extensions) 1 Rudolf Steiner school	?
4 medical surgeries, 1 per hub		?	?
4 corner shops, 1 per hub		listed under neighbourhood level, group of shops	
4 nursery schools, 1 per hub		1 kindergarten (Taka-Tuka-Land) 3 children's day care centres ('Rieselfeld', 'Wilde 13' & 'Arche Noah' run by a caritas charity) 1 sports-kindergarten (Freiburg-Turnerschaft 1844 e.V.) 2 outdoor kindergartens 1 private sports club 1 club 'Sport vor Ort'	?
4 playgrounds, 1 per hub		Freiburger Turnerschaft 1844 e.V.	?
4 small 'parks', 1 per hub as central community place		?	?
Neighbourhood level amenities			
Local pub	400-600m	along the central avenue integrated business & residential units with possibilities for trading and offering services; numerous commercial units are under construction	?
Group of shops	to additional neighbourhood S+F		?
Post office			?
Community office		?	?
Community centre and square	(All amenities located in a central urban quarter square or 'high street' with public transport stop)	district meeting centre 'Glashaus' incl. a child & youth media centre (branch of city library)	?
Access to bus, LRT		3 tram stops on central avenue; no information on bus routes	LRT up to 400m
Youth meeting place		1 meeting centre for youth projects incl. Mediothek 1 media centre for children and teenagers 1 ecumenical church centre (Maria-Magdalena) 2 church parishes 1 senior residence (Pro Seniore) 1 district association K.I.O.S.K e.V.	up to 600m (estimate)
Connectivity: road links to surroundings, city		connectivity limited to 4 links at periphery of urban quarter	
Permeability of internal street network		pedestrian and vehicular permeability is good due to the urban block structure and cars being allowed on roads at 30 km/h.	
Integrated public transport system		LRT with good links to railway; no information on buses	

Sources City of Freiburg, Rieselfeld Project Group, *The new district of Freiburg-Rieselfeld: a case study of successful, sustainable urban development*, January 2009

In conclusion, the small sizes of land area and total population of the urban quarter Vauban do not seem to have compromised the viability of local services and facilities with exception for the primary school that seems to be stretched for places. The concept of near self-sufficiency of Vauban has been mentioned as main reason for the variety of amenities, but it has been tried many times elsewhere, frequently with little success as other factors play an essential role. A stronger reason for the viability of so many services might be that many of them might be provided by members of the Vauban

community who have been involved in the development of the settlement, care for the place and know the local needs. But even that is not fully convincing. It is, however, evident that the eastern part of St. Georgen immediately west of Vauban is connected to the western tram stop at Vauban. Furthermore a shuttle-bus connects Merzhausen, located south / southeast of Vauban, to the Paula-Modersohn-Platz at the eastern side of Vauban. Around this square a concentration of services and shops has developed that is accessible by public transport or the bicycle and has a catchment population beyond that of Vauban. Furthermore, the market square accommodates a restaurant, flea markets and a weekly farmers market and attracts many visitors from other parts of Freiburg. People from outside Vauban also visit cultural events, the children's adventure farm and the sports hall. All this is documented by Quartiersarbeit Vauban (online: <http://www.quartiersarbeit-vauban.de>). It is clear, therefore, that Vauban has indeed developed into something like a small market town and that explains why it can offer so many services despite its relatively small population: it also caters for people beyond its boundaries.

The key social characteristics of Freiburg's urban quarters Vauban and Rieselfeld

In this section the main social characteristics of Vauban and Rieselfeld will be investigated to establish population and household profiles. A comparison is made of Vauban, Rieselfeld, and Freiburg values (2008 data) and the research project targets as far as they are relevant. The research project suggests that a balanced population is dependable on two main variables: *the population age profile* (a balance between young single people, young families, mature families, middle-aged and elderly singles/couples) and *income levels and socio-economic groups* (low-, middle- and upper-income groups) (Barton et al. 2003, pp.83-9). Table 5.03 summarises some of the key characteristics of the urban quarters and the City of Freiburg.

Table 5.03 Comparison of social characteristics of Rieselfeld, Vauban and Freiburg (31.12.2008)

indicator	characteristic	Rieselfeld	Vauban	Freiburg	Research project
av. household size	persons per household	2.63 pph	2.60 pph	1.77 pph	2.1-2.3 pph ¹⁾
percentage population age profile	% pers. age 0 to <15	28.5 %	26.6 %	13.6 %	20 %
	% pers. age 15 to <65	66.2 %	71.3 %	69.4 %	64 %
	% pers. age 65+	5.3 %	2.1 %	17.0 %	16 %
percentage of hhs per no. of pers.	% hhs with 1 to 2 pers.	51.2 %	64.1 %	78.8 %	71.5 %
	% hhs with 3 to 5+ pers.	48.4 %	35.9 %	21.2 %	28.5 %
percentage of dwellings per no. of rooms (incl. kitchen)	% 2 to 4 room dwellings	59.4 %	57.6 %	65.3 %	no target profile ²⁾
	% 5 to 7+ room dwellings	35.8 %	38.4 %	27.1 %	
	% of other dwellings	4.8 %	4.0 %	7.5 %	
percentage of hhs (households) with 0 to 4+ children	% of hhs no child	52.3 %	62.1 %	82.5 %	62.8 %
	% of hhs 1 - 2 children	41.2 %	32.2 %	15.4 %	37.2 %
	% of hhs 3 - 4+ children	6.5 %	5.6 %	2.1 %	

Sources Stadt Freiburg, Amt für Bürger Service and Informationsverarbeitung, online statistics
 1) Census 2001 GRO Scotland, Glasgow and Scotland average household size
 2) There is no significant interrelationship between the number of persons per household and the number of rooms per dwelling as other economic, social and cultural factors come to play, e.g., working from home; therefore no target profile was developed.

Scales hh(s) household(s)
 pphh persons per household

Both Rieselfeld and Vauban show a larger than usual average size of households, a rather young population with a high percentage of children and few people in retirement age and, logically, a larger than average number of households with children. These characteristics are indicative of the population of new urban quarters that have attracted specifically young people and families, certainly not least due the qualities of the city of Freiburg already highlighted earlier. The urban

quarters are both located at the city edge, away from more hectic central traffic volumes, congestion and pollution and therefore good places for bringing up children.

The problem that arises from the young population profiles of both urban quarters is that the demand for services is fluctuating and the process of population renewal is not steady. The demand for places at crèches and the primary schools is currently high – the primary school at Vauban is said to have been extended already three times (email message by eRich Lutz, Freiburg-Vauban, March 2010) – but will in a relatively short time diminish to an extent that some of the services may not remain viable while at the same time the demand for other services – for higher levels of education and for the elderly – will emerge.

In contrast to the new urban quarters, Freiburg shows a social profile of a mature population with a rather small percentage of young people in school age and a much higher percentage of people in retirement age. With such a profile the problem arises how a steady population renewal can be achieved from within; it is likely that immigration of people from the region will have to play an important part. Compared with the research project targets, a balanced population profile that promises a natural renewal of the population is somewhere in between those of Freiburg and the urban quarters Rieselfeld and Vauban.

The socio-economic characteristics of Freiburg's urban quarters Rieselfeld and Vauban

The next part of this investigation is an examination of the socio-economic characteristics of Rieselfeld, Vauban and Freiburg as a whole in order to establish specifically whether or not the new urban quarters are socially inclusive. To this end, the most important indicators are: the *income levels* and the educational achievements of the local population; the *mixture of tenure types*; the percentage of those in working age that are economically active and inactive; and the level of unemployment. With the exception of unemployment levels, no detailed enough data could be secured, therefore no sufficiently comprehensive database could be established. The assessment of the socio-economic characteristics consists necessarily of general non-data-based statements that were retrieved from early planning statements and those of members of the local community, but specifically the planning department of the City of Freiburg, Amt für Projektentwicklung und Stadterneuerung [office for project development and city renewal] during interviews (21-12-2004) and through emails (17-03-2010).

Income levels of inhabitants at Vauban and Rieselfeld

It is safe to say that the income levels of people living in Vauban are above average as buying a plot of land in Freiburg-Vauban requires a higher than average income. The population of Vauban can be safely classified as 'upper middle class'. No information has been found or received on the income levels of people living in Rieselfeld, but it is assumed that there is a more usual mixture of upper, middle and lower income levels due to the tenure profiles discussed below.

Educational achievement of inhabitants at Vauban and Rieselfeld

With Freiburg being a university city, one would expect the educational qualification of its population to be on average rather high due to many professionals and academics that are likely to live and work in the city. A slightly unfair comparison between Freiburg's levels obtained in 2001/02 with those of Glasgow in 2001 will illustrate this. Although the compared data may not be entirely compatible, the margin of deviation can be expected to be small. The percentage of persons leaving public and private schools (excluding night schools) without qualifications was 6.5% in Freiburg and 42.5% in Glasgow. The percentage of persons leaving higher education with a university degree was 38.2% in Freiburg (in 2007/08 even 41.5%) and 17.1% in Glasgow. The rather drastic difference

between achievements in Freiburg and Glasgow is due to the consequences of the collapse of traditional industries in the UK, Scotland and specifically Glasgow after the Second World War. Furthermore, despite the fact that Glasgow, with about three times the population of Freiburg, has, as many higher education colleges, 3 universities in the city and one further one close by at Paisley, many of the academics live outside the city in smaller towns and villages, as a survey at the University of Strathclyde has shown. The year 2001/02 was selected as database for Freiburg because for Glasgow only 2001 Census data is available. The source of information on Freiburg is the Statistisches Landesamt Baden-Württemberg and on Glasgow the Census 2001 GRO (Scotland).

Information has been received that the educational qualifications of the population in Vauban are rather high; although no data have been retrievable, many people are said to hold a university degree, and many of them to be academics. The educational achievements in Rieselfeld are assumed to be a more standard mixture of higher, middle and lower qualifications.

Tenure profiles at Vauban and Rieselfeld

The distribution of households across tenures – owner-occupied, private-rented and social-rented accommodation – is the key characteristic largely indicative for the level of social inclusiveness or exclusiveness of an urban quarter. According to the Statistisches Bundesamt, in Germany the distribution of households across tenures in 2002 was 43% owner-occupied, 8% social rented and 49% privately rented. It is likely that today the ownership rate will be somewhat higher, that of private-rented accommodation somewhat lower, but social-rented accommodation is expected to be still roughly around 8%. In 2006, Germany's owner-occupation rate was 40.9%, i.e. 2% lower than in 2002; the average owner-occupation rate of Baden-Württemberg was 49.1%, the third highest after the Saarland and Rheinland-Pfalz. It is likely that in the City of Freiburg the owner-occupation rate is lower than the Baden-Württemberg average but that the level of owner occupation at Freiburg-Vauban is higher. The mixture of flats and town (terraced) houses at Vauban supports this assumption as the latter are usually built for owner-occupation rather than rent. Table 5.04 lists the tenure profiles of Germany, Baden-Württemberg, Freiburg i.Br., Vauban, Rieselfeld and the Research Project.

Table 5.04 Comparison of tenure profiles in Germany, Baden-Württemberg, Freiburg i.Br., Vauban, Rieselfeld with the research project target profile

	owner-occupied dwelling	all rented dwellings	private-rented dwelling	social-rented dwelling
2002 data				
Germany ¹⁾	43.0 %	57.0 %	49.0 %	8.0 %
2006 data				
Germany ²⁾	41.0 %	59.0 %	?	?
Baden-Württemberg ²⁾	49.0 %	51.0 %	?	?
Freiburg i.Br. ²⁾	39.0 %	61.0 %	?	?
Vauban ³⁾	70.0 %	30.0 %	20.0 %	10.0 %
Rieselfeld ³⁾	?	?	?	50.0 %
Research project	49.0 %	51.0 %	12.0 %	39.0 %
average values	48.5 %	51.5 %		

Source: 1) Statistisches Bundesamt Deutschland – Wohnsituation: Mikrozensus 2002
2) Statistisches Bundesamt Deutschland – Wohnsituation: Mikrozensus 2006
3) Öko-Institut & Partner: Nachhaltige Stadtteile, final extended report 2003

The information provided by the table is, unfortunately, rather incomplete with regard to the percentages of private-rented and social-rented dwellings. According to the extended final report *Nachhaltige Stadtteile* by Öko-Institut & Partner (2003, p.12), 70% of Vauban's residential units are owner-occupied, 20% are private-rented units and about 10% social-rented (residential units constructed within the framework of subsidised house building). A similar tenure split was confirmed

by information received from the City of Freiburg planning department; therefore the tenure split can be taken as reasonably correct. These figures show that Vauban has a social-rented accommodation rate only slightly above the average 8% in 2002, but the rate of owner-occupied dwellings is 27% above the German average in 2002 and close to 21% higher than the average Baden-Württemberg rate in 2006. In contrast, the rate for private-rented accommodation is 29% below the German average in 2002.

Unlike Vauban with a mix of town houses and flats, at Rieselfeld the predominant dwelling type is the flat: more than 90% of the residential buildings are 4 to 5 storey apartment blocks with multiple dwelling units (City of Freiburg, Rieselfeld Project Group, January 2009). With a City Council decision to adopt a split of 50 percent of all residential units being subsidised social housing and, consequently, 50% owner-occupied and private-rented accommodation (Report *Freiburg-Rieselfeld: urban expansion and public transport*, no date), Rieselfeld caters for an unusually high level of population depending on social-rented accommodation, but also in turn for an unusually low level of population seeking either their own property or private-rented accommodation.

The figures at odds with all others in Table 5.04 are Vauban's 70% owner-occupied units and Rieselfeld's 50% social-rented units; these percentages are clearly skewing the tenure profiles of both urban quarters and indicate that they are catering for a very specific, rather than an average population profile. Although Vauban is built at fairly high population and dwelling densities, in all other accounts it shares the characteristics of suburbs predominantly for the well to do - with the exception that it is not a car suburb but a public transport suburb. Accordingly, Vauban has to be classified as a socio-economically rather exclusive urban quarter that acts as a small market town in terms of the provision of services. Rieselfeld's exceptionally high percentage of social-rented accommodation (for German conditions) makes it look on paper almost like a social housing estate. However, when walking through the urban quarter the impression of the place, the people, the built form and the landscaping dispel that impression.

Conclusions regarding the population profiles and socio-economic characteristics of Vauban and Rieselfeld

At Vauban, three issues result from its built form, social and socio-economic characteristics:

- Vauban is rather small in area and population. Normally this would indicate that only few local services would be viable. The research project has provided broad evidence that a threshold population of 7,500 is required to support both a relatively modest set of services and public transport, but this evidence assumes that the local services of an urban quarter are providing for the local population only, as higher-level amenities are generally located at district centres. However, with a little more than half of the threshold population, Vauban manages to support a considerable range and diversity of local services as well as tram and bus services. This is clearly only possible because it acts like a small market town catering for a catchment population well beyond its boundaries, and this renders its own population size less significant.
- Vauban has a rather young population profile with a higher than usual percentage of children and a rather low percentage of people of pension age. This means that it is likely that continuous population renewal might not be achieved and that the population age profile might remain skewed over a longer period of time; this also means that demands on services will shift away from current needs to emerging needs, for instance to further education and provision for the elderly. A contingency plan, if it does not already exist, would help to prepare for such changes.
- With a 70% majority of owner-occupied accommodation, Vauban is socially more exclusive than inclusive. As a result of the density of development, this problem may only be tackled – if the city and the Vauban community wants to tackle it – by expansion of the area and by providing further housing and services for a socio-economically more mixed population, with a wider range of

tenure types than currently available. It is not clear that such expansion is at all possible and it might well be that the community and the city don't see that there is a problem.

Rieselfeld has the right size of area and a population that supports a good range of local services including public transport. Rieselfeld's issues are therefore only twofold as the result of its population age profile and its tenure profile:

- Like Vauban, but to an even larger degree, Rieselfeld has a rather young population with a higher than usual percentage of children and a rather low percentage of people of pension age. This means again that continuous population renewal might not be achievable, and that the population age profile might remain skewed over a longer period of time. This also means that demands on services will in the short term shift away from school and crèche places to further education and provision for the elderly and other demands. As at Vauban, a contingency plan would be useful, and might already be in place, to prepare for such changes.
- Rieselfeld has a rather unbalanced tenure type profile, at least when compared with other German profiles with a percentage of social-rented accommodation at around 10% - it seems that Rieselfeld's 50% would be almost normal in a city like Glasgow. This balance is not likely to be solvable by expansion as the area would be too large and consequently also the distances from edge to central services. Nor would it be solvable by intensification through development of remaining gap sites and plots of land as too few are available. It is, however, likely that the city and community do not see any problem with the large percentage of social-rented accommodation.

Environmental and ecological concepts of Vauban

Due to the lack of more detailed information on Rieselfeld, the following investigation will focus on Vauban. Beyond the targets for population and dwelling density, population profiles as well as social and socio-economic characteristics of a sustainable urban quarter, the planning framework for Vauban (to a more clearly advertised level in comparison to that at Rieselfeld) included ecological energy concepts, an ecological traffic and mobility concept and water management, and ecological concepts for the design and landscaping of semi-public and public space. These Vauban concepts will be summarized next.

An ecological energy concept for Vauban to reduce CO₂ and other emissions and protect the climate

The key goal with regard to an ecological energy concept at Freiburg-Vauban was an effective reduction of the energy requirements of all residential buildings. Different alternatives to achieve this were considered and then put into practice (compare Öko-Institut & Partner, *Nachhaltige Stadtteile*, revised version of final report, August 2003):

- The promotion of an 'Improved Low Energy House Standard' for all new buildings at Vauban at a threshold level of 65 kWh/m²a (kilowatt hours per square metre annually), calculated with the Freiburg Method, equivalent to 52 kWh/m²a according to WSV95 (Wärmeschutz-Verordnung 1995) with rules for establishing an energy index for new buildings. In comparison, the German average between 1995 and 2000 was 100 kWh/m²a, before that period 200 kWh/m²a.
- The promotion of a 'Passive House Standard' for 4-storey residential buildings at 15 kWh/m²a, with dwellings exclusive of regular heating systems; heating is achieved through internal gains, passive solar gains, and a heat recuperation system. The target was to build 42 residential units in the first building phase, about 80 more in the second phase. The problem with Vauban's master plan was that only very few residential blocks are facing due south, essential for optimal passive solar gains. This restricted the number of units that could be built.

- The promotion of a 'Plus Energy Standard' for residential units - produced with the help of photovoltaic panels surplus electricity that is sold to the public grid.

The achievements by the end of 1999 were 450 m² thermal solar collectors, 1,200 m² photovoltaic panels; since then there has been a considerable increase. Large areas of photovoltaic panels were used on the Quartiergarage (multi-storey car park) and at the Solarsiedlung (the solar settlement) with approximately 100 residential units (Figure 5.08). An important further element of the ecological energy concept is:

- A district heating co-generation (CHP) plant and grid with collective connections for building groups. The plant runs on wood-chips from wood sustainably harvested within a radius of 60 km to keep production local and reduce transport costs.

Figure 5.08 Solar settlement at Vauban



Source: Daniel Schoenen, Photographer, Freiburg im Breisgau

By 2000 the provisional figures of energy and mineral savings and the reduction of emissions were:

- Energy savings: 28 GJ per year at a CER (cumulative energy requirements) based calculation;
- Reduction of CO₂ equivalents: 2100 tons/year;
- Reduction of SO₂ equivalents: 4 tons/year;
- Saving of mineral resources: 1600 tons/year.

An ecological traffic / mobility concept for Vauban

One of the key goals in the early planning stages of the urban quarter of Vauban was the drastic reduction of vehicular traffic in the settlement in order to reduce pollution and give street spaces back to the people. The concepts investigated and implemented were:

- Reduced car usage in the urban quarter:
 - streets and other public spaces are playgrounds for children and places for social interaction (Figure 5.09);
 - no parking in front of the house or on private property for large parts of the residential areas;
 - cars are parked in 3 multi-storey community car parks at the periphery (Figure 5.10);
 - a 30 km/h speed limit on main access roads, a 5 km/h speed limit in the residential areas.
- Car-free living:

- this required a new legal framework: the Association of Car-free Living in Vauban, a legal body, was founded to achieve the goal;
- more than 140 households joined in the first development phase;
- today, nearly 50% of all households are 'car-free'.

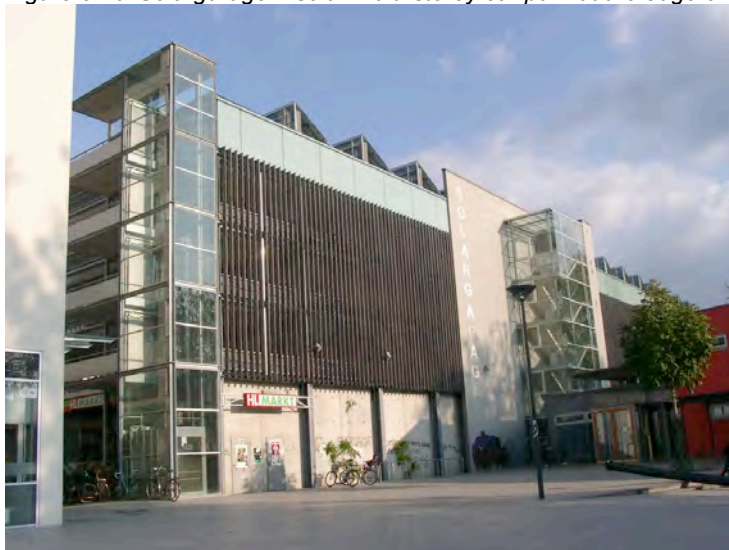
Figure 5.09 Residential street at Vauban: a place for social gatherings and children to play; cars can load and unload but not park there



Source: www.vauban.de/ - Fotorundgang

- Car sharing: residents joining the car sharing organisation have access to cars and receive a one year free pass for public transportation within Freiburg and a 50% reduction on every railway ticket.
- Extension of the tram network to serve Vauban (as well as Rieselfeld) (Figure 5.11), allowing easy access to other parts of the city and city centre (only 2.5 km away).
- Two bus lines connecting Vauban with the city and the railway station.
- The city's extensive network of bicycle routes and pedestrian walkways was extended to Vauban and throughout the urban quarter.

Figure 5.10 Solargarage – solar multi-storey car park at the edge of the residential area



Source: www.vauban.de/ - Fotorundgang

Figure 5.11 Tram route extension under construction at Vaubanallee (2004)



Source: The author

- An integrated transport system for the city and city region. By 1998 already, the system had achieved a balanced use of traffic modes (Source: Socialdata, 1998):
 - Bicycle 17.8%
 - publ. transport 20.8%
 - walking 20.8%
 - Car (driver) 29.7%
 - Car (passenger) 9.9%
 - Motorcycle 1.0%

Figure 5.12 Cars, a bicycle and chariot: alternative modes of transport



Source: Daniel Schoenen, Photographer, Freiburg-Vauban

A sustainable water management concept for Vauban

A water management concept was investigated and then implemented on two levels:

- Rainwater is collected and infiltrated into the ground; the system covers 80% of the residential areas.
- A new ecological sewage system was installed: sewage is transported via vacuum pipes into a biogas plant where it ferments together with organic household waste, generating biogas which is used for cooking; the remaining grey water is cleaned and reused for gardening, flushing toilets etc. It is not quite clear whether this system was installed experimentally or for Vauban at large.

Sustainable concepts for the design of public spaces in Vauban

There was an extensive community involvement in the design of semi-public and public space with the objective to create a 'landscaped' urban quarter:

- Semi-public spaces – such as access galleries, communal gardens and roofs – were created mainly by the building groups and the Genova cooperative; they make visible the urban quarter and its community structure;
- The design of public green spaces, residential streets and the centre of the urban quarter was developed in meetings and workshops with the active participation of the residents.

Figure 5.13 The planting of façades, roofs and gardens: a visual and ecological integration of the built and natural environment



Source: Daniel Schoenen, Photographer, Freiburg-Vauban

Further illustration of the effects of sustainability concepts at Vauban

Vauban has only two types of residential units: flats in generally four storey residential buildings and (two or) three storey terraced houses. The family houses with their own front and back gardens are not segregated into different zones of the urban quarter but mixed with multi-storey residential buildings to generate a built environment with a rich visual-formal variety. The landscaping of façades adds to this by softening the visual appearance of residential buildings. The town houses, being vertically organised and primarily located along the more informal residential streets, fit well in scale and maintain a generally high density (Figure 5.14). This horizontal mix of the two prevailing

dwelling types was made possible through the parcelling of development plots and the almost random allocation of plots of different sizes to smaller or larger building groups.

Figure 5.14 The horizontal mix of two to three-storey town houses and multi-storey residential buildings at Vauban



Source: The author

Thanks to the traffic-calming concept at Vauban, the streets have been taken over by people; they have become meeting places and playgrounds for children, and crèches, shops, cafés and other services attract visitors (Figures 5.15). Particularly noticeable in Vauban is the lack of vehicular traffic and car parking in public spaces; this makes Vauban a very large settlement with pedestrian priority.

Also noticeable in the Vaubanallee is the fragmented character of the street enclosure as a result of largely freestanding parallel rows of residential building blocks and the frequent intersection of perpendicular residential streets on both sides, which allow frequent views into and through these streets beyond the quarter's boundary into the surrounding landscape (Figure 5.16). The consequence of this openness of the spatial structure is that semi-private garden spaces are also frequently unprotected from views and therefore not very intimate.

However, while Vauban's building mass is fragmented, landscaping, in many locations, fulfills the role of spatial enclosure, specifically noticeable in the Vaubanallee (see Figure 5.15). One wonders if additional mature trees could help defining Vaubanallee even more strongly.

Figure 5.15 Public streets as gathering places: Vaubanallee



Source: Daniel Schoenen, Photographer, Freiburg-Vauban

Figure 5.16 View from a residential street into Vaubanallee and beyond into the surrounding landscape



Source: Daniel Schoenen, Photographer, Freiburg-Vauban

Of considerable attraction is the Alfred-Döblin-Platz, the main square in front of the Stadtteilzentrum (the Vauban Community Centre), specifically during the weekly farmers market (Figure 5.17).

Figure 5.17 Market at the Alfred-Döblin-Platz



Source: Daniel Schoenen, Photographer, Freiburg-Vauban

One of the strongest design features at Vauban is the landscaping of the residential streets and alleys; here the openness of the spatial structure really comes into its own (Figure 5.18). The very beautiful landscape of the surrounding countryside flows into the settlement and brings with it a sense of time as well as a strong ecological integration.

Figure 5.18 View through a walkway and cycling path into the surrounding landscape



Source: Daniel Schoenen, Photographer, Freiburg-Vauban

5.4 What can be learned from the investigation of Freiburg's urban quarters Vauban and Rieselfeld

It is now possible to draw conclusions from the analysis of the two urban quarters at Freiburg, how its approach to urban development compares with that proposed by the research project, and what convinces most regarding approach and achievements.

The City of Freiburg's approach to the urban development projects of Vauban and Rieselfeld

The investigation of Freiburg's urban quarters Vauban and Rieselfeld, which was largely carried out after the development of the sustainability *Tool*, has shown that the approach to the generation of development programmes for these urban quarters are firmly based on indicators and target values. In both quarters target values for built form, social, economic and environmental/ecological indicators are formally established during the early stages of the projects, and this process involved the local population.

The approach at Vauban and Rieselfeld of the formulation of target values at the very early stages of these projects is therefore at first sight identical with that of the *Urbanising Suburbia* research project. And indeed, quite a few of the built form target values achieved at Vauban and at Rieselfeld are close to those of the research project, except for Vauban's small area (which was taken as given) and population size (which could have been larger but might have resulted in unsuitably high development densities).

The communalities and differences of the 'Freiburg' and the 'research project' approaches to urban development and regeneration

Both the 'Freiburg' and the 'research project' approaches are target-based, and both formulate targets within the planning and conceptual framework of sustainable urban development. For the research team it was a rewarding experience to see a target-based approach applied in urban development projects and to see that the built form, social and socio-economic values played also an important part in the shaping of the two urban quarters at Freiburg. Their study revealed considerable commonalities in the formulation of targets, specifically the strategically important built form target values. Both the approach and the methodology used in the research project are corroborated by Freiburg's best practice cases. It was especially interesting to be able to study the environmental and ecological targets and values that could not be developed in the research project for reasons already mentioned.

The detailed comparison of values led to the detection of only one categorical divergence. The socio-economic target values, specifically the tenure and age profiles, formulated for Vauban differ considerably from those formulated for Rieselfeld, and both depart from the research target profiles. It is understood that local considerations and constraints at Freiburg led to different socio-economic targets for Vauban compared with those for Rieselfeld. At Vauban the land had to be bought by the city at considerable cost, and plots of land had to be sold to be able to finance the urban quarter's infrastructure, according to the planning department (Interview at Technisches Rathaus, Amt für Projektentwicklung und Stadterneuerung [office for project development and city renewal], 21/12/2004). At Rieselfeld the land was already owned by the city, so no land acquisition cost occurred. This led the city to tailor Vauban largely for owner-occupied residential units and a small percentage of social-rented and private-rented units. In Rieselfeld – in an attempt, it seems, to balance the socio-economic profiles of the two urban quarters if not the city – the decision was to go for a rather high percentage of social-rented residential units and a respectively smaller percentage of owner-occupied and private-rented units. Apparently, Freiburg offers an example of the prioritisation of indicators and target values on the basis of local conditions.

The research project also allows for the prioritisation of targets, but pleads for social inclusion through balanced socio-economic profiles of all urban areas of a city to overcome not only the socio-economic but specifically also the spatial-locational exclusion of low-income groups. In the example of Govan-Drumoyne presented in chapter 4 of this *Summary Report*, the first modest intervention scenario of maintaining a single urban quarter has been tailored such that overall average socio-economic values are achievable through the development of the central area predominantly for owner-occupied residential units in order to compensate for the predominance of social-rented accommodation of the surrounding areas. The second more rigorous intervention scenario of developing a northern urban quarter achieved overall the target values. The northern area of the first urban quarter Drumoyne–South, achieving only average values, becomes part of the second urban quarter Drumoyne–North while its waterfront site is suggested to achieve values at or above targets to compensate for the average achievement of the first scenario areas. So here too are different socio-economic profiles, specifically at the waterfront area that provides accommodation at executive level and is also socially exclusive. Regarding prioritisation there is accordingly not much of a difference between the handling of Freiburg's urban quarters and the Glasgow–Drumoyne quarters. Freiburg's urban quarters are, however, completely separate entities, causing a degree of spatial segregation of higher and lower income groups, whereas the Drumoyne urban quarters are adjacent, actually overlapping, so that there is no categorical spatial segregation of the higher and lower income groups. In that sense Drumoyne achieves more spatial integration and so does Rieselfeld.

What convinces most at the urban quarter Vauban

Leaving aside the issue of social exclusion, there are a number of characteristics at Vauban that convince most. This account focuses on Vauban as more detailed information is available, but similar comments could surely also be made on Rieselfeld.

The breadth of the list of indicators and target values

The list of indicators and target values comprehensively includes issues of sustainable built form, social, economic and environmental/ecological conditions. The pursuit of these issues is rigorous and seemingly supported by the local population. The urban quarter therefore clearly stands as an example of a settlement that has achieved high levels of sustainability and is rightly known as an exemplary best practice case.

The involvement of the community in the planning, design and construction of the urban quarter

The participatory approach reached a level that is unprecedented. Individuals and groups of people were able to influence the list of indicators and values and the decision making process (for instance the retention of some of the barrack blocks). But beyond that, individuals and groups of people became the priority for private developers and virtually built Vauban within a loose urban design framework that regulated the infrastructure, building lines and the height of buildings, but did not constrain the design and landscaping of individual projects. One might think that such an approach of a multiplicity of private developers and developer groups might complicate and slow down the planning, design and construction process, but astonishingly the process seems to have been faster and cheaper than the usual investors/developers approach (email correspondence with the Amt für Projektentwicklung und Stadterneuerung [office for project development and city renewal] by email 13-03-2010). The outcome of the chosen approach has also resulted in a rather refreshing variety of built form, materials and colours that has overcome the sterility of many conventionally developed urban quarters elsewhere.

The high quality of landscaping and the integration of the built and natural environment

The landscape design of urban quarters often seems to be something that is introduced as an afterthought, added on after the major development has already taken shape. In Vauban the landscaping concept evolved from an environmental and ecological strategy to integrate the built form of the urban quarter with the natural world that surrounds and penetrates it. Thus the built form has become part of the natural world, and nature – in form of high quality garden, park, roof and façade landscapes – has infiltrated the built form. Together with all other ecological concepts already discussed, this makes Vauban an urban quarter that responds to human needs as well as to those of the natural environment.

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Chapter 6

Conclusions regarding the formulation of target values and their application in theoretical and concrete urban regeneration & development cases

The purpose of *Urbanising Suburbia – Summary Report* was to explain, for what kind of reasons, in which way, and on what basis of theoretical underpinning the research team established a *Tool* for the measurement of levels of sustainability of urban areas, based on target and threshold values for sustainable urban quarters. Although there is an ongoing discussion on sustainable urban development, the *Summary Report* demonstrates that disappointingly few research projects, publications and recommendations by the UK governments and the European Commission have actually investigated target-based approaches in urban development and regeneration. If one considers that companies developing products for general use by the public cannot afford working without goals and values – a car manufacturer, for instance, considering and setting precise thresholds for emission levels and targets for consumption levels, speed and safety characteristics of their product – why is it that the theory and methodology of urban development and regeneration of one of the most important human ‘products’, the city, draws so little attention? Some speculative answers are attempted to conclude the *Summary Report*.

6.1 Recommendations of built form characteristics and targets for urban development and regeneration

Overall, there are rather few recommendations of target values for sustainable urban development and regeneration and there is little empirical evidence backing up these values. Most of the recommended targets are developed for built form characteristics because some of them are quantifiable as a function of operational and economic viability. The values of such characteristics and their impact on the sustainability of urban areas, towns and cities can be observed and quantified in existing urban areas, a process that can underpin targets by some empirical evidence.

A rare chance of establishing such targets was provided by the UK Government’s ‘Millennium Villages’ and ‘Sustainable Communities’ Programmes mentioned already earlier. They are generally based on sustainable development frameworks for urban neighbourhoods (villages, urban quarters) with the aim to build residential areas on the basis of the adopted frameworks and then measure in post-occupancy studies their achievements in terms of quality of life, environmental friendliness, economic performance and social inclusion. Unfortunately, for the projects undertaken to date under these umbrella programmes no common sustainability framework was developed. Accordingly, concepts for population size, development densities, local services and facilities, and access to public transport and the like are quite different and in cases dependent more on rather diverse contextual conditions than predefined strategic values and sustainability concepts. There is therefore a distinct possibility that well-intended socio-economic, environmental and ecological concepts may falter as the result of insufficient population sizes and socio-economic profiles.

The *Urbanising Suburbia* project was fortunate to find among others two cases of urban quarters built on the basis of well defined sustainability concepts: Vauban and Rieselfeld at Freiburg im Breisgau, Germany. Their investigation helped corroborate to a considerable extent the research team’s approach and its strategic sustainability indicators and target values (although on some values and concepts there are some disagreements). Further ground covering and systematic investigations on such best practice case studies in the UK and Europe would greatly help to support target values with empirical evidence and should be carried out as a matter of urgency. This

investigation might also answer the question whether built form indicators and established target values have general validity within areas of the same or similar political, cultural and socio-economic conditions, for instance the UK, perhaps even some of the 'old' EU countries.

6.2 The lack of social and socio-economic target and threshold values

To establish target values for social and economic characteristics of sustainable urban quarters is an altogether different matter. Investigations of *The Handbook* show, and it is common knowledge, that many of the socio-economic conditions in the UK, England, Scotland, even of individual urban quarters in one and the same city, differ quite considerably. Commonly valid socio-economic targets are accordingly difficult to achieve, and place-specific values and value profiles have therefore to be established that reflect existing social and socio-economic conditions in, and the specific built form of urban areas. This adds to the complexity of research and may well be one of the reasons why no general recommendations for socio-economic targets were found in literature and governmental policies and recommendations, also not in EU proclamations, recommendations and rules.

That socio-economic conditions differ so intensely – for example in areas of southeast England compared with areas of northeast England – has generally to do with location, connectivity and accessibility within the UK and beyond, but more specifically with the high concentration of central government departments and International Financial Services industries in London and the southeast of England, the concentrations of coal mining and production industries in the 19th and early 20th century in middle England and the northeast where many cities are still today struggling with the remnants of the collapse of traditional production industries. Such concentrations are responsible for considerable socio-economic imbalances of cities and city regions in the UK that are echoed by the imbalance of urban areas in the cities. However, research that focuses predominantly on the investigation of the emergence of specific socio-economic population profiles and the reasons behind that emergence, while on its own is interesting, it is insufficient. Much more intense research should be undertaken as to how poor socio-economic profiles of urban areas, cities and regions can be improved.

6.3 Barriers to the balancing of socio-economic profiles

It is quite likely that the call for some socio-economic balance in UK cities and regions will be challenged at city and region levels by those living and working in specific urban quarters of a city and specific regions in the UK with high qualitative profiles: those in advantaged areas and urban quarters of UK cities are likely to prefer the good image and qualities of their living and working environment getting even better and even more advantaged rather than becoming more average. It is also likely that not all urban regions of a country and not all urban quarters of a city will have the opportunities and resources to achieve balanced profiles; there will accordingly always be some differences, but they should not be as huge as they are today.

Most importantly, the differences between the socio-economic profiles of a city's urban quarters or a country's urban regions are in many, if not all, cases the outcome of historical 'accidents', e.g. the collapse of traditional industries during the first half of the 20th century or the development of free international trading that gave rise to the birth of a global economy during the Thatcher period. The impacts of such historical 'accidents' on individuals, cities and UK regions may have caused the socio-economic downfall for the masses of people employed in disappearing traditional industries or the emergence of a new socio-economic 'elite' of those skilled enough to be players in a global economy. There are therefore considerable differences in the amount of balancing to be done, and some urban

quarters, cities or urban regions will need a longer period of regeneration than others, even for achieving only average socio-economic value profiles.

The process of the improvement of built form and socio-economic profiles of urban quarters will therefore be shorter or longer according to starting points closer or further away from targets and available resources. The local contextual and socio-economic conditions and constraints will accordingly require priorities to be set as to which targets to meet and where, if only temporarily, to compromise in case that not all targets are, as is momentarily likely, achievable.

6.4 The outcome of the improvement of urban areas in pursuit of common targets: cloned urban quarters, towns and cities?

There is one remaining question that has been asked and needs to be answered. Leaving aside all different context conditions, constraints, available resources and local priorities, and leaving aside the different potential of existing urban areas for regeneration, and assuming the impossible that all urban areas of a city could actually meet target values, would this not produce urban quarters with identical characteristics and a repetitive everywhere-the-same kind of built environment as was the case during the 1960s? There are some who believe that the application of common targets and value profiles would produce cloned urban areas and cities to an even higher degree as is currently the case. They promote therefore different target values and profiles to generate variety and a unique identity for each city, town and urban quarter.

Well, we already have cloned cities, or at least cloned city parts, but they are not the result of common social and socio-economic values but of very specific values of a relatively small but very powerful group of investors, developers, and people employed in the International Financial Services industry. They generate vertical cities, little or not so little Manhattans with international architecture and high-tech facades of buildings the height of which express the amount of power their companies have in the global market and economy. What needs to be understood is that those targets that are truly common to all urban areas in a particular region or country define only those indispensable qualities that all urban quarters, towns and cities must have to become places where the basic needs of ordinary human beings are provided for: shelter, employment and income, local services and facilities, and a socio-economically balanced community if that is achievable. Beyond these vital basics that form the generally valid 'key concept' of urban quarters, there is, however, a multitude of additional human needs and aspirations that promote a very place-specific development. This is the development phase during which creativity and individual human endeavour transform the 'concept' into a very specific human settlement with a clear identity. This is one of the reasons why the research project focuses only on strategic targets for the planning and conception stage of an urban quarter: a strategic framework based on common goals of the inhabitants of urban quarters, towns and cities ought provide a platform for individualistic further development once the common denominator of urban development and regeneration have been agreed upon.

Again, the two best practice case studies of Freiburg demonstrate the validity and advantages of a loose common framework and individual freedom to build one's very own environment. In both urban quarters a strategic value framework was developed with regard to population size, development densities, local services and facilities, and workplaces as well as environmental / ecological concepts for energy-saving accommodation, the use of clean and renewable energy, water recycling and waste water treatment, ecological landscaping; but there were no further constraints other than sticking to the building and site configuration as specified in the master plan. In contrast to the sterility of pre-planned and pre-designed settlements of the 1960s and '70s which individuals

had no other chance but to accept or, if they could, to refuse - the outcome of a loose development framework and the involvement of individuals and groups of people that are the future inhabitants of an urban quarter is a lively built environment with a very unique identity.

6.5 Barriers to the application of the sustainability tool in practice

This research project has generated a target-based tool with the help of which levels of sustainability of urban areas can be measured and, on the basis of this measurement, regeneration programmes can be systematically established to improve the areas' levels of sustainability. The *Summary Report* has demonstrated how the indicators, threshold and target values are used to measure the level of an urban area's sustainability, develop regeneration programmes in theoretical cases and measure the achievements in concrete regeneration and development projects.

The testing of the sustainability tool, specifically its target and threshold values in the Glasgow Govan area, the survey of existing conditions and values, and the theoretical remodelling of the urban quarters were the most difficult parts of the project. The research team saw that the tool had great benefits, the City Council and the Glasgow Housing Association, however, discouraged the project team from consulting local communities and stakeholders in order not to jeopardise ongoing discussions of concrete but much smaller regeneration projects in comparison to those of the research team. This meant that the last step of research, the fine-tuning of the sustainability tool in response to reactions from the community and stakeholders, was not possible.

For the research team the formulation and application of target / threshold values has proved to be very helpful for the development of regeneration programmes, but achieving with the City Council partners a consensus on regeneration strategies even in hypothetical cases has shown to be a somewhat painful process as the sustainability tool requires approaches that seem to be categorically different from common practice:

- strategic and multi-lateral thinking, specifically the ability to comprehensively ascertain the needs of individuals and communities and integrate individual urban development projects in a sustainability framework;
- the courage not to compromise too soon when pressure groups push for development projects that reflect their own needs and aspirations but not also those of other groups and the community at large;
- planning strategically for rather long development periods and to view current conditions as changeable even though change may be rather slow.

The theoretical application of the sustainability tool in Glasgow has shown the research team the potential of substantially improving the sustainability levels of existing urban areas by achieving most target values if rigorously pursued. In practice this may not be so easy. The most difficult thing for local authority planners will be to change from a case-by-case approach in urban development to a more strategic approach of the development of flexible frameworks for urban quarters – and through them for urban districts, towns and the city – that are adaptable to changing needs and conditions and loosely integrate individual development projects.

The application of the sustainability tool further requires the review of current city plans, as it is unlikely that they are based on the concept of the modularity of the city's physical structure. The importance of focusing on urban quarters with a substantial size of population and area will not be easily understood, and this is another, most likely decisive barrier to the application of the tool. It is current planning practice to focus on rather small urban areas, if not on individual urban projects at a time, and to change current practice will be difficult. It is well understood that an urban quarter is

developed bit by bit in a relatively long process as the result of the sequence of individual planning proposals. It should, however, also be understood that sustainability target and threshold values are essential for the forming of frameworks that guide and integrate disparate development projects, to be implemented in a sequential process that is likely to take many years. Needed is the change of the planning approach away from mere social and economic pursuits towards the inclusion of strategic spatial and structural planning and long-term development and regeneration frameworks. The UK's Royal Town Planning Institute has declared its keen interest of that kind of change of the planning system; on the basis of today's planners and their current way of operating, it is likely that it will take years for the theory and methodology proposed by the research team for urban development and regeneration be understood, let alone implemented.