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**Article**

**Title:** Children living with 'sustainable' urban architectures

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**DOI:** [10.1068/a140401p](https://doi.org/10.1068/a140401p)

**Example citation:** Horton, J., Hadfield-Hill, S. and Kraftl, P. (2015) Children living with 'sustainable' urban architectures. *Environment and Planning A*. **47**(4), pp. 903-921. 1472-3409.

It is advisable to refer to the [publisher's version](#) if you intend to cite from this work.

**Version:** Published version

**Official URL:** <http://dx.doi.org/10.1068/a140401p>

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## Children *living with* ‘sustainable’ urban architectures

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Received 8 August 2014; in revised form 11 November 2014

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**Abstract.** This paper considers the everyday geographies of children living in new large-scale urban developments in which multiple forms of ‘sustainable’ urban architecture are characteristic features. We argue that children’s experiences of *living with* materialities, politics, and technologies of sustainability have too often been marginalised in much chief research on childhood, youth, and sustainability. Drawing on qualitative research with 8–16-year-olds living with materialities of ‘sustainable’ ecohousing, urban drainage, wind turbines, and photovoltaic panelling, we explore how sustainable urban architectures are noticed, (mis)understood, cared about, and lived with by children in the course of their everyday geographies. In so doing, we highlight the challenging prevalence and significance of architectural conservatisms, misconceptions, rumours, disillusionments, and urban myths relating to sustainable urban architectures.

**Keywords:** sustainable, urban, architecture, children, young people

### Preface: ‘weird’ architectures?

An interview with a young resident of a new urban development in the English Midlands:

“The [ecohouses] are not normal. They look a bit different. They are upside down houses—the living room is up there and the bedrooms down here. I don’t like it. It’s *weird*” (Max,<sup>(1)</sup> age 10).

### Introduction

In this paper we consider the everyday experiences and practices of children living in new large-scale urban developments in the UK, in which multiple forms of sustainable urban architecture are characteristic features. Drawing on qualitative research with seventy-nine children aged 8–16 years living in a case-study community—designed and hailed as an exemplar of large-scale ‘sustainable’ urbanism—the paper explores how ‘sustainable’ urban architectures are noticed, (mis)understood, and, especially, *lived with* by children during their everyday lives.

The term ‘sustainable urban architecture’ is used to denote a specific suite of technological, design, planning, and building features—including but not confined to buildings themselves—which are explicitly figured as ‘environmentally sustainable’, and increasingly designed-in to large-scale urban development projects. We therefore deploy the term as shorthand to

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<sup>(1)</sup>To protect participants’ identities, all names, including that of the case-study community, are pseudonyms.

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encapsulate (but not to efface the differences between) several overlapping professional practices that, together, have been charged with implementing ‘sustainable urbanism’ in diverse contexts. These practices include architecture, town planning, landscape architecture, and urban design. In the UK, over the last decade, large-scale planning interventions such as the *Sustainable Communities* agenda (ODPM, 2003) have sought to ‘upscale’ or ‘mainstream’ principles of sustainable urban architecture, and particularly those architectures historically and normatively associated with ‘deep green’ ecohousing and community-development projects (Pickerill, forthcoming). During our analysis, we focus upon children’s encounters with four components of sustainable urban architectures: modular ‘ecohouse’ designs, community wind turbines, sustainable urban drainage (SUD) systems, and domestic photovoltaic panels. We should also clarify, from the outset, that our focus upon communities, policies, architectures, and technologies which have been named ‘sustainable’ does not presuppose that these social–material features are truly sustainable in any functional or intellectual sense.

Our analyses are based upon three premises. First, we argue that spaces of sustainable urban architecture are important settings for an increasingly numerous and diverse range of children’s geographies. As we note in the following section, an international proliferation of large-scale policy turns towards sustainable urbanism has brought increasing numbers of children into everyday encounters with forms of sustainable urban architecture. Second, we argue that the large body of extant research on children and sustainability has tended to say little about children’s everyday encounters with the material, lived, and spatial manifestations of policy and planning interventions relating to sustainability. Indeed, in the following section we suggest that a focus upon *education for* sustainability has led to children’s everyday habits of *living with* sustainability, and especially sustainable design, becoming somewhat marginalised. Third, we align our paper with an expanding body of research exploring everyday geographies of architecture. In particular, our contribution is to highlight a range of knowledges, (mis)conceptions, (mis)understandings, norms, urban myths, in-jokes, worries, hopes, and cares. In relation to architecture we suggest these knowledges and myths hold importance—both in constituting children’s relationships to the broader politics of sustainability, and processes of meaning-making at and with (sustainable urban) architectures. This move is particularly important given the relatively scant attention to children’s experiences in recent geographies of architecture. In conclusion, these arguments are configured as a set of challenges for future research and practice in relation to children, sustainability, and architecture.

### **Children, sustainability, and architecture**

#### **Sustainable urban architectures in policy and practice**

Sustainable urban architectures are an increasingly commonplace, characteristic feature of newbuild and retrofitted urban spaces, in diverse contexts. We therefore suggest that sustainable urban architectures should be understood, increasingly, as key settings for many children’s everyday geographies. In a wide range of international contexts over the last decade we would identify multiple concurrent turns towards the ‘mainstreaming’ of ostensibly sustainable urban architectures in large-scale housebuilding, planning, and urban design programmes (eg, Williams et al, 2000). For example, in the UK the Sustainable Communities agenda (ODPM, 2003) instigated a major programme of planning for housebuilding and urban extension, focused in four ‘growth areas’ in southeast England (each earmarked for approximately 300 000 new homes by 2031). The programme was committed to a wide-ranging concept of ‘sustainable’ urban development, combining social, economic, and environmental facets of sustainability (ODPM, 2000; 2003; also Raco, 2007). Urban design and planning practices were figured as central to addressing these issues (Hadfield-Hill, 2013; Kraftl, 2014). Aiming to foster a step-change in approaches to urban design, the mainstreaming of ‘sustainable’

forms of construction, infrastructure, and architecture were strongly valorised. Architects and planners were exhorted to “explore what low carbon, sustainable places might be like now and in the future”, to foster “public inspiration” and “motivate changes in behaviour” through innovative design, and to understand “strategic urban design, masterplanning and the management of buildings [as] essential parts of any sustainable development or climate change strategy” (CABE, 2007, pages 2–3; see also DfCLG, 2007).

Perhaps the most visible, manifestation of this policy/planning context was the preponderant incorporation of various ‘energy-efficient’, ‘low-carbon’, or ‘environmentally friendly’ design features into households, public spaces, and infrastructures in new urban developments. For example, it became increasingly common for large-scale housing developments to incorporate elements such as: sustainable construction materials, energy-efficient boilers, photovoltaic cells, solar water heaters, superinsulation, rainwater harvesting, sedum roofing, wind turbines, passive solar retention, or SUDs. We contend that this policy/planning context has established some arguably new but certainly increasingly commonplace forms of built environment and urban life in the UK. For although the Sustainable Communities agenda itself was effectively hampered by economic crisis and housing-market downturn in 2008–09 (see Raco, 2012), a wide range of new urban spaces have been constituted. We note that: (i) numerous new housing developments (ranging in size from 100 to 10 000 homes) featuring elements of sustainable urban architecture were established in this political-geographic context [for illustrative examples see: Catto (2008) and TCPA, (2009)]; (ii) many communities planned during this period continue to be constructed and expanded, as per the sustainable urban architectural influence of the Sustainable Communities agenda; and (iii) innovations in sustainable urban architecture continue to be valorised within emergent policy (re)turns toward large-scale housebuilding in the UK.<sup>(2)</sup>

The UK Sustainable Communities agenda is also situated within a broader, internationalised turn towards ‘sustainable urbanism’ (Farr 2008; Gauzin-Müller 2002; Whitehead, 2003). Herein, innovations in housing and community design are understood as central to fostering behaviour change, and mitigating environmental degradation, resource depletion, and global warming (Shaw et al, 2007; Zero Carbon Hub, 2013). A wide range of exemplars of large-scale ‘sustainable’ urban developments—located in Sweden, Germany, the Netherlands (HCA, 2009), and North America (Mapes and Wolch, 2010), and planned, on a vast scale, in China, Singapore (Government of Singapore, 2012), and India—evidences such international proliferation.

A large, important body of interdisciplinary literature has critically engaged with notions of sustainable urbanism. In the UK the Sustainable Communities agenda has been widely critiqued: for its discursive and biopolitical production of normative neoliberal, ‘sustainable’ subjects (Kraftl, 2014; Raco, 2007); for its overweening promises to tackle a remarkable range of problems through design interventions (Raco, 2005); for its ‘greenwashing’ of corporate interests and political-economic imperatives (O’Riordan, 2004); and for its resolute adherence to norms of large-scale housing supply (Cochrane et al, 2014). While sustainable urbanism has thus been extensively critiqued, we contend that remarkably little research has considered the experiences of those people *living with* buildings and communities constructed via this policy/planning context. Much qualitative research on sustainable urbanism in the UK focuses upon: (i) planners’, policy makers’, and stakeholders’ views on sustainable urbanism (Cochrane et al, 2014; Osmani and O’Reilly, 2009); (ii) perceptions of

<sup>(2)</sup>The UK Coalition government that followed New Labour stated in 2012 its intention to recommit to large-scale housebuilding along sustainable urban principles, albeit badged as ‘Garden Cities for the Twenty-First Century’ (in tandem, the Town and Country Planning Association developed guidance notes for comprehensively planned communities along these lines: [http://www.tcpa.org.uk/data/files/reimagining\\_garden\\_cities\\_final.pdf](http://www.tcpa.org.uk/data/files/reimagining_garden_cities_final.pdf)).

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sustainable architectures and lifestyles within the general population; (iii) the efficacy of sustainable architectures in terms of behaviour change or education; or (iv) of residents *within individual domestic spaces* of sustainable architecture.

While this literature has been important in fostering a space for research on sustainable urbanism, and developing contemporary geographies of architecture, we seek a somewhat broader sense of *living with* (Pyyry, 2015) sustainable urban architectures: that is, to offer, and call for, an expanded apprehension of residents' everyday encounters with the material, lived, and spatial manifestations of such interventions. We focus upon children (aged 8–16 years): a population group noted to be among the most frequent users of public spaces and built environments in *any* urban places (Matthews et al, 2000), and for whom, thereby, sustainable urban architectures increasingly constitute spaces of everyday life. However, as we note in the following subsection, children's encounters with sustainability have often been framed by a particular discourse of *education for* sustainability.

### **Children and (education for) sustainability**

Overwhelmingly, extant scholarship about children and sustainability focuses on the realm of education, including scrutiny of initiatives such as Education for Sustainability (EfS). A large, important body of interdisciplinary research has evaluated the development of manifold pedagogic interventions that address children's knowledge, values, and actions around sustainability (Walshe, 2013). Meta and longitudinal analyses have identified childhood experiences that are evidently critical for later sustainable behaviours (Stern, 2000). Chawla and Cushing (2007), for instance, identify a range of antecedents for 'action for the environment', including: positive influences of family members and 'role models'; experiences of organisations such as the Scout Association; or witnessing the destruction of environmental resources. Elsewhere, free play at home has been shown to particularly support EfS amongst children (Malone and Tranter, 2003). Other significant research has identified social differentiation in children's sustainable behaviours: for example, in terms of gender (Zelezny, 1999) and social class (Kahn and Friedman, 1995). Meanwhile, recent work by children's geographers, amongst others, has examined the roles of children as 'agents of change' in relation to EfS in community settings (Percy-Smith and Burns, 2013, page 323) or the home (Hadfield-Hill, 2013). Children's immediate environment is frequently targeted as a key site of EfS (Malone, 2007; Tranter and Pawson, 2001), and a wide range of EfS projects have been designed to work with children and families within local neighbourhoods, often addressing an apparent decline in experiences of nature (Ridgers et al, 2012).

However, we note that there exist few studies regarding children and sustainability that are *not* driven by some kind of focus on education, or associated emphases upon children's agency in mitigating against environmental threats because of their environmental 'literacy' (Satchwell, 2012). Thus, we seek to develop a somewhat expanded apprehension of children's everyday encounters with sustainability, viewing the local environment not merely as a site for learning about, but for diverse experiences of *living with sustainability*: practices and material engagements ranging from play (Ward, 1978) to intergenerational tension (Matthews et al, 2000). An overwhelming focus upon *education for* sustainability has meant that many other interactions between children and 'sustainability' (however conceived) may often be effaced. Whilst this paper *does* return to questions of knowledge, education, and agency (especially in the conclusions), it is driven initially by a different objective—to ascertain children's everyday experiences and perceptions of sustainable urban architectures. As has been the case in recent children's geographies scholarship (Hadfield-Hill, 2013; Hörschelmann and van Blerk 2011; Horton and Kraftl, 2006; Matthews et al, 2000; Rautio, 2013), such an objective requires attention to the everyday, localised, sometimes-emotional, sometimes-routinised, sometimes-shared engagements of children with sustainable urban architectures.

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In so doing, this paper contributes empirically to broader, recent calls to investigate social-cultural constructions of sustainability in everyday spaces (Barr and Gilg, 2006).

### **Children and geographies of architecture**

Geographical research on architecture has been a longstanding component of cultural-geographic research (Kraftl, 2010). During the 1980s and 1990s most studies of architecture focused upon the symbolism and/or iconography of buildings and developed nuanced techniques for 'reading' their facades (Domosh, 1989). Echoing broader 'new cultural geographies' of landscape, considerable critical attention was afforded to how built forms expressed or concealed power relations (Goss, 1993; Ley, 1993). Whilst none of these studies entirely overlooked more-than-symbolic elements of built form, from the 2000s geographers nonetheless developed a range of approaches that sought explicitly to extend beyond the symbolic—to more directly address humans' inhabitation of (or what we call here 'living with') buildings. For example, Lees's (2001) call for a 'critical geography of architecture' combined nonrepresentational-inspired accounts of inhabitation *alongside* symbolic analyses of built form (also Kraftl, 2009; Llewellyn, 2003). Whilst critical of Lees's argument, Jacobs's (2006) later study also sought an expanded purview. This time including an even more diverse range of human and especially nonhuman actors (including, for instance, window technologies), her use of science and technology studies permitted nonhierarchical interpretations of built forms that did not privilege formal accounts of a building's size or significance (also Jacobs et al, 2007). More recently, several studies have extended attention to the emotional/affective realms in which buildings are constructed, maintained, and inhabited (Rose et al, 2010)—from the everyday use of colour, scent, and volume to create desired 'atmospheres' (Kraftl and Adey, 2008) to haptic qualities of architectural surfaces (Paterson, 2011).

The approach taken in this paper draws upon facets of these geographies architecture. Yet it is also guided by some important omissions in extant geographical research on architecture. Firstly, whilst the paper is predominantly concerned with inhabitations of built forms, it is explicitly concerned with *children's* perspectives. Simply put, there exist very few studies that combine children's geographies scholarship with that on architectural geographies. Those exceptions that do exist concentrate upon work in school settings (den Besten et al, 2008; Kraftl, 2006; Thornham and Myers, 2012). Secondly, surprisingly little geographical scholarship on architecture has foregrounded sustainable design (key exceptions being Faulconbridge, 2013; Pickerill, forthcoming). Given both the contribution of buildings to global CO<sub>2</sub> emissions, and diverse efforts around the world to plan 'greener' homes and communities, this is problematic. Certainly, many studies critically interrogate the policy imperatives and conceptual underpinnings of sustainable urban forms (Raco, 2007), whilst others examine sociotechnical underpinnings of ecological architectures (Guy, 2010). Meanwhile, important strides are being made in understanding the design and inhabitation of more radical ecological buildings (Pickerill, forthcoming). However, very little attention has been paid to how sustainable design features, incorporated into more commonplace mass-produced urban architectures (as in large-scale housing developments), are experienced by inhabitants.

Thirdly, our analysis is guided by attention to experiences and perceptions of inhabitation—encompassing the kinds of emotions, affects, and performances that have become staples of nonrepresentational-inspired studies in both architectural and children's geographies (Horton and Kraftl, 2006; Lees, 2001). However, in doing so, the paper also offers reflection upon the meaning of built forms. More unusually, rather than recount these through the intentions of architects or owners (Domosh, 1989; Lees, 2001), it offers accounts of 'ordinary' interpretations of architectural symbolism/iconography. Specifically, we articulate a series of value judgments about the relative significance, meaning, and

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attractiveness of sustainable urban architectures as children view them. Unlike previous research on (sustainable) architecture, we highlight the importance of urban myths, rumours, (mis)conceptions, and (mis)understandings—here, in children’s everyday geographies. We are less interested in chastising these myths as failures of EfS than in recognising their centrality in the shared, habituated, everyday, ongoing experience of living with new urban spaces. Moreover, we also highlight the role of such narratives and (mis)understandings in raising questions—as we do in our conclusions—about contemporary sustainable urban architectures and their sustainability in sociocultural terms (our also Pickerill, forthcoming).

Thus, this paper offers an important contribution to the geographical study of architecture. Given that, in many contexts, children are the predominant users of urban spaces—and given their entrainment in debates about EfS—there are compelling reasons for focusing on their experiences and perceptions of sustainable urban architectures. They provide a series of important insights into meanings and emotions attached to sustainable urban architectures—as well as critical insights regarding promises and intentions laid out by the planners of their communities.

### **Case study and research methods**

The following sections reflect upon data from two complementary, concurrent qualitative research projects conducted by the authors in one case-study newbuild community in the English Midlands. Outline planning permission for the community—which we give the pseudonym ‘Hettonbury’—was granted in 1997, and so it was designed and constructed during the *Sustainable Communities* planning/policy context outlined above. Hettonbury—predominantly comprising multiple parcels of ‘mixed’ newbuild housing on a 40 ha site—was conceived as a sustainable urban extension to an existing town. Initial development included permission for 1000 new homes, a community centre, a primary school, local shops, and a range of landscaped outdoor public spaces. During our research around 500 homes were already inhabited and construction was ongoing, with subsequent planning options for 5000 homes. Following the 2003 Sustainable Communities agenda, the development was explicitly positioned as an exemplar for sustainable urban growth. This aspiration was cemented via the development of a design code for Hettonbury, which required housing developers to meet stringent design standards in terms of energy/water conservation, waste minimisation, and provision of energy-efficient utilities and domestic technologies. This design code was most visibly manifest in the incorporation of a range of landscape and architectural features—including SUD systems, photovoltaic panels, rainwater harvesting, a wind turbine, sedum roofing, and energy-efficient heating. As such, Hettonbury constitutes a single-site exemplar of a range of sustainable urban architectures which are increasingly commonplace in the UK and elsewhere.

Data are drawn from two research projects with children living in Hettonbury. In both projects the decision to work with children followed directly from our concern that children are frequently directly targeted by EfS and planning/architectural interventions, but very little extant research had directly considered their experiences and participation in such processes. In the first project Horton and Kraftl conducted nine focus groups with thirty-five children (aged 8–10 years; seventeen males, eighteen females) living in Hettonbury, as part of a wider transdisciplinary project on innovations in sustainable housing. Participants were recruited via workshops about sustainability at a local primary school. Friendship groups of children engaged in two activities: semistructured group discussion, and a mapping activity. The discussions were designed to prompt reflection regarding experiences, attitudes, and behaviours in relation to sustainability, with a specific focus upon encounters with sustainable urban architectures. The mapping activity recorded respondents’ responses to specific

sustainable architectural features in Hettonbury. All activities were digitally recorded and sound files transcribed for thematic analysis.

The second project was a major, four-year interdisciplinary research project exploring the everyday lives of children living in new urban environments. The authors conducted multiple-method qualitative research with 9–16-year-olds living in Hettonbury. In this paper we draw only upon material from thirteen focus groups and ten participant-led community walks, involving a total of forty-five children (twenty-one males, twenty-four females). Participants were recruited via local schools, youth groups, community events, and word of mouth. Focus groups concentrated on children's everyday interactions with sustainable features in the local community. During community walks, researchers were led on tours of Hettonbury by friendship groups of children. The walks typically entailed encounters with, and discussions of, Hettonbury's diverse sustainable architectural features. All activities were digitally recorded, before transcription and thematic analysis via NVivo software (QSR International).

All work was subject to a detailed institutional ethics review, and formal 'opt-in' consent was obtained from all children and their parents/carers. Participants in both projects were diverse in terms of social class, ethnicity, religion and location/duration in Hettonbury. In the following analysis there were no reportable differences in responses in terms of age, gender, or demographic characteristics. Indeed, as a point of departure, we note that most respondents were fairly consistent in their broad support, in principle, for the notion of being 'green', 'sustainable', or 'environmentally friendly'. However, as we will argue, this stated commitment to 'green' values did not necessarily translate into positive orientations towards sustainable urban architectures. Our analysis focuses upon children's perceptions



(a)



(b)



(c)



(d)

**Figure 1.** Sustainable urban architectures in the case-study community: (a) ecohouses; (b) wind turbine; (c) sustainable urban drainage system; (d) photovoltaic panels. All photographs copyright Sophie Hadfield-Hill.



and experiences of four architectural features (see figure 1): an iconic terrace of modular ‘ecohouses’; a community wind turbine; a SUD system; and domestic photovoltaic panelling.

### Living with ecohouses

The row of ‘ecohouses’ was identified by the majority of participants as the ‘most environmentally friendly’ part of Hettonbury. These were among the first commercial residential properties in the UK to be built to Level 6—the highest level of the UK’s *Code for Sustainable Homes*.<sup>(3)</sup> The ecohouses feature extensively in place promotion, publicity, and other published materials relating to Hettonbury. With their vibrant design, glazed frontages, sunspaces, sedum roofs, solar panels, passive heat recovery ventilation system, and solar hot water tubing, the properties are visually striking. Their location on a key thoroughfare meant that most children frequently passed the ecohouses in the course of their everyday mobilities (see Horton et al, 2014).

Children’s opinions and experiences of living in a community with such iconic ecohousing were strongly polarised. Around one in four participants were unequivocally excited and positive about living in a community with “the most ecofriendly house in the whole world”, as one 11-year-old participant put it. These participants articulated a range of different architectural enthusiasms: the ‘cool’-ness, ‘ecofriendliness’, and almost sci-fi (*Doctor Who*-like) novelty of the houses were often hailed as exciting and distinctive. The ecohouses typically served as a point of articulation for enthusiasm about, and commitments to, ‘ecofriendliness’ in general.

“The ecohouses make you think about being ecofriendly” (Millie, 10).

However, many children who were excited about the ecohouses tended to be vague about what made these houses ‘ecofriendly’. As we note in the discussion of the community wind turbine, children’s experiences of sustainable urban architectures were widely characterised by frustrated inquisitiveness: they had many queries about local sustainable architectural features, but did not find it easy to access information about things they ‘did not get’:

“I like them because they have things on them but I don’t know what they do” (Tyler, 9).

“They save energy but I don’t know how they save energy” (Luca, 8).

“I don’t get why the houses have leaves and grass on them” (Karen, 8).

Around half of the children were considerably more negative about the presence of ecohouse architecture in Hettonbury. Although many participants had encountered the ecohouses daily for several years, there was still a strong sense that the properties were ‘weird’ and—therefore—‘ugly’.

“They are ugly and strange” (Leo, 9).

“It’s just unusual ... it don’t look nice” (Karen, 8).

“It looks a bit weird ... there’s not really much point” (Grace, 10).

It became clear that many children responded negatively to architectural features which offended their strongly held normative senses of what domestic architecture should look like:

“They’re full of windows—you wouldn’t even know it was a house” (Carl, 13).

“I hate all of them, they look absolutely ... I think they look really stupid” (Izzy, 14).

“They could have put a chimney on or something” (Neil, 13).

As such, our findings echoed previous studies of English children’s architectural preferences, which highlight their frequently strongly “conservative view of the ideal home”, typically wedded to an idealisation of detached, two-storey houses or cottages with pitched roofs (Savills, 2008, page 5). Our research also supports the findings of previous studies of British architectural ideals, which identify a ‘clear preference for the familiar’ and idealisation

<sup>(3)</sup>For details, see: <http://www.breeam.org/page.jsp?id=86>

of the 'traditionally-styled home' among many homeowners, as well as most UK volume housebuilders (NHBC, 2008, page 45; also Osmani and O'Reilly, 2009).

As already indicated, most children were overwhelmingly positive about the *principle* of being 'ecofriendly'. However, their discussions of the ecohouses revealed an aversion to being (seen to be) *too* ecofriendly. Thus the 'over-the-top' (OTT) ecofriendliness and visuality of the ecohouses were often critiqued:

"We knew they'd attempted to make it eco because they've put the grass and the roofs in and so, I'm sorry but that looks ridiculous ... I think you can make houses ecofriendly without making them look like something out of *Doctor Who* ... I think you can just do things like put solar panels on and don't need to have the house green and brown with grass on the roof, it's just OTT ... I think it's just silly, it doesn't look like a real house, it's like a children's toy ... what I think they're trying to do, I think they're trying to make it look more eco, ... by using colours and the random designs, and it just fails'" (Imogen, 14).

In these discussions, architectural features such as sedum roofing and glazed frontages emerged as particular points of disgruntlement. For example, the appearance of sedum-vegetated roofing evidently challenged normative ideas of domestic architecture in a variety of ways: (i) by compromising the 'new' appearance of newbuild architecture; (ii) by essentially diminishing the attractiveness of house roofs; (iii) by fundamentally unsettling norms about the very constitution of a house (grass being 'not for the roof'); even (iv) by failing to conform to norms about the appearance and colour of grass in residential landscapes (being 'not even green'):

"Grass is for playing football not for the roof!" (Leo, 9).

"The grass [on the roof] isn't even green, it's like brown" (Neil, 13).

These senses of the weirdness of sedum roofing were compounded by a number of worries and misconceptions (see also the discussion of urban myths in later sections). Most frequently, children worried about the likelihood of insect infestations and water ingress which they believed would result from domestic sedum roofing:

"Bugs could go in it and fly in your hair" (Jayden, 8).

"The rain might come through the roof and it might be wet" (Aisha, 9).

"I don't like getting wet when it rains" (Layla, 10).

Likewise, what 12-year-old Emma termed the 'weirdness' of the ecohouse's 'hamster cage'-like glazed frontage (designed to maximise passive solar gain) compounded anxieties about its structural integrity and privacy:

"[The glass] will smash. It's too weak, it'll probably smash" (Ben, 10).

"I don't think I would love to live in one of them houses because it has got lots of windows all the way around it, so say you are like having a bath or something, someone could go like that [peer] and then say, 'oh, look she is having a bath'" (Millie, 10).

Collectively, these norms and misconceptions constituted a fairly taken-for-granted understanding that the ecohouses were *for weird people*. Indeed, some participants sympathised with ecohouse residents who may 'feel left out' precisely because their homes are seen as *so* 'weird':

"They are different, they are kind of weird ... yeah the yellow bits freak me out ... they are all a bit cuckoo ... the people living in them" (Colette, 11).

"They're really unusual—everyone would think you were weird" (Anne-Marie, 11).

"Oh god ... that's a bad area ... [people] living in these homes would feel left out" (Zed, 11).

Again, then, we noted a sense of (in)appropriate degrees of weirdness in relation to sustainable lifestyles, practices, and architectures. In practice, the fine line between acceptable and ‘weird’ ecofriendliness lay somewhere between living-in-an-ecohouse (‘weird’) and living-in-a-‘normal’-house-with-photovoltaic-panels (‘acceptable’). Our more general argument, however, is that ‘critical’ geographies of architecture—and especially sustainable urban architectures—must uncover these lay, quotidian, but in themselves highly *critical* knowledges because they are central both to everyday meaning-making and everyday practices of living with (sustainable) buildings [chiming with Ley’s (1993) exposition of multivocal postmodern domestic architectures]. We develop this argument through our paper in relation to children’s perceptions of other facets of sustainable urban architectures.

### ***Living with a community wind turbine***

A 15 m wind turbine, which supplies the local community centre, is a visible landmark in Hettonbury. Like the ecohouses, the turbine features prominently in the emerging visual culture of the community: in logos, stationery, and publicity materials relating to the school, residents’ group, and self-styled ‘ecofriendly community centre’. Children’s opinions and experiences of living in a community with a wind turbine were, again, polarised. However, unlike the evident (aesthetic) critique of ecohouse architecture, children’s assessments of the turbine were more particularly affected by contested planning processes in Hettonbury.

Compared with the ecohouses, a greater proportion of participants were broadly positive about encountering the turbine in the course of everyday life. Specifically, these participants were enthusiastic about living in a community with such a distinctive and innovative architectural feature:

“It saves energy ... it uses the wind power” (Kaamil, 10).

“It saves a lot of electricity that people don’t have to create in other ways” (Grace, 10).

“Because ... we are saving a bit of energy ... then we can save the environment” (Aisha, 9).

The turbine was valued for its exemplary contribution to wider social and architectural change in support of ‘saving the environment’, and for sparking community interest in sustainability issues—and thus, despite our starting with children’s everyday experiences, was not wholly divorced from questions of education in and about the environment (eg. Malone, 2007). In this latter sense, the turbine was often valued for rendering renewable energy visible and comprehensible via the direct connection between its turning blades and energy usage at the nearby community centre:

“It is good—seeing it makes people interested in the environment” (Kai, 10).

“The windmill is massive and it turns and it will give loads of new energy” (Ellis, 10).

“Like it collects up all the wind and makes electricity for the community centre” (Harriet, 12).

For many children, the turbine was also valued aesthetically, as a landmark, and as a constituent of everyday playscapes. Several participants described how they enjoyed playing around and sometimes *with* the turbine:

“I think it is OK because it is not actually making any noise when it is on ... it is near the field so when we play football on the field it doesn’t make that much noise” (Rachel, 9).

“[Local children] like being a monkey, climbing up the lamppost [ie, the base of the turbine’s supporting tower]” (Lucy, 10).

Despite these more positive experiences, around half of the participants expressed reservations about their everyday encounters with the community wind turbine. For a small number of children, these reservations were, once again, articulated in terms of the supposedly

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inherent 'weird'-ness or 'ugly'-ness of a turbine in a residential landscape: "like a helicopter that's crashed" (James, 10). However, we note that this perception was much less widespread than analogous critiques of the ecohouses.

More significantly, and unlike the ecohouses, encounters with the turbine were profoundly affected by local geographies of planning, policy making, and community development. Around half of the research participants also cited disappointment with, and critiques of, planning and policy-making processes when discussing the turbine. Vagaries of planning, construction, and governance had meant that operationalisation of the turbine was protracted and behind schedule. A succession of changes and challenges with regard to governance, funding, and policy imperatives meant that planning permission for the turbine was originally granted in 2004, but it was not constructed until 2008; the community centre was completed in 2010, but did not open for use until 2011. Even after 2011, a number of technological issues meant that the turbine was often not operational. Consequently, many children expressed disillusionment and concern that the turbine was 'never on'. Disappointments and rumours about the motionless turbine were evidently widely circulated within everyday spaces of friendship, community, school, and family life:

"I don't think the windmill does much use because you never see it on ... my brother was asking, 'why did they build that when that don't work'" (Rachel, 9).

"What is the point of putting it in if it doesn't move? ... [The turbine does not work because] the wind isn't strong enough" (Chakor, 10).

"Apparently, they are going to take it down" (Ben, 10).

The frustrating experience of waiting for the long-promised turbine to materialise, or of witnessing the turbine not turning, had also affected participants' opinions of renewable energy more broadly. A number of children indicated that, as a result of these experiences, they had become disillusioned not just with *this one wind turbine*, but with the idea of wind power in general:

"I don't think the windmill does much because you never see it on and ... it looks like it wouldn't really [power the community centre] because there's only one of them" (Rachel, 9).

"Well it has not been on since it has been there really ... a waste of time mostly if they have built it and they are not actually putting it on" (Chakor, 10).

Despite children's more positive reception of the turbine, our most striking finding has been—building upon the previous section—to construct a sense of the critical knowledges that circulate amongst children, families, and communities living with sustainable urban architectures and the infrastructures that (sometimes) power them. Whilst there is a well-established body of work reflecting upon children's participation in design processes (den Besten et al, 2008) and critiquing policies *for* children (Kraftl et al, 2012), comparatively few studies have teased out children's often detailed knowledges about design *processes*, practices, and controversies. Children not only acquired these knowledges from significant adult others but—in this new community—were active and important agents in constructing and circulating knowledges about the wind turbine that fed into multigenerational domestic, community discourses (and concerns) about the progress of Hettonbury's development. It was because of their routine engagements—aesthetic, embodied, emotional, but often thoughtful and critical—that they were, and have remained, a key source of knowledge about sustainable urban architectures.

### ***Living with a sustainable urban drainage (SUD) system***

The SUD system in Hettonbury consists of a network of interlinked drainage channels (swales), reed beds, and retention ponds, designed to attenuate flood risk and remove pollutants from urban runoff (Environment Agency, 2013; Susdrain, 2012). The ponds and channels which criss-cross Hettonbury were widely described as significant within participants' everyday experiences. These features were key constituents of children's everyday routines: some look out onto them from bedroom windows; most walk past or through them en route to school; and many identify the channels and ponds as good places to play with friends:

“My brother likes to go in them ... we play in them as well ... we play catch, who can get the furthest up and stuff” (Rachel, 9).

“I always walk around the river thingies to get some exercise each day” (Zane, 10).

“You can go in them with your bike, if it is not full with water” (Harriet, 12).

Many participants valued everyday experiences of walking, exploring, and seeing wildlife in SUD features. During participant-led community walks, participants would often lead the researchers to favourite channels or ponds, often describing how they ‘love’ these features, or pointing out wildlife:

“I love them—I live next to it and I see the quacking ducks” (Karen, 8).

“We saw a duck living in there and I see frogs” (Meena, 9).

“They are good and natural and all the water goes along and they are full of the vegetation and animals” (Erin, 10).

Tellingly, however, many participants evoked a range of rumours, urban myths and anxieties about the SUD system. Building on our earlier argument about ecohouses, we noticed that widely circulated urban myths became attached to the SUD system. Although a number of authors have explored the importance of rumour and urban myths in children's everyday geographies (Alexander, 2008), we note that most cited examples in that research have typically related to ‘other’ people and social groups. By contrast, the kinds of urban myths which recurred in our research related to detailed aspects of the material, built, and nonhuman environment. For example, many children's valuing of the SUD system was underscored by anxiety about the rumoured presence of rats and ‘poo’:

“They can be a bit frightening because rats might be in there” (Amber, 9).

“If the rat goes in that water and dies there will be diseases” (Mo, 9).

“It looks like those thingies where people poo in” (Neil, 13).

Although major, long-established biodiversity surveys of Hettonbury do not give credence to the presence of either rats or excrement, it was clear that these rumours tangibly affected children's engagement with the community's landscape. A number of participants described how they preferred not to play near the SUD system, or were prevented from doing so by adults, in the wake of these widely circulated local rumours. These experiences would be especially concerning for SUD system designers, since they are intended to be key ‘amenity’ spaces for communities, fulfilling a social function alongside the management of water and biodiversity (Kraftl, 2014). Yet:

“The flood plains I can't play in because of rats ... down in the SUDs where the pipes come, they scatter out of the pipes ... we used to play in them but as soon as we heard about the rats ... it's OK, they just need to sort out the rat infestation and stuff like that” (Colette, 11).

Therefore, participants' discussions of the SUD system suggested the importance of aesthetic norms about landscaping in engagements with sustainable urban architectures. SUD systems are, by nature, liable to contain mud, algae, detritus, and smelly micro-organic processes after particular weather events. However, for some children, these materialities

and smells somewhat devalued the community's sustainable urban architectures, rendering sustainable spaces 'horrible' and (again) 'weird'. Notions of attractiveness (for example, 'normal' levels of muddiness and smelliness) were thus closely related to norms about domestic and community design, and, ultimately, affected participants' likelihood to engage with sustainable urban architectures:

"When I look out of my bedroom window I think this would be such a lovely view if that ditch wasn't there" (Zane, 10).

"They make it look really weird" (Zed, 11).

"They are like a swamp—all the green stuff in them looks really horrible" (Mo, 9).

"They are where everyone puts their rubbish and it smells" (Tyler, 9).

We also noted that, although most participants valued these landscape features—and used the lexicon of 'SUDs' and 'swales' in their discussions—there was, again, often a fairly hazy understanding of their purpose and function. As with the critical questioning of ecohousing and photovoltaic panels, participants often indicated that they actively wanted more information about SUD features:

"Do they like use the flood water?" (Harriet, 12).

"How's a ditch going to stop a flood?" (Imogen, 14).

"Is that one of them drinks things? ... I don't think they are that useful" (Emma, 12).

This section has continued to build a picture of the ambivalence of children's perceptions of sustainable urban architectures—swinging between enthusiastic endorsement and stinging critique. We have also continued to foreground the role of myth as a key part of how children come to know, live, and play with sustainable urban architectures, as part of the ongoing emotive, affective process of living with buildings (compare Kraftl and Adey, 2008; Rose et al, 2010). Finally, we have, in this section, foregrounded some of the quotidian, tacit, 'lay' assessments that inhabitants—in this case, children—make about architecture. At times, these seemed to contrast markedly with the symbolic and aesthetic codes valorised by some design professionals—with the latter, as we argued earlier, tending to be more commonplace foci for scrutiny by geographers of architecture (Goss, 1993). Thus, in part, the intention of this section has been to pay greater attention to children's aesthetic judgments as part of the flow of lives lived with sustainable urban architectures.

### ***Living with photovoltaic panels***

Many newbuild residential properties in Hettonbury are equipped with a range of roof-mounted solar photovoltaic systems. Consequently, solar panels were an everyday sight, widely commented upon by research participants. In contrast to some other (reportedly 'weird') sustainable architectural features, photovoltaic panels were typically seen as representing an 'acceptable' degree of 'ecofriendliness'. Even children who were negative about the 'weird' ecohomes described solar panels as:

"being eco but not over the top, so that's okay" (Imogen, 14).

The panels did not polarise opinion in quite the same way as other sustainable architectural features. Rather, they were valued in a range of ways, but, once again, children's articulation of this value revealed some important misconceptions and concerns.

Everyday encounters with photovoltaic panels were described positively in several senses. First, broadly, most children valued the presence of such 'environmentally friendly' (but not 'OTT') features in their homes and community. Second, more specifically, domestic photovoltaic panels were widely valued for their contribution to reducing household non-renewable energy consumption and bills:

"Solar panels on the roof are good because they use the sun's energy to have electricity and heat" (Skye, 10).

“You can save a lot of money if you had glass roof” (Adam, 9).

Third, a number of participants described how the panels were valued as prompts for collaborative discussions within family and friendship groups in relation to a range of issues, including resource depletion, technological innovation, and sustainable futures:

“I talk to my mum about it sometimes like one time I asked her about solar panels I said ‘why do you really need solar panels?’ and we talked about it for ages” (Maya, 9).

“Technology ... I talk with my dad like how they get solar panels up there and energy, double glazing ... all the technology ... [and] thinking about what the future’s going to be like for children when they’re older” (Ellis, 10).

Fourth, the panels were valued as tangible, visible markers of perceived ‘sustainable’ urban spaces. Indeed, the presence or absence of roof-mounted photovoltaic panels was often used as a ‘rule of thumb’ for determining which parts of the community were (un)sustainable:

“The whole of [area of community] has no double glazing, no solar panels” (Luka, 8).

“This half [of the map] is bad and this half is good; this bit is very sustainable and this is very unsustainable” (Tyler, 9).

Within these discussions, children who did not live in houses with photovoltaic panels were explicitly disappointed that their house did not have such ‘good stuff’:

**Harriet (12)** “We don’t have any of them up here ... because our [part of community] is older.”

**Interviewer** “What do you feel about that, being less ecofriendly?”

**Alice (12)** “I don’t like it.”

**Harriet** “... very upsetting ... I want a solar panel ...”

**Alice** “... because, yeah, they get all the good stuff.”

Indeed, and related to our previous discussion of children’s critique of local planning processes, some children expressed such disappointment in terms of a broader dissatisfaction with local policy makers’ decisions.

“I know it would do the tax, our mum’s and dad’s and everyone’s taxes better if they used them for us. But like they [housebuilders, local authority] just randomly start digging up paths just to use the money so they can use the money for solar panels and stuff” (Harriet, 12).

Thus, while they were generally positive about living in a community with numerous photovoltaic panels, many children revealed some underlying misconceptions and concerns in relation to these architectural features. As per their reflections on the ecohouses, children who did not live in properties with photovoltaic panels believed that the panels essentially constituted a ‘glass roof’, at risk of water ingress and passers-by looking in. Other participants imagined the panels as ‘windows’ through which inhabitants might fall or burglars might enter:

“If you lived in one of those houses with the windows in the roof you could fall out of the window” (Kyle, 9).

“A dog could fall out of those windows” (Jack, 8).

“Robbers could get in” (Carley, 8).

These kinds of anxieties and misconceptions constituted a certain distrust among some participants, in relation to sustainable architectural features. This distrust was compounded by gossip around a number of residents’ malfunctioning panels. There was related concern that some residents did not feel they had received requisite instructions, guidance, and support to optimise the use of their theoretically energy-efficient homes (see also Hadfield-Hill, 2013). Significantly, then, even a small number of instances of malfunctioning, or poorly explained,

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technology could generate a significant degree of community dissatisfaction with sustainable urban architectures—amongst both children and adults:

“I don't really know what they are for ... my mum knows all about them ... we have got ten ton of them, the whole front of the roof is like that and the rest of the glass ... . Our house is ... is freezing, because we don't know how to work the central heating” (Rachel, 9).

“We have got solar panels ... they don't work ... all the water is dripping down into my brother's bedroom” (Colette, 11).

Finally, as was the case with all of the sustainable urban architectural features discussed in this paper, participants often indicated that they actively wanted more information about the photovoltaic panelling they frequently encountered in their community: an issue we return to in the conclusions.

### Conclusions

We have argued that children's everyday encounters with, and opinions of, sustainable urban architectures are important. An increasing, international population of children live in large-scale, ostensibly 'sustainable' urban places, yet much extant research on children and sustainability tends to overlook everyday experiences of *living-with* political, architectural, technological constructs of sustainability. In general terms, this paper constitutes one move to address this gap in recent scholarship. Through the paper we have suggested that chief policy discourses/practices of EfS and the deployment of architecture as a lever for behaviour change are profoundly challenged when the details and narratives of children's (and, more widely, communities') everyday narratives and experiences are accommodated in research about sustainability. Specifically, four politically/practically challenging findings have recurred through the paper.

First, although our research participants were diverse, they held in common an underlying conservatism in relation to sustainable design and lifestyles. As was particularly apparent in discussions about 'weird'-ness, it was evident that children often had particular, deep-seated norms about what houses, communities, streetscapes (and even *grass*) should look like. Against these norms, certain aspects of sustainable urban architecture were considered 'over-the-top' and problematically 'weird' (and, moreover, for *weird* people). It was considered good to be 'ecofriendly', but 'weird' to be *too* 'ecofriendly'. We argue that, despite burgeoning literatures around EfS, and relationships between knowledge, action, and behaviour (Hargreaves, 2011), this fine line between 'good' and 'weird' ecofriendliness requires further study. We particularly call for this notion of 'weirdness' (and the imagined 'weird' identities of 'too-ecofriendly' people) to be the focus of community outreach and public-understanding-of-science efforts on the part of academics and educators committed to sustainable urban futures.

Second, and related, children's engagements with sustainability were heavily affected by a complex array of misconceptions, rumours, and urban myths. While rumours that, for example, SUD systems are rat infested or sedum roofs are bug ridden may not necessarily be literally true, they were nevertheless widely circulated and significantly affected everyday attitudes and behaviours (including parenting practices). It is our contention that, whilst architectural geographers (eg, Lees, 2001) have paid significant attention to professional discourses surrounding architectural design—and, to some extent, to public responses within formal consultations—these myths and rumours *matter*, substantially, to ongoing, everyday experiences of living with buildings. They matter not only in the (rightly criticisable) observation that children living in sustainable urban places will be inhabitants, tenants, and owner-occupiers of ecohouses in future. They also matter *now*—as everyday knowledges, meanings, and feelings are produced and negotiated in new communities, and rumours and



narratives thus circulate in the constitution of community socialities. Again, we call for renewed, interdisciplinary, and particularly multigenerational, work by scientists, planners, and educators to understand and engage with the kinds of rumours, myths, and misconceptions encountered, in relation to sustainable architectures, identified in this paper.

Third, it was also clear from our research that planning, policy-making, and construction processes can significantly affect the extent to which children ‘buy in’ to sustainable urban architectures. For instance, there are important lessons to be learnt from the case of the community wind turbine, where a range of local planning, governance, and construction delays led to many children becoming disillusioned *with the concept of wind power in general*. We suggest that these kinds of disillusionment, rumour-ing, and criticality exemplify a kind of everyday knowingness through which children and young people may participate in contemporary political and planning processes (Skelton, 2013). As noted above, such knowledges matter in the becoming-lively of (sustainable urban) architectures and the ongoing, recursive relationship between design professionals and inhabitants that does not necessarily ever end in the production of built forms (Jacobs et al, 2007; Krafft, 2014).

Fourth, throughout all of the participants’ talk about sustainable urban architectures, there was a constant sense that *children want answers* to a whole range of questions (ranging from the profound, to the absurd, to the minutely detailed). We found research participants were typically keen and willing to engage in discussion, questioning, and critical reflection about sustainable urban architectures. And it is here that the question of education (for sustainability) returns—yet as part of a broader, shared responsibility that extends beyond formal and/or explicitly articulated kinds of learning and teaching. Children were frustrated by a lack of answers: many participants actively wanted to be not only better informed about but *more engaged with* sustainability in their community, in their everyday lives. Yet, there seemed to be few opportunities to address or foster this enthusiasm. In effect, children *wanted something more* from a broad range of actors: not only (in)formal educators but also planners, designers, housebuilders, and decision makers. Thus, in closing, we suggest that the findings of our research demand a greater commitment to community engagement and participatory planning processes relating to sustainability, particularly among practitioners and policy makers engaged in large-scale sustainable urbanisms.

**Acknowledgements.** The ‘New Urbanisms, New Citizens: Children and Young People’s Everyday Life and Participation in Sustainable Communities’ research project (2009–2013), funded by the Economic and Social Research Council (ESRC) (Reference: RES-062-23-1549) was a collaboration between the University of Warwick, the University of Northampton, and the University of Leicester. We thank Professor Pia Christensen (Principal Investigator) and the anonymous referees for their feedback. Funding for research with children aged 8–10 was also supported by Sustainable Construction iNet funding from the East Midlands Development Agency (EMDA) and European Regional Development Fund (ERDF) (Principal Investigator Dr Janet Jackson). Above all we thank the children and young people who shared their experiences of living with ‘sustainable’ urban architectures.

## References

- Alexander C, 2008, “Safety, fear and belonging: the everyday realities of the formation of a civic identity in Fenham, Newcastle upon Tyne” *ACME* 7(2)
- Barr S, Gilg A, 2006, “Sustainable lifestyles: framing environmental action in and around the home” *Geoforum* 37 906–920
- CABE, 2007 *Sustainable Design, Climate Change and the Built Environment* Commission for Architecture and the Built Environment, London
- Catto I, 2008, “Carbon zero homes UK-style” *Renewable Energy Focus* 9(1) 28–29
- Chawla L, Cushing D, 2007, “Education for strategic environmental behaviour” *Environmental Education Research* 13 437–452

- 
- Cochrane A, Colenutt, B, Field M, 2014, "Spatial policy, urban extensions and volume house-building: lessons from a growth region", Open University, Milton Keynes, <http://www.open.ac.uk/researchprojects/tensionsandprospects/communication-outputs/working-papers>
- den Besten O, Horton J, Kraftl P, 2008, "Pupil involvement in school (re)design: participation in policy and practice" *Co-Design* **4** 197–210
- DfCLG, 2007 *Building a Greener Future* Department for Communities and Local Government (The Stationery Office, London)
- Domosh M, 1989, "A method for interpreting landscape" *Area* **21** 347–355
- Environment Agency, 2013 *Sustainable Construction: Sustainable Drainage Systems* Environment Agency (The Stationery Office, London)
- Farr D, 2008 *Sustainable Urbanism: Urban Design with Nature* (John Wiley, Hoboken, NJ)
- Faulconbridge J, 2013, "Mobile 'green' design knowledge: institutions, bricolage and the relational production of embedded sustainable buildings" *Transactions of the Institute of British Geographers, New Series* **18** 339–353
- Gauzin-Müller D, 2002 *Sustainable Architecture and Urbanism* (Birkhäuser, Basel)
- Goss J, 1993, "The 'magic of the mall': an analysis of form, function, and meaning in the contemporary retail built environment" *Annals of the Association of American Geographers* **83** 18–47
- Government of Singapore, 2012, "Tianjin Eco-City", Government of Singapore, <http://www.tianjinecocity.gov.sg/index.htm>
- Guy S, 2010, "Pragmatic ecologies: situating sustainable building" *Architectural Science Review* **53** 21–28
- Hadfield-Hill S, 2013, "Living in a sustainable community: new spaces, new behaviours?" *Local Environment* **18** 354–371
- Hargreaves T, 2011, "Practice-ing behaviour change: applying social practice theory to pro-environmental behaviour change" *Journal of Consumer Culture* **11** 79–99
- HCA, 2009 *Learning from Europe on Eco-towns* Homes and Communities Agency, London
- Hörschelmann K, van Blerk L, 2011 *Children, Youth and the City* (Routledge, London)
- Horton J, Kraftl P, 2006, "What else? Some more ways of thinking about and doing children's geographies" *Children's Geographies* **4** 69–95
- Horton J, Christensen P, Hadfield-Hill S, Kraftl P, 2014, "'Walking ... just walking': children's pedestrian practices in new urban developments" *Social and Cultural Geography* **15** 95–115
- Jacobs J, 2006, "A geography of big things" *Cultural Geographies* **13** 1–27
- Jacobs J, Cairns S, Strebel I, 2007, "A tall storey ... but, a fact just the same: the Red Road high-rise as a black box" *Urban Studies* **44** 609–629
- Kahn P, Friedman B 1995, "Environmental views and values of children in an inner-city black community" *Child Development* **66** 1403–1417
- Kraftl P, 2006, "Building an idea: the material construction of an ideal childhood" *Transactions of the Institute of British Geographers, New Series* **31** 488–504
- Kraftl P, 2009, "Living in an artwork: the extraordinary geographies of everyday life at the Hundertwasser-Haus, Vienna" *Cultural Geographies* **16** 111–134
- Kraftl P, 2010, "Geographies of architecture" *Geography Compass* **4** 402–415
- Kraftl P, 2014, "Liveability and urban architectures: mol(ecular) power and 'becoming lively' of sustainable communities" *Environment and Planning D: Society and Space* **32** 274–292
- Kraftl P, Adey P, 2008, "Architecture/affect/inhabitation" *Annals of the Association of American Geographers* **98** 213–231
- Kraftl P, Horton J, Tucker F, 2012 *Critical Geographies of Childhoods and Youth* (Policy Press, Bristol)
- Lees L, 2001, "Towards a critical geography of architecture" *Ecumene* **8** 51–86
- Ley D, 1993, "Co-operative housing as a moral landscape", in *Place/Culture/Representation* Eds J Duncan, D Ley (Routledge, London) pp 128–148
- Llewellyn M, 2003, "Polyvocalism and the public: 'doing' a critical geography of architecture" *Area* **35** 264–270

- Malone K, 2007, "The bubble-wrap generation: children growing up in walled gardens" *Environmental Education Research* **13** 513–527
- Malone K, Tranter P, 2003, "Hanging out in the school ground': a reflective look at researching children's environmental learning" *Canadian Journal for Environmental Education* **10** 196–212
- Mapes J, Wolch J, 2010, "'Living green': the promise and pitfalls of new sustainable communities" *Journal of Urban Design* **16**(1) 105–126
- Matthews H, Limb M, Taylor M, 2000, "The street as 'thirdspace'", in *Children's Geographies* Eds S Holloway, G Valentine (Routledge, London) pp 63–79
- NHBC, 2008 *Zero Carbon?* National House Builders' Council, Milton Keynes
- ODPM, 2000 *Our Towns and Cities: The Future* Office of the Deputy Prime Minister (The Stationery Office, London)
- ODPM, 2003 *Sustainable Communities: Building for the Future* Office of the Deputy Prime Minister (The Stationery Office, London)
- O'Riordan T, 2004, "Environmental science, sustainability and politics" *Transactions of the Institute of British Geographers, New Series* **29** 234–247
- Osmani M, O'Reilly A, 2009, "Feasibility of zero carbon homes in England by 2016: a housebuilder's perspective" *Building and Environment* **44** 1917–1924
- Paterson M, 2011, "More-than-visual approaches to architecture" *Social and Cultural Geography* **12** 263–281
- Percy-Smith B, Burns D, 2013, "Exploring the role of children and young people as agents of change in sustainable community development" *Local Environment* **18** 323–339
- Pickerill J, forthcoming *Ecohomes: People, Place and Politics* (Zed Books, London)
- Pyry N, 2015, "'Sensing with' photography and 'thinking with' photographs in research into teenage girls' hanging out" *Children's Geographies* **13**(2) 149–163
- Raco M, 2005, "Sustainable development, rolled-out neo-liberalism and sustainable communities" *Antipode* **37** 324–346
- Raco M, 2007 *Building Sustainable Communities* (Policy Press, Bristol)
- Raco M, 2012, "A growth agenda without growth: English spatial policy, sustainable communities, and the death of the neo-liberal project?" *GeoJournal* **77** 153–165
- Rautio P, 2013, "Children who carry stones in their pockets: on autotelic material practices in everyday life" *Children's Geographies* **11** 394–408
- Ridgers N, Knowles Z, Sayers J 2012 "Encouraging play in the natural environment" *Children's Geographies* **10** 49–65
- Rose G, Degen M, Basdas B, 2010, "More on 'big things': building events and feelings" *Transactions of the Institute of British Geographers, New Series* **35** 334–349
- Satchwell C, 2013 "'Carbon literacy practices': textual footprints between school and home in children's construction of knowledge about climate change" *Local Environment* **18** 289–304
- Savills, 2008, "Kids' dream home", Savills, London, <http://www.kidsdreamhome.co.uk/Results.html>
- Shaw R, Colley M, Connell R, 2007 *Climate Change Adaptation by Design* (Town and Country Planning Association, London)
- Skelton T, 2013, "Young people, children, politics and space: a decade of youthful political geography scholarship 2003–13" *Space and Polity* **17**(1) 123–136
- Stern P, 2000, "Towards a coherent theory of environmentally significant behaviour" *Journal of Social Issues* **56** 407–424
- Susdrain, 2012 *Creating a Water Sensitive UK* Susdrain, London
- TCPA, 2009 *Creating Low Carbon Homes for People in Eco-towns* (Town and Country Planning Association, London)
- Thornham H, Myers C, 2012, "Architectures of youth: visibility, agency and the technological imaginings of young people" *Social and Cultural Geography* **13** 783–800
- Tranter P, Pawson E, 2001, "Children's access to local environments: a case-study of Christchurch, New Zealand" *Local Environment* **6** 27–48
- Walshe N, 2013 "Exploring and developing children's understandings of sustainable development with dialogic diaries" *Children's Geographies* **11**(1) 132–154
- Ward C, 1978 *The Child in the City* (Architectural Press, London)

- 
- Whitehead M, 2003, "(Re)analysing the sustainable city: nature, urbanisation and the regulation of socio-environmental relations in the UK" *Urban Studies* **40** 1183–1206
- Williams K, Burton E, Jenks M, 2000 *Achieving Sustainable Urban Form* (Spon, London)
- Zelezny L, 1999, "Educational interventions that improve environmental behaviours" *Journal of Environmental Education* **31** 5–14
- Zero Carbon Hub, 2013 *Zero Carbon Strategies* National House Builders' Council, Milton Keynes