

What environmental *advantages* might low densities have?

Overcoming architects' conventional antipathy to suburbs

Metabolic suburbs, or the virtue of low densities

Susannah Hagan

The 'Compact City' model of sustainable development relies almost exclusively on transport energy analysis to justify the raising of low residential densities by the insertion of higher density dwellings within them. Higher densities mean more people per hectare, which makes public transport more economically viable, which cuts down on car use, which saves transport energy. Suburbs are very popular, however – over 80% of the populations of the UK and the US would prefer to live in them – and they can't all be bulldozed or 'densified'. Turning the Compact City model on its head frees us to ask what environmental *advantages* low densities might have. Most suburbs have abundant open land, and land can perform: grow food and fuel, collect and recycle water, modify harsh microclimates, save and generate energy. The 'performative' potential of the suburban landscape can transform it into a grown infrastructure contributing to the reduction of the overall environmental impact of a city region, justifying its relatively low densities.

Suburbs as part of the city

At present, over 80% of the populations of the UK and the US, and, interestingly, also Paris,¹ find the suburbs 'attractive places to live'.² This is a startling figure, given the hostility that suburbs provoke among most of those promoting 'sustainable development'. Does that mean 80% of these populations want to live 'unsustainably'? If so, in what sense? And is the hostility of reformers towards the suburbs driven entirely by what is perceived to be a waste of land and energy, or is there also a desire to preserve traditional distinctions between city and non-city, inside and outside,

each defined in opposition to the other? Such hard-edged differentiations started to lose meaning when towns first expanded past their Renaissance fortifications, sliding over the walls and into the countryside, obscuring the sharp demarcations between town and country. This sprawl was largely unplanned and freely chosen. The majority of people who moved to the suburbs moved because they wanted to. In the twentieth century, corporations relocated because they wanted to, because there was a skilled workforce in the hinterlands. Such a mix transformed suburbs into 'technoburbs'³ and Edge Cities⁴ – economically, if not environmentally, self-sustaining settlements.

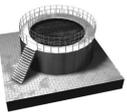
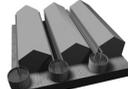
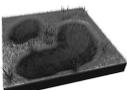
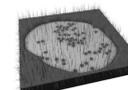
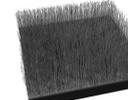
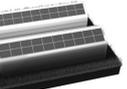
What was defended as democracy in action in the late 1960s had become neo-conservative free market dogma by the 1980s, but the point, oddly, was the same: suburbs = liberty; suburbs = freedom from top-down state planning. Writing in the journal *New Society* in 1969, Paul Barker, Reyner Banham, Peter Hall and Cedric Price declared things could not be any worse if planners were relieved of their powers and we were left with what they called 'Non-Plan'. In their article of the same name, they made several provocative connections between land use, social exclusion and democratic choice:

*[...] as people become richer, they demand more space; and because at the same time they become more mobile, they will be able to command [more space]. They will want this extra space in and around their houses [...] To impose rigid controls in order to frustrate people in achieving the space standards they require, represents simply the received personal or class judgements of those who are making the decisions.*⁵

Though this decentralising desire for *lebensraum* has slowed in both England and the United States, it has not stopped or reversed,⁶ and the concern now is about the environmental – and therefore economic – costs of sprawl, and the revived importance of planning to mitigate these costs. In the mid-twentieth century, suburbanites were criticised for reaping economic rewards in the city and disappearing to their 'castles' in the evening, depriving the city of large numbers of its middle classes. In the early twenty-first century, the environmental dispensation, driven by the current fashion for the increased densities of the 'Compact City'⁷ paradigm, has turned pursuing one's desires in low-density suburbia into an antisocial act, a perception it will not shake off unless it becomes a net contributor to our collective environmental welfare.

Defining 'suburbs' is vexed, as there are large differences in age, typology, density and demography to choose from, or to try to include. English Heritage restrict their definition to 'outgrowths of larger settlements', now as likely to be economically independent of them as dependent, characterised by the individual house and garden, and a focus on the family,⁸ though this last is not necessarily the case in suburbs nearer city centres, where many unmarried and young childless couples in the UK have been pushed out to find an affordable place to live, thus widening the traditional suburban demographic racially, economically and socially.

However broad or narrow one's definition, however, suburbs are, according to the Civic Trust, 'the forgotten dimension of urban policy',⁹ policy that in the UK has

HABITAT	INCOME	METABOLISM	ENERGY
 HEDGEROWS/THICKETS - Use when soil isn't good enough for trees.	 MARKET GARDENS 1 - Use when soil is good. - Use when water is available. - Use when there is one open space or a collection of open spaces in close proximity of not less than 1.6ha/person to ensure a living. - Use in combination with orchards.	 LIVING MACHINE - For black water cleaning. - Use when there is a 10m x 30m strip of land available for 60m ³ /day of sewage (300 people)	 AEROBIC DIGESTER - For producing compost from agricultural and household waste to sell to growers. - Size: For 500 households - 6 x 1.5m x 1.5m. - Cheaper option than anaerobic digester. - Use when brownfields site can't be dug. - Use when open space is less than 1ha.
 TREES - Use when market gardens and orchards cannot thrive. - Use species appropriate to climate and soil, eg willows on polluted soil.	 BEEHIVES - For honey to sell. - Use when soil is unsuitable for food growing. Use on open space of any size, where there are flower / wildflower areas within striking distance.	 RAINWATER HARVESTING 1 - Collection of rainwater for growers' land. - Use when buildings are adjacent to land used for income.	 ANAEROBIC DIGESTER - For producing heating gas from agricultural and household waste. - Use when this digester becomes affordable to a district - Use when Brownfield site can't be dug. - Use when open space is less than 1ha.
 MARSHES / BOGS - Use where there is existing unpolluted water or new water storage.	 MARKET GARDENS 2 - Use when soil is unsuitable for food growing, green houses for vegetable or flower growing. - Use on open space of any size.	 RAINWATER HARVESTING 2 - Collection of rainwater for growers' storage pond. - Use where there are vacant, non-porous sites.	 CHP - For producing heat and electricity when there is simultaneous demand for electricity and heating over 24 hour cycle (eg. for hospitals, swimming pools etc). - Use when Brownfield ground can't be dug. - Use when open space is less than 1ha.
 WILDFLOWERS - Use bee - friendly species. - Can be used with hedgerows and/or marsh agent.	 ORCHARDS - For cash crop orchards. - Use when soil is good, water is available. - Use when there is one open space or a collection of open spaces in close proximity of not less than 1.6ha/person to ensure a living. - Use in combination with market gardens.	 STORAGE POND - Constructed wetlands for grey water cleaning and storage for growers' land. Surface flow/storage pond. - Use where water or marsh exists already, or where they can be introduced near greywater harvesting. - Use where there is open space of a minimum of 20m ² . - Will also contribute to habitat.	 COPPICING - For heating energy only. 1ha heats 4 houses/year. - Use when rainfall is 1200mm or more. - Use when soil is polluted
 REED BED - Constructed Wetlands for grey water cleaning sub-surface flow. - Use where water or marsh exists already, or where it is suitable to introduce them. - Use where there is open space of 5-10m ² . - Use where cost is less of an issue, and efficiency needs to be high. - Will also contribute to habitat.	 SOLAR WATER / PV - For solar hot water and/or electricity - Use when subsidies are available for solar water panels or photovoltaics. - Use when roof inclination and solar orientation are productive.		

1 A context and climate-responsive catalogue of elements for creating a suburban artificial ecology, ranging from low-cost 'Habitat' insertions to economically beneficial 'Income' insertions

been largely shaped by the Urban Task Force report *Towards an Urban Renaissance*¹⁰ and European Union development policy.¹¹ These advocated the 'Compact City' model for regional sustainability and relied almost exclusively on transport energy analysis to justify the raising of low residential densities by the insertion of higher density dwellings within them.¹² Higher densities mean more people per hectare, which makes public transport more economically viable, which cuts down on car use, which saves transport energy. Although this causal chain has been convincingly challenged by subsequent academic research,¹³ not

in its logic, but in its inevitable occurrence, the Compact City remains the dominant influence on planning policy internationally, the one cited in planning documents to ensure 'sustainable development'. As a result, the qualities that draw people to suburbs are diminished by increasing congestion:¹⁴ 'relatively spacious, low density suburban areas (the archetypal leafy suburbs) are coming under increasing development pressure [...C]urrent levels of change increase the potential for local distinctiveness and historically significant features to be lost'.¹⁵ What is also being lost is an opportunity to include

suburbs *within* sustainable development, rather than remain prodigally outside it. The Greater London Authority has recognised the consequences of disinvestment in, and neglect of, the urban fringe: suburbs that are deprived areas rather than the plump houses and gardened gardens of popular imagination. The result in the consultation draft of the new London Plan¹⁶ is a more inclusive approach to planning, with the suburbs now seen as *part* of the city, and therefore entitled to the same regeneration investment, though that may not translate into sterling in the current economic and political climate.

A modest proposal

Within the framework of sustainable redevelopment, low densities are perceived to be socially isolating and environmentally – and therefore economically – wasteful; a description that may fit some, but certainly not all, suburbs. Turning the ‘Compact City’ model on its head, however, frees us to ask what the environmental *advantages* of low densities might be? In other words, if the minuses of compaction and densification are admitted – increased stress on citizens, increased pressure on existing infrastructure and services, increased expenditure on increased maintenance of infrastructure and services, increased energy demand for more vertical living – then the pluses of lower densities can be entertained as well. What are these pluses? How can they be achieved? And will they enhance or undermine the current desirability of suburbs to a majority of the population in many countries?

The one commodity that many suburbs have in abundance is open land. Land is valuable. It can do

things: grow food and fuel, collect, purify and recycle water, modify harsh microclimates, save energy, generate energy [1]. The ‘performative’ potential of the suburban landscape can potentially transform suburbs into ‘organic extensions of the urban system’.¹⁷ This requires an expansion of focus from urban centres, which exclude suburbs and the countryside beyond, to urban regions, which include both. Suburban landscapes can and should be a key component of a grown infrastructure, ‘a multifunctional resource capable of delivering a wide range of environmental and quality of life benefits for local communities, [which] includes parks, open spaces, playing fields, woodlands, allotments and private gardens’.¹⁸ Among these ‘environmental benefits’ are energy-saving capacities latent within suburban open space, capacities that can contribute to the reduction of the overall environmental impact of the city region, importing certain wastes from the centre to metabolise in their open spaces,

and exporting to the centre any surplus renewable energy, locally grown organic food, or recycled water. In this way, the suburb becomes part of an artificial ecosystem, rather than a parasite.

The suburban landscape is a complex patchwork of privately and publicly owned land: gardens, parks, derelict plots, brownfield spaces, railway cuttings, allotments, sports grounds etc. The private garden is ground zero, however, whether a few trees behind a terraced house or a rolling couple of acres, and its privacy is potentially an obstacle to the ‘collectivity’ of an environmentally productive landscape. Natural system boundaries do not observe ownership boundaries. They ride right over them or stop short of them or include some privately owned land but not all, thus unfairly distributing the metabolic work to be done [2a–d]. There is also a cultural resistance to one’s hard-earned property being dragooned into a communal undertaking for which the immediate personal benefit remains elusive.



phase 1 - harvest rainwater from existing industrial buildings

2a



phase 2 - plant coppice/trees on green open spaces [14/15he]

2b



phase 3 - place raised beds on non-green open spaces [35he]

2c



phase 4 - install biomass CHP / convert warehouses to process timber and honey products

2d

2 An artificial ecosystem can proliferate over time, as land ownership is reconciled with land use

The integration of different kinds of green space, with their different forms of ownership, into one integrated energy-saving suburban landscape system therefore requires research into governance and participation as well as into environmental strategies, appropriate techniques and technologies, appropriate scales of intervention (from the individual house to the district). How is top-down 'push' on energy-saving converted into community 'pull'? How can people be helped to reconcile what the majority of them moved to the suburbs for – space and independence – with the increasing number of ethical and practical challenges to that space, if not that independence? Conceptually, one needs to stand at the 'intersection between social and bio-physical dimensions to [sub]urban space'.¹⁹

Technology is not enough. No amount of anaerobic digesters, 'living machines' and wind turbines will have much impact until they are embraced by a public that understands their importance: '[p]ublic education is a prerequisite to public participation'.²⁰

In this case, however, public education could be accomplished *through* participation: these new 'performative' landscapes would have to be designed, and this could allow a process of 'co-design', in which lay and expert knowledge are viewed as equally important to the process of developing place-specific strategies, and residents and other stakeholders collaborate with designers and engineers. 'Co-design'²¹ is a fast-growing design

practice, driven by Agenda 21 and Local Agenda 21, galvanised in the UK by New Labour's commitment to 'sustainable communities'.²² As the present coalition government's Localism Bill takes hold, co-design could equally as rapidly decline, and we would lose a very promising approach to effecting social change. The practice requires a commitment on the part of the designer to work in this way, something not often encouraged by his or her training, and the space and time (and therefore money) to engage in a genuine collaboration. As environmental interventions in the suburbs would require new legislation to deal with the complexities of using public and private land, local planners and councillors are also vital to successful co-design sessions. This range of collaboration could 'provide a wealth of information regarding the appropriateness of a technology in a given setting, along with any potential barriers to its implementation'.²³

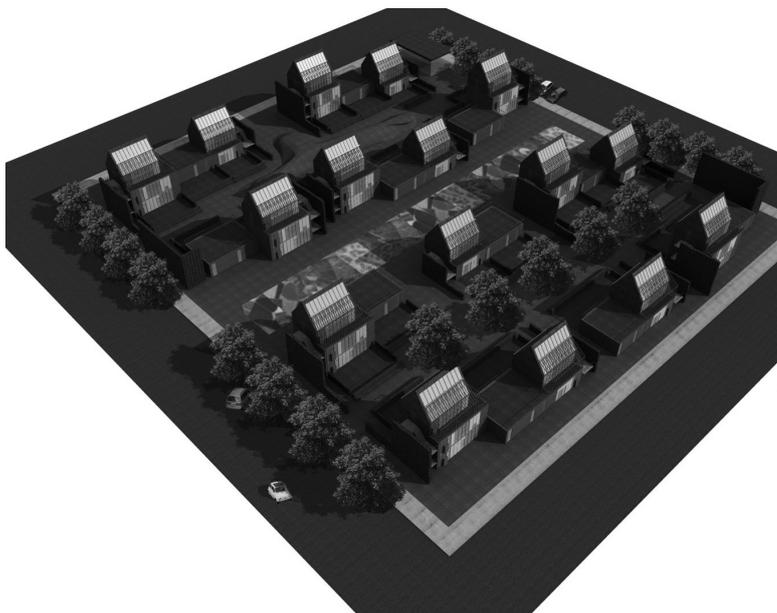
Ornamented performance

What the resulting designs looked like would vary according to suburb, residents and council. New suburbs in which such systems could be built in from the beginning are obviously much easier to configure uncontroversially than inserting them into existing suburbs. New residential cluster developments are particularly easy to deal with, as there is a much larger proportion of land commonly owned by the cluster than there is commonly owned by the council in older

house-and-garden suburbs. That land could be put to work without having to poach too much from private gardens. 'What it looks like' also depends on soil, climate, density and typology. Where there is unpolluted and fertile soil, a reasonable growing season, and worthwhile dimensions of open land, then (sub)urban agriculture may be appropriate in the form of market gardens, commercial orchards and/or a greater provision of sought-after allotments. If the land is flat and subject to high winds, stands of trees could be planted to improve the microclimate and reduce heating fuel consumption. 'Living machines' to clean grey or even black water, ponds for storing rainwater, and systems for delivering it from, and redistributing it to, surrounding buildings would appear where there was the space. Water systems might be in a park or at the bottom of a line of private gardens, their extremities donated to make a communal collection point in return for free recycled water (desirable once all water is metered) [3]. Seasonal heat storage systems could be installed under parking lots and tennis courts. Neighbourhood CHP plants might be deployed, or anaerobic digesters, the gas of which could be used to produce electricity.

'Co-design' would ensure that residents understood the reasons for such moves, and had a direct influence on the location of metabolic processes. Underused or ornamental open land could be extended to social as well as environmental uses: for instance, the area around a collecting pond at the end of some gardens could also serve as a semi-private gathering place shared by a group of houses, a typology one finds in some areas of London, where the private gardens at the rear of the houses give on to an interior communal garden, accessible only to residents. This delivers an immediate and familiar benefit – the opportunity to socialise in a protected space – and provides a double use for these landscapes, one social, the other environmental.

This artificial ecology folded into the public-private patchwork of suburban open land does not, of course, address the problems raised by the 'Compact City' critique of low-density settlements – their car dependency. But it would be difficult to 'densify' every low-density settlement to create enough travellers to justify public



3 Private space donated for shared environmental functions can double as social space

transport – assuming people would then abandon their cars and use trains or buses, as UK ticket prices for overcrowded public transport rise inexorably. Nor can one extend public transport infrastructure so that it provides a convenient access point for every user. Cars are unavoidable for the foreseeable future, but fossil fuel and status-driven ones are not. Small solar and/or biomethane and/or hydrogen powered vehicles could be used to travel in existing low-density suburbs and the countryside. If ‘metabolic landscapes’ were introduced into suburbs, their residents’ thinking about the environment may change sufficiently for them to independently assess their relationship to the car, or at least the car as it is presently constituted.

‘Non-Plan’, post-Brundtland, is simply nostalgia, a longing for the 1970s when Reyner Banham defended the unplanned, self-organising super-sprawl of Los Angeles as the way forward from oppressive and unsuccessful post-war planning.²⁴ Two subsequent decades of neo-conservative deregulation have made it abundantly clear that non-plan is equally oppressive, but oppresses the weak rather than occasionally thwarting the strong, the weak being the economically vulnerable, and the environment. Non-plan allows the free market to devour the unfit and overexploit natural resources that belong to the common weal. Planning ostensibly protects both, and needs now to allow the re-tooling of the suburbs’ open spaces, and turn the suburban picturesque towards an eighteenth-century landscape paradigm of ornament-and-performance: husbanded woods that bore timber to sell, re-moulded hills that fed profitable wool-producing sheep. This is not, however, post-war planning in all its statist glory. Whichever political party or combination of parties is in power in the UK, necessary environmental re-formation will not happen without social acceptance, and social acceptance will not happen without education and participation, especially in privatised realms such as suburbs. This suggests that design may become crucial, not as an arm of an arm of the state, but a medium of public education and lay-professional collaboration. The removal of the regional planning tier by the present government, however, means the need to reconsider and reconfigure the suburbs may very well remain

unaddressed, if the negotiation between one locality and another proves a barrier to the trans-border spatial configurations needed for metabolic processes. Is the architectural profession ready, not only to overcome its traditional antipathy towards the suburban, but to help suburban communities produce neighbourhood development plans that radically reconsider their open spaces?

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Notes

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