Place value: place quality and its impact on health, social, economic and environmental outcomes

Matthew Carmona

The Bartlett School of Planning, UCL, London, UK

ABSTRACT

This paper explores the link between the quality of the built environment and its value, in health, social, economic and environmental terms. This is theorized as ‘place value’ which, alongside ‘place quality’, is conceptualized as existing within a virtuous loop in which quality dictates value and value defines quality. To test this, a systematic review brought together wide-ranging international research evidence. The work confirmed a range of definitive associations between the quality of place and its place derived value. It also makes a clear link back from the evidence on place value to the sorts of qualities that enhance or detract from that value. These, in turn, define the constituent elements of place quality.

Introduction

The urban places that most of us inhabit are made up of buildings, streets, spaces and landscape, various land uses and a community of users. ‘Place’ is therefore a socio-physical construct, and numerous claims are made about the power of place.

The international literature suggests that whoever we are, our everyday engagement with the places in which we live, work and play will influence, for good or ill, the lives we lead, the opportunities available to us, and our personal and communal happiness, identity and sense of belonging (Speck 2012; Montgomery 2013). Place underpins cultural activities and social opportunities. Place is political, influencing provision of and access to common assets, including to grey, green and social infrastructure (Tonkiss 2013; Inam 2014). The quality of places influences and is influenced by housing conditions, real estate markets and our use of technology, and the experience of place is fundamental to our physical and mental health and sense of well-being (Adams and Tiesdell 2013; Barton 2017). Place has an impact on the way we govern ourselves, on our democracy and local decision making, on community togetherness and empowerment (Netto 2017), and on much, much more.

This paper reviews the empirical evidence in order to explore whether the types of benefits outlined above are merely a woolly wish-list of desired benefits advocated by those already convinced about the importance of investing in a high quality built environment, or whether they are statements of fact supported by robust and convincing evidence. If the
evidence is clear, then arguably policy makers, developers and built environment professionals would be foolish not to make the pursuit of a high quality built environment a top priority. First, however, the evidence needs to be clear, and second, it needs to be presented in a manner that allows the connection to be made between particular qualities of place and the types of value they give rise to for users of the built environment.

To do this the concept of ‘place value’ is theorized and linked to the allied notion of ‘place quality’. The inter-relationships are conceptualized, before the approach taken to the research — a systematic review — is discussed. The evidence is summarized against four policy arenas: health, social, economic and environmental, with each summary concluding with what the evidence tells us about the types of value that place can deliver in each field. By necessity these sections are highly curtailed as space does not permit discussion of the large number of sources used, but the ‘raw’ data can be found in a more expansive form in a new open source wiki: www.place-value-wiki.net. Finally, some overarching conclusions are drawn out of two types. First, concerning what types of place qualities (design principles) the growing body of evidence reveals as most likely to deliver greatest place value, and second, with regard to overarching findings on the value / quality nexus and the significance and coherence of the collective evidence.

What is meant by place value?

Value is most generally defined as ‘a measure of the worth of something’ (Carmona et al. 2001b, 14), but this generality means that the concept suffers from an unavoidable ‘spread of opinion over meaning’ (Eccles 1996). Concepts of value have been most comprehensively developed in the field of economics, and while economic value is only one way of defining and measuring value, it is useful to help explain how people establish preferences and make choices that involve trade-offs in allocating resources (Carmona et al. 2006).

Here, the conceptual distinction between ‘exchange’ and ‘use’ value is often made. In economics, exchange value is related to market price as determined by supply and demand and would be derived from some observation of market behaviour of the good which may or may not reflect any universal intrinsic value of the good. Use value, on the other hand, expresses the simple notion that goods can be useful — offer benefits to people — and this reflects the use to which a good can be put. These two values will often be quite different, and, for the same good or service, can even accrue to different parties.

A third and more avowedly ‘public’ conception of value is described by Abelson (2000, 5) when discussing the impact of heritage buildings as a public benefit. In doing so he draws on a ‘common distinction in economics — between internal and external impacts’. In this respect public benefits are the external benefits that cannot be directly appropriated by the owner.

These three notions of value are rooted in classical and neo-classical economics and so tend not to take into account (or do so inadequately) the social and cultural understandings of the term (Eccles 1996). Taking a broader notion of value, one that extends the public conceptions of value, the former Commission for Architecture & the Built Environment (CABE 2006) in England identified six different types of value that can be delivered by the built environment:

- Exchange value: parts of the built environment can be traded;
- Use value: the built environment impacts on the activities that go on there;
- Image value: the identity and meaning of built environment projects, good or bad;
- Social value: the built environment supports or undermines social relations;
- Environmental value: the built environment supports or undermines environmental resources;
- Cultural value: the built environment has cultural significance.

These conceptual notions demonstrate a much broader scope of the concept than that associated with exchange, although still relate poorly to the types of very tangible policy and practice agendas within which politicians, built environment professionals and policy makers typically operate (Mulgan et al. 2006). An entirely different way of thinking about value, therefore, is more straightforwardly the degree to which the different qualities of the built environment impact, either positively or negatively, on different public policy goals. As the intention when embarking on this review was to create findings that were immediately useful to those considering the case for investing in place quality, this was the view taken in the study. This notion, which might be called ‘Place value’, reflects the idea that a complex but inter-related basket of benefits accompanies any intervention in the built environment and ultimately flows to those with a stake in the place: local residents, investors and developers, everyday users, business owners, public authorities, and so forth. Place value can therefore be defined as ‘The diverse forms of value generated as a consequence of how places are shaped’.

The analysis that follows gathers research evidence together under four ‘big ticket’ policy arenas that governments (national and local) everywhere are typically concerned with: health, society, the economy and environment. These are the areas on which elections are won and lost as they impact so directly on the daily lives of citizens. Testing the extent to which these arenas are influenced by the quality of the local built environment is therefore a legitimate means to make a judgement about the value, broadly defined, of investing in the quality of the built environment; in other words, how do the qualities of place deliver value with regard to enhanced health outcomes, greater societal well-being, economic success and environmental sustainability. If a higher quality built environment adds value in and across these policy arenas, it follows that an intelligent approach to public policy should have a clear place quality dimension at its heart.

**What is meant by place quality?**

The other side of the coin is place quality. Again, the literature points to a host of over-lapping and poorly defined terms that all have relevance. Liveability, sense of place, urban environmental quality, physical capital, urban design, urbanism and even sustainability are all concepts / fields which are related, which overlap, and which incorporate ideas about the quality of the built environment. Equally, they are frequently contrasted or used as repositories in which almost anything fits (Massen 2002; Van Kamp et al. 2003; Brook Lyndhurst 2004).

The different conceptualizations owe their origins to different policy / practice traditions, each being multi-dimensional and multi-objective and often subject to their own normative prescriptions for what is a liveable place, high quality urban design, sustainable development, etc. Thus Witold Rybczynski (cited in Moore 2000, 208) describes such notions as being like an onion:

> It appears simple on the outside, but it’s deceptive, for it has many layers. If it is cut apart there are just onion-skins left and the original form has disappeared. If each layer is described separately, we lose sight of the whole.
By way of example, taking just one such conceptualization, Carmona and de Magalhaes (2009) define 12 measurable elements of ‘local environmental quality’: clean and tidy, accessible, attractive, comfortable, inclusive, vital and viable, functional, distinctive, safe and secure, robust, green and unpolluted, and fulfilling. Each of these elements, in turn, represents a complex amalgam of issues, that is experienced in a relative manner (in the sense that the experience of it can be either positive or negative), whilst the complexity of the whole spirals on and on.

Cutting through this complexity and relating the issue back to the discussion of value, one way of answering the question ‘what is meant by place quality?’ might simply be that a high quality place is one which returns the greatest value to its users with regard to meeting and sustaining them in healthy, socially rich and economically productive lifestyles that touch lightly on the environment. Reflecting this position, a deliberately broad and unconstrained notion of ‘place quality’ was adopted to guide the systematic review, with studies included as long as they related some measurable aspect of public and/or private value to one or more tangible ‘qualities’ of the built environment, for example, the presence of trees, a mix of uses, walkability, and so forth.

In fact, many of the research studies examined in the review define what they mean by ‘place’, ‘urban design’, ‘urban quality’, ‘environmental quality’ or a whole host of other descriptors of the built environment quite differently, and most focus on particular very limited aspects or dimensions of what is a broad set of concerns. One consequence of this is that whilst place quality might be strongly associated with the quality of design in the built environment, it also goes well beyond by incorporating the processes and outcomes of development, regeneration and the long-term management of places (as well as their design); in other words the complete place-shaping process (Carmona 2014). In turn, this provides further support for the strategy adopted during the systematic review of seeking and including evidence that expands beyond the purely physical built environment to the social workings of place and to environmental sustainability.

**Theorizing place value**

The discussion so far can be represented in a simple conceptual framework (Figure 1). This has three elements:

- Policy goals from different policy arenas are mediated through particular qualities embodied in the built environment;
- In helping (or not) to meet those goals, value is added (or deducted), defining a collective ‘place value’;
- Measures that add place value can in turn be used as a gauge for place quality, aka the desirable qualities of the built environment.

Following this logic, prioritizing a high quality built environment in decision making and associated public and private investments can (in theory at least) positively influence the delivery of a broad range of public policy goals, just as a disregard can detract from it. There is also (potentially) a virtuous loop, with the degree to which environments deliver value (and facilitate key public policy goals), determining whether they are intrinsically high quality or not. The question the research asks is, what does the empirical evidence say, and is this really the case?
The research

Systematic reviews are a standard approach used in the sciences to establish what is known and what is not known about a particular topic. They are particularly popular in the medical sciences where different studies can present conflicting findings on an issue and where there is a need to gauge the sum total of knowledge quickly and effectively in order to draw robust and reliable overarching conclusions (Brown et al. 2012). In recent years, these methodologies have also become more popular in the social sciences, driven by the spread of evidence-based policy in the 2000s (The Cabinet Office 2001).

Systematic review

Typically, systematic reviews begin with the identification of a key question or issue in order to focus the search. In this case the review focused on mapping out and presenting the wide range of research on the value added by the quality of place. This was guided by the relationships expressed in the conceptual framework in that research was sought that explicitly conflated aspects or qualities of the built environment with aspects of the public policy goals already outlined. The full range of the public policy dimensions eventually covered by the research is included in Figure 2, although it is important to note that at the start the list was more narrowly defined. The categories emerged as the review developed and as evidence coalesced around certain themes.

To start the review, appropriate search terms were identified and entered into a database of likely evidence sources. The narrower the search and the more specific the terms, the more straightforward a review is likely to be. In this case the terms ‘value’ and ‘place’ are...
widely used generic terms with broad meanings, and so initial searches using the Science Direct and Sage Databases narrowed the field down by using these terms alongside other identifiers such as urban design, planning, health, crime, social benefits, social inclusion, place-making and added value.

The search was conducted with a cut-off date of March 2017, with a simultaneous search of academic publications through Google Scholar taking the work up to July 2017. Combined, the initial hunts revealed approximately 3300 possible studies. A later search focusing specifically on environmental evidence was undertaken in late 2017. Using Science Direct, that search used 21 unique combinations of terms including: urban design, place, quality, value, pollution reduction, carbon reduction, conservation of built heritage, hydrology, sustainability and so forth. A review of approximately 6300 potential studies were identified from this work (once duplicate results across searches were removed). However, relatively few of these focused at the urban scale (as opposed to that of the building) or on factors that could be linked directly to particular urban qualities.

Concurrently, earlier similar reviews were examined, including Carmona et al. (2001a); (2002) and Woolley et al. (2004) that had been commissioned in the early 2000s by CABE. Since these reviews were conducted, research on the subject has ballooned, as have the scope of studies, the range of primary disciplines within which it is published, and the methodologies employed by researchers. This greater diversity was immediately obvious on launching the new review and informed the decision to take the broader view of ‘place
quality’ rather than ‘design quality’ which had been adopted in the earlier studies (Carmona 2016). It was starkly revealed in the percentages of studies from across the decades covered by the review (Figure 3), with the quantity of studies conducted in recent years spiralling. Undoubtedly this is also linked to the greater availability of journals electronically via the World Wide Web in recent years.

Whilst systematic reviews in the medical sciences avoid including publications that have not been through a peer-reviewing process, in the built environment field much valuable research is produced by companies, charities and public sector organizations and distributed via reports. As long as such work met the inclusion criteria discussed below, this ‘grey’ literature was also included in the review. Once a relevant study was identified, Google Scholar was further consulted in order to identify at least the first 20 related studies. This exercise often tapped into a broader body of similar research that was not always revealed using the key terms alone.

Together, these searches (of earlier similar reviews, the grey literature and related studies) revealed approximately 10,800 records. After removing the duplicates between this and the earlier search results, 13,700 records were identified for possible inclusion in the review.

**Inclusion (and exclusion) criteria**

From this long list of possible studies, a series of inclusion and exclusion criteria were applied to narrow the selection down across three levels: first, through more critically reviewing the title of the publication to determine its relevance; second, at the level of the abstract; and third by exploring the text in full. Four inclusion criteria were used:

- The study needed to investigate the relationship, whether positive of negative, between some quality of place, and at least one form of value relating to health outcomes, social well-being, economic success and environmental sustainability.
- It needed to report on original research. Review articles were included but only if they drew out a clear new conclusion from a rigorous analysis of the literature.
- The research reported needed to result in a clear conclusion relating to place quality and value. Other conclusions from the various studies examined (e.g., relating to process...
issues or policy recommendations) were not considered relevant for the purposes of this research.

- The research methodology needed to be clear and robust. In this respect the grey literature was more carefully examined to ensure studies had used a rigorous methodology or drew from research that had.

When a research project resulted in more than one paper by the same research team looking at a closely related aspect of the work, only the more comprehensive paper was included in the review. The review also excluded research studies that focused exclusively on the construction or internal spaces of buildings, as well as those that were only strategic (citywide or regional) relevance. In other words, there was a scale limitation to the studies included, which needed to be ‘urban’ and ‘place’ focused.

All 13,700 studies were examined against the inclusion criteria and in total, 271 studies were considered worthy of inclusion in the review — approximately 2% of the studies identified. These were classified against the four related public policy dimensions and the various sub-categories already set out (Figure 2). Here it is important to note that a significant proportion of the research spanned more than one of the sub-categories, and occasionally (as will be discussed) more than one of the policy arenas.

Whilst the evidence reviewed was truly international in its origins, the search itself was restricted to English language articles and this inevitably biased the results. Of the 271 studies, 38% derived from the USA and 34% from the UK. Other significant contributors to the evidence base included other European countries (notably The Netherlands), Australia, China, South Korea and Canada. Whilst there was a remarkable consistency in many of the findings across very different cultural and environmental contexts, inevitably the research reviewed is dominated by a Western, Anglo-Saxon perspective, and so care needs to be taken in extrapolating the findings to other contexts.

**The collective evidence on place value**

This is not a review article that relates and discusses in detail the literature on a subject, nor is any claim made that every study included in the review was equally rigorous and definitive in its findings. Space simply does not permit a source by source discussion, and instead the contribution of the paper is in bringing together a large number of empirical studies to examine collectively what they reveal.

In this section, the evidence is brought together in four extended tables.1 Similar studies are (as far as possible) grouped, and observations are made about the nature and scope of the evidence in the different categories and what, collectively, it tells us about the nature of place value. This is followed, as anticipated in the place value framework (Figure 1), by a discussion of the nature of place quality that the revealed dimensions of value in turn expose.

**The evidence on place value and health outcomes**

There is a large and rapidly growing body of evidence on the importance of place quality for health outcomes, primarily using scientific methodologies to explore the field (Table 1). A diverse range of physical qualities, and perceptions of those qualities, are studied, ranging from intangible issues such as the importance of a positive sense of place to very
### Table 1. The health evidence.

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|-----------------------------|-----------------------------------|
| **A1. Greenness and physical health** |             |                             |                                   |
| Ulmer et al. (2016) | Health benefits of urban tree canopy | Urban tree cover | lower obesity, better social cohesion, less type 2 diabetes, high blood pressure and asthma |
| Maas et al. (2006) | Green space benefits by socio-economic group | Presence of local urban green space | Improved general health |
| World Health Organization (2016) | Urban green spaces and health | Access to urban green space | Improved mental health, reduced cardiovascular morbidity and mortality, obesity and risk of type 2 diabetes, and improved pregnancy outcomes |
| Lee and Maheswaran (2011) | The health benefits of urban green spaces | Quality and accessibility of green space | Degree of physical activity |
| de Vries et al. (2003) | Greenspace and self-reported health | Living in a green environment | General population health |
| Liu et al. (2017) | Urban park accessibility, physical activity and mental health | Park accessibility | Enhanced physical and mental health (self-confidence, energy levels, self-perceived health, mood restoration and relaxation) |
| **A2. Greenness and psychological well-being** |             |                             |                                   |
| Ulrich (1984) | View through a window and recovery | View from a window onto a natural scene | Shorter post-operative hospital stays and less medical intervention |
| Burton, Mitchell, and Stride (2015) | Viewing green space and older people's well-being | A green view from living spaces | Enhanced general well-being |
| Hartig et al. (2003) | Restoration in natural and urban field settings | Sitting in a room with tree views and walking in green space | Decline in diastolic blood pressure |
| Velarde, Fry, and Tveit (2007) | Health effects of viewing landscapes | Viewing greener landscapes over more urban ones | Short-term recovery from stress or mental fatigue, faster physical recovery from illness, long-term overall improvement in health and well-being |
| Seresinhe, Preis, and Moat (2007) | The health impact of scenic environments | Scenicness of the local environment | Better general health |
| Ulrich (1981) | Natural vs. urban scenes and emotional state | Presence of nature and especially water in views | Enhanced psychophysiological state |
| Van den Berg, Koole, and van der Wulp (2003) | Environmental preference and restoration | Viewing natural environments | Improvement in mood, concentration, restoration from mental fatigue and anxiety-based stress |
| Lohr and Pearson-Mims (2006) | Emotional responses to trees and tree forms | Urban scenes with trees, and tree shape (rounded not conical) | Positive emotional responses: happier, friendlier, more attentive, less angry, less sad and less fearful |
| Ulrich (1979) | Visual landscapes and psychological well-being | Urban scenes with natural elements | Less stress and feelings of affection, friendliness, playfulness and elation |
| Kaplan (2001) | The psychological benefits of natural views from the home | Natural views of gardens, flowers, and well-kept landscaped areas | Increased neighbourhood satisfaction |

(Continued)
| Study                                      | Study focus                                      | Dimensions of place quality             | Aspects of value added (deducted)                          |
|--------------------------------------------|-------------------------------------------------|----------------------------------------|-----------------------------------------------------------|
| Stigsdotter et al. (2010)                  | Associations between green space and stress     | Easy access to and use of green space  | Better general health and reduced stress                  |
| Taylor et al. (2015)                       | Street tree density and anti-depressants        | Presence of street trees               | Reduced use of prescription anti-depressants              |
| Javad Koohsari et al. (2018)               | Open space size, location and depression        | Larger and more accessible public open space | More walking and associated health benefits             |
| A3. Place quality and mental health        |                                                 |                                        |                                                           |
| Shahirah, LeVasseur, and Michael (2017)    | Neighbourhood amenity and depression            | Higher neighbourhood amenity           | Lower depression                                          |
| Ellard and Montgomery (n.d.)               | Urban quality, mood and physiological arousal   | High visual permeability and greenness | Higher levels of positive mood                            |
| Ellaway et al. (2009)                      | Environmental quality, incivilities and mental health | High perceived street-level incivilities and absence of environmental quality and amenities | Increased anxiety and depression                         |
| Golembiewski (2017)                        | The urban environment and severe psychosis      | Negative, yet demanding phenomenological experience from the built environment | Severe psychoses (including schizophrenia)               |
| McKenzie, Murray, and Booth (2013)         | Urban versus rural impacts on mental health     | Relative urbanity                      | Higher rates of prescriptions for psychotropic medication for anxiety, depression and psychosis Psychiatric disorders, and for mood disorders and anxiety disorders |
| Peen et al. (2010)                         | Urban / rural differences in psychiatric disorders | The urban environment (against rural ones) |                                                             |
| White et al. (2010)                        | Blue space preference and restorative potential | Natural and built scenes containing water | Higher perceived restorativeness (relief from stress)     |
| Williams and Kitchen (2012)                | Perceptions of place and mental health          | Sense of place                         | Self-perceived mental health                              |
| Guite, Clark, and Ackrill (2012)           | The physical environment and mental well-being  | Neighbour noise, sense of over-crowding in the home, lack of green spaces and community facilities, and fear of crime | Reduced mental well-being                                |
| Kent, Ma, and Malley (2017)                | Happiness and the built environment             | Perceived walkability, aesthetic quality and sense of a well-connected community | Increased happiness                                       |
| A4. Walkability, active travel and related health |                                                 |                                        |                                                           |
| Giles-Corti et al. (2013)                  | Local infrastructure availability and walking   | Increased access to public transport and recreational destinations | Increased walking and associated health benefits           |
| Sinnett et al. (2011)                      | Investment in the walking environment           | Street improvements                    | Increased pedestrian use, reduced traffic collisions      |
| Giles-Corti et al. (2003)                  | Environmental factors and obesity               | Living on a highway, poor pedestrian facilities, poor access to recreation and shopping facilities | Increased obesity                                         |
| Saelens et al. (2003)                      | Neighbourhood-based differences and physical activity | Higher residential density, land use mix, street connectivity, better aesthetics and safety | More physical activity and had lower obesity prevalence  |

(Continued)
| Study                        | Study focus                                                                 | Dimensions of place quality                                                                 | Aspects of value added (deducted)                                                                 |
|------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Lee et al. (2015)            | Street pattern (walkability) and obesity-related diseases                     | More walkable environments                                                                 | Reduced abdominal obesity, lower hypertension and diabetes                                      |
| Berrigan and Troiano (2002)  | House age as a surrogate for walkability                                       | Walkable street environments (in pre 1973 environments)                                      | Increased walking with associated health benefits                                             |
| Frank, Andresen, and Schmid (2004) | Mixed use, travel and obesity by ethnic group | Increase in land-use mix                                                                  | Increased walking and reduction in obesity                                                 |
| Cervero and Duncan (2003)    | Urban landscapes qualities, walking and bicycling                             | Higher land-use diversity, neighbourhood density, and better design                           | Increased walking and bicycling                                                              |
| Garfinkel-Castro et al. (2017) | Built environment variables and active travel decision-making               | Diversity of land uses, design quality, destination accessibility, lower distance to public transport, higher density | Increased active travel decision making                                                      |
| Ewing et al. (2014)          | Relationship between urban sprawl, physical activity and health               | Greater urban sprawl                                                                        | Less minutes walked, higher obesity and prevalence of hypertension                           |
| Alfonzo et al. (2014)        | Walking, obesity and urban design                                             | Connected urban form, presence of parks, public spaces, and pedestrian and cycle amenities, better personal and traffic safety, and aesthetics | Higher walking and lower BMIs                                                                |
| Ameli et al. (2015)          | Urban design qualities and walkability                                         | Higher imageability and transparency, and more human scale                                   | Increased walkability                                                                        |
| Roberts-Hughes (2013)        | Urban quality and perceptions of walkability                                  | Greenery, and streets and parks designed to be safer and more attractive                     | Better general health and higher perceptions of walkability                                  |
| Sung, Lee, and Jung (2014)   | Built environment and walking in a high density environment                   | Higher land-use mix and greater access to public transport                                  | Higher levels of walking                                                                    |
| Cervero and Gorham (1995)    | Pedestrian modal share and urban form                                          | Transit-oriented communities — availability of public transport                             | Higher pedestrian modal share and use of public transport                                    |
| Cervero et al. (2009b)       | Street design and active travel for utilitarian and leisure purposes          | Reserved lanes for bicycles and pedestrians and greater connectivity and density of streets | Higher utilitarian cycle and pedestrian travel                                              |
| Papas et al. (2007)          | The built environment and obesity                                            | Design of the built environment                                                            | Body weight (higher or lower)                                                              |
| Zhang et al. (2014)          | Neighbourhood commuting environment and obesity                               | Higher neighbourhood automobile dependency and longer commuting                              | Increased obesity in urban areas                                                            |
| Frank et al. (2005)          | Physical activity and urban form                                              | Increased land-use mix, residential density and intersection density                         | Higher walkability and exercise                                                             |
| Talen and Koschinsky (2014)  | Compact, walkable, diverse districts and health                               | Compact, walkable, diverse districts                                                        | Better general health and more social interaction and safety                                 |
| Gebreab et al. (2017)        | Neighbourhood social cohesion, food stores and type two diabetes             | Higher neighbourhood social cohesion and lower density of unfavourable food stores          | Lower incidence of type 2 diabetes                                                          |

**A5. Place quality and physical health**

(Continued)
tangible issues, including the presence of fast food stores in neighbourhoods. Some place qualities were investigated by multiple studies, notably the impact of greenery and landscape resources (including parks) on the physical and mental well-being of populations. The related issue of walkability was extensively researched, with a focus on whether the design of the built environment can encourage people out of their cars through the creation of attractive, safe settings within which people can walk to a mix of local facilities and amenities. Between these issues there was a tension, as lower density car-dependant environments integrate more greenery (often in private space) but discourage walking. By contrast, higher density walkable places encourage greater exercise, but with potentially negative health impacting side effects including noise, pollution and the absence of greenery.

Collectively the health evidence was remarkably consistent in its direction of travel, demonstrating that the way places are designed can play a major role in delivering place value care of the wide range of positive health benefits that can be delivered. These include:

- Better physical health: lower obesity, less type 2 diabetes, lower blood pressure, reduced heart disease, lower rates of asthma and respiratory disease, faster recovery from illness, and from fatigue.
- Better mental health: less stress and more psychological restfulness, reduced depression, anxiety and anger, reduced psychosis.

| Study                           | Study focus                              | Dimensions of place quality                                    | Aspects of value added (deducted)                                                                 |
|---------------------------------|------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Timperio et al. (2017)          | Neighbourhood environments and children’s physical activity | Higher mix of land uses and availability of playgrounds and sport venues | Less television viewing and higher physical activity                                        |
| Frank et al. (2006)             | Neighbourhood design and air quality     | Increase in walkability                                        | Increased time spent in physically active travel and reduced BMI and reduced emission of oxides of nitrogen and volatile organic compounds |
| Frumkin (2002)                  | Urban sprawl and health                  | Presence of urban sprawl                                       | Negative health consequences in obesity, inactivity, social stratification, loss of social capital, higher air pollution and heat stress (although mental health benefits from peace and greenery) |
| Weden, Carpiano, and Robert (2008) | Perceived neighbourhood quality and adult health | Higher perceived neighbourhood quality                          | Better general health                                                                      |
| Jackson (2003)                  | Neighbourhood design and human health    | Higher-density neighbourhoods, including access to public buildings, open space, mixed land uses, pedestrian walkways, greenery (visually and physically) and urban infrastructure | Increased physical exercise and enhanced civic life                                           |
| Droomers et al. (2016)          | Place-based regeneration and health      | Regeneration programmes that focus on place                    | Better general health                                                                      |
Better general fitness: increased walking (for both travel and recreation), increased exercise, sport and recreation, and more cycling.

Greater daily comfort: reduced air pollution, heat stress, traffic noise and poor sanitation, and reduced exposure of lower socio-economic groups to the effects of debilitating neighbourhoods.

Enhanced quality of life: increased sense of emotional well-being and satisfaction, greater happiness, reduced fear and higher energy levels.

The evidence on place value and social outcomes

The research relating to social outcomes was more diverse than the health research, and more reliant on social scientific rather than scientific methodologies to explore the links (Table 2). In this arena much is written, and many assertions are made in the literature, but the evidence is often open to a greater degree of interpretation, with more studies that failed to meet the inclusion criteria on the basis of a lack of research rigour. Large bodies of evidence were nevertheless collected relating to the impact of aspects of the design of the built environment on crime (notably burglary), on dimensions of social inclusion and social capital, and on the impact of design on urban liveability. Less, but still significant, evidence is available on road safety in the street environment, the creation and impact of urban vitality, and designing for play, learning and for physically enabling environments.

Whilst there was some contrasting evidence relating to issues of street layout, and its impact on crime and sociability, in general the social evidence demonstrated that the way places are shaped has a major impact on delivering aspects of place value through social benefits that range from lower fearfulness to greater happiness. The social evidence is powerful in what it reveals, notably that the manner in which places are designed has the potential to deliver:

- Fewer accidents: reduced collisions and casualties on the road, and reduced fearfulness of accidents.
- Social integration: reduced stratification and greater integration of social groups and larger social networks locally, with stronger social support.
- Lower rates of crime: reduced burglary from homes, lower street crime, less fear of crime, and stronger perceptions of safety.
- Better educational outcomes: increased child independence and positive play behaviours, and enhanced learning and educational achievement.
- Enhanced street level vitality and sociability: a richer public life, enhanced social interaction, and greater longevity of use in urban streets and spaces.
- Stronger civic pride: an increased sense of pride, local morale, social resilience and community life, and enhanced social capital (social and political engagement) generally.
- Greater inclusiveness: enhanced use of the city by marginalized and socio-economically disadvantaged groups, and greater female empowerment and acceptance of cultural and social difference.
- Enabling environments: in older age and for those with disabilities.
Table 2. The social evidence.

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|-----------------------------|-----------------------------------|
| **B1. Street layout and crime** | | | |
| Johnson and Bowers (2010) | Permeability and burglary risk | Increased permeability and presence on major roads | Elevated burglary risk |
| Nubani and Wineman (2005) | Street connectivity and crime | High local street integration, connectivity and density | Higher crime in areas of low home ownership (lower in areas of high ownership) |
| Hillier (2004) | Street layout and crime | Higher permeability, lower street integration and intervisibility and presence of secondary access | Higher burglary |
| Hillier and Sahbaz (2008) | Layout, vitality and crime | Higher through movement, and number of sides exposed, and lower ground level densities, population densities, local movement, numbers of dwellings in street segments, and mix of uses | Raises residential burglary and on street robbery |
| Cozens (2008) | Rear parking courts, lanes and crime | Parking in rear lanes and parking courts and more permeable residential street networks | Higher levels of crime |
| Armitage, Monchuk, and Rogerson (2011) | Layout, parking and crime | Cul-de-sac layouts (vs. through roads and leaky cul-de-sac) and rear parking courts | Reduced levels of crime (in true cul-de-sacs) and highest in leaky cul-de-sacs and in association with rear parking courts |
| Shu (2000) | Housing layout and crime vulnerability | Global or local segregation in residential layouts and street segment length | Higher property crimes (in segregated areas and shorter cul-de-sacs) |
| Cozens, Hillier, and Prescott (2002) | Crime and characteristic British housing designs | Absence of defensible space characteristics, signs of decay and dereliction, multiple dwelling units | Higher levels of crime and fear of crime |
| Chang (2011) | Spatial factors and burglary rates | Intelligible (legible) areas with good permeability (visual and physical) | Reduced vulnerability to crime |
| **B2. Environmental design and crime** | | | |
| Loukaitou-Sideris et al. (2001) | Measuring the effects of the built environment on bus stop crime | Good visibility of the bus stop from its surroundings, existence of bus shelters, lower traffic and parking, absence of environmental decay | Lower crime rates |
| Loukaitou-Sideris (1999) | Hot spots of bus stop crime and the environment | Coexistence and combination of negative environmental attributes and a general lack of defensible space | Higher public nuisance and crime rates |
| Nasar and Fisher (1993) | Hot spots of fear and crime | Physical environments that allow concealment for offenders, and blocked prospect and escape for victims | Crime and fear of crime concentrates in these ‘hot spots’ |
| Austin, Furr, and Spine (2002) | Housing, neighbourhood conditions and personal safety | Deteriorated neighbourhood conditions | Increased concerns for safety and decreased levels of satisfaction with the neighbourhood physical environment |
| Casteel and Peek-Asa (2000) | Crime prevention through environmental design and retail robberies | Crime Prevention Through Environmental Design (CPTED) strategies | Reduced robbery rates |
| Armitage and Monchuk (2011) | Secured by Design Crime prevention through design and social activity | Secured by Design (SBD) crime reduction strategies Crime Prevention Through Environmental Design (CPTED) strategies | Reduced burglary rates |
| Seo and Lee (2017) | Crime prevention through design and social activity | | Increased social activities, sociability, external play, and sense of community and reduced disorder and fear of crime |
| Painter and Farrington (1997) | Improved street lighting and crime | Improved street lighting | Reduced crime and victimization |

(Continued)
### Table 2. (Continued).

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|-----------------------------|-----------------------------------|
| Painter and Farrington (1999). | Improved street lighting, crime and displacement | Improved street lighting | Reduced crime and no displacement to adjacent areas |
| Welsh and Farrington (2008) | Improved street lighting and day time and night time crime | Improved street lighting | Increased community pride and reduced night-time and day time crime |
| Farrington and Welsh (2007) | Improved street lighting and crime prevention | Improved street lighting | Reduced crime, increase in perceived public safety and greater use of public space |
| Kuo and Sullivan (2001) | Crime rates and vegetation | Greenness in the built environment | Fewer property crimes and violent crimes |
| Maruthaveeran and Konijnendijk van den Bosh (2015) | Fear of crime in urban parks | Concealment (vegetation), being alone, signs of physical disorder, presence of social incivilities, familiarity, prior information about crime, and previous crime experience | Higher fear of crime |
| Schweitzer, Kim, and Mackin (1999) | The built environment, crime and fear of crime | Physical characteristics of urban blocks, including presence of a nearby convenience or grocery store and of porches and shared driveways | Higher levels of crime and fear of crime |
| Foster, Giles-Corti, and Knuiman (2010) | Residents’ fear in new suburban housing developments | More walkable neighbourhoods | Less fearfulness and a greater sense of safety |
| Christian et al. (2011) | Built environment, BMI and perceived safety from crime | Environmental factors, including walkability | Higher BMI and perceived crime |
| Kowaltowski and Granja (2011) | Desired security in social housing | Design for security in the external residential environment | Perceptions of well-being |
| **B3. Street design and safety from collisions** | | | |
| Dumbaugh and Gattis (2005) | Street liveability and safety | Liveability streetscape treatments | Enhanced roadway safety |
| Dumbaugh and Rae (2009) | Street design and collision incidences | Disconnecting local street networks and relocating non-residential uses to arterial thoroughfares | Increased incidences of traffic-related crashes and injuries (reduced incidents in traditional, pedestrian-scaled retail configurations) |
| Ewing, Scheiber, and Zeeger (2003) | Urban sprawl and pedestrian fatalities | More compact and less sprawling development | Reduced all-mode traffic and pedestrian fatality rates |
| Ewing and Dumbaugh (2009) | Road design and safety | Dense urban development with less ‘forgiving’ design treatments, such as narrow lanes, traffic-calming measures, and street trees close to the roadway | Increased traffic safety, fewer miles driven, lower speeds, less fatalities |
| Mohammad Rifaat, Tay, and de Barros (2010) | Street pattern and crash severity | Loop and lollipop street patterns | Stronger traffic calming effect and reduced fatality risk, but reduced sight distances leading to increased probability of injury to pedestrians and cyclists |
| Marshall and Garrick (2011) | Street network design and safety | Denser street networks with higher intersection counts | Fewer crashes across all severity levels and higher levels of walking (additional lanes lead to more crashes) |
| MVA Consultancy (2009) | Shared space, impact and use | Shared space street design | Better visual amenity, economic performance and perceptions of personal safety. No safety benefit or dis-benefit. Difficulties for some visually impaired people |

(Continued)
### B4. Place quality and liveability

| Study                                      | Study focus                                      | Dimensions of place quality | Aspects of value added (deducted)                                                                 |
|--------------------------------------------|--------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------|
| MVA Consultancy (2010a)                    | Shared spaces in operation                       | Shared space street design | Reduced traffic speed, more careful driver behaviour                                             |
| MVA Consultancy (2010b)                    | Shared space and user perceptions                | Shared space street design | Poor user experience with a preference for clearly demarcated areas for vehicles and pedestrians |
| Venerandi et al. (2016a)                   | Well-being and urban form                        | Well-connected and easily accessible, characterized by green areas and predominance of historic properties, a dense street network, grid-shaped | High levels of well-being, walking, sociability, less pollution and stress, feelings of safety and better eating habits |
| Gilderbloom, Riggs, and Meares (2015)      | Walkability and social resilience                | Walkability                | Reduced foreclosures and crime, greater social resilience and higher housing values               |
| Jansen (2014)                              | Values and preferences in housing environments   | Innovative residential design, mixed neighbourhoods, urban settings | Greater self-direction in resident character (less concern for security, family, traditional design) |
| Appleyard and Lintell (1972)               | Traffic and street liveability                   | Traffic intensity on urban streets | All aspects of perceived liveability — absence of noise, stress and pollution; levels of social interaction, territorial extent and environmental awareness; and safety — correlate inversely (with more traffic) |
| Hart and Parkhurst (2011)                  | Traffic and social interaction                   | Traffic intensity on urban streets | Reduced social interaction, friendships, home territories, child independence (with more traffic) |
| Sauter and Huettenmoser (2008)             | Traffic and neighbourhood contacts               | Slower traffic speeds      | Greater personal development, contentment and social integration                                |
| Shafer, Lee, and Turner (2000)             | Green links and quality of life                  | Urban greenway trails      | Better community quality of life through resident fitness, resident pride, reducing pollution, reducing transportation costs and providing better connectivity |
| Weber et al. (2017)                        | The impact of urban greenways                    | Proximity to greenways     | Raising property values, providing places for outdoor recreation and social spaces for gathering |
| Thompson et al. (2004)                     | Urban woodlands and quality of life              | Urban woodlands            | Raises quality of life capital, child education                                                  |
| Byravan et al. (2017)                      | Quality of life from sustainable development     | Reduced air pollution and resource use in construction | Quality of life improvements                                                                    |
| Klichowski and Patrício (2017)             | The human brain, ICT and the outdoors            | Opportunities for outdoor recreation and play | Human cognitive satisfaction                                                                    |
| **B5. Urban vitality**                     |                                                  |                            |                                                   |
| Whyte (1980)                               | Social life in spaces                            | Public space pedestrian accessibility, integration (with the street network), comfort, and adaptability | More social spaces                                                                            |
| Gehl (2010)                                | Cities for people                                | Increased pedestrianization, reduced traffic and parking, and cycle lane provision | Longer and more sociable use of public spaces and greater bicycle use                           |
Table 2. (Continued).

| Study                        | Study focus                                         | Dimensions of place quality                                                                 | Aspects of value added (deducted)                                                                 |
|------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Carmona (2014)               | Determinants of space occupancy and use             | High levels of transient use, microclimate control, grass to sit on, movable seating, and presence of ‘amenities’ — cafés / restaurants, shops, big screens, band stands, kiosks, markets, sports facilities, toilets, seating, etc. — and ‘features’ around and in a space — fountains, paddling pools, street pianos, public art, sculptural furniture, play equipment, skating opportunities, etc. | Space animation through engagement with the space, learning through play, informal social exchange, longer use (visual permeability though spaces have little impact) |
| Anderson et al. (2016)       | Lively social space, well-being activity, and urban design | Small-scale public realm improvements                                                       | Increased community users and life                                                              |
| Sullivan, Kuo, and Depooter (2004) | Vital neighbourhood spaces                      | Green space provision (vs barren spaces)                                                   | Increased use and social activity (particularly amongst women) and reduction in anti-social behaviours |
| Thompson, Corkery, and Judd (2007) | Community gardens and happy communities          | Presence of community gardens                                                             | Enhancing physical, emotional and spiritual well-being through opportunities to relax, undertake physical activity, socialize, mix with neighbours, learn environmental practices, food production |
| Thompson and Kent (2014)     | Connecting and strengthening communities           | High quality, safe streets and spaces and contact with nature                               | Significant to health, social interaction and community building                                |
| Worpole and Knox (2008)      | The social value of public spaces                  | Presence of local ‘everyday’ public spaces                                                | ‘Feel-good’ buzz from a busy street scene; therapeutic benefits of quiet time spent on a park bench; places where people can display their culture and identities and learn awareness of diversity and difference; opportunities for children and young people to meet, play or simply ‘hang out’. |
| Palaiologou and Vaughan (2014) | Sociability of the street interface               | Narrow building plots and high threshold frequency, functional mixture, morphological and building mixture, short street segments | Vibrant street life, pedestrian flows and co-presence on the street                             |
| Bramley et al. (2009)        | Social sustainability and urban form               | Higher density neighbourhoods                                                              | Reduced neighbourhood pride and attachment, stability, safety, environmental quality, and home satisfaction. Higher use of local services, including transport. Higher social interaction and group participation (up to a point) |
| ActionAid (2015)             | Women’s empowerment and the city                   | Improved urban infrastructure and pedestrian-focused street lighting and safety             | Empowering women in cities                                                                     |
| Carlson et al. (2011)        | Public support for street-scale urban design practices | Quality of local street design                                                             | Influences public engagement and civic action in the built environment (and amount of physical activity) |

(Continued)
| Study                                      | Study focus                      | Dimensions of place quality                                                                                      | Aspects of value added (deducted)                                                                 |
|-------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Talen (2006)                              | Designing for diversity          | Strong edges, grids with commercial corridors and mixed housing types Public housing estate modernization       | Facilitates community (social and cultural) diversity Higher morale of estate residents and enhanced social capital |
| Page (2000)                               | Social housing and resident satisfaction |                                                                                                                                                     | Higher social capital (compared with those in car-oriented suburbs), social and political engagement and trust in others |
| Leyden (2003)                             | Social capital and the residential design | Walkable, mixed-use neighbourhoods                                                                                                                                          | Higher social capital                                                                                                               |
| Richard et al. (2009)                     | Neighbourhood qualities and social participation Social life and tree cover | Perceptions of neighbourhood user-friendliness Density of urban tree cover | Higher social participation                                                                                                                          |
| Holtan, Dieterlen, and Sullivan (2015)    | Designing for mixed income communities Tenure blind design |                                                                                                                                                     | Higher social capital                                                                                                                   |
| Freeman (2001)                            | Urban sprawl and social ties Cul-de-sacs and social cohesion | Sprawl and vehicle based urbanism Increased safety, walkability, accessibility (including to ‘third places’) and the provision of soft edges within developments | Undermines social ties among neighbours Increased neighbourliness (particularly in ‘bulb’ shaped cul-de-sac) Better social health amongst older aged residents (greater segregation undermines health) |
| Hochschild (2015)                         | Sociability of Masterplanned communities for ageing Cul-de-sacs and social cohesion | Cul-de-sac based housing layouts                                                                                                                                 |                                                                                                                                   |
| Alidoust and Bowman (2017)                | Increased safety, walkability, accessibility (including to ‘third places’) and the provision of soft edges within developments |                                                                                                                                                     |                                                                                                                                   |
| Brown et al. (2008)                       | Older people and social support Low levels of positive front entrance features |                                                                                                                                                     | Reduced sociability and poor physical functioning amongst elders                                                                                                                              |
| McCarthy and Saegert (1978)               | High-rise and social withdrawal Living in high-rise residential building environments |                                                                                                                                                     | Social overload manifested in perceptions of crowding, less control, safety, and privacy, problematic social relationships, and dissatisfaction with the residential environment Less satisfaction amongst low income residents, greater behaviour problems amongst children (reflecting their play opportunities), fewer friendships and greater fear of crime Generate positive feelings (vs. negative feelings) |
| Gifford (2007)                            | Well-being and high-rise living Living in high-rise residential building environments |                                                                                                                                                     |                                                                                                                                   |
| Rosenberg Weinreb and Rofé (2013)         | Emotional responses to the built environment Areas that are verdant and cared for, offer natural views and show signs of children’s play (vs. areas perceived to be ugly, dirty, unkempt, uncared for, neglected or abandoned) |                                                                                                                                                     | Perceived community satisfaction (economic security, better schools, and social interaction) Tendency to gentrification                                                                 |
| Florida, Mellander, and Stolarick (2011)  | Beauty and community satisfaction Urban beauty in communities |                                                                                                                                                     |                                                                                                                                   |
| Venerandi et al. (2016b)                  | Urban form and the tendency to gentrification Traditional, fine-grained, perimeter block-based urban form, with calm, internal streets at their cores, and strong connection to main amenities and transport |                                                                                                                                                     | Tendency to gentrification                                                                                                               |

(Continued)
| Study                                      | Study focus                                      | Dimensions of place quality                                                                 | Aspects of value added (deducted)                                                                 |
|-------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Mouratidis (2017)                         | Urban form and social relationships              | Shorter distances to the city centre, higher densities, and presence of mixed land uses, including ‘third places’ | Greater satisfaction with personal relationships, larger local networks and social support, overall social well-being |
| B7. Enabling environments                  |                                                 |                                              |                                                                                                  |
| Clarke, Ailshire, and Lantz (2009)        | Disability and the built environment            | Pedestrian friendly (as opposed to car dependent) environments                              | Lower mobility disability in old age, particularly amongst women and those with lower education |
| Clarke et al. (2008)                      | Mobility, Disability and the built environment  | Poor street condition (characterized by cracks, potholes, or broken curbs)                 | Leads to much greater mobility disability among adults with more severe impairment in neuromuscular and movement-related functions |
| Rosso, Auchincloss, and Michael (2011)    | Older mobility and disability in the built environment | Higher street connectivity. Better street conditions and safety against traffic. Proximity to amenities | Greater mobility                                                                                   |
| Clarke and George (2005)                  | Built environment and the disablement process   | Limited land-use diversity                                                                | Greater dependency amongst older adults and greater car dependence                               |
| Grant (1997)                              | Pedestrianization and disability                | Pedestrianization                                                                         | Offer greater freedom for mobility impaired groups                                              |
| Blackman, Van Schaik, and Martyr (2007)   | Dementia and the outdoor environment            | Segregation of pedestrian space from motor traffic and use of clear text based signage     | Enhances self-reliance amongst those with dementia                                               |
| B8. Place quality, play and learning      |                                                 |                                              |                                                                                                  |
| Hochschild (2012)                         | Cul-de-sacs and children’s play                  | Cul-de-sacs street layouts                                                                | Greater perceived safety and therefore freedom for children (to play) and less deviant activities amongst children |
| Othman and Said (2012)                    | Cul-de-sac design and play                       | Cul-de-sacs street layouts and vegetation                                                | Encourages sociality and opportunities for children to play                                      |
| Foreman (2017)                            | Residential street design and play              | Home zones (Woonerfs), cul-de-sacs, traffic-calmed streets, safe networks (with little or no traffic) | All facilitate increased play (to some degree)                                                   |
| Biddulph (2012)                           | Home zones vs. traffic calming                  | Home zone residential street layouts                                                      | Facilitate children’s external play, and allow adults to relax and socialize in their streets   |
| Biddulph (2010)                           | Home zones, liveability and play                | Home zone residential street layouts                                                      | Gave rise to lower traffic speeds and continued low or reduced numbers of traffic accidents, perceived safety for children to play out, and reduced levels of crime and antisocial behaviour |
| Tanner (2000)                             | Learning environments and academic achievement  | Clearly defined pathways, positive outdoor spaces, and a positive overall impression in school design | Predictors of high academic attainment                                                           |
| Coopers (2001)                            | School capital investment and pupil performance | Better designed teaching environments                                                     | Higher staff morale and willingness to spend time after school. Greater pupil motivation, pride in their surroundings and enhanced parental support |
| Britain (2005)                            | Design value in higher education                | Well-designed campus buildings and environments                                           | Better recruitment of staff and of students, and better perceived performance, particularly amongst staff |
The evidence on place value and economic outcomes

Evidence relating to the economy was most numerous, accounting for almost 100 of the 271 studies selected as meeting the inclusion criteria (Table 3). Research methods here were diverse, but often related particular place quality dimensions to large-scale quantitative analyses of property datasets with the intention of extracting key explanatory variables for how and when economic value was added. In this task a wide range of studies sought to compare economic value with dimensions of greenness and open space provision, whilst other qualities of the built environment, for example, street layout, permeability, architectural design, and so forth, are typically examined separately in studies that focus on particular property sectors, notably residential or commercial. A smaller but relatively coherent group of studies focused on the impact that streetscape improvements have in their surrounding areas, whilst a more diverse collection of studies focused on the impact of the built environment on larger processes of economic development and regeneration, or on public spending (including on healthcare and social care costs).

In this policy arena there was a remarkable confluence in the research, with very little conflicting evidence. This growing body of work suggests strong private as well as public benefits from place quality, and that this is, again, overwhelming given the richness of the available evidence. Caution is required, however, when interpreting the results as certain outcomes such as rising property values, may not always be considered desirable outcomes in every context; for example, where property values are already high and certain users and/or uses are being priced out of the market. Collectively the evidence suggests that how places are shaped can deliver:

• Property uplift in the residential sector: influenced by access to views, trees and open space, lower pollution, mixed use (up to a point and as long as homes are not too close to retail), walkability, neighbourhood character, access to public transport (if not too close to homes), external appearance, public realm quality, connectivity and vitality.
• Property uplift in the retail sector and reduced vacancy: influenced by urban greenery, walkability, public realm quality, external appearance, street connectivity, frontage continuity; all leading to increased retail viability.
• Property uplift in the office sector, and reduced vacancy and depreciation: influenced by walkability, external appearance, design innovation and street connectivity.
• Viable investments and extended regeneration benefits: by making investment more attractive, enhancing competitiveness through differentiation, and strengthening community support for development.
• Reduced public expenditure: through reduced capital and maintenance costs for roads infrastructure, reduced public realm maintenance and management (including security) costs, support for the historic built environment and urban regeneration, lower crime and policing costs, and reduced health and social care expenditure (thanks to reduced levels of medication, prescriptions and hospitalization).
• Higher local tax take: through attracting new development, and generating a greater willingness to pay for place services from businesses and communities alike.
• Lower costs of living: through lower car use and public transport costs (more viable / cost effective public transport), and lower costs for health insurance, and reduced energy consumption and smaller carbon footprints (from transport, infrastructure and buildings).
Table 3. The economic evidence.

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|------------------------------|-----------------------------------|
| **C1. Property values and green space** | | | |
| Benson et al. (1998) | The value of a view | Good views from buildings | Views have economic value and the willingness to pay for a good view can be high |
| Anderson and Cordell (1988) | Trees and residential sales prices | Housing in the vicinity of landscaping with trees (especially large trees) | Trees raise property values and property tax revenues |
| Wolf (2007) | City trees and property values | Trees and forest cover in development growth areas | Homes with trees are generally preferred to comparable homes without trees. Trees on the building plot and adjacent to it raise market prices |
| Mohamed (2006) | Paying for nature | Residential developments with stronger landscape integration | Carry a market premium, and assuage concerns about higher density |
| Li et al. (2016) | Air pollution, nature and housing values | Urban amenities and accessibility factors such as air pollution, forest coverage, quality of public schools, and commuting cost | Air pollution and the lack of forest coverage have the most significant and detrimental effect on housing values |
| Nilsson (2014) | Natural open space and house price variation | Open landscape amenities in residential areas | Open land is valued higher where undeveloped land is scarce and home densities are relatively high |
| Peiser and Schwann (1993) | The value of open space in residential areas | Presence of structural green space in residential areas | Perceived as having aesthetic, exercise and play functionality and as adding value to homes |
| Correll, Lillydahl, and Singell (1978) | Greenbelt proximity and residential values | Greenbelt areas in neighbourhoods | Properties adjacent to the greenbelt fetch a premium |
| CABE Space (2005) | The value of parks | Presence of a high quality park | Overlooking or being close to a high quality park adds economic value |
| Anderson and West (2006) | Open space and residential property values | Proximity to open space | Proximity adds economic value. Values are higher in neighbourhoods that are dense, near the central business district, high-income, high-crime or home to many children |
| Lutzenhiser and Netusil (2001) | Open space types and housing values | Type and size of open spaces | All open space types have a positive impact on property values (natural area parks the highest) |
| Kong, Yin, and Nakagoshi (2007) | The amenity value of open green space | Accessibility to parks and plazas | There is a positive value impact of greater accessibility to green spaces, with larger proportions of green space adding greater value |
| Zhang et al. (2012) | Public green space and property values | Residential proximity to green spaces | Proximity to parks adds economic value |
| Cho, Bowker, and Park (2006) | Open space, water bodies and housing values | Proximity to parks and water bodies | Natural and constructed amenities are valuable attributes in housing demand and positively impact sale prices |
| McCord et al. (2014) | Green space availability and residential value | Urban green space proximity | A significant positive impact on residential properties sale price for the terrace and apartment sectors, much less for detached and semi-detached sectors |
| Curran (2001) | Economic benefits of natural green space protection | Natural open space proximity | Proximity has a positive effect on real estate values that residents will pay to protect |

(Continued)
### Table 3. (Continued)

| Study                                    | Study focus                        | Dimensions of place quality                                           | Aspects of value added (deducted)                                                                 |
|------------------------------------------|------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Smith (2010)                             | Valuing greenness                  | Presence and amount of parkland space                                 | Proximity increases house prices as does the quantity of local green space                      |
| Irwin (2002)                             | Valuing absence (of development)   | Presence of permanently preserved open space in residential areas     | A premium associated with permanently preserved open space over other types                    |
| Dewaelheyns et al. (2014)                | Valuing open space continuity      | Size and continuity of open space in residential areas               | Larger and contiguous open spaces are valued more highly                                       |
| McConnell and Walls (2005)               | Value of open space in urban locations | Types of open space (parks, greenways, forests, and other natural areas) and location relative to households | There is value to preserving all types of open space in urban locations. Values vary with the size of the area, proximity to residences, and the type |
| Kopits, McConnell, and Walls (2007)      | Private versus public open space   | Size and location of open space                                      | Adjacency to open space has a positive effect on house price, as do increases in open space size |
| C2. Residential property values and urban design |                                     |                                                                       |                                                                                                  |
| Boys Smith, Venerandi, and Toms (2017)   | Urban form and the value of amenities | Quality of green space (as opposed to quantity or proximity), proximity to heritage, walkability, connected street networks, diversity in form, land use and transport | High quality street based urbanism carries an economic premium. But homes located adjacent to low quality green space suffer a depreciation in value |
| Diao and Ferreira (2010)                 | Residential property values and auto dominance | Auto dominance (and accessibility to public transport and jobs, connectivity and walkability) | Property values are positively associated with accessibility to public transport and jobs, connectivity and walkability and negatively related to auto dominance |
| Dittmar et al. (2007)                    | Valuing sustainable urbanism       | Qualities of sustainable urbanism                                    | Enhances development value in all markets (particularly when low demand)                      |
| Savills (2010)                           | The value of residential layout    | Permeability, connectivity, street layout                            | More permeable and connected street networks exhibit higher property values (connections at the local level only reduce value) |
| Asabere (1990)                           | The value of residential street layout | Cul-de-sac streets layouts                                           | Generated a premium over grid street patterns                                                  |
| Savills (2016a)                          | The value of place-making          | Investing in place-making                                            | Investing early in high quality place-making rises values                                      |
| Song and Knaap (2004)                    | Mixed land uses and housing values | Mixing land uses and parks into residential areas                    | Housing prices are higher where non-residential land uses are evenly distributed. Parks and neighbourhood store create an economic premium if in walkable distance |
| Matthews and Turnbull (2007)             | Neighbourhood layout, access to retail and property value | Proximity to retail sites                                            | A significant positive effect in grid street neighbourhoods, but none in curvilinear and cul-de-sac based layouts. |
| FPD Savills Research (2003)              | The value of housing design and layout | Density, proportions of open space, sense of place, design innovation | Design innovation, higher proportions of open space and built form that creates a sense of place add an economic premium. Density does not necessarily decrease value |

(Continued)
Table 3. (Continued).

| Study                        | Study focus                        | Dimensions of place quality                                                                 | Aspects of value added (deducted)                      |
|------------------------------|------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Tu and Eppe (1999)           | The value of new urbanism          | New Urbanist housing principles (public space, interconnected street networks, pedestrian oriented design, a mix of uses and neo-traditional architecture) | Consumers are willing to pay a premium                |
| Lacy (1990)                  | Market appreciation and neo-traditional housing | Neo-traditional development                                                                | Yields a higher rate of return on investment over conventional development |
| Buitelaar and Schilder (2017) | The economics of style (in housing) | Architectural styles in residential developments                                            | Neo-traditional styles and buildings that refer to traditional styles fetch a premium |
| Ahlfeldt and Mastro (2012)   | Valuing proximity to iconic (residential) design | Proximity to iconic heritage buildings in residential areas                                  | A premium is paid up to 50 m from iconic units         |
| Thorsnes (2000)              | Internalizing neighbourhood externalities | Size of residential developments                                                            | Larger developments allow developers to internalize neighbourhood externalities and generate a premium |
| Bowes and Ihlanfeldt (2001)  | Connectivity to rail and property values | Presence and proximity of rail stations in residential areas                               | Houses very close to stations suffer reduced property values from negative externalities (e.g. higher crime), but those at an intermediate (one-quarter to three miles) distance benefit from the transportation access |
| Bartholomew and Ewing (1995) | The value of pedestrian and transit-oriented development | Transit-oriented development                                                              | Adds a premium from the accessibility benefits, and also from the other amenity benefits of TOD |
| Levine and Inam (2004)       | The market for smarter growth      | Pedestrian- and transit-oriented development                                                | An inadequate supply leads to a market premium of non-standard development layouts and forms |
| Groves and Niner (1998)      | External improvements and housing markets | Public investment in the exterior of properties                                              | Revives areas with a weak housing market                |
| Nase, Berry, and Adair (2016a) | Real estate value and quality design in residential properties | Connectivity and vitality associated with building density, appropriateness of material quality, and fenestration and massing in relation to the surroundings | Add real estate value to residential properties         |
| RICS (2016)                  | Place-making and value             | Better place-making in residential areas                                                   | Place-making adds economic value although the size of the premium varies widely |
| Yang, Song, and Choi (2016)  | Commercial land use and residential values | Commercial activity in residential areas                                                   | Beyond a very local area marked by negative externalities, higher land values are supported |
| Cervero and Duncan (2004)    | Land use diversity, land values and taxation | Land-use diversity in residential areas                                                   | Land-use diversity contributed positively to residential land values and land taxation receipts |
| Cervero et al. (2009a)       | Elevated freeway removal, traffic impacts and property prices | Replacement of elevated freeways                                                          | Freeway-to-boulevard conversions yield net positive benefits (including in house prices) without sacrificing transportation performance |
| Whitbread (1978)             | Trade-off qualities in the residential environment | Proximity to bad neighbour uses or eyesores                                               | Removal of eyesores within residential contexts represents a valuable investment. House price change is an indicator of overall quality change |

(Continued)
### Table 3. (Continued).

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|-----------------------------|-----------------------------------|
| **C3. Commercial property values and urban design**<br/>Sohn, Moudon, and Lee (2012) | Density, mix and value | High development density, land use mix and walkability | High development density can increase retail values. Pedestrian infrastructure and land use mix increases residential rental property values |
| Cervero and Duncan (2002) | Public transport connectivity and commercial values | Proximity to public transportation | Substantial capitalization benefits for commercial land parcels near light and heavy rail stops |
| Pivo and Fisher (2011) | The walkability premium in commercial investments | Greater walkability | The benefits of greater walkability are capitalized into higher office, retail and residential values, but not in the industrial property sector |
| Nase, Berry, and Adair (2011) | Exterior design quality and office rents | External design quality | Higher exterior design quality leads to a price premium in the office rental market, even in times of depression |
| Nase, Berry, and Adair (2016b) | Real estate value and quality design in commercial office properties | Higher design quality specifications across interior, exterior and urban scales | Higher specifications across all scales generates a rent premium. Connectivity, materials quality, and building facade distinctiveness enhance corporate image |
| Cheshire and Dericks (2014) | ‘Iconic design’ as deadweight loss | Trophy architect design | Trophy architects seem able to squeeze more space on to a given site leading to a value premium |
| Baum (1993) | Quality vs. depreciation in the office property market | Building quality (configuration and external design factors) | There is a positive relationship between building quality and return on investment, notably from the resistance of rental values to depreciation |
| Vandell and Lane (1989) | The economics of office architecture | Architectural quality | A strong positive influence of design on rents and vacancy |
| Hough and Kratz (1983) | Good architecture and the market | Architectural (aesthetic) excellence | New architecturally significant office buildings carry a significant premium (not associated with old office buildings) |
| Baum (1994) | Quality and retail property performance | Retail design (plan layout, durability, aesthetics) | Better configuration leads to higher income and capital return through rental growth. Better external appearance leads to a higher capital return through yield. |
| Joye et al. (2010) | Urban greenery, retail experience and spend | Urban greening, especially trees | Trees were associated with higher ratings of amenity and visual quality. Trees are consistently associated with higher price points and higher levels of patronage |
| Wolf (2003) | Urban greenery and retail valuations | Urban greening | Higher price valuations are mediated by inferences of district character and product quality, notably the presence of urban greener |
| Nase, Berry, and Adair (2013) | High street retail properties and quality of design | Aspects of quality design (connectivity, frontage continuity and variety, material quality and massing appropriateness) | All these aspects of quality add to real estate value |
**Table 3. (Continued).**

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|----------------------------|-----------------------------------|
| Roberts (1995) | The value of public art on buildings | Public art on buildings | Public art makes buildings distinctive, and contributes to securing quality tenants and minimizing void rental periods |
| Fuerst, McAllister, and Murray (2011) | Signature architecture and value | Buildings designed by signature architects | Office buildings designed by signature architects have higher rents and sell for higher prices |
| UN Habitat (2013) | Streets as drivers of prosperity | Presence of quality street space | Quality street space drives productivity, infrastructure development, environmental sustainability, quality of life, and equity/social inclusion |
| Lawlor (2013) | Better streets and retail performance | Walkability, streetscape quality, vehicle access | Better streets for walking can significantly boost footfall and trading. Walkers spend more than drivers |
| Carmona (2015) | The value of mixed street corridors | Mixed use street environments | Support large-scale employment, social well-being and physical and economic development and strategic growth potential |
| We Made That & LSE Cities (2017) | High street economic opportunities | Traditional high street qualities | The economic capacity of high streets is highly adaptive, hosting large-scale employment opportunities and social welfare and health benefits, particularly for the vulnerable and elderly |
| CABE Space (2007) | The value of good street design | Public realm quality | Improvements in streetscape quality lead to direct increases in retail rents and residential apartment prices. Pedestrians are willing to pay through higher council tax or public transport fares for improvements |
| New York City, Department of Transportation (2012a) | Economic benefits from investing in streets | Bike paths, expanded walking facilities, new parks, streetscape improvements, bus transit facilities | Various the public realm improvements delivered reduced commercial vacancy and higher retail sales |
| New York City, Department of Transportation (2012b) | Economic benefits of sustainable streets | Improved accessibility and a more welcoming street environment | Improvements in retail sales data |
| Carmona et al. (2017) | The value of street-based improvements | Public realm improvements on mixed high street locations | Benefits to everyday users of streets, and to the occupiers of and investors in surrounding property: office and retail rental value uplift, boost in static and active street activities (particularly leisure based street activities), and strong perceptions of improvements, including to general vibrancy (no residential value uplift or alterations to traffic flows) |
| CBRE & Gehl Architects (2017) | The value of public realm | Public space improvements | Value uplifts (sometimes substantial) from improved image and character, a new destination for commercial or recreational facilities, added versatility for events, improved experience (comfort, enjoyment and willingness to dwell) |
### C5. Economic development and regeneration

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|-----------------------------|----------------------------------|
| Savills Research Report to the Cabinet Office (2016b) | Street-based value in estate regeneration | Redevelopment of post-war Modernist housing with street based urbanism | Potential for far greater densities and more housing, plus enhanced neighbourhood, community and commercial facilities |
| Worpole (2000) | The value of architecture | High quality architecture | Flagship architectural projects have a clear economic impact, and impact on people's perception of an area and decisions to locate there |
| Places Matter (2009) | Good design in a downturn | Aspects of architectural design in a downturn (appearance, space and layout) | In a challenging economic environment, good design had a positive effect on rental and capital values and on occupancy and take-up rates |
| Bell (2005) | Masterplans, property markets and value | Masterplanned development | Economic benefits are perceived by promoters of development from designing a public realm that is seen as higher quality by potential users |
| English Heritage (2002). | The heritage dividend | Heritage based regeneration | Heritage based place-making can lever in funding many times the original investment, including in economic development |
| Ahfeldt, Holman, and Wendland (2012) | Conservation area designation and property values | Heritage based designation | Residential properties fetch a premium and appreciate faster |
| Brennan and Tomback (2013) | The use of historic buildings in regeneration | Retention and investment in heritage buildings | Investment in historic buildings generates a substantial premium in the local economy |
| Designed to Move (2015) | Active cities and competitiveness | Low cost health based physical interventions (to encourage physical activity) | Reduced health insurance, better health and cuts in noise and expenditure on fuel |
| Spencer and Winch (2002). | Design and occupier productivity | Well-designed buildings (that better meets occupier needs) | Well-designed buildings deliver substantial productivity boosts |
| Carmona et al. (2001b) | The value of urban design | Better urban design (more attractive, accessible, legible, connected, mixed, resilient, etc.) | A wide range of economic and social benefits, including higher returns on investments (rental returns and capital values); responding to occupier demand; helping to deliver more lettable area; reducing management, maintenance, energy and security costs; more contented and productive workforces; differentiating places and raising their prestige; boosting civic pride and enhancing civic image |
| McIndoe et al. (2005) | The value of better urban design | Better urban design (local character, connectivity, density, mixed uses, adaptability, high quality public realm) | Attracts skilled workers, assists in promotion and branding; reinforces a sense of identity; increases vitality and viability of local services; encourages walking and cycling and greater social cohesion; reduces pollution; enhances social equity and economic activity; encourages safe use of space, civic pride and engagement. |
Table 3. (Continued).

| Study                        | Study focus                              | Dimensions of place quality                        | Aspects of value added (deducted)                                                                 |
|------------------------------|------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|
| La Rosa et al. (2017)        | Spreading regeneration benefits further  | Greater permeability, compactness and mixed use    | Net positive benefits spread to surrounding areas by connecting regenerated areas to existing urban fabric |
| Ryan and Weber (2007)        | New development in distressed neighbour-hoods | Urban design types and preferences                | Infill housing is more highly valued than either enclave or traditional neighbourhood development (TND) housing. Residents prefer greater integration with the surrounding neighbourhood |

C6. Public spending (and savings)

| Study                        | Study focus                              | Dimensions of place quality                        | Aspects of value added (deducted)                                                                 |
|------------------------------|------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Willis and Osman (2005)      | Economic benefits of accessible green spaces | Accessible, attractive and well-cared for greenspace | Substantially lower social costs from physical activity, lower obesity and psychological quality of life benefits |
| Zapata-Diomed, Herrera, and Veerman (2016) | Built environment attributes and health care costs | Density, land use mix, availability of destinations, distance to public transport, design and neighbourhood walkability | Each attribute can lead to significant health care cost savings due to preventable physical activity-related diseases, with associated health adjusted life year benefits |
| Pineo (2016)                 | The value of healthy places              | Healthy and unhealthy neighbourhoods               | Many expensive ‘lifestyle diseases’ are preventable, and are strongly influenced by the built environment, leading to high health costs and loss of productivity. Poor people are also more likely to live in neighbourhoods which are worse for health |
| Litman (2004)                | Economic value of walkability            | Increased walkability                              | Increases the access (of people to goods) and decreases consumer costs, notably in personal travel, alongside significant health care savings to society |
| Leinberger and Alfonzo (2012) | The economics of walkability             | Increased walkability                              | Increase a place’s triple bottom line: profit (economics), people (equity) and planet (environment). Notably in office, residential and retail rent premiums and capital values. In higher retail sales and lower transportation costs, but also higher housing costs |
| Sheldon et al. (2007)        | Valuing the urban realm                  | Good, bright, even lighting after dark; vehicles prohibited from parking on the pavement; direct green man crossings; and pavements with no cracks and which are even | People are willing to pay for street improvements through increased local taxation or public transport fares to enhance the quality of streets |
| MVA Consultancy (2008)       | Valuing urban realm qualities            | Design responses focused on personal security, good street lighting, the quality of environment generally, and good maintenance | Improvements in these qualities increased sale prices for residential apartments and increased shop rental values. Business users are willing to pay higher business rates (taxation) to see the street environment improve |
| Ewing et al. (2009)          | Compact city savings                     | Compact city (over sprawl) urban structures        | Reductions in vehicle miles travelled, CO² emissions, and infrastructure costs |

(Continued)
Higher productivity: more efficient property and workers, easier recruitment of employees, the enabling of higher density development and more efficient land use, greater adaptability of buildings and spaces over time, and avoiding the unnecessary costs associated with bad design.

The evidence on place value and environmental outcomes

The final grouping of evidence was also the thinnest with regard to the quantity of robust evidence uncovered (Table 4). This may seem surprising given the quantity of energy related research being conducted globally, but can be explained by the place focus at the urban scale, which excluded in the process the very large number of studies from the sustainability literature that relate to technical construction / building design issues, the many transport related studies that focus on transport modal choices, energy studies focusing on strategic energy generation and use, and the extensive range of generic landscape and ecology focused studies without a clear place dimension. Of those that remained, evidence on the
### Table 4. The environmental evidence.

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|-----------------------------|-----------------------------------|
| **D1. Urban form, density and energy use**  |  |  |  |
| Ewing and Rong (2008) | Sprawl and energy use | Urban form, house type | Residential energy use varies with house type and house size and these vary with the degree of urban sprawl. The average household consumes less energy (and emits less carbon) if living in a compact locality |
| Ratti, Baker, and Steemers (2005) | Energy consumption and urban texture | Urban form / geometry / texture | The variation of energy consumption relating to urban geometry (or texture) has a tremendous impact on the energy use, particularly in hotter and colder climates where more compact building forms are less wasteful |
| Chen et al. (2011) | Urban form and energy consumption | Land fragmentation vs. compact forms | As urban size increases energy consumption increases. Fragmented urban land use patterns are correlated with increased energy consumption |
| Wilson (2013) | Residential density and energy consumption | Urban form characteristics | Urban form characteristics matter at the micro-scale: compact residential development provides opportunities to manage electricity consumption, and by extension, greenhouse gas emissions. Higher density leads to less energy consumption |
| Ward et al. (2015) | Carbon release and urbanization | Urbanization vs. vegetated ecosystems | Annual CO₂ exchange among urbanized study sites is many times that of vegetated ecosystems |
| Lee and Lee (2014) | Urban form and carbon emissions | Urban form, household travel | More compact, mixed-use urban forms dramatically reduce CO₂ emissions and energy consumption |
| Makido, Dhakal, and Yamagata (2012) | Compactness and carbon emissions | Compact development, urban form regularity, density | Greater compactness and less irregularity correlated with lower CO₂ emissions, but extreme density and mono-centrism lead to higher CO₂ emissions |
| Jones and Kammen (2014) | City size, density and carbon emissions | Urban form, density, population | Lower household carbon footprints are found in urban core cities. Population density exhibits a weak but positive correlation with carbon footprints until a density threshold is met |
| Fang, Wang, and Li (2015) | The shape of cities and greenhouse gas emissions | Shape complexity of cities (perimeter-to-area ratios) | Integrated (compact) urban forms with regular shapes lowered greenhouse gas emissions |
| Liu, Song, and Song (2014) | Compactness and CO₂ emissions efficiency | Compactness, social infrastructure | Optimizing efficiency requires a balance between compactness and investment in public services to manage the resulting high population density |

**D2. Transport, technology and carbon reduction**

| Study | Study focus | Dimensions of place quality | Aspects of value added (deducted) |
|-------|-------------|-----------------------------|-----------------------------------|
| Tiwari, Cervero, and Schipper (2011) | Integrating transport and urban design strategies | Transport mode, place-making | Rapid bus and light rail show significant reductions in carbon emissions and better place-making than ‘business as usual’ |

(Continued)
Table 4. (Continued).

| Study                        | Study focus                                      | Dimensions of place quality                                                                 | Aspects of value added (deducted)                                                                                                                                 |
|------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nakamura and Hayashi (2013)  | Low-carbon urban transport and land uses         | Low-carbon transport strategies, urban development and land use                             | Encouraging density, transit oriented development and transit corridor development coupled with economic interventions such as road pricing may significantly reduce CO₂ |
| Alawadi (2017)               | Generating sustainable form-based strategies     | Form-based urban design strategies and environmental, social, and economic coherence         | Moving to a compact city model leads to reduction in infrastructure and service expenses; reduced heat gain and cooling load during daytime hours; and facilitating passive cooling strategies |
| Liu and Sweeney (2012)       | Housing form and energy use                      | Land uses, urban form, density, building age                                                | Domestic energy use is sensitive to land use type; age; size of housing; household density. Newer, smaller, apartments in denser built areas consume less energy |
| Zhou et al. (2013)           | Mixed use, density and energy consumption         | Mixed use, density, transport energy                                                        | Mixed-use developments with greater density lead to lower transportation energy consumption                                                                   |
| Ishii et al. (2010)          | Carbon reducing technologies and urban form      | Technological interventions, land uses and density                                           | Integrating technological interventions in medium scale development reduces greenhouse gas emissions most significantly |
| Wang et al. (2017)           | CO₂ emissions in megacities                      | Urban structure, public transport                                                           | Reductions in urban sprawl and more integrated public transportation networks reduce CO₂ emissions                                                               |

D3. Thermal comfort, cooling and pollution

| Study                        | Study focus                                      | Dimensions of place quality                                                                 | Aspects of value added (deducted)                                                                                                                                 |
|------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Yahia et al. (2017)          | Urban design and thermal comfort outdoors in warm-humid climates | Building height, tree cover                                                              | Areas with low-rise buildings suffer from greater heat stress in urban spaces. Dense trees help to enhance the thermal comfort conditions |
| Bowler et al. (2010)         | Cool towns and cities                             | Parks and trees                                                                            | Green sites are cooler than non-green sites. Larger parks are cooler than smaller ones. Shade from trees lowers temperatures. Cooling extends beyond a green area's boundaries |
| Xu et al. (2017)             | The cooling and energy saving effect of landscape | Shading and trees                                                                           | Optimal cooling benefits can be obtained by a combination of manmade and natural elements, notably designed shading and trees |
| Swinbourne and Rosenwax (2017) | Tree canopy, comfort and value              | Tree coverage, street maintenance                                                          | Greater street tree canopy coverage reduces urban heat, and costs of maintenance, and increases property values |
| Akbari, Pomerantz, and Taha (2001) | Energy, cool surfaces and shade trees             | Cool surfaces and urban trees                                                               | Cool surfaces (cool roofs and cool pavements) and urban trees can have a substantial effect on urban air temperature, reducing cooling-energy use and smog |
| Ward and Grimmond (2017)     | Surface cover and energy use                     | Urban greening, building height                                                            | Building upwards has a smaller impact on the urban energy balance than building on vegetated areas. Greening has the greatest effect |

(Continued)
Table 4. (Continued).

| Study                                             | Study focus                                                      | Dimensions of place quality                                                                 | Aspects of value added (deducted)                                                                 |
|--------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Ko and Radke (2014)                               | Urban form and reducing energy load through cooling               | Higher population density, east-west street orientation, higher green space density, and a higher sum of tree heights on the east, south and west side of houses | All have a statistically significant effect on summer cooling energy consumption                |
| Jamei et al. (2016)                              | Urban geometry, greening and outdoor thermal comfort             | Street-level greening, building form, density and placement                                 | The placement, density and distribution of buildings affects the creation of heat islands by the shaping the flow of air and sunlight exposure. Street-level greening cools urban environments by providing shade and mitigating heat build-up |
| Honold et al. (2012)                             | Pollution and resident behaviours                                | Traffic noise, air pollution, greenery                                                      | Neighbourhood satisfaction scores are strongly impacted by levels of traffic noise, air pollution and availability of green space. Perceived air pollution has the biggest impact on health behaviours |
| Braubach and World Health Organization (2011)    | Traffic noise exposure and health                                 | Road traffic noise                                                                          | Road traffic noise is a significant risk factor for ischaemic heart diseases                    |
| Shield and Dockrell (2003)                       | Community noise exposure and stress in children                  | Neighbourhood noise                                                                         | Children living in relatively noisy neighbourhoods have raised blood pressure, heart rates, levels of stress hormones, and reduced motivation leading potentially to ‘learned helplessness’ syndrome |
| D4. Ecology and resilience                       |                                                                  |                                              |                                                                                                  |
| Liao, Le, and Van Nguyen (2016)                  | Urban design principles for flood resilience                    | Design for flooding                                                                         | Designing for flooding leads to a greater sense of well-being and an appreciation of the positive side of flooding and nature |
| Li (2012)                                        | Eco-hydrology and good urban design                              | Eco-hydrology, green space, place-making                                                    | Increasing greenspace, using water and other natural features as place making devices and incorporating more permeable surfaces in the built environment facilitates storm water management |
| Tratalos et al. (2007)                           | Ecosystem performance and density                                | Density, ecosystem management, trees and greening                                            | High density urban developments are associated with poor ecosystem performance, but at any given density, there is substantial scope for maximizing ecological performance |
| McKinney (2008)                                 | Urbanization and species richness                                 | Urbanization, density                                                                       | Extreme urbanization (representative of urban cores) almost always reduces species richness. Moderate (suburban) urbanization leads to greater richness |
| Ye et al. (2015)                                 | Green/blue space availability and energy use                     | Density, green and blue space access                                                        | The benefits of compactness may be offset by household distance to greenspace and water bodies. Better access can positively impact urban energy use |
| Flynn et al. (2016)                              | Eco-cities and sustainable lifestyles                            | Sustainable communities, resident behaviours                                                 | Reduced energy consumption in communities built as sustainable exemplars derives principally from improved technology, not lifestyle change |
The relationship between the environment and quality of place relied on a mix of natural and social scientific data which were categorized into four types. Most prolific were energy studies relating to particular urban form/density profiles and studies with a focus on urban cooling and thermal comfort. Smaller categories of studies focused, respectively, on transport integration and use and on questions of local ecology and resilience.

A remarkable consistency in what the evidence revealed helped to overcome its relative paucity, with many of the findings strongly reinforcing those associated with the other policy arenas. Collectively the research pointed to multiple potential environmental benefits from how places are shaped, including:

- Reduced energy use and associated carbon (greenhouse gas) emissions: through the creation of urban forms that need less heating and cooling and require less private (vehicle) travel.
- Adaptive reuse: buildings, spaces and urban infrastructure that is adaptable over time and more able to support the changing needs of society within the existing built fabric (and its embodied energy).
- A viable local exchange network: with local facilities, amenities and employment opportunities reducing the need to travel further afield and supporting local economic and social resilience.
- Reduced heat stress and enhanced thermal comfort: particularly for pedestrians through greater greening and shading in urban areas.
- Reduced waste: through a lower demand for construction materials and a reduction in construction waste.
- Reduced pollution: including atmospheric pollution and noise pollution (with knock-on health and well-being benefits).
- Greater resilience: through accommodating and managing hydrological cycles and working with (rather than against) natural phenomena.
- Ecological diversity: through supporting a greater diversity of species and a greener built environment.

The collective evidence on place quality

As well as revealing much about the nature of place value through the lens of the different policy arenas, the collective evidence also revealed a good deal about the types of places that deliver that value, and more specifically about the qualities of the built environment that do that. As was argued earlier, this can be seen as one way of defining what is meant by place quality, in other words, those places that deliver greatest value, in all its guises, are by implication of high quality. They may not be particularly unique, innovative or remarkable in any way, but day-to-day they successfully influence positive health, social, economic and environmental outcomes.

Whilst, in order to relate the evidence to the constituent policy arenas, these different forms of value have been separated and discussed individually, much of the research evidence cuts across the different arenas and sub-categories. A few studies cut across three of the arenas (e.g. Carmona et al. 2001b; McInloe et al. 2005; Leinberger and Alfonzo 2012) and explore triple bottom line benefits of investing in place quality. A much larger group connects
two policy arenas, reinforcing the multiple potential benefits from well-designed interventions in the built environment:

- Health and environmental: notably tying a greener and less polluted environment to better general health across the generations, e.g. Shield and Dockrell (2003); Braubach and World Health Organization (2011); Honold et al. (2012).
- Health and social: linking the health benefits of more exercise with that of a safer, more sociable and inclusive public realm, e.g. Jackson (2003); Talen and; Brown et al. (2008); Clarke et al. (2008); Sinnett et al. (2013); Koschinsky (2014); Ulmer et al. (2016); Venerandi et al. (2016a).
- Health and economic: tying the benefits of better health to reduced health care and insurance costs, e.g. Designed to Move (2015); Pineo (2016); Zapata-Diomed, Herrera, and Veerman (2016); McKenzie et al. (2017).
- Social and economic: linking a range of social benefits, including less crime, social inclusion, general well-being, and vibrancy, with property value uplift and enhanced economic performance and productivity, e.g. Ekblom et al. (1996); Bowes and Ihlanfeldt (2001); Britain (2005); UN Habitat (2013); Venerandi et al. (2016b); Carmona et al. (2017); CBRE & Gehl Architects (2017); Weber et al. (2017).
- Social and environmental: demonstrating the association between green space and community quality of life, but also the learning opportunities provided by nature, e.g. Shafer, Lee, and Turner (2000); Kuo and Sullivan (2001); Thompson et al. (2004); Liao et al. (2016); Thompson et al. (2007).
- Economic and environmental: with large numbers of studies revealing the links between greenspace and property values, and smaller numbers other associations such as the potential to reduce infrastructure costs, e.g. Lutzenhiser and Netusil (2001); Dewaelheyns et al. (2014); Li et al. (2016); Swinbourne and Rosenwax (2017); Alawadi (2017).

Looking across the 271 studies, many are highly focused on particular types of intervention and particular outcomes. Collectively, however, the results can be aggregated in order to determine which associations between Place value and the different qualities of place are stronger, which weaker and which are negative, or simply still uncertain given the available evidence.

There is, for example, a **VERY strong positive** association between place derived value of all types (health, social, economic and environmental) and six qualities: greenness in the built the environment (notably the presence of trees and grass, water, and open space—the latter if of good quality); a mix of uses (notably the diversity of land uses within a neighbourhood); low levels of traffic; the walkability and bikeability of places (derived from their strategic street-based connectivity and the quality of the local public realm); the use of more compact (less sprawling and fragmented) patterns of development; and ready convenient connection to a good public transport network. These can be seen as first order highly desirable qualities that also happen to be very tangible and objective and therefore measurable qualities. By implication, therefore, if the will is there, they can be readily articulated and specified by policy makers through the formal tools of design governance (Carmona 2017) in a manner that can ‘require’ their delivery.

Next there is a **strong positive** association between place derived value of all types and fifteen often less tangible, sometimes subjective, and generally more difficult to measure qualities of place. Whilst the evidence on each of these remains powerful, it is not definitive,
in the same way as it is for the qualities already discussed. Partly this seems to be because
the more ‘difficult’ nature of these qualities makes researching them more challenging, and
so there is often less research available on which to make a definitive assessment. There are
also greater challenges in specifying exactly what quality means in these areas, making the
evidence that is available more equivocal.

These second order desirable qualities include: visual permeability; sense of place (dis-
tinctiveness); pedestrian scale (of streets and buildings); façade continuity; natural surveil-
lance (the creation of defensible space); presence of street level activity / background
movement; good street lighting; a denser street network (urban grain); low traffic speeds;
low neighbourhood noise; presence of attractive / welcoming / comfortable / adaptable
public spaces; positive (sociable) public/private threshold features; integration of built her-
itage; integration of natural features and a diverse ecosystem; and perceived architectural
quality and beauty generally in the built environment. Whilst some of these, for example,
façade continuity or traffic speeds are relatively easily specified, most need more careful
interpretation in the light of local circumstances and this will lend itself more easily to control
through the informal tools of design governance (Carmona 2017). They are therefore likely
to be ‘aspirational’ rather than required qualities.

The other side of the coin are those place qualities where the collective research evidence
reveals a very strong negative association with place derived value of all types. Here the
strength of the evidence is just as strong as for the ‘first order’ qualities already discussed,
but in the opposite direction as qualities to be ‘avoided’ when shaping the built environment.
Eight of these negative qualities were identified: car dependent and extensive forms of
suburbanization; relentlessly hard urban space (absence of local green space); too much
very local permeability; the presence of rear parking courts and other segregated areas;
poor maintenance / dilapidation (including of green spaces); a sense of overcrowding in
residential areas; the presence of unfavourable food stores; and the impact of roads with
higher traffic loads and speeds, wider carriageway widths, or which are elevated. Like the
first order qualities, these qualities are largely tangible and measurable and therefore capable
of direct control (in a preventative manner) through the formal tools of design
governance.

A final category encompasses those place qualities for which the research evidence is
conflicting, and in connection with which it is not possible to be definitive about the value
added (or not) by particular qualities. There are nine of these:

- Different architectural styles (about which the evidence is simply unclear).
- Higher versus lower densities of development (where within the health research, and
  with regard to sociability versus perceived crime, the evidence conflicts).
- Extreme densities (where conflicting evidence is apparent relating to carbon reduction,
  social welfare and ecological richness).
- High-rise living (where the evidence is unclear, although tending to warn against fam-
  ilies living in such circumstances).
- Street length and pedestrian connectivity (where divergences are apparent within the
  evidence on health versus crime).
- Cul-de-sacs (where, within the evidence on crime and safety and with regard to property
  value, sociability and children’s play, conflicts are apparent).
- Vehicle / pedestrian separation (about which the evidence is weak and indecisive).
• Use of shared spaces (where conflicts are apparent, particularly with regard to the evidence on actual and perceived safety).

• The economic impact of the proximity of retail to residential properties (about which conflicts exist on the relative size and impact of negative externalities sometimes associated with local retail).

On all these qualities, more research is required, and care should be taken when seeking, without very good reason, to be prescriptive on such issues in policy or guidance. This might include, for example, requiring the use of high-rise residential blocks in urban areas or cul-de-sacs in suburban ones.

It is possible to envision these different qualities as sitting on a ladder (Figure 4) that climbs from those place qualities to be avoided when shaping the built environment (because of their very possible negative impact on place value); to those where the impact is as yet unknown (and where care should be taken to avoid any negative side effects); to second order place qualities that are strongly associated with the delivery of place derived value of all types (and which should be the aspiration of built environment policy and development-related decision making); to those first order qualities which are fundamental and which should be required as a means to maximize place value through good design.
Conclusions

This paper has examined the notion that place quality and place value are inherently interlinked. It was first theorized that high quality places deliver greater value to their users in terms of the positive impact those places have on the delivery of a large number of health, social, economic and environmental public policy goals. It was also theorized that there is a virtuous loop, with the degree to which environments deliver value (and facilitate key public policy goals) determining whether they are intrinsically high quality, or not. The question the research asked was: what does the empirical evidence say, and is this really the case? Three overarching conclusions can be drawn to address this.

The first reflects the overwhelming nature of the evidence, the very large majority of which points in the same broad direction, that better place quality adds value economically, socially and with regard to health and environmental outcomes. The impacts of place are profound, contribute benefits to society over short, medium and long-term time horizons, and reverberate throughout the lives of citizens across all socio-economic strata and globally.

Second, whilst the different types of value listed under each of the sub-headings in Tables 1 to 4 may not be directly comparable (e.g. mental well-being versus return on a property investment), may flow differentially to different stakeholders and over different time horizons (e.g. short-term profit to developers versus long-term health benefits to society), and perhaps not to those who paid for them at all (e.g. the impact of street trees may not be truly felt until they are fully grown); all are important and can be considered together as a varied and ever changing basket of place value. In this, value of different types flows from the qualities of place, and feeds into a virtuous loop in which quality dictates value and value defines quality.

Finally, in a context where the governance of design (and place) is increasingly a shared endeavour encompassing critical inputs from public, private, third and community sectors, such a shared perspective on the importance of place quality is all the more important and (where it exists) powerful in its impact. Place quality is not a mysterious and luxurious aspiration only to be considered when things are good or only for the wealthy. Instead, as the evidence collected in this paper shows, it is a basic necessity of urban life with profound and far-reaching impacts on the lives of citizens today and tomorrow. It is so important to our basic well-being that it should be the expectation of all. Fortunately, it is also a field of knowledge about which we know a good deal, including the essentials of what makes a good place, and how the way we shape places can add value.

We can use this knowledge to advance the case for quality when place-shaping policy, project or investment decisions are being made. Or we can ignore it and suffer the consequences.

Notes

1. See www.place-value-wiki.net for a more extensive abstract of each study and link to the original source.
2. For convenience and clarity, cross-cutting research was located in only one of the Tables 1 to 4, reflecting the dominant focus of each study.
Acknowledgements

Particular thanks are extended to Hooman Foroughmand Araabi and Jeffrey Roberts for their assistance in collecting the evidence underpinning this research.

Disclosure statement

No potential conflict of interest was reported by the author.

Funding

This work was supported by the Arts and Humanities Research Council [grant number AH/J013706/1].

References

Abelson, P. 2000. Valuing the Public Benefits of Heritage Listing of Commercial Buildings. Sydney: New South Wales Heritage Office.

ActionAid. 2015. Women and the City III: A Summary of Baseline Data on Women's Experience of Violence in Seven Countries. ActionAid February 2015.

Adams, D., and S. Tiesdell. 2013. Shaping Places: Urban Planning, Design and Development. Abingdon Oxon.: Routledge.

Ahlfeldt, G., and A. Mastro. 2012. “Valuing Iconic Design: Frank Lloyd Wright Architecture in Oak Park.” Housing Studies 27 (8): 1079–1099.

Ahlfeldt, G., N. Holman, and N. Wendland. 2012. An Assessment of the Effects of Conservation Areas on Value. Final Report. London: LSE.

Akbari, H., M. Pomerantz, and H. Taha. 2001. “Cool Surfaces and Shade Trees to Reduce Energy Use and Improve Air Quality in Urban Areas.” Solar Energy 70 (3): 295–310.

Alawadi, K. 2017. “Rethinking Dubai’s Urbanism: Generating Sustainable Form-Based Urban Design Strategies for an Integrated Neighborhood.” Cities 60: 353–366.

Alfonzo, M., Z. Guo, L. Lin, and K. Day. 2014. “Walking, Obesity and Urban Design in Chinese Neighborhoods.” Preventive Medicine 69: S79–S85.

Alidoust, S., and C. Bowman. 2017. “Master Planned Communities for Ageing Populations. How Sociable Are They?” Cities & Health 1 (1): 38–46.

Ameli, S. H., S. Hamidi, A. Garfinkel-Castro, and R. Ewing. 2015. “Do Better Urban Design Qualities Lead to More Walking in Salt Lake City, Utah?” Journal of Urban Design 20 (3): 393–410.

Anderson, L. M., and H. K. Cordell. 1988. “Influence of Trees on Residential Property Values in Athens, Georgia (USA): A Survey Based on Actual Sales Prices.” Landscape and Urban Planning 15 (1-2): 153–164.

Anderson, J., K. Ruggeri, K. Steemers, and F. Huppert. 2016. “Lively Social Space, Well-Being Activity, and Urban Design Findings from a Low-Cost Community-Led Public Space Intervention.” Environment and Behavior 49(6): 685–716.

Anderson, S. T., and S. E. West. 2006. “Open Space, Residential Property Values, and Spatial Context.” Regional Science and Urban Economics 36 (6): 773–789.

Appleyard, D., and M. Lintell. 1972. “The Environmental Quality of City Streets: The Residents’ Viewpoint.” Journal of the American Institute of Planners 38 (2): 84–101.

Armitage, R., and L. Monchuk. 2011. “Sustaining the Crime Reduction Impact of Designing out Crime: Re-Evaluating the Secured by Design Scheme 10 Years on.” Security Journal 24 (4): 320–343.

Armitage, R., L. Monchuk, and M. Rogerson. 2011. “It Looks Good, but What is It like to Live There? Exploring the Impact of Innovative Housing Design on Crime.” European Journal on Criminal Policy and Research 17 (1): 29–54.

Asabere, P. 1990. “The Value of a Neighborhood Street with Reference to the Cul-De-Sac.” Journal of Real Estate and Finance. Economics 3: 185–193.

Austin, D. M., L. A. Furr, and M. Spine. 2002. “The Effects of Neighborhood Conditions on Perceptions of Safety.” Journal of Criminal Justice 30 (5): 417–427.
Bartholomew, K., and R. Ewing. 1995. “Hedonic Price Effects of Pedestrian- and Transit-Oriented Development.” *Journal of Planning Literature.* 26 (1): 18–34.

Barton, H. 2017. *City of Well-Being, a Radical Guide to Planning.* Abingdon Oxon.: Routledge.

Baum, A. 1993. “Quality, Depreciation, and Property Performance.” *Journal of Real Estate Research* 8 (4): 541–565.

Baum, A. 1994. “Quality and Property Performance.” *Journal of Property Valuation and Investment* 12 (1): 31–46.

Bell, D. 2005. “The Emergence of Contemporary Masterplans: Property Markets and the Value of Urban Design.” *Journal of Urban Design* 10 (1): 81–110.

Benson, E. D., J. L. Hansen, A. L. Schwartz Jr, and G. T. Smersh. 1998. “Pricing Residential Amenities: The Value of a View.” *The Journal of Real Estate Finance and Economics* 16 (1): 55–73.

Berrigan, D., and R. Troiano. 2002. “The Association between Urban Form and Physical Activity in U.S. Adults.” *American Journal of Preventive Medicine* 23 (2): 74–79.

Biddulph, M. 2010. “Evaluating the English Home Zone Initiatives.” *Journal of the American Planning Association* 76 (2): 199–218.

Biddulph, M. 2012. “Street Design and Street Use: Comparing Traffic Calmed and Home Zone Streets.” *Journal of Urban Design* 17 (2): 213–232.

Blackman, T., P. Van Schaik, and A. Martyr. 2007. “Outdoor Environments for People with Dementia: An Exploratory Study Using Virtual Reality.” *Ageing and Society* 27: 811–825.

Bowes, D. R., and K. R. Ihlanfeldt. 2001. “Identifying the Impacts of Rail Transit Stations on Residential Property Values.” *Journal of Urban Economics* 50 (1): 1–25.

Bowler, D. E., L. Buyung-Ali, T. M. Knight, and A. S. Pullin. 2010. “Urban Greening to Cool Towns and Cities: A Systematic Review of the Empirical Evidence.” *Landscape and Urban Planning* 97 (3): 147–155.

Boys Smith, N., A. Venerandi, and K. Toms. 2017. *Beyond Location, a Study into the Links between Specific Components of the Built Environment and Value.* London: Create Streets.

Bramley, G., N. Dempsey, S. Power, C. Brown, and D. Watkins. 2009. “Social Sustainability and Urban Form: Evidence from Five British Cities.” *Environment and Planning A* 41 (9): 2125–2142.

Brauchbach, M., and World Health Organization. 2011. “Environmental Burden of Disease Associated with Inadequate Housing: A Method Guide to the Quantification of Health Effects of Selected Housing Risks in the WHO European Region.” Bonn: WHO Regional Office for Europe.

Brennan, T., and D. Tomback. 2013. *The Use of Historic Buildings in Regeneration.* London: Historic England.

Brown, S., C. Mason, T. Perrino, J. Lombard, F. Martinez, E. Plater-Zyberk, A. Spokane, and J. Szapocznik. 2008. “Built Environment and Physical Functioning in Hispanic Elders: The Role of “Eyes on the Street”.” *Environmental Health Perspectives* 116 (10): 1300–1307.

Burton, E., L. Mitchell, and C. Stride. 2015. “Bed of Roses? The Role of Garden Space in Older People’s Well-Being.” *Proceedings of the Institution of Civil Engineers: Urban Design and Planning* 168 (4): 164–173.

Byravan, S., M. S. Ali, M. R. Ananthakumar, N. Goyal, A. Kanudia, P. V. Ramamurthi, S. Srinivasan, and A. L. Paladugula. 2017. “Quality of Life for All: A Sustainable Development Framework for India’s Climate Policy Reduces Greenhouse Gas Emissions.” *Energy for Sustainable Development* 39: 48–58.

CABE. 2004. *Liveability & Sustainable Development: Bad Habits & Hard Choices.* London: ODPM.

Brown, P., M. Harniss, K. Schomer, M. Feinberg, N. Cullen, and K. Johnson. 2012. “Conducting Systematic Evidence Reviews: Core Concepts and Lessons Learned.” *Archives of Physical Medicine and Rehabilitation* 93 (8) supplement: S177–S184.

Buitelaar, E., and F. Schilder. 2017. “The Economics of Style: Measuring the Price Effect of Neo-Traditional Architecture in Housing.” *Real Estate Economics* 45 (1): 7–27.

Burton, E., L. Mitchell, and C. Stride. 2015. “Bed of Roses? The Role of Garden Space in Older People’s Well-Being.” *Proceedings of the Institution of Civil Engineers: Urban Design and Planning* 168 (4): 164–173.

Byravan, S., M. S. Ali, M. R. Ananthakumar, N. Goyal, A. Kanudia, P. V. Ramamurthi, S. Srinivasan, and A. L. Paladugula. 2017. “Quality of Life for All: A Sustainable Development Framework for India’s Climate Policy Reduces Greenhouse Gas Emissions.” *Energy for Sustainable Development* 39: 48–58.

CABE. 2006. *The Value Handbook, Getting the Most from Your Buildings and Spaces.* London: Commission for Architecture and the Built Environment.

CABE Space. 2005. Does Money Grow on Trees? Commission for Architecture and the Built Environment.

CABE Space. 2007. *Paved with Gold: The Real Value of Street Design.* London: CABE.

CABE Space. 2009. *Making the Invisible Visible: The Real Value of Park Assets.* London: Commission for Architecture and the Built Environment.

Cabinet Office. 2001. *Better Policy Making.* London: HM Government.
Carlson, S. A., R. Guide, T. L. Schmid, L. V. Moore, D. T. Barradas, and J. E. Fulton. 2011. “Public Support for Street-Scale Urban Design Practices and Policies to Increase Physical Activity.” Journal of Physical Activity and Health 8 (s1): S125–S134.

Carmona, M. 2014. “The Place-Shaping Continuum, a Theory of Urban Design Process.” Journal of Urban Design 19 (1): 2–36.

Carmona, M. 2015. “London’s Local High Streets: The Problems, Potential and Complexities of Mixed Street Corridors.” Progress in Planning 100: 1–84.

Carmona, M. 2016. “Design Governance: Theorising an Urban Design Sub-Field.” Journal of Urban Design 21 (6): 705–730.

Carmona, M. 2017. “The Formal and Informal Tools of Design Governance.” Journal of Urban Design 22 (1): 1–36.

Carmona, M., and C. de Magalhaes. 2009. “Local Environmental Quality: Establishing Acceptable Standards in England.” Town Planning Review 80 (4-5): 517–548.

Carmona, M., S. Carmona, and W. Clarke. 2001a. A Bibliography of Design Value, for the Commission for Architecture & the Built Environment, Unpublished. London: CABE.

Carmona, M., C. de Magalhaes, and M. Edwards. 2001b. The Value of Urban Design. London: Thomas Telford.

Carmona, M., S. Carmona, and W. Clarke. 2002. The Value of Good Design. London: CABE.

Carmona, M., C. de Magalhaes, M. Edwards, and L. Sieh. 2006. Offices, Value and Design, a Discussion Document. London: British Council of Offices.

Carmona, M., T. Gabrieli, R. Hickman, T. Laopoulou, and N. Livingstone. 2017. “Street Appeal: The Value of Street Improvements.” Town Planning Review 80 (4-5): 517–548.

Casteel, C., and C. Peek-Asa. 2000. “Effectiveness of Crime Prevention through Environmental Design (CPTED) in Reducing Robberies.” American Journal of Preventive Medicine 18 (4): 99–115.

CBRE & Gehl Architects. 2017. Place Making, Value and the Public Realm. London: CBRE.

Cervero, R., and M. Duncan. 2002. “Transit’s Value-Added Effects: Light and Commuter Rails and Commercial Land Values.” Transportation Research Record: Journal of the Transportation Research Board 1805: 8–15.

Cervero, R., and M. Duncan. 2003. “Walking, Bicycling, and Urban Landscapes: Evidence from the San Francisco Bay Area.” American Journal of Public Health 93 (9): 1478–1483.

Cervero, R., and M. Duncan. 2004. “Neighbourhood Composition and Residential Land Prices: Does Exclusion Raise or Lower Values?” Urban Studies 41 (2): 299–315.

Cervero, R., J. Kang, and K. Shively. 2009a. “From Elevated Freeways to Surface Boulevards: Neighborhood and Housing Price Impacts in San Francisco.” Journal of Urbanism: International Research on Placemaking and Urban Sustainability 2 (1): 31–50.

Cervero, R., O. L. Sarmiento, E. Jacoby, L. F. Gomez, and A. Neiman. 2009b. “Influences of Built Environments on Walking and Cycling: Lessons from Bogotá.” International Journal of Sustainable Transportation 3 (4): 203–226.

Chang, D. 2011. “Social Crime or Spatial Crime? Exploring the Effects of Social, Economical, and Spatial Factors on Burglary Rates.” Environment and Behavior 43 (1): 26–52.

Chen, Y., X. Li, Y. Zheng, Y. Guan, and X. Liu. 2011. “Estimating the Relationship between Urban Forms and Energy Consumption: A Case Study in the Pearl River Delta, 2005–2008.” Landscape and Urban Planning 102 (1): 33–42.

Cheshire, P., and G. Dericks. 2014. ‘Iconic Design’ as Deadweight Loss: Rent Acquisition by Design in the Constrained London Office Market. SERC Discussion Papers, SERCDP0154. Spatial Economics Research Centre (SERC). London, UK: London School of Economics and Political Science.

Cho, S.-H., J. Bowker, and W. Park. 2006. “Measuring the Contribution of Water and Green Space Amenities to Housing Values: An Application of Spatially Weighted Hedonic Models.” Journal of Agricultural and Resource Economics 31 (3): 485–507.

Christian, H., B. Giles-Corti, M. Knuiman, A. Timperio, and S. Foster. 2011. “The Influence of the Built Environment, Social Environment and Health Behaviors on Body Mass Index. Results from RESIDE.” Preventive Medicine 53 (1-2): 57–60.
Clarke, P., and L. George. 2005. “The Role of the Built Environment in the Disablement Process.” *American Journal of Public Health* 95 (11): 1933–1939.

Clarke, P., J. Ailshire, and P. Lantz. 2009. “Urban Built Environments and Trajectories of Mobility Disability: Findings from a National Sample of Community-Dwelling American Adults (1986–2001).” *Social Science and Medicine* 69: 964–970.

Clarke, P., J. Ailshire, M. Bader, J. Morenoff, and J. House. 2008. “Mobility Disability and the Urban Built Environment.” *American Journal of Epidemiology* 168 (5): 506–513.

Coopers, Price Waterhouse. 2001. *Building Performance: An Empirical Assessment of the Relationship between Schools, Capital Investment and Pupil Performance*. Research Report 242. London: Department for Education and Employment.

Correll, M. R., J. H. Lillydahl, and L. D. Singell. 1978. “The Effects of Greenbelts on Residential Property Values: Some Findings on the Political Economy of Open Space.” *Land Economics* 54 (2): 207–217.

Cozens, P. 2008. “New Urbanism, Crime and the Suburbs, a Review of the Evidence.” *Urban Policy and Research* 26 (4): 429–444.

Cozens, P., D. Hillier, and G. Prescott. 2002. “Criminogenic Associations and Characteristic British Housing Designs.” *International Planning Studies* 7 (2): 119–136.

Curran, D. 2001. Economic Benefits of Natural Green Space Protection. Victoria B.C.: The Polis Project on Ecological Governance, University of Victoria.

De Vries, S., R. A. Verheij, P. P. Groenewegen, and P. Spreeuwenberg. 2003. “Natural Environments—Healthy Environments? An Exploratory Analysis of the Relationship between Greenspace and Health.” *Environment and Planning A* 35 (10): 1717–1731.

Designed to Move. 2015. Active Cities Report, a Physical Activity Action Agenda.

Dewaelheyns, V., E. Vanempten, K. Bomans, A. Verhoeve, and H. Gulinck. 2014. “The Fragmentation Bias in Valuing and Qualifying Open Space.” *Journal of Urban Design* 19 (4): 436–455.

Diao, M., and J. Ferreira Jr. 2010. “Residential Property Values and the Built Environment: Empirical Study in the Boston, Massachusetts, Metropolitan Area.” *Transportation Research Record: Journal of the Transportation Research Board* 2174: 138–147.

Dittmar, H., G. Mayhew, J. Hulme, and C. Smallwood 2007. *Valuing Sustainable Urbanism: A Report Measuring and Valuing New Approaches to Residentially Led Mixed Use Growth*. The Prince’s Foundation For the Built Environment.

Droomers, M., B. Jongeneel-Grimen, J. W. Bruggink, A. Kunst, and K. Stronks. 2016. “Is It Better to Invest in Place or People to Maximize Population Health? Evaluation of the General Health Impact of Urban Regeneration in Dutch Deprived Neighbourhoods.” *Health & Place* 41: 50–57.

Dumbaugh, E., and J. Gattis. 2005. “Safe Streets, Livable Streets.” *Journal of the American Planning Association* 71 (3): 283–300.

Dumbaugh, E., and R. Rae. 2009. “Safe Urban Form: Revisiting the Relationship between Community Design and Traffic Safety.” *Journal of the American Planning Association* 75 (3): 309–329.

Eccles, T. 1996. “The Professional Concept of Value within the Built Environment.” *Environment by Design* 1 (1): 39–51.

Ekblom, P., H. Law, M. Sutton, P. Crisp, and R. Wiggins. 1996. *Safer Cities and Domestic Burglary*. Home Office, Research and Statistics Directorate.

Ellard, C., and C. Montgomery. *n.d.* Testing, Testing: A Psychological Study on City Spaces and How They Affect Our Bodies and Minds” BMW Guggenheim Lab.

Ellaway, A., G. Morris, J. Curtice, C. Robertson, G. Allardice, and R. Robertson. 2009. “Associations between Health and Different Types of Environmental Incivility: A Scotland-Wide Study.” *Public Health* 123 (11): 708–713.

English Heritage. 2002. Heritage Dividend 2002-Measuring the Results of Heritage Regeneration 1999-2002.

Ewing, R., and F. Rong. 2008. “The Impact of Urban Form on U.S. Residential Energy Use.” *Housing Policy Debate* 19 (1): 1–30.

Ewing, R., and E. Dumbaugh. 2009. “The Built Environment and Traffic Safety a Review of Empirical Evidence.” *Journal of Planning Literature* 23 (4): 347–367.

Ewing, R., K. Bartholomew, S. Winkelman, J. Walters, and D. Chen. 2009. *Growing Cooler: The Evidence on Urban Development and Climate Change*. New York: Urban Land Institute (ULI).
Ewing, R., G. Meakins, S. Hamidi, and A. C. Nelson. 2014. “Relationship between Urban Sprawl and Physical Activity, Obesity, and Morbidity—Update and Refinement.” *Health & Place* 26: 118–126.
Ewing, R., R. Scheiber, and C. Zeeger. 2003. “Urban Sprawl as a Risk Factor in Motor Vehicle Occupant and Pedestrian Fatalities.” *American Journal of Public Health* 93 (9): 1541–1545.
Fang, C., S. Wang, and G. Li. 2015. “Changing Urban Forms and Carbon Dioxide Emissions in China: A Case Study of 30 Provincial Capital Cities.” *Applied Energy* 158: 519–531.
Farrington, D. P., and B. C. Welsh. 2007. *Improved Street Lighting and Crime Prevention: A Systematic Review*. Stockholm, Sweden: National Council for Crime Prevention.
Florida, R., C. Mellander, and K. Stolarick. 2011. “Beautiful Places: The Role of Perceived Aesthetic Beauty in Community Satisfaction.” *Regional Studies* 45 (1): 33–48.
Flynn, A., L. Yu, P. Feindt, and C. Chen. 2016. “Eco-Cities, Governance and Sustainable Lifestyles: The Case of the Sino-Singapore Tianjin Eco-City.” *Habitat International* 53: 78–86.
Foreman, H. 2017. Residential Street Design and Play, a Literature Review of Policy, Guidance and Research on Residential Street Design and Its Influence on Children’s Independent Outdoor Activity, Playing out.
Foster, S., B. Giles-Corti, and M. Knuiman. 2010. “Neighbourhood Design and Fear of Crime: A Social-Ecological Examination of the Correlates of Residents’ Fear in New Suburban Housing Developments.” *Health & Place* 16 (6): 1156–1165.
FPDSavills Research. 2003. *The Value of Housing Design and Layout, Commission for Architecture and the Built Environment*.
Frank, L. D., M. A. Andresen, and T. L. Schmid. 2004. “Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars.” *American Journal of Preventive Medicine* 27 (2): 87–96.
Frank, L. D., J. F. Sallis, T. L. Conway, J. E. Chapman, B. E. Saelens, and W. Bachman. 2006. “Many Pathways from Land Use to Health: Associations between Neighborhood Walkability and Active Transportation, Body Mass Index, and Air Quality.” *Journal of the American Planning Association* 72 (1): 75–87.
Frank, L., T. Schmid, J. Sallis, J. Chapman, and B. Saelens. 2005. “Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ.” *American Journal of Preventive Medicine* 28 (2): 117–125.
Freeman, L. 2001. “The Effects of Sprawl on Neighborhood Social Ties.” *Journal of the American Planning Association* 67 (1): 69–77.
Frumkin, H. 2002. “Urban Sprawl and Public Health.” *Public Health Reports* 117 (3): 201.
Fuerst, F., P. McAllister, and C. Murray. 2011. “Designer Buildings: Estimating the Economic Value of ‘Signature’ Architecture.” *Environment and Planning a* 43: 166–184.
Garfinkel-Castro, A., K. Kim, S. Hamidi, and R. Ewing. 2017. “Obesity and the Built Environment at Different Urban Scales: Examining the Literature.” *Nutrition Reviews* 75 (suppl 1): 51–61.
Gebreab, S. Y., D. A. Hickson, M. Sims, S. B. Wyatt, S. K. Davis, A. Correa, and A. V. Diez-Roux. 2017. “Neighborhood Social and Physical Environments and Type 2 Diabetes Mellitus in African Americans: The Jackson Heart Study.” *Health & Place* 43: 128–137.
Gehl, J. 2010. *Cities for People*. Washington DC: Island Press.
Gifford, R. 2007. “The Consequences of Living in High-Rise Buildings.” *Architectural Science Review* 50 (1): 2–17.
Gilderbloom, J. I., W. W. Riggs, and W. L. Meares. 2015. “Does Walkability Matter? An Examination of Walkability’s Impact on Housing Values, Foreclosures and Crime.” *Cities* 42: 13–24.
Giles-Corti, B., F. Bull, M. Knuiman, G. McCormack, K. Van Niel, A. Timperio, and B. Boruff. 2013. “The Influence of Urban Design on Neighbourhood Walking following Residential Relocation: Longitudinal Results from the RESIDE Study.” *Social Science & Medicine* 77: 20–30.
Giles-Corti, B., S. Macintyre, J. P. Clarkson, T. Pikora, and R. J. Donovan. 2003. “Environmental and Lifestyle Factors Associated with Overweight and Obesity in Perth, Australia.” *American Journal of Health Promotion* 18 (1): 93–102.
Glaeser, E. L., and J. D. Gottlieb. 2008. *The Economics of Place-Making Policies* (No. W14373). National Bureau of Economic Research.
Golembiewski, J. 2017. “Architecture, the Urban Environment and Severe Psychosis: Aetiology.” *Journal of Urban Design and Mental Health* 2: 1.
Grant, R. 1997. “Pedestrianisation and Disabled People: A Study of Personal Mobility in Kingston Town Centre.” *Disability and Society* 12 (5): 723–740.

Groves, R., and P. Niner. 1998. *A Good Investment?: the Impact of Urban Renewal on an Inner-City Housing Market*. Bristol: Policy Press.

Guite, H., C. Clark, and G. Ackrill. 2012. “The Impact of the Physical and Urban Environment on Mental Well-Being.” *Public Health* 120: 1117–1126.

Hart, J., and G. Parkhurst. 2011. “Driven to Excess: Impacts of Motor Vehicles on the Quality of Life of Residents of Three Streets in Bristol UK.” *World Transport Policy & Practice* 17 (2): 12–30.

Hartig, T., G. W. Evans, L. D. Jamner, D. S. Davis, and T. Gärling. 2003. “Tracking Restoration in Natural and Urban Field Settings.” *Journal of Environmental Psychology* 23 (2): 109–123.

Hillier, B. 2004. “Can Streets Be Made Safe?” *URBAN DESIGN International* 9 (1): 31–45.

Hillier, B., and O. Sahbaz. 2008. *An Evidence Based Approach to Crime and Urban Design. or, Can We Have Vitality, Sustainability and Security All at Once*. Bartlett School of Graduate Studies UCL.

Hochschild, T. 2012. “Cul-De-Sac Kids.” *Childhood* 20 (2): 229–243.

Hochschild, T. 2015. “The Cul-De-Sac Effect: Relationship between Street Design and Residential Social Cohesion.” *Journal of Urban Planning & Development* 141 (1): 1–6.

Holtan, M. T., S. L. Dieterlen, and W. C. Sullivan. 2015. “Social life under Cover: Tree Canopy and Social Capital in Baltimore.” *Environment and Behavior* 47 (5): 502–525.

Honold, J., R. Beyer, T. Lakes, and E. van der Meer. 2012. “Multiple Environmental Burdens and Neighborhood-Related Health of City Residents.” *Journal of Environmental Psychology* 32 (4): 305–317.

Hough, D., and C. Kratz. 1983. “Can ‘Good’ Architecture Meet the Market Test?” *Journal of Urban Economics* 14: 40–54.

Inam, A. 2014. *Designing Urban Transformation*. New York: Routledge.

Irwin, E. G. 2002. “The Effects of Open Space on Residential Property Values.” *Land Economics* 78 (4): 465–480.

Ishii, S., S. Tabushi, T. Aramaki, and K. Hanaki. 2010. “Impact of Future Urban Form on the Potential to Reduce Greenhouse Gas Emissions from Residential, Commercial and Public Buildings in Utsunomiya.” *Energy Policy* 38 (9): 4888–4896.

Jackson, L. E. 2003. “The Relationship of Urban Design to Human Health and Condition.” *Landscape and Urban Planning* 64 (4): 191–200.

Jamei, E., P. Rajagopalan, M. Seyedmahmoudian, and Y. Jamei. 2016. “Review on the Impact of Urban Geometry and Pedestrian Level Greening on Outdoor Thermal Comfort.” *Renewable and Sustainable Energy Reviews* 54: 1002–1017.

Jansen, S. J. 2014. “Different Values, Different Housing? Can Underlying Value Orientations Predict Residential Preference and Choice?” *Housing, Theory and Society* 31 (3): 254–276.

Javad Koohsari, M., H. Badland, S. Mavoa, K. Villanueva, J. Francis, P. Hooper, N. Owen, and B. Giles-Corti. 2018. “Are Public Open Space Attributes Associated with Walking and Depression?” *Cities* 74: 119–125.

Johnson, S. D., and K. J. Bowers. 2010. “Permeability and Burglary Risk: Are Cul-De-Sacs Safer?” *Journal of Quantitative Criminology* 26 (1): 89–111.

Jones, C., and D. Kammen. 2014. “Spatial Distribution of US Household Carbon Footprints Reveals Suburbanization Undermines Greenhouse Gas Benefits of Urban Population Density.” *Environmental Science & Technology* 48 (2): 895–902.

Joye, Y., K. Willems, M. Brengman, and K. Wolf. 2010. “The Effects of Urban Retail Greenery on Consumer Experience: Reviewing the Evidence from a Restorative Perspective.” *Urban Forestry & Urban Greening* 9 (1): 57–64.

Kaplan, R. 2001. “The Nature of the View from Home: Psychological Benefits.” *Environment and Behavior* 33 (4): 507–542.

Kent, J., L. Ma, and C. Malley. 2017. “The Objective and Perceived Built Environment: What Matters for Happiness?” *Cities & Health* 1 (1): 59–71.

Klichowski, M., and C. Patrício. 2017. “Does the Human Brain Really like ICT Tools and Being Outdoors? A Brief Overview of the Cognitive Neuroscience Perspective of the CyberParks Concept.” In *Enhancing Places through Technology. Proceedings from the ICiTy conference*, edited by A. Zammit & T. Kenna. Malta: Edições Universitárias Lusófonas.
Ko, Y., and J. D. Radke. 2014. “The Effect of Urban Form and Residential Cooling Energy Use in Sacramento, California.” Environment and Planning B: Planning and Design 41 (4): 573–593.

Kong, F., H. Yin, and N. Nakagoshi. 2007. “Using GIS and Landscape Metrics in the Hedonic Price Modeling of the Amenity Value of Urban Green Space: A Case Study in Jinan City.” Landscape and Urban Planning 79 (3-4): 240–252.

Kopits, E., V. McConnell, and M. Walls. 2007. “The Trade-off between Private Lots and Public Open Space in Subdivisions at the Urban-Rural Fringe.” American Journal of Agricultural Economics 89 (5): 1191–1197.

Kowaltowski, D. C., and A. D. Granja. 2011. “The Concept of Desired Value as a Stimulus for Change in Social Housing in Brazil.” Habitat International 35 (3): 435–446.

Kuo, F. E., and W. C. Sullivan. 2001. “Environment and Crime in the Inner City: Does Vegetation Reduce Crime?” Environment and Behavior 33 (3): 343–367.

La Rosa, D., R. Privitera, L. Barbarossa, and P. La Greca. 2017. “Assessing Spatial Benefits of Urban Regeneration Programs in a Highly Vulnerable Urban Context: A Case Study in Catania, Italy.” Landscape and Urban Planning 157: 180–192.

Lacy, J. 1990. An Examination of Market Appreciation for Clustered Housing with Permanent Open Space. Department of Landscape Architecture and Regional Planning, University of Massachusetts, 78.

Landscape Institute. 2014. Profitable Places; Why Housebuilders Invest in Landscape, September 2014.

Lawlor, E. 2013. The Pedestrian Pound: The Business Case for Better Streets and Places. London: Living Streets.

Lee, A. C., and R. Maheswaran. 2011. “The Health Benefits of Urban Green Spaces: A Review of the Evidence.” Journal of Public Health 33 (2): 212–222.

Lee, H., H. M. Kang, Y. J. Ko, H. S. Kim, Y. J. Kim, W. K. Bae, and B. Cho. 2015. “Influence of Urban Neighbourhood Environment on Physical Activity and Obesity-Related Diseases.” Public Health 129 (9): 1204–1210.

Lee, S., and B. Lee. 2014. “The Influence of Urban Form on GHG Emissions in the US Household Sector.” Energy Policy 68: 534–549.

Leinberger, C. B., and M. Alfonzo. 2012. Walk This Way: The Economic Promise of Walkable Places in Metropolitan. Washington DC: The Brookings Institution.

Levine, J., and A. Inam. 2004. “The Market for Transportation-Land Use Integration: Do Developers Want Smarter Growth than Regulations Allow?” Transportation 31 (4): 409–427.

Leyden, K. M. 2003. “Social Capital and the Built Environment: The Importance of Walkable Neighbourhoods.” American Journal of Public Health 93 (9): 1546–1551.

Li, C. 2012. “Ecophydrology and Good Urban Design for Urban Storm Water-Logging in Beijing.” Ecohydrology & Hydrobiology 12 (4): 287–300.

Li, H., Y. D. Wei, Z. Yu, and G. Tian. 2016. “Amenity, Accessibility and Housing Values in Metropolitan USA: A Study of Salt Lake County, Utah.” Cities 59: 113–125.

Liao, K. H., T. A. Le, and K. Van Nguyen. 2016. “Urban Design Principles for Flood Resilience: Learning from the Ecological Wisdom of Living with Floods in the Vietnamese Mekong Delta.” Landscape and Urban Planning 155: 69–78.

Litman, T. 2004. “Economic Value of Walkability.” World Transport Policy & Practice 10 (1): 5–14.

Liu, H., F. Li, J. Li, and Y. Zhang. 2017. “The Relationships between Urban Parks, Residents’ Physical Activity, and Mental Health Benefits: A Case Study from Beijing, China.” Journal of Environmental Management 190: 223–230.

Liu, X., and J. Sweeney. 2012. “Modelling the Impact of Urban Form on Household Energy Demand and Related CO\textsubscript{2} Emissions in the Greater Dublin Region.” Energy Policy 46: 359–369.

Liu, Y., Y. Song, and X. Song. 2014. “An Empirical Study on the Relationship between Urban Compactness and CO\textsubscript{2} Efficiency in China.” Habitat International 41: 92–98.

Lohr, V. I., and C. H. Pearson-Mims. 2006. “Responses to Scenes with Spreading, Rounded, and Conical Tree Forms.” Environment and Behavior 38 (5): 667–688.

Loukaitou-sideris, A. 1999. “Hot Spots of Bus Stop Crime: The Importance of Environmental Attributes.” Journal of the American Planning Association 65 (4): 395–411.

Loukaitou-Sideris, A., R. Liggett, H. Iseki, and W. Thurlow. 2001. “Measuring the Effects of Built Environment on Bus Stop Crime.” Environment and Planning B: Planning and Design 28 (2): 255–280.
Lutzenhiser, M., and N. Netusil. 2001. “The Effect of Open Spaces on a Home’s Sale Price.” *Contemporary Economic Policy* 19 (3): 291–298.

Maas, J., R. A. Verheij, P. P. Groenewegen, S. De Vries, and P. Spreeuwenberg. 2006. “Green Space, Urbanity, and Health: How Strong is the Relation?” *Journal of Epidemiology & Community Health* 60 (7): 587–592.

Makido, Y., S. Dhakal, and Y. Yamagata. 2012. “Relationship between Urban Form and CO2 Emissions: Evidence from Fifty Japanese Cities.” *Urban Climate* 2: 55–67.

Marshall, W. E., and N. Garrick. 2011. “Does Street Network Design Affect Traffic Safety?” *Accident Analysis and Prevention* 43 (3): 769–781.

Maruthaveeran, S., and C. Konijnendijk van den Bosh. 2015. “Fear of Crime in Urban Parks—What the Residents of Kuala Lumpur Have to Say?” *Urban Forestry & Urban Greening* 14: 702–713.

Massen, B. 2002. “Quality of Life: Public Planning and Private Living.” *Progress in Planning* 58: 141–227.

Matthews, J., and G. Turnbull. 2007. “Neighborhood Street Layout and Property Value: The Interaction of Accessibility and Land Use Mix.” *The Journal of Real Estate Finance and Economics* 35 (2): 111–141.

McCarthy, D., and S. Saegert. 1978. “Residential Density, Social Overload, and Social Withdrawal.” *Human Ecology* 6 (3): 253–272.

McConnell, V., and M. A. Walls. 2005. *The Value of Open Space: Evidence from Studies of Nonmarket Benefits*, 1–78. Washington, DC: Resources for the Future.

McCord, J., M. McCord, W. McCluskey, P. Davis, D. McLlhatton, and M. Haran. 2014. “Effect of Public Green Space on Residential Property Values in Belfast Metropolitan Area.” *Journal of Financial Management of Property and Construction* 19 (2): 117–137.

McIndoe, G., R. Chapman, C. McDonald, G. Holden, P. Howden-Chapman, and A. Sharpin. 2005. *The Value of Urban Design: The Economic, Environmental and Social Benefits of Urban Design*. Wellington: Ministry for the Environment, Wellington City Council, Auckland Regional Council.

McKenzie, K., A. Murray, and T. Booth. 2013. “Do Urban Environments Increase the Risk of Anxiety, Depression and Psychosis? An Epidemiological Study.” *Journal of Affective Disorders* 150 (3): 1019–24.

McKinney, M. L. 2008. “Effects of Urbanization on Species Richness: A Review of Plants and Animals.” *Urban Ecosystems* 11 (2): 161–176.

Mittman, T., and C. Kloss. 2014. *The Economic Benefits of Green Infrastructure: A Case Study of Lancaster, PA*. Mohamed, R. 2006. “The Economics of Conservation Subdivisions: Price Premiums, Improvement Costs, and Absorption Rates.” *Urban Affairs Review* 41 (3): 376–399.

Mohammad Rifaat, S., R. Tay, and A. de Barros. 2010. “Effect of Street Pattern on the Severity of Crashes Involving Vulnerable Road Users.” *Accident Analysis and Prevention* 43 (1): 276–283.

Montgomery, C. 2013. *Happy City, Transforming Our Lives through Urban Design*. London: Penguin Books.

Moore, J. 2000. “Placing Home in Context.” *Journal of Environmental Psychology* 20: 207–217.

Mouratidis, K. 2017. “Built Environment and Social Well-Being: How Does Urban Form Affect Social Life and Personal Relationships?” *Cities* 74: 7–20.

Mulgan, G., G. Potts, J. Audsley, M. Carmona, C. de Magalhaes, L. Sieh, and C. Sharpe. 2006. *Mapping Value in the Built Environment*. London: CABE.

MVA Consultancy. 2008. *Seeing Issues Clearly; Valuing Urban Realm*, Report for Design for London September 2008.

MVA Consultancy. 2009. DfT Shared Space Project, Stage 1: Appraisal of Shared Spaces.

MVA Consultancy. 2010a. *Designing the Future, Shared Space: Operational Assessment*.

MVA Consultancy. 2010b. *Designing the Future, Shared Space: Qualitative Research*.

Nakamura, K., and Y. Hayashi. 2013. “Strategies and Instruments for Low-Carbon Urban Transport: An International Review on Trends and Effects.” *Transport Policy* 29: 264–274.

Nasar, J., and B. Fisher. 1993. “‘Hot Spots’ of Fear and Crime: A Multi-Method Investigation.” *Journal of Environmental Psychology* 13: 187–206.

Nase, I., J. Berry, and A. Adair. 2011. *Urban Design Quality and Downtown Office Rents: A Case Study of Belfast City Centre (No. Eres2011-158)*. European Real Estate Society (ERES).

Nase, I., J. Berry, and A. Adair. 2013. “Hedonic Modelling of High Street Retail Properties: A Quality Design Perspective.” *Journal of Property Investment & Finance* 31 (2): 160–178.

Nase, I., J. Berry, and A. Adair. 2016a. “Impact of Quality-Led Design on Real Estate Value: A Spatiotemporal Analysis of City Centre Apartments.” *Journal of Property Research* 33 (4): 309–331.

Nase, I., J. Berry, and A. Adair. 2016b. “Real Estate Value and Quality Design in Commercial Office Properties.” *Journal of European Real Estate Research* 6 (1): 48–62.
Netto, V. 2017. *The Social Fabric of Cities*. Abingdon Oxon.: Routledge.

New York City, Department of Transportation. 2012a. *Measuring the Street: New Metrics for 21st Century Streets*. New York City, Department of Transportation.

New York City, Department of Transportation. 2012b. *The Economic Benefits of Sustainable Streets*. The New York City

Nicol, S., M. Roys, and H. Garrett. 2015. The Cost of Poor Housing to the NHS. Watford, UK: BRE Trust.

Nilsson, P. 2014. “Natural Amenities in Urban Space–A Geographically Weighted Regression Approach.” *Landscape and Urban Planning* 121: 45–54.

Nubani, L., and J. Wineman. 2005. The Role of Space Syntax in Identifying the Relationship between Space and Crime. In *Proceedings of the Fifth International Space Syntax Symposium* Amsterdam: Techne Press.

Othman, S., and I. Said. 2012. “Affordances of Cul-De-Sac in Urban Neighborhoods as Play Spaces for Middle Childhood Children.” *Procedia - Social and Behavioral Sciences* 38: 184–194.

Page, D. 2000. *Communities in the Balance: The Reality of Social Exclusion on Housing Estates*. YPS for the Joseph Rowntree Foundation.

Painter, K., and D. P. Farrington. 1997. “The Crime Reducing Effect of Improved Street Lighting: The Dudley Project.” *Situational Crime Prevention: Successful Case Studies* 2: 209–226.

Painter, K., and D. P. Farrington. 1999. “Improved Street Lighting: Crime Reducing Effects and Cost-Benefit Analyses.” *Security Journal* 12 (4): 17–32.

Palaiologou, G., and L. Vaughan. 2014. “The Sociability of the Street Interface - Revisiting West Village, Manhattan.” In *Our Common Future in Urban Morphology*, edited by V. Oliveira, P. Pinho, L. Batista, T. Patatas and C. Monteiro, 88–102. Portugal: Porto.

Papas, M. A., A. J. Alberg, R. Ewing, K. J. Helzlsouer, T. L. Gary, and A. C. Klassen. 2007. “The Built Environment and Obesity.” *Epidemiologic Reviews* 29 (1): 129–143.

Peen, J., R. A. Schoevers, A. T. Beekman, and J. Dekker. 2010. “The Current Status of Urban-Rural Differences in Psychiatric Disorders.” *Acta Psychiatrica Scandinavica* 121 (2): 84–93.

Peiser, R. B., and G. M. Schwann. 1993. “The Private Value of Public Open Space within Subdivisions.” *Journal of Architectural and Planning Research* 10 (2): 91–104.

Pineo, H. 2016. “The Value of Healthy Places, for Developers, Occupants and Society.” *Town and Country Planning* 85 (11): 476–479.

Pivo, G., and J. D. Fisher. 2011. “The Walkability Premium in Commercial Real Estate Investments.” *Real Estate Economics* 39 (2): 185–219.

Places Matter (2009) “The Economic Value of Good Design” *Places Matter*

Ratti, C., N. Baker, and K. Steemers. 2005. “Energy Consumption and Urban Texture.” *Energy and Buildings* 37 (7): 762–776.

Richard, L., L. Gauvin, C. Gosselin, and S. LaForest. 2009. “Staying Connected: Neighbourhood Correlates of Social Participation among Older Adults Living in an Urban Environment in Montréal, Québec.” *Health Promotion International* 24 (1): 46–57.

RICS. 2016. *Placemaking and Value*. Royal Institution of Chartered Surveyors.

Roberts-Hughes, R. 2013. *City Health Check: How Design Can save Lives and Money*. Architecture. com: Royal Institute of British Architects (RIBA).

Roberts, M. 1995. “For Art’s Sake: Public Art, Planning Policies and the Benefits for Commercial Property.” *Planning Practice & Research* 10 (2): 189–198.

Roberts, M. 2007. “Sharing Space: Urban Design and Social Mixing in Mixed Income New Communities.” *Planning Theory & Practice* 8 (2): 183–204.

Rosenburg Weinreb, A., and Y. Rofé. 2013. Mapping Feeling: An Approach to the Study of Emotional Response to Built Environment and Landscape, Research Gate, July, 1-19.

Rosso, A., A. Auchincloss, and Y. Michael. 2011. “The Urban Built Environment and Mobility in Older Adults: A Comprehensive Review.” *Journal of Aging Research* 816106: 1–10.

Ryan, B., and R. Weber. 2007. “Valuing New Development in Distressed Urban Neighborhoods.” *Journal of the American Planning Association* 73 (1): 100–111.

Saelens, B. E., J. F. Sallis, J. B. Black, and D. Chen. 2003. “Neighborhood-Based Differences in Physical Activity: An Environment Scale Evaluation.” *American Journal of Public Health* 93 (9): 1552–1558.

Sauter, D., and M. Huettenmoser. 2008. “Liveable Streets and Social Inclusion.” *Urban Design International* 13 (2): 67–79.
Savills. 2010. Spotlight on: Development Layout. London: Savills Research.
Savills. 2016a. Spotlight Development: The Value of Placemaking. London: Savills World Research.
Savills Research Report to the Cabinet Office. 2016b. “Completing London’s Streets; How the Regeneration and Intensification of Housing Estates Could Increase London’s Supply of Homes and Benefit Residents,” Savills.Com, January 11, 2016.
Schweitzer, J. H., J. W. Kim, and J. R. Mackin. 1999. “The Impact of the Built Environment on Crime and Fear of Crime in Urban Neighborhoods.” Journal of Urban Technology 6 (3): 59–73.
Seo, S. Y., and K. H. Lee. 2017. “Effects of Changes in Neighbourhood Environment due to the CPTED Project on Residents’ Social Activities and Sense of Community: A Case Study on the Cheonan Safe Village Project in Korea.” International Journal of Urban Sciences 21 (3): 326–343.
Seresinhe, C., T. Preis, and H. S. Moat. 2007. “Quantifying the Impact of Scenic Environments on Health.” Scientific Reports 5 (16899): 1–9.
Shafer, C. B., B. K. Lee, and S. Turner. 2000. “A Tale of Three Greenway Trails: User Perceptions Related to Quality of Life.” Landscape and Urban Planning 49 (3-4): 163–178.
Shahirah, G., M. LeVasseur, and Y. Michael. 2017. “Neighbourhood Amenities and Depressive Symptoms in Urban-Dwelling Older Adults.” Journal of Urban Design and Mental Health 2:4.
Sheldon, R., C. Heywood, P. Buchanan, D. Ubaka, and C. Horrell. 2007. “Valuing Urban Realm-Business Cases in Public Spaces.” In Proceedings of the European Transport Conference (Etc) 2007, Leiden, The Netherlands.
Shield, B. M., and J. E. Dockrell. 2003. “The Effects of Noise on Children at School: A Review.” Building Acoustics 10 (2): 97–116.
Shu, C. F. 2000. “Housing Layout and Crime Vulnerability.” Urban Design International 5 (3–1): 177–188.
Simmons, R., J. Desyllas, and R. Nicholson. 2006. The Cost of Bad Design. London: CABE.
Sinnett, D., K. Williams, K. Chatterjee, and N. Cavill. 2011. Making the Case for Investment in the Walking Environment: A Review of the Evidence Bristol: University of the West of England.
Smith, D. 2010. Valuing Housing and Green Spaces: Understanding Local Amenities, the Built Environment and House Prices in London.
Sohn, D. W., A. V. Moudon, and J. Lee. 2012. “The Economic Value of Walkable Neighborhoods.” Urban Design International 17 (2): 115–128.
Song, Y., and G. J. Knaap. 2004. “Measuring the Effects of Mixed Land Uses on Housing Values.” Regional Science and Urban Economics 34 (6): 663–680.
Speck, J. 2012. Walkable City, How Downtown Can save America, One Step at a Time, New York. North Point Press.
Spencer, N. C., and G. Winch. 2002. How Buildings Add Value for Clients. London: Thomas Telford.
Stigsdotter, U. K., O. Ekholm, J. Schipperijn, M. Toftager, F. Kamper-Jørgensen, and T. B. Randrup. 2010. “Health Promoting Outdoor Environments—Associations between Green Space, and Health, Health-Related Quality of Life and Stress Based on a Danish National Representative Survey.” Scandinavian Journal of Social Medicine 38 (4): 411–417.
Sullivan, W. C., F. E. Kuo, and S. F. Depooter. 2004. “The Fruit of Urban Nature: Vital Neighborhood Spaces.” Environment and Behavior 36 (5): 678–700.
Sung, H., S. Lee, and S. Jung. 2014. “Identifying the Relationship between the Objectively Measured Built Environment and Walking Activity in the High-Density and Transit-Oriented City, Seoul, Korea.” Environment and Planning B Urban Analytics and City Science 41 (4): 637–660.
Swinbourne, R., and J. Rosenwax. 2017. “Green Infrastructure: A Vital Step to Brilliant Australian Cities” 2017 AECOM.
Talen, E. 2006. “Design for Diversity: Evaluating the Context of Socially Mixed Neighbourhoods.” Journal of Urban Design 11 (1): 1–32.
Talen, E., and J. Koschinsky. 2014. “Compact, Walkable, Diverse Neighborhoods: Assessing Effects on Residents.” Housing Policy Debate 24 (4): 717–750.
Tanner, C. K. 2000. “The Influence of School Architecture on Academic Achievement.” Journal of Educational Administration 38 (4): 309–330.
Taylor, M., B. Wheeler, P. White, T. Economou, and N. Osborne. 2015. “Research Note: Urban Street Tree Density and Antidepressant Prescription Rates—A Cross-Sectional Study in London, UK.” Landscape and Urban Planning 136: 174–179.
Thompson, C. W., P. Aspinall, S. Bell, C. Findlay, J. Wherrett, and P. Travlou. 2004. *Open Space and Social Inclusion: Local Woodland Use in Central Scotland*. Edinburgh: Forestry Commission.

Thompson, S., and J. Kent. 2014. “Connecting and Strengthening Communities in Places for Health and Well-Being.” *Australian Planner* 51 (3): 260–271.

Thompson, S., Corkery, L., & Judd, B. (2007). The Role of Community Gardens in Sustaining Healthy Communities. In Paper to be presented at the Third State of Australian Cities Conference, Adelaide.

Thornsnes, P. 2000. “Internalizing Neighborhood Externalities: The Effect of Subdivision Size and Zoning on Residential Lot Prices.” *Journal of Urban Economics* 48 (3): 397–418.

Timperio, A., D. Crawford, K. Ball, and J. Salmon. 2017. “Typologies of Neighbourhood Environments and Children’s Physical Activity, Sedentary Time and Television Viewing.” *Health & Place* 43: 121–127.

Tiwari, R., R. Cervero, and L. Schipper. 2011. “Driving CO2 Reduction by Integrating Transport and Urban Design Strategies.” *Cities* 28 (5): 394–405.

Tonkiss, F. 2013. *Cities by Design, the Social Life of Urban Form*. Cambridge, Polity Press.

Tratalos, J., R. A. Fuller, P. H. Warren, R. G. Davies, and K. J. Gaston. 2007. “Urban Form, Biodiversity Potential and Ecosystem Services.” *Landscape and Urban Planning* 83 (4): 308–317.

Tu, C., and M. Eppli. 1999. “Valuing New Urbanism: The Case of Kentlands.” *Real Estate Economics* 27 (3): 425–451.

Ulmer, J. M., K. L. Wolf, D. R. Backman, R. L. Tretheway, C. J. Blain, J. P. O’Neil-Dunne, and L. D. Frank. 2016. “Multiple Health Benefits of Urban Tree Canopy: The Mounting Evidence for a Green Prescription.” *Health & Place* 42: 54–62.

Ulrich, R. 1979. “Visual Landscapes and Psychological Well-Being.” *Landscape Research* 4 (1): 17–23.

Ulrich, R. 1981. “Natural versus Urban Scenes: Some Psychophysiological Effects.” *Environment and Behavior* 13 (5): 523–556.

Ulrich, R. 1984. “View through a Window May Influence Recovery.” *Science* 224 (4647): 224–225.

UN Habitat. 2013. *Streets as Public Spaces and Drivers of Urban Prosperity*. Nairobi: UN Habitat.

Van den Berg, A. E., S. L. Koole, and N. Y. van der Wulp. 2003. “Environmental Preference and Restoration: (How) Are They Related?” *Journal of Environmental Psychology* 23 (2): 135–146.

Van Kamp, I., K. Leidelmeijer, G. Marsman, and A. de Hollander. 2003. “Urban Environmental Quality and ‘Human Well-Being, towards a Conceptual Framework and Demarcation of Concepts.” *Landscape and Urban Planning* 65: 5–18.

Vandell, K. D., and J. S. Lane. 1989. “The Economics of Architecture and Urban Design: Some Preliminary Findings.” *Real Estate Economics* 17 (2): 235–260.

Velasco, M. D., G. Fry, and M. Tveit. 2007. “Health Effects of Viewing Landscapes–Landscape Types in Environmental Psychology.” *Urban Forestry & Urban Greening* 6 (4): 199–212.

Venerandi, A., G. Quattrone, and L. Capra. 2016a. “City Form and Well-Being: What Makes London Neighborhoods Good Places to Live?” Proceedings of the 24th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, Article 70.

Venerandi, A., M. Zanella, O. Romice, J. Dibble, and S. Porta. 2016b. “Form and Urban Change—An Urban Morphometric Study of Five Gentrified Neighbourhoods in London.” *Environment and Planning B: Urban Analytics and City Science* 44 (6): 1056–1076.

Wang, S., X. Liu, C. Zhou, J. Hu, and J. Ou. 2017. “Examining the Impacts of Socioeconomic Factors, Urban Form, and Transportation Networks on CO2 Emissions in China’s Megacities.” *Applied Energy* 185: 189–200.

Ward, H. C., and C. S. B. Grimmond. 2017. “Assessing the Impact of Changes in Surface Cover, Human Behaviour and Climate on Energy Partitioning across Greater London.” *Landscape and Urban Planning* 165: 142–161.

Ward, H. C., S. Kotthaus, C. S. B. Grimmond, A. Bjorkegren, M. Wilkinson, W. T. J. Morrison, J. G. Evans, J. I. L. Morison, and M. Iamarino. 2015. “Effects of Urban Density on Carbon Dioxide Exchanges: Observations of Dense Urban, Suburban and Woodland Areas of Southern England.” *Environmental Pollution* 198: 186–200.

We Made That & LSE Cities. 2017. *High Streets for All*. London: Greater London Authority.

Weber, S., B. B. Boley, N. Palardy, and C. J. Gaither. 2017. “The Impact of Urban Greenways on Residential Concerns: Findings from the Atlanta BeltLine Trail.” *Landscape and Urban Planning* 167: 147–156.
Weden, M. M., R. M. Carpiano, and S. A. Robert. 2008. “Subjective and Objective Neighborhood Characteristics and Adult Health.” Social Science & Medicine 66 (6): 1256–1270.

Welsh, B. C., and D. P. Farrington. 2008. “Effects of Improved Street Lighting on Crime.” Campbell Systematic Reviews 13: 1–51.

Whitbread, M. 1978. “Two Trade-off Experiments to Evaluate the Quality of Residential Environments.” Urban Studies 15 (2): 149–166.

White, M., A. Smith, K. Humphryes, S. Pahl, D. Snelling, and M. Depledge. 2010. “Blue Space: The Importance of Water for Preference, Affect, and Restorativeness Ratings of Natural and Built Scenes.” Journal of Environmental Psychology 30 (4): 482–493.

Whyte, W. 1980. The Social Life of Small Urban Spaces. New York: Project for Public Spaces.

Williams, A., and P. Kitchen. 2012. “Sense of Place and Health in Hamilton, Ontario: A Case Study.” Social Indicators Research 108(2): 257–276.

Willis, K., and L. Osman. 2005. Economic Benefits of Accessible Green Spaces for Physical and Mental Health. CJC Consulting.

Wilson, B. 2013. “Urban Form and Residential Electricity Consumption: Evidence from Illinois, USA.” Landscape and Urban Planning 115: 62–71.

Wolf, K. 2003. “Public Response to the Urban Forest in Inner-City Business Districts.” Journal of Arboriculture 29 (3): 117–126.

Wolf, K. L. 2007. “City Trees and Property Values.” Arborist News 16 (4): 34–36.

Woolley, H., M. Carmona, S. Rose, and J. Freeman. 2004. The Value of Public Space, How High Quality Parks and Public Spaces Create Economic, Social and Environmental Value. London: CABE Space.

World Health Organization. 2016. Urban Green Spaces and Health—A Review of Evidence. Geneva, Switzerland: WHO.

Worpole, K. 2000. The Value of Architecture: Design, Economy and the Architectural Imagination. RIBA Future Studies.

Worpole, K., and K. Knox. 2008. The Social Value of Public Spaces. Joseph Rowntree Foundation.

Xu, X., S. Sun, W. Liu, E. García, L.H. He, Q. Cai, and J. Zhu. 2017. “The Cooling and Energy Saving Effect of Landscape Design Parameters of Urban Park in Summer: A Case of Beijing, China.” Energy and Buildings 149: 91–100.

Yahia, M. W., E. Johansson, S. Thorsson, F. Lindberg, and M. I. Rasmussen. 2017. “Effect of Urban Design on Microclimate and Thermal Comfort Outdoors in Warm-Humid Dar Es Salaam, Tanzania.” International Journal of Biometeorology 62(3): 373–385.

Yang, H. J., J. Song, and M. J. Choi. 2016. “Measuring the Externality Effects of Commercial Land Use on Residential Land Value: A Case Study of Seoul.” Sustainability 8 (5): 1–15.

Ye, H., X. He, Y. Song, X. Li, G. Zhang, T. Lin, and L. Xiao. 2015. “A Sustainable Urban Form: The Challenges of Compactness from the Viewpoint of Energy Consumption and Carbon Emission.” Energy and Buildings 93: 90–98.

Zapata-Diomedi, B., A. M. M. Herrera, and J. L. Veerman. 2016. “The Effects of Built Environment Attributes on Physical Activity-Related Health and Health Care Costs Outcomes in Australia.” Health & Place 42: 19–29.

Zhan, W., and T. F. M. Chui. 2016. “Evaluating the Life Cycle Net Benefit of Low Impact Development in a City.” Urban Forestry & Urban Greening 20: 295–304.

Zhang, B., G. Xie, B. Xia, and C. Zhang. 2012. “The Effects of Public Green Spaces on Residential Property Value in Beijing.” Journal of Resources and Ecology 3 (3): 243–252.

Zhang, X., J. B. Holt, H. Lu, S. Onufak, J. Yang, S. P. French, and D. Z. Sui. 2014. “Neighborhood Commuting Environment and Obesity in the United States: An Urban–Rural Stratified Multilevel Analysis.” Preventive Medicine 59: 31–36.

Zhou, J., J. Lin, S. Cui, Q. Qiu, and Q. Zhao. 2013. “Exploring the Relationship between Urban Transportation Energy Consumption and Transition of Settlement Morphology: A Case Study on Xiamen Island, China.” Habitat International 37: 70–79.