

CONFERENCE: HOUSING – A CRITICAL PERSPECTIVE

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DENSITY: A NUMBERS GAME, BUT WHAT'S THE ALTERNATIVE?

CLAIRE HARPER

AUTHOR AFFILIATION
UNIVERSITY OF WESTMINSTER

The city is manifestly a complicated thing. Part of the difficulty we experience in dealing with it can be attributed to this inherent complexity. But our problems can also be attributed to our failure to conceptualize the situation correctly. If our concepts are inadequate or inconsistent, we cannot hope to identify problems and formulate appropriate policy solutions. One set of problems arises from academic and professional specialization on certain aspects of city processes. ... Sociologists, economists, geographers, architects, city planners, and so on, all appear to plough lonely furrows and to live in their own confined conceptual worlds.¹

At its most basic, density is a simple ratio of matter to space. Typically, in the planning and design of the built environment, that ‘matter’ is defined in terms of dwelling units, floor area or people. Space is measured in abstract hectares. Yet, in spite of its relatively narrow definition, the concept of density is implicated in a vast range of issues and attributed a range of social, economic, ecological, psychological and architectural consequences.² The frequent and familiar debate about where we build and what type of housing we build wields the terminology of density to infer something about the physical attributes of the housing and its environment. This is not new. Myriad studies have sought to investigate, prove and disprove the relationship between density ratio and built form.³ Arguably the most rigorous of these is the recent Spacematrix study carried out by researchers at TU Delft which established a complex parametric model that accounted for the critical physical of the built environment dimensions that contribute to the measured density ratio.⁴ In demonstrating this complex model the study clearly showed that without supplementary information in regards to site area, distance to adjacent buildings, and the size of the dwellings themselves – density ratios on their own are relatively dumb measurements.

We might begin by asking why this is important. There is a long and a short history to the subject of density in UK planning and development. The recent history began with the publication of the Urban Task Force (UTF) white paper *Towards an Urban Renaissance* in 1999.⁵ The UTF report called for a more ‘compact’ model of urban development intended to bring about the best qualities of the city centres of Paris, Barcelona and Berlin in UK towns and cities. These were taken as models of ‘compact city’ urbanism, characterised by mixed-use - residential, commercial and institutional buildings close together rather than segregated in to their respective zones as in the twentieth century Modern city - good public transport and public open spaces. Richard Rogers, lead author of the UTF report defined the compact city as:

A dense and socially diverse city where economic and social activities overlap and where communities are focused around neighbourhoods.⁶

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The UTF report ushered in a wave of changes to UK planning policy within which density was given a key role. Higher urban densities were attributed with a range of environmental benefits such as reduced travel distances and generating the physical proximity required to develop and sustain public transport and other services. There were assumed social benefits, too. The ‘dense city’, wrote Rogers, offered the opportunity to reconsider the “social advantages” of proximity and living in each other’s company.⁷

In London this shift spurred an increase in the density ratios of new housing, from 50 dwellings per hectare (d/ha) in 2001 to 103d/ha in 2009.⁸ The pattern has been similar in other UK cities. The city centres of Leeds and Manchester for instance have been transformed by new residential developments with very high density ratios. The intended consequences of the higher density ratios may be realised: the concentration of people to support public transport, the additional population revitalizing the city centre (as long as these apartments are occupied), but there is continued debate over the long term suitability of this housing.⁹

In the context of the current critical shortage in housing supply, however, higher density is equated with increased quantity. This is the political angle. The economic angle is that it is a vehicle for speculation. I am not an economist, however, but I am an architect. This paper therefore sets out to do two things. Firstly, it sets out to demonstrate the limitations of using density ratios – instruments of economic viability and strategic planning – as an indicator of the qualities or character of the built environment. Secondly, it proposes an alternative conception of density that responds to designerly concerns for the tangible and experiential qualities of our urban, and particularly our residential environment.

Measuring Density

Since it was first introduced to the discourse of architecture and planning at the beginning of the twentieth century both the concept of density and the way that it is measured have undergone multiple transitions. These different measurements were predicated on different ideas about the implications of density and different applications for its measurement. Depending upon whether density was being used as an index of overcrowding, congestion, built form, or urban vitality, the way that it is measured (units) and the way that it is interpreted within architectural and planning practice has shifted repeatedly.¹⁰

There are many patent differences between a high density of people during rush hour, and a high density of under-occupied apartment buildings, yet in most references to density the terms of measurement are not stated. The former scenario is a dynamic and changing phenomenon, generated by the concentration of people, their activities, their vehicles and the space that they share. The latter meanwhile is a more static measurement, but one which might be perceived differently depending upon the units used to describe it.

Historically, bedspaces per hectare might have been used to describe a residential environment and give an indication of the number of inhabitants.¹¹ But these are problematic because they can only ever measure the designed occupancy and are therefore distorted by over and under-occupancy. Habitable-rooms-per-hectare (hr/ha) is the measurement commonly used in London. It is intended to give a greater idea of the population within a given development than dwelling densities. However, habitable rooms not only lack a clear and universal definition, but as with dwelling densities, provide no indication as to the size of the rooms and therefore the amount of building that is being described.¹² Whilst elsewhere in Europe, floor area ratios and plot ratios are the primary measurement of density used in urban planning and development, in the UK dwelling densities (along with habitable room densities in London) continue to be the most prevalent measurements used.

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Both have intrinsic problems. Neither measure gives any indication as to the size of the dwellings or the layout of the site, or accounts for any other, non-residential land use.¹³ Therefore, when measuring mixed developments, only the residential use is measured and even then, not very accurately.

It is argued that the dominance of dwelling densities as a favoured density measurement is a product of the way that we measure and sell housing; that is by number of units or rooms rather than by floor area. It has also been shown that, far from benign measurement, the use of dwelling densities and habitable room densities to prescribe limits on the amount of development permitted directly affects the type of housing that developers will choose to build. Maximum limits on the density of dwellings, incentivise developers to build the largest houses possible, thereby maximising the resale value of the land purchased.¹⁴ Meanwhile, as Duncan Bowie has demonstrated in his review of planning consents granted in London, a quota based on habitable rooms per hectare encourages the development of greater numbers of small dwellings, with an optimal ratio of non-habitable to habitable rooms.¹⁵

This correlation between increased density and increased land value was acknowledged by Raymond Unwin in one of the earliest recorded applications of density ratios as an instrument of (what was then the emerging) discipline of town planning. Unwin predicated his twelve-to-the-acre manifesto on the principles of land economics, determining that prescribed density ratios for the Garden Cities and Suburbs would only encourage housebuilders to build the largest houses possible in order to maximize their economic return. He advocated therefore that density quotas ought to be supplemented by limits on the size of the houses that could be built to prevent over-development and maintain diversity within the new neighbourhoods.¹⁶

Unwin's thesis clearly highlights the potential economic implications of maximum and minimum limits on density ratios. He recognized that density ratios, whilst having capacity to affect the character of a development, in the context of housing production driven by market economics, density ratios are first and foremost an economic instrument. Furthermore, he recognized that limiting the density of new housing was by no means an adequate mechanism through which to ensure the quality of the housing or its environment. He therefore supplemented his thesis on density with a design guide setting out the principles for development in the Garden Cities. What we have lost today is the coupling of quantitative measurements for economic calculation with qualitative measures as a way of appraising the spatial qualities associated with these density quotas. Whilst numerous studies have set out to demonstrate the fallibility of using density ratios as a descriptor of the amount or type of building on a given site, presumptions about the type and size of housing associated with a given density ratio prevail. In spite of the variety of approximations and generalisations required in order to translate dwelling densities (or any ratio measure) as a descriptor of the form or organisation of the built environment as were expanded in the previous chapter, there persists a general understanding that density X will produce building typology Y, with a given amount of garden space and parking ratio.¹⁷ The American scholar Ernest Alexander refers to these assumptions rather romantically as “a kind of ‘folklore’” that relates density ratios with specific dwelling types”.¹⁸ Yet these preconceptions colour understanding about density and have a potentially normative effect on the design of new housing. The *Callcutt Review* into housing delivery verified this, stating that the use of dwelling and habitable room densities as the primary measurements of site capacity requires (and makes necessary) assumptions about the size, layout and massing of different dwelling types. The report states:

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Standard house types are also designed to allow the optimum compliant densities to be achieved. Optimum density is not necessarily the highest density, but the combination of house types and densities which yields the highest value per hectare at a given rate of sale.¹⁹

By positioning density ratios as instruments of economic calculation and viability, it becomes clear their application as a means of understanding or appraising the social, spatial or experiential qualities of the built environment is limited. Instead, it is necessary to establish a spatial conception of density as a means of giving weight to these concerns.

So, what's the alternative?

This counter index aims to define those spatial qualities of density that are evaded by the ratio measures. It is proposed as a means to shift the debate about density away from simplistic, polarizing models of towerblock versus suburban arcadia. It has been developed out of a detailed historical and theoretical study, drawing on architectural theory, environmental psychology, fictional and artistic depictions of conditions of density. Three conceptions of density were identified (to supplement the abstract, numeric measures).

The first, 'physical density', is concerned with the perception of density in the built environment. Whilst it has been demonstrated by various studies that density ratios are by no means a determinant of built form, there are aspects of built form that popular opinion associates with the notion of density.²⁰ Perhaps the most obvious of these is building height.²¹ However, it is not as simple as an equation of height with density. There are numerous examples of pavilions-in-the-park which have a very different character to the Hong Kong landscape for instance. It is complicated by the subjective nature of the perception of density. However, by articulating qualities associated with density, such as the number of people (or evidence of them), perceived anonymity, the physical proximity between buildings and perceived intensity of development, as a designer, one is able to begin to design for an experiential quality of density.

The second concept is that of 'communality'. The impetus for this as a way of thinking about the impacts of density arose from the early modernists and their attitude towards the design of high density housing. There was a notion, advocated most viscerally by Walter Gropius and later by Ludwig Hilberseimer, that the concentration of dwellings into larger, taller blocks would liberate large areas of land to provide public parks and open space – a broader public good as a consequence of more compact housing typologies.²² The collective benefits of compact living were elaborated further by Le Corbusier, who utilized the proximity generated by apartment living to enable the provision of modern conveniences such as concierge services, on-site health services and childcare.²³

The third conception of density was that of 'social proximity'. Aspects such as social encounter, proximity, privacy and the hustle-and-bustle generated by a density of people are all frequently cited in experiential portrayals of the city, but rarely referenced in design discourse – particularly that around housing. Yet, these conditions fundamentally affect the experience of living in the city, and ought therefore to be considered as part of the design of new housing environments.

These alternative conceptions of density have the potential to change the way that new housing is designed – particularly in an urban context. The notion of communality, for instance has great potential for promoting shared space and infrastructure as a socially and economically sustainable housing model. In the case studies used to test the development of these indices, it was clear that in order to achieve the higher density ratios demanded, new, higher density housing is being designed to cater for increasingly individual dwelling habits. There are few opportunities to bump into one's neighbours, to casually look

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out for whether neighbours are at home. If future residents can be persuaded that these are positive social norms, then the integration of shared space, shared infrastructure and services can potentially enable more compact housing forms with an embedded social infrastructure. Indeed, co-housing, where residents have actively bought into the idea of communality to a greater or lesser extent is perhaps one of the most useful models in terms of designing for proximity and compaction.

There is a body of socio-geographic research that posits proximity and encounter as one of the essential social logics of the city.²⁴ Architects too, expound the value of proximity and encounter. Dutch architect and writer, Rudy Uytenhaak suggests that proximity between people, promoted by different types of space designed for different uses and activities promotes complexity which is the essential ingredient of the bustle and ‘urbanity’ of the city.²⁵ The architect and activist Teddy Cruz makes a strong case for an index of encounter as an alternative way of thinking about density arguing that by thinking of density in terms of a density of encounters per area, the social propensity of design can be measured and given weight in deliberations over density. Furthermore, these deliberations necessitate the engagement of agencies other than those economic forces that currently dominate housing production.²⁶ That is to say that developing social indices for the appraisal of the built environment and the housing that we are designing and delivering opens up the debate not only about what we build and where, but who is engaged in the process.

The economic implications of density are inherent. Higher permitted density ratios increase the value of land and it is clear that, in London at least, the maximum quotas set out in the London Plan have rapidly become minimum values. These quotas were borne out of the Urban Task Force report which promoted an increase in urban density not on economic grounds (although it would be naïve to assume that this was not a recognized and intended consequence of the planning proposals). It is also clear that density ratios on their own have little veracity as a means of describing the physical experience of the city, or the phenomenology of density.

The alternative index of density is proposed as a counter to the numeric measurements that predominate in planning, and particularly in relation to new housing development. Density in terms of its social and phenomenological implications is one of the defining characteristics of the urban. In failing to identify and value these qualities, the character and organization of the city as a place of interaction and integration could be changed significantly. It is apparent that increased numeric densities have implications for the design – that is the spatial organization - of new housing which is not, as might be expected, inherently more social. Yet, the conception of density as an organizational or social characteristic of the urban environment requires a shift in how we, as designers approach the notion of proximity between neighbours, the scale of large developments, the relationship that homes have to their immediate environment. Perhaps most importantly, it introduces these other conceptions of density alongside the numbers and opens up the space for designerly concerns to be part of the debate about density.

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ENDNOTES

¹ David Harvey, *Social Justice and the City* (London: Edward Arnold Publishers, 1973), 22.

² Churchman cites an extensive list of potential consequences associated with higher and lower urban densities in her paper: “Disentangling the Concept of Density,” *Journal of Planning Literature* 13, no. 4 (1999): 389–411.

³ Martin and March’s study sought to unpack the Modernist dictum that high density necessarily meant high rise “Speculations,” in *Urban Space and Structures* (Cambridge: Cambridge University Press, 1972), 28–54. More recently, the Spacematrix study investigated the relationship between Floor Area Ratio and different physical dimensions of built form. The resulting model is available online at Meta Berghauser Pont and Per Haupt, “Space Calculator,” Online application, *Spacemate*, (2001), <http://www.permeta.nl/spacemate/index2.html>.

⁴ Meta Berghauser Pont and Per Haupt, *Spacematrix: Space, Density and Urban Form* (Rotterdam: NAI Publishers, 2010).

⁵ *Urban Task Force, Towards an Urban Renaissance* (London: Department of the Environment, Transport and the Region, 1999).

⁶ Lord Richard Rogers, *Cities for a Small Planet: Reith Lectures*, ed. Philip Gumuchdijan (London: Faber and Faber, 1997), 33.

⁷ Ibid.

⁸ Department for Communities and Local Government, “Land Use Change: Proportion of New Dwellings on Previously Developed Land, and Density of New Dwellings 1994-97, 2006-09” (Department for Communities and Local Government, July 30, 2010), <http://www.communities.gov.uk/planningandbuilding/planningbuilding/planningstatistics/livatables/landusechange/>.

⁹ Oliver Wainwright, “The Truth about Property Developers: How They Are Exploiting Planning Authorities and Ruining Our Cities,” *The Guardian*, September 17, 2014, Online edition, <http://www.theguardian.com/cities/2014/sep/17/truth-property-developers-builders-exploit-planning-cities>.

¹⁰ Nicola Dempsey and Mike Jenks, “The Language and Meaning of Density,” in *Future Forms and Design for Sustainable Cities* (Amsterdam: Architectural Press, 2005), 287–309; Berghauser Pont and Haupt, *Spacematrix: Space, Density and Urban Form* both provide a history of the use of density ratios within planning practice.

¹¹ Bedspaces emerged as a measure of occupancy in response to the primary density concern of the nineteenth century which was that of overcrowding. The conditions of the nineteenth century Victorian city are described in Anthony S. Wohl, *The Eternal Slum: Housing and Social Policy in Victorian London, 2002nd ed.* (London: Edward Arnold Publishers, 1977); and George Godwin, *Another Blow for Life* (London: Wm. H. Allen, 1864).

¹² Part of the difficulty in conceptualising habitable rooms is that are defined in complex, academic terms, which have little relevance to the way the dwelling is inhabited. The England and Wales Building Regulations (2010), define a ‘habitable area’ according to different criteria in three different documents, Part B, Part F and Part M. Scott Wilson, “Dwelling Size Survey: Housing Standards: Evidence and Research,” (CABE, 2010).

¹³ Meta Berghauser Pont and Per Haupt, “The Spacemate: Density and the Typomorphology of the Urban Fabric,” *Nordic Journal of Architectural Research*, no. 4 (2005): 58.

¹⁴ Michael Collins and Patrick Clarke, “Planning Research Programme: The Use of Density in Urban Planning,” (Department of the Environment, Transport and the Region, 1998), 55.

¹⁵ *Duncan Bowie, Politics, Planning and Homes in a World City, Housing, Planning and Design* (Oxon: Routledge, 2010), 98.

¹⁶ *Raymond Unwin, Nothing Gained by Overcrowding!: How the Garden City Type of Development May Benefit Both Owner and Occupier*, (Garden Cities and Town Planning Association, 1918).

¹⁷ Berghauser Pont and Haupt, *Spacematrix: Space, Density and Urban Form*. The recently published Housing Density Study discussed in the previous chapter is premised on the notion that there are numerical densities are equated with certain types of urban environment and certain types of housing development. Maccreanor Lavington Architects, Emily Greeves Architects, and Graham Harrington Planning Advice, “Housing Density Study” (Greater

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London Authority, August 30, 2012),

http://www.london.gov.uk/sites/default/files/HousingDensityStudy_finaldocument_120830.pdf.

18 Ernest R. Alexander, "Density Measures: A Review and Analysis," *Journal of Architectural and Planning Research* 10, no. 3 (Autumn 1993): 182.

19 John Callcutt, "The Callcutt Review of Housebuilding Delivery," (Communities and Local Government, November 2007), 178, <http://www.communities.gov.uk/documents/housing/pdf/callcuttreview.pdf>.

20 One of the earliest, but perhaps most representative study into the perception of density was carried by the architect Amos Rapoport "Toward a Redefinition of Density," *Environment and Behavior* 7, no. 2 (June 1975): 133–58.

21 Ricky Burdett et al., "Density and Urban Neighbourhoods in London" (Enterprise LSE Cities, 2004).

22 Walter Gropius, *The New Architecture and the Bauhaus* (London: Faber and Faber Limited, 1935); L. Hilberseimer, *Nature of Cities* (Academy Editions, 1955).

23 Fondation Le Corbusier, "Unité D'habitation," Fondation Le Corbusier, accessed June 3, 2011, http://www.fondationlecorbusier.fr/corbuweb/morpheus.aspx?sysId=13&IrisObjectId=5234&sysLanguage=en-en&itemPos=1&itemSort=en-en_sort_string1%20&itemCount=1&sysParentName=Home&sysParentId=11.

24 Urban geographers, Fincher and Iveson expand the socio-political importance of 'encounter' through a reading of the city as a place of juxtaposition and necessary encounter, which is the means by which the equalising objectives of recognition (of social diversity) and redistribution (of resources and opportunities), can be achieved. *Planning and Diversity in the City* (Basingstoke: Palgrave MacMillan, 2008), 13.

25 Rudy Uytenhaak, *Cities Full of Space: Qualities of Density* (Rotterdam: 010 Publishers, 2008), 8–9.

26 Cruz suggests that by thinking of density in terms of the quantity of social relationships per acre, then to make a housing project sustainable, socially at least, we have to involve mediating agencies, such as these non-profit organizations. "Architecture: Participation, Process, and Negotiation," in *Verb Crisis*, *Boogazine* 6 (Barcelona - New York: Actar, 2008), 156.

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