



# Urban form and sustainability

This briefing provides initial information and evidence on the links between urban form and sustainable outcomes. It looks at sustainability through a spatial perspective, i.e. the location of new housing developments and physical and social infrastructure.

## Who should read this?

Policy-makers, decision-makers and practitioners in the UK and internationally.

## Key findings

Low-density, car-oriented and dispersed developments are often disconnected from physical and social infrastructure, creating economic, social and environmental problems over time. Long-term spatial planning is required to ensure that new developments are located in the right places for sustainability.

## Background

### Urban form and infrastructure: definitions

Urban form is defined as the physical characteristics that make up built-up areas, including the shape, size, density and configuration of settlements. It can be considered at different scales: regional, urban, neighbourhood, block and street. Urban form evolves constantly in response to social, environmental, economic and technological developments; planning, housing and urban policies; and health, transport and economic policies.<sup>1</sup>

Sustainable urban form needs to be considered in relation to infrastructure. Successful infrastructure meets demand and provides reliable, cost effective, and high-quality services. Other important infrastructure aspects include the affordability and accessibility of services and the resilience and sustainability of infrastructure. However, in the UK, the National Infrastructure Plan takes a sectoral approach rather than a spatial one. In general this approach can mean we get infrastructure in the wrong places.<sup>2</sup>

### What is sprawl?

As an urban form, sprawl has been described as the opposite of the desirable compact city, with high density, centralised development and a mixture of functions. However, what is considered to be sprawl ranges along a continuum of more compact to completely dispersed development. A variety of urban forms have been covered by the term 'urban sprawl', ranging from contiguous suburban growth, linear patterns of strip development, leapfrog and scattered development.<sup>3</sup>

Suburbs are often used as a proxy for sprawl in research on urban form and sustainability. While it is difficult to agree on a definition of the term in a way which makes sense internationally, location and newness seem to be important factors to consider.<sup>4</sup> To the Smith Institute, "the

<sup>1</sup> Government Office for Science/Foresight, *Urban form and infrastructure: a morphological review*, June 2014.

<sup>2</sup> Ibid. See also RTPI, *Thinking Spatially*, June 2014.

<sup>3</sup> ESPON, *EU-LUPA European Land Use Patterns*, June 2011.

<sup>4</sup> Ann Forsyth, 'Global suburbia and the transition century: physical suburbs in the long-term' *Urban Design International* (2014) 19, pp. 259-273.

suburb is [...] defined by its locality, on the edge of but still part of a city or town. Rather than a 'parasitic' relationship, it implies an interdependent relationship".<sup>5</sup> Investigating the city/suburb contrast, Turcotte defined the suburbs by their built environment or activities, for example as places with many detached houses, as mainly residential in land use, or that are car-oriented.<sup>6</sup>

### UK context

In Victorian and interwar Britain, housebuilding was planned around infrastructure - new road, rail or tram networks, water and sewer pipes, schools and hospitals. Land and resources were used rationally to meet housing need.<sup>7</sup> By contrast, the 1980s, 1990s, and 2000s witnessed a growing disconnect between urban form, land use and infrastructure. This resulted in peripheral, car-based housing estates, increased suburbanisation and dispersed development. Much housing over the last decades has been developed without adequate infrastructure.<sup>8</sup>

In addition, the considerable development in the last 30 years, but especially in the last decade, in rural areas, villages and small towns has dispersed the built-up area. A quarter of all new housing built between 2000 and 2004 was built in small settlements of less than 10,000 people including dispersed residential development within villages, hamlets and isolated farms. Some commentators have argued that this form of development is akin to a new form of sprawl.<sup>9</sup>

5 Smith Institute, *Poverty in Suburbia*, April 2014.

6 Martin Turcotte (2008), 'The city/suburb contrast: How can we measure it?' <http://www.statcan.gc.ca/pub/11-008-x/2008001/article/10459-eng.pdf>

7 Yvonne Rydin, *The Purpose of Planning*, 2011

8 Government Office for Science/Foresight, *Urban form and infrastructure: a morphological review*, June 2014.

9 Ibid.

For example in South Hampshire, where development from the 1960s exhibited a reasonable overall density, a combination of clustering, moderate concentration and low continuity promoted additional travel and scattered suburban sprawl.<sup>10</sup>

Sprawl is a complex phenomenon which is also shaped by wider processes, such as housing prices driving people out of cities. This raises the question of how to deal with a property and housing market that orientates the residential choices of households towards suburbs, which in turn generates socio-spatial segregation.

### The costs of urban sprawl

The issue of urban sprawl - from suburban development to dispersed development - raises the question whether these patterns of development are sustainable in the long-term. This has been the focus of attention in research on the following topics.

#### Environment and climate change

Dispersed settlements typically result in higher levels of greenhouse gas emissions and resource consumption (land, energy and water) than compact settlements. This is attributable to increased car-dependency and energy consumption associated with low-density housing, coupled with the increased embodied energy during infrastructure provision. Dispersed settlements may also cover land with value for future climate adaptation, such as green spaces which mitigate against flood risk.<sup>11</sup>

Developments in suburbs have implications for energy use, levels of local pollutants and opportunities for sustainable

10 Nicholas A. Phelps, *An Anatomy of Sprawl: Planning and Politics in Britain*, 2012.

11 Government Office for Science/Foresight, *Urban form and infrastructure: a morphological review*, June 2014.



employment.<sup>12</sup> Sprawl has an impact on flood and drought risk and the expansion of sprawl results in motor vehicle collisions, higher climate change, transport emissions and level of local pollutants, which also impose significant costs on the economy and people. For example in Toronto smog emissions from automobiles cost the economy 2.2 billion per year and kill an estimated 440 people per year.<sup>13</sup>

### Health and quality of life

Sprawl has an impact on quality of life and health, and raises questions of choice and equity in public service provision such as healthcare. Suburban living can disadvantage those who are unable to drive, such as the elderly and children, and has been linked with lack of social connections and isolation<sup>14</sup>. Furthermore, urban form also impacts on levels of physical activity<sup>15</sup>, with sprawl correlated to an increased likelihood of obesity.<sup>16</sup> Longer travel times and being stuck in traffic can impact stress levels. In many suburban environments, people are not only dependent on the car for commuting but also driving to access local amenities such as shops, schools, health services, etc which has an impact on physical activity levels.

### Transport poverty

The real cost of a house in a place where individuals and families are dependent on driving for their daily needs is much higher

than its advertised price,<sup>17</sup> as fuel costs can weigh heavily on a household's budget. In France, households spending 18% to 20% of their disposable wage on transportation costs are considered at risk of transport poverty, especially in a context where fuel prices are unstable.<sup>18</sup> In the UK 1.5 million people are deemed at high risk of transport poverty.<sup>19</sup> Those in less urban areas are less likely to use public transport; and whereas bus fares have risen by 30% between 2001 and 2013, petrol prices have risen by 70%. This obviously has a disproportionate effect on low-income suburban households who are reliant on the car.<sup>20</sup> In the US the 'location efficiency' concept offers lower mortgage rates in locations where less money has to be spent on automobile-dependency.<sup>21</sup>

### Poverty

Poverty has been growing faster in suburbia than in cities in the UK, where there is a higher proportion of lone parents, older people and people with a disability than in cities. Issues such as access to jobs, availability of public transport and provision of housing as well as access to shops, services are more prominent in suburban areas, which are spatially more spread out and people there are more reliant on the car. For example, being physically able to attend job interviews is difficult for those who don't own a car as bus services can be infrequent and unreliable.<sup>22</sup>

<sup>12</sup> Ann Forsyth, 'Global suburbia and the transition century: physical suburbs in the long-term' *Urban Design International* (2014) 19, pp. 259-273.

<sup>13</sup> Sustainable Prosperity, *Suburban Sprawl: Exposing Hidden Costs, Identifying Innovations*, October 2013.

<sup>14</sup> Ann Forsyth, 'Global suburbia and the transition century: physical suburbs in the long-term' *Urban Design International* (2014) 19, pp. 259-273.

<sup>15</sup> Billie Giles-Corti, *The impact of urban form on public health*, 2006.

<sup>16</sup> Sustainable Prosperity, *Suburban Sprawl: Exposing Hidden Costs, Identifying Innovations*, October 2013.

<sup>17</sup> Pembina Institute, *Location Matters: Factoring location costs into homebuying decisions*, January 2015.

<sup>18</sup> Observatoire Régional de l'Habitat et du Logement Rhône-Alpes, *De la vulnérabilité à la précarité énergétique*, December 2010.

<sup>19</sup> Sustrans, *Locked Out: Transport Poverty in England*, 2012.

<sup>20</sup> Smith Institute, *Poverty in Suburbia*, April 2014.

<sup>21</sup> John I. Gilderbloom et al, 'Does walkability matter? An examination of walkability's impact on housing values, foreclosure and crime', *Cities* 42 (2015) pp. 13-24.

<sup>22</sup> Smith Institute, *Poverty in Suburbia*, April 2014.



## Infrastructure costs

The costs of providing and maintaining infrastructure for scattered developments are high. Suburbs share a number of similar characteristics, e.g. problems with regional accessibility and the need to establish physical connections and physical infrastructure (either over time or at substantial initial cost).<sup>23</sup>

## Implications for Planning

Urban forms can be described as successful when they underpin the functioning of an array of urban systems, use resources sustainably, and provide a sound economic base which enables a good quality of life for its inhabitants. They can also withstand shocks, and are able to 'bounce back' or improve their conditions post-shock (whether that shock be environmental, economic and/or social such as shrinking cities, peak energy and climate crises).<sup>24</sup>

Many poorly planned places in the world will need extensive retrofitting in the years to come. We need to plan actively to allow for new development to be located in sustainable places, with the right infrastructure, taking a spatial approach in response to rising inequality, an ageing population and climate change.

According to Rydin<sup>25</sup>, questions around the location of new developments include:

- the relationship to infrastructure of all kinds;
- the impact of overall patterns of urban form; and

- the question of what is being replaced.

Infrastructure can be expanded but this raises the questions of who should bear the cost. Developers will often only cover a proportion of additional infrastructure provision, with the remaining financial burden falling on the public sector.

Planning on a local and regional scale should start with mapping infrastructure and deciding which sites to prioritise for development. As infrastructure is costly to put into place, it makes sense to locate new developments in areas of spare capacity, such as from energy and water networks, or in terms of local education and healthcare facilities.

It can be challenging to reconcile individual preferences on housing location with societal and environmental capacities. However in many cases, the decision to live in the suburbs is based on price rather than personal preference<sup>26</sup>, raising the wider question of housing affordability.

## Further research

The RTPI will be conducting a policy and research programme on the location of development in 2015.

## About the RTPI

This briefing is based on research undertaken by Victoria Pinoncelly, RTPI Research Officer.

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<sup>23</sup> Ann Forsyth, 'Global suburbia and the transition century: physical suburbs in the long-term' *Urban Design International* (2014) 19, pp. 259-273.

<sup>24</sup> Government Office for Science/Foresight, *Urban form and infrastructure: a morphological review*, June 2014.

<sup>25</sup> Yvonne Rydin, *The purpose of planning – creating sustainable towns and cities*, 2011.

<sup>26</sup> Pembina Institute, *Location Matters: Factoring location costs into homebuying decisions*, January 2015.