Morpho: a methodology for assessing urban form

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Abstract. *A methodology is proposed for assessing the physical form of urban areas. Termed* morpho, *it deals with fundamental elements of urban form: streets, plots and buildings. It includes seven assessment criteria: one for each of the elements individually; one for each relation between pairs of elements; and finally, one linking form and function. The application of this methodology provides a quantitative assessment of the 'morphological basis' of an urban area, identifying its strengths and weaknesses. It is argued that* morpho *can make an important contribution to urban research and practice..*

Keywords: assessment methodology, urban form, streets, plots, buildings

In recent decades there has been a significant growth in the amount of research on the physical form of urban areas. This is particularly evident in the increasing number of publications on both urban morphology specifically and more generally on the built environment. Journals that have commenced publication in the last 4 decades include *Built Environment* (established in 1974), *Environment and Planning B* (1974), *Urban Design International* (1996), *Journal of Urban Design* (1996), *Urban Morphology* (1997), *Journal of Urbanism* (2008) and *Journal of Space Syntax* (2010). This growth is also expressed in the establishment of international research networks such as the International Seminar on Urban Form (including its three national/ regional groups – Nordic, Italian, and Portuguese – and the Urban Morphology Research Group) and the International Space Syntax Symposium.

A major challenge for urban morphology is to convey effectively its findings to a wider readership. Perhaps a wider appreciation of the potential of urban morphological theories, concepts and methods in research and action on urban areas needs to involve some simplification. However, this does not have to mean a loss in the fundamental contents of the discipline. Two examples of such simplification illustrate this.

Angular segment analysis is a method recently introduced in the space syntax community (Hillier, 2009; Turner 2007). It focuses on road-centre lines, a particular type of information that, unlike the axial lines that are central to the former space syntax mainstream method, is easily available in many countries for use with Geographic Information Systems (GIS). This step forward makes space syntax less consuming of resources and potentially more attractive, both to academics outside urban morphology and to practitioners.

The second example is the framework proposed and applied by Kropf in the 1990s (Kropf, 1996). Based on the work of Conzen and Caniggia – particularly the concepts of 'plan unit' and *tessuto urbano* – Kropf proposes a framework for identifying and describing, in hierarchical terms, the main elements of urban form. After a process of simplification of the existing theoretical and methodological background to make it more

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operational, Kropf was able to bridge the gap between studies of urban form and the zoning system of planning.

General principles

A number of issues have influenced the design of the methodology, termed *morpho,* that is proposed here. These include the type of area to be assessed and the purpose of the assessment. The first principle is that *morpho* should deal exclusively with the physical dimension of cities. Although it acknowledges that the form and structure of cities are influenced by social and economic drivers, it only reflects them indirectly. *Morpho* focuses on the essential and specific contributions that urban morphology can make to contemporary societies.

The second principle is that *morpho*, in common with most morphological approaches, involves a selection of a reduced set of physical elements to describe and explain the city in morphological terms: the streets, the plots and the buildings. This is not novel: other examples can be found in the literature. Kropf (1996) maintains that the urban tissue is an organic whole whose form can be described at a number of levels of resolution, each concerned with different elements of urban form: streets and blocks, or plot series; plots; buildings; rooms or spaces; structures, such as walls or roofs (including details of construction); and finally, materials. Space syntax (Hillier, 1996; Hillier and Hanson, 1984) provides a number of concepts and methods to assess one element of urban form, the street system, using one assessment criterion, accessibility. Place syntax (Stahle *et al*., 2006) expands the focus of the syntactical approach on the street system to include the plot system.

The third principle is that *morpho* should quantitatively assess the morphological basis of a given area, framed by a concept of 'urbanity'. This means that the performance of the urban forms of that area would be expressed by a degree of urbanity as part of a continuous rural-to-urban gradient. The use of a concept of urbanity to frame the assessment of urban form has been used by authors such as Duany (2002) and Marcus (2010), in more operational terms; and also by Lees (2010) and Holanda (2011) in more strategic terms. While sharing some aspects of these proposals, a more specific concept of urbanity is argued for here. Urbanity is both a social and spatial construct. It is something that the built environment delivers through the main elements of urban form – the system of streets, the system of plots, and the system of buildings. In relation to these elements, a high degree of urbanity would generally mean high accessibility, high density, high diversity and high continuity. This concept of urbanity acknowledges two important issues. First, urbanity is something that results from both planned and unplanned contributions. Secondly, it is a continuing construction, like knowledge itself.

Finally, *morpho* should provide sound bases for integrated research and planning practice. This assessment can be both synchronic and diachronic, monitoring the evolution of urban form over the years – it can focus on present cities and on their past. But *morpho* can also focus on the future and assess the morphological impact of potential actions or projects on an urban area.

Assessment procedure

The application of the method includes four steps. The first involves consideration of its suitability for a particular urban area and type of study. Matters to be considered here include the objectives of the assessment process, the criteria and techniques to be employed, and the suitability of the available data, both cartographic and statistical, for a full morphological characterization. This initial step may be slow and sometimes demanding, and may lead to adjustments in the methodology. *Morpho* should be able to assess urban form at different scales – street, neighbourhood and city – allowing identification of the main strengths and weaknesses of that form and providing guidance on how to mitigate the weaknesses.

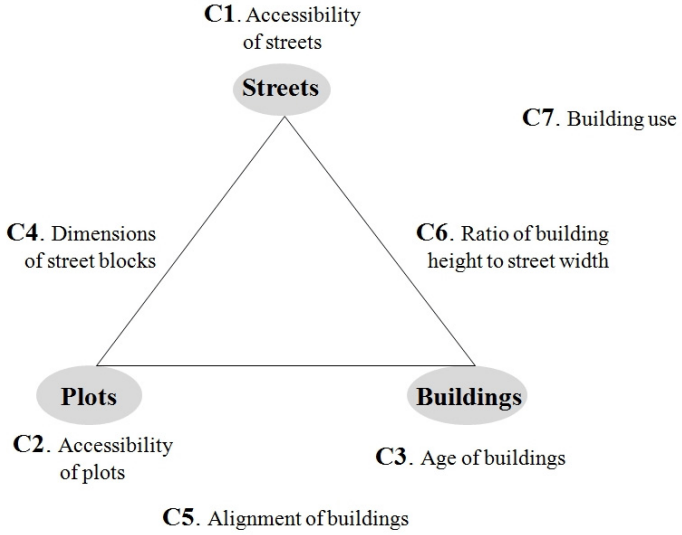

Figure 1. *Morpho* assessment criteria.

The second step corresponds to the measurement of seven assessment criteria (Figure 1): accessibility of street system (similar to the space syntax criterion); accessibility of plots (resembling the place syntax criterion); age of buildings (highlighting the importance of 'time' in the city building process); dimensions of street blocks and plot series (expressing the relation between streets and plots); alignment of buildings (expressing the relation between plots and buildings); ratio of building height to street width; and finally, building use. The assessment of each of these criteria involves the production of a number of tables and maps, expressing the different performances and degrees of urbanity in different parts of the city.

After assessing each criterion, the results are gathered in a matrix, which forms the basis for a kind of benchmarking exercise. Each particular result can then be compared with two sets of assessments: a local or context-based set and a general set. The first may provide a city-wide background to an assessment at the street level or a regional background to an assessment at the city level. The second set should be a continuing construction, informed by a learning process based on successive applications of the method in a variety of environments and at various scales.

The final step in this procedure is the proposal for the utilization of the results. One important aspect when developing a model or a representation of the city, is that no matter how complex or how evidence-based the model is, it will always be just a model of the city and not the city itself. This means that the utilization of *morpho*, and of the results that it may provide, should always be reflective and critical. Carefully applied, the method can be used by local authority planners, to provide basic information for municipal planning practice and for the guidance of private development.

Assessment criteria

Accessibility of streets

Streets have always been a fundamental object of analysis for urban morphologists. The space syntax approach is one of the most notable examples of this reliance on streets as a way of understanding the physical form and structure of cities. The focus of space syntax on a single element of urban form is generally accompanied by a reliance on one assessment criterion. This criterion is accessibility, understood not in metric terms but

topologically and geometrically (Hillier *et al.*, 2007).

Using space syntax, the first task in assessing the topological accessibility of streets is the preparation of an axial map (or segment map). The axial map is a powerful representation that is constituted by the least set of axial lines that cover the whole system in such a way that every convex space is crossed by at least one of those lines. The set of axial lines is the least set of longest straight lines – representing both visibility and movement – that can be drawn through the entire spatial configuration.

The second task is the analysis of the map based on two syntactical measures: global integration and local integration. Global integration (or integration of radius *n*) measures the relative depth of each axial line in the map, to all other lines of the system. Local integration (radius 3) measures the accessibility of each axial line to other lines up to three topological steps away. The results can be normalized and a scale established, ranging from 0 (segregation) to 1 (integration).

Accessibility of plots

As with streets, plots have frequently been an object of study in urban morphology, giving rise to new concepts, such as the well-known burgage cycle (Conzen, 1960), and to innovative methods, such as metrological analysis (Slater, 1981) and place syntax.

Traditional space syntax methods (not combined with GIS tools) deal with the street system per se: what is analysed is accessibility to urban space without regard for the 'contents' of space. Place syntax, in contrast, uses the axial map as a distance measure to sense such contents loaded as GIS data on plots. Place syntax thereby adds two criteria – density, which is a major variable in geographical analysis of urban space, and diversity, which has been seen by many in recent years as a much needed attribute (Marcus, 2010).

Accessibility of plots is measured by calculating, within a given metric radius (for example 500 m), the plots that are accessible at a specific topological distance (for example three topological steps). The results can then be normalized on a scale between 0 (segregation) and 1 (integration) by comparing the identified accessible plots and all plots contained within the radius.

Age of buildings

The importance of built heritage has been part of academic debate since the seminal works of Viollet-le-Duc and Camillo Sitte, and of public debate since the publication of the Venice Charter in 1964. Since the 1960s, a number of events have fed this debate, notably the establishment of the International Council on Monuments and Sites (ICOMOS) and one of its best-known initiatives, the World Heritage List. Within urban morphology interest in the different periods of construction of buildings has been associated with the typological process approach developed by the Muratorian School (Caniggia and Maffei, 1979; Muratori, 1959) and the historico-geographical approach developed by the Conzenian School (Conzen, 1981; Slater, 1978).

The contribution of 'time' in the process of city building is represented within *morpho* by the age of buildings. First, all buildings in an urban area are classified according to their period of construction. Bearing in mind that a major purpose of the methodology is its applicability in practice, some simplification is desirable – hence division into just two time periods is suggested. Naturally, the 'success' of this simplification depends on the appropriateness of the date selected for distinguishing the two periods. For instance, 1945 could be a relevant date when analysing a European city, reflecting the massive destruction, and subsequent reconstruction, caused by the Second World War. Although the date should be context specific it is hoped that a learning process based on successive applications of *morpho* would provide the basis for cross-cultural comparisons.

Dimensions of street blocks

The street block is a fundamental element of the physical structure of cities. The surprisingly small literature on this topic favours the view that smaller blocks generally provide greater scope for interaction and are better suited to particular aspects of urban development than larger blocks. They tend to produce finer-mesh circulation patterns, more potential plot frontages, and more coherent and finer-grained fabrics (Hillier, 1999; Jacobs, 1961; Maitland, 1984; Siksna, 1997). Assessment of block size entails the division of blocks into groups, defined by the GIS method of 'natural breaks', according to the width of block frontages.

Alignment of buildings

Guidance on the alignment of buildings has usually been part of urban planning and development control. Nevertheless, in some planning systems this has been eliminated, allowing for increasing variation in the position of buildings within plots. Surprisingly, building alignment and its influence on the quality of the built environment has not been a prominent theme in urban morphology.

Assessment of building alignment within the present methodology involves a GIS procedure for each street. First, for each side of the street under analysis, the dominant alignment is identified. Then, the number of buildings in the street that have a dominant alignment is expressed as a percentage of all buildings. A scale is then established, ranging from 0 (or more precisely, a value near to 0), meaning the absence of a dominant alignment, to 1, meaning the presence of a single alignment only in the entire street.

Ratio of building height to street width

Though the relationship between height of buildings and width of streets is commonly an aspect of development control, in many cases it has been applied in a rather simplistic way: for example, the use of a single maximum ratio for the whole city – normally a ratio of 1:1 (building height / street width). In the present methodology, a scale is employed ranging from near to 0, meaning little sense of enclosure (the height of buildings is much less than street width), to more than 1:1 (the height of buildings is greater than street width).

Building use

Of the seven criteria in the methodology, building use (and land use) is probably the most utilized in planning practice and the most debated in the planning literature. In fact, this criterion and the zoning mechanism associated with it (promoting the segregation, or sometimes the integration, of uses) have remained among the most stable instruments of planning over time. In the planning literature (including mainstream planning journals and planning conferences) regulation based on land use is often misunderstood as form-based regulation. Issues relating to use-led regulation are rather different from those concerning form-led regulation.

Built forms and human activities are intricately interrelated but the relationship is not fixed (Kropf, 1997). While forms remain relatively stable over time, uses and activities tend to change more rapidly. A given type of form can accommodate a range of activities. Within urban morphology, building use has for long been a major consideration (Jacobs, 1961; Mashhoodi and Pont, 2011).

Within *morpho* the degree of mixture of residential and non-residential building use is calculated. A scale is employed which ranges from 0, indicating the presence of exclusively residential use, to 0.5, indicating equal amounts of residential and non-residential, to 1, indicating the presence of exclusively non-residential.

An illustration of the assessment procedure

To illustrate the application of *morpho* to an

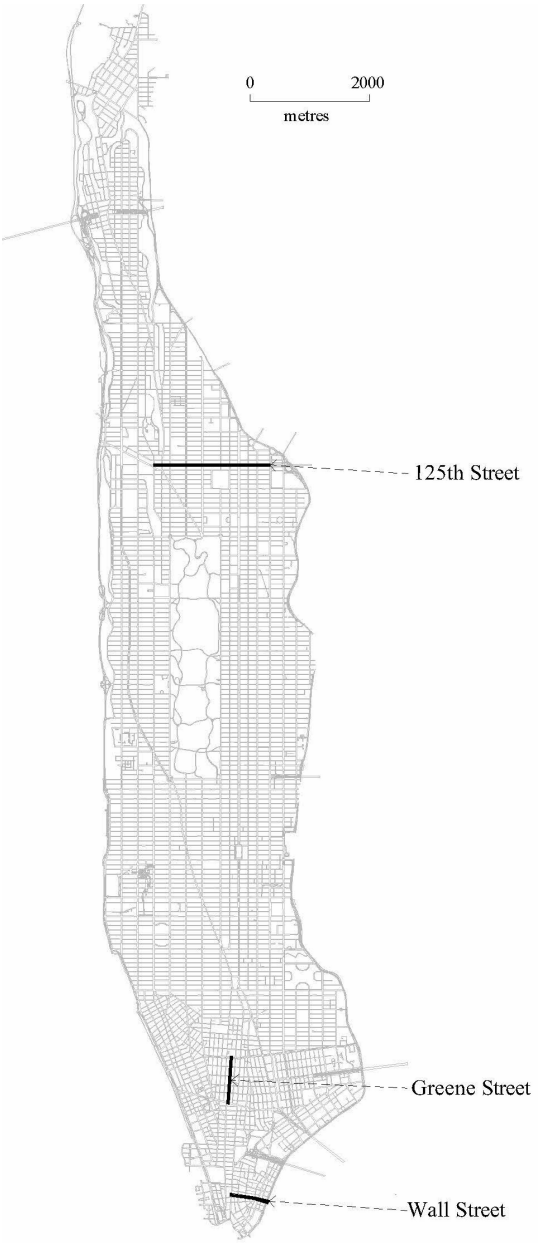

Figure 2. Location of the three streets in Manhattan, New York.

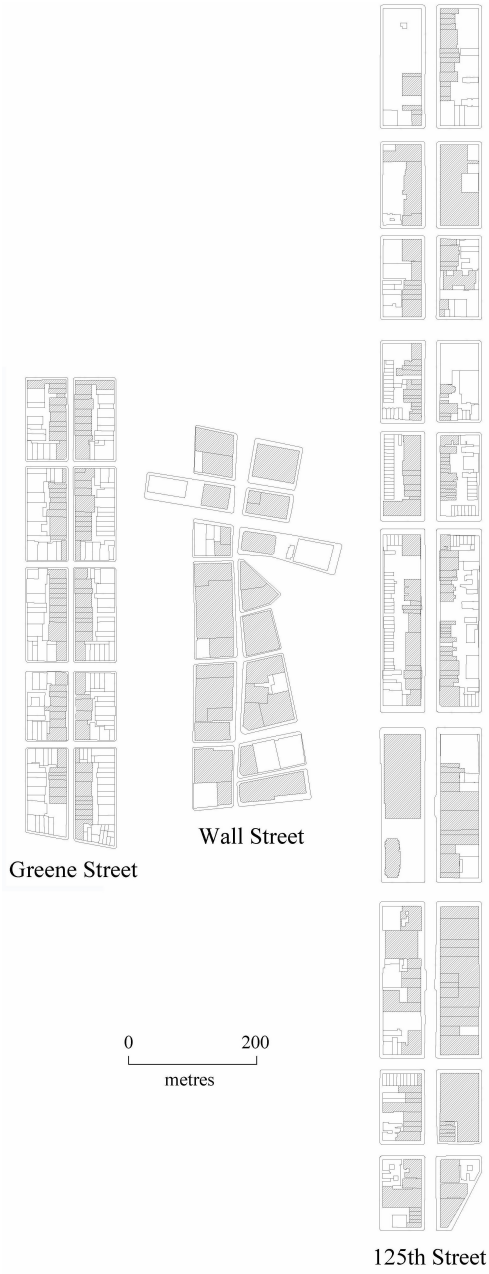

Figure 3. Greene Street, Wall Street and 125th Street: streets, plots and buildings.

international readership it seems appropriate to use an area within a widely-known 'global city'. For this purpose three streets within Manhattan, New York were chosen (Figures 2 and 3). Greene Street, in the historical district of Soho, is widely known for its remarkable architecture: it is 750 m long and 14 m wide, and is bounded by 10 blocks including 93 plots and 92 buildings. In contrast, Wall Street, which takes its name from the seventeenth-century wall of the city and is now the home of the New York Stock Exchange, is 600 m long, has a variable width, and is bounded by 14 blocks including 26 plots and buildings. Finally, the eastern part of 125th Street, also known as Martin Luther King Jr Boulevard, is the main street of the Harlem neighbourhood and includes key buildings in the culture of the city. It is 2000 m long and 30 m wide, and bounded by 20 blocks, including 181 plots and 170 buildings.

Table 1. Accessibility of streets

	Global integration (HH)		Local integration (HH R3)	
Greene Street		2.331		3.539
Wall Street		1.969		3.454
125th Street		3.090		4.367
Manhattan	0.910-3.877	2.299	0.682-5.759	3.332

The integration results were not subject to a normalization process.
Source: Space Syntax Laboratory, UCL – urban database.

Table 2. Age of buildings

	Number of buildings	Number of buildings built before 1940	Per cent
Greene Street (10 blocks)	92	85	92.4
Wall Street (20 blocks)	26	18	69.2
125th Street (14 blocks)	170	134	78.8
New York City	975 000	351 000	36.0

Source: Department of City Planning, New York City

Accessibility of streets

Analysis of the Manhattan axial map (Figure 4 and Table 1), using the Depthmap software, reveals that at the global scale, the most integrated lines of Manhattan are concentrated south of Central Park, between 58th Street and 13th Street. In relation to this core, the most integrated north-south axes are 10th Avenue, 11th Avenue and Broadway, and the most integrated east-west axes are 110th Street / Central Park North and 97th Street (Transverse Road). At the local scale the results are similar. More detail on the syntactical analysis of Manhattan is provided by Hillier and Penn (2004), Ratti (2004a, 2004b), and Sayed *et al*. (2009). For the three selected streets, practically all the integrations are above the average for Manhattan. The only exception is Wall Street when analysed at a global scale.

Accessibility of plots

Greene Street provides an example of the accessibility of plots. In calculating the accessibility of each of the 93 plots to other plots in Manhattan the initial calculation was for streets that are at one topological step. A second calculation was then made for streets that are at two topological steps, and a third for streets that are at three topological steps. All plots accessible at three topological steps were identified. A radius of 500 m was defined, enabling a comparison between the identified accessible plots and the plots contained within that radius. All three streets have the maximum value of 1.0 (or 100 per cent), expressing the high accessibility of their plots in relation to plots in surrounding tissues. However, plots in 125th Street have access to a higher number of plots than those in Greene Street, and to an even higher number than in Wall Street.

Age of buildings

Data on buildings from New York City's Department of City Planning (NYC-DCP) were divided into eight time spans: 1939 or earlier, 1940-59, 1960-69, 1970-79, 1980-89, 1990-94, 1995-98 and 1999-2000. These were then reduced to two periods: up to and including 1939 (the start of the Second World War), and since that date. The three streets all

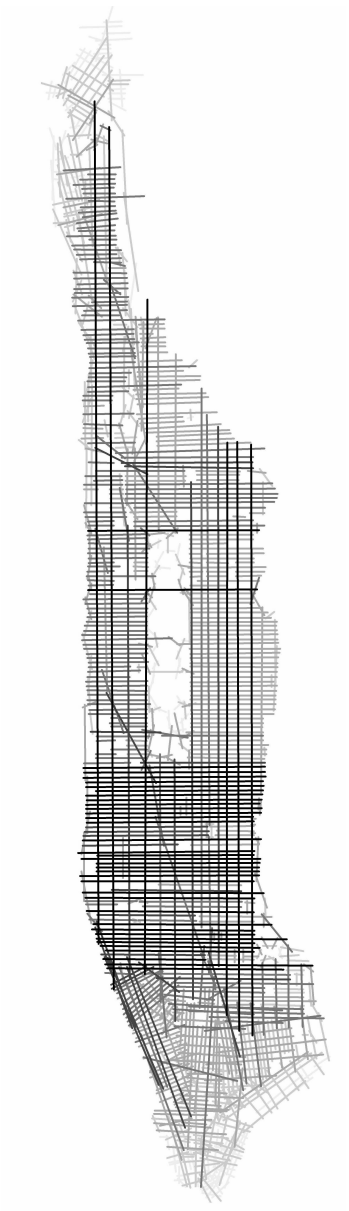

Figure 4. Axial map of Manhattan. Source: Space Syntax Laboratory, UCL – urban database.

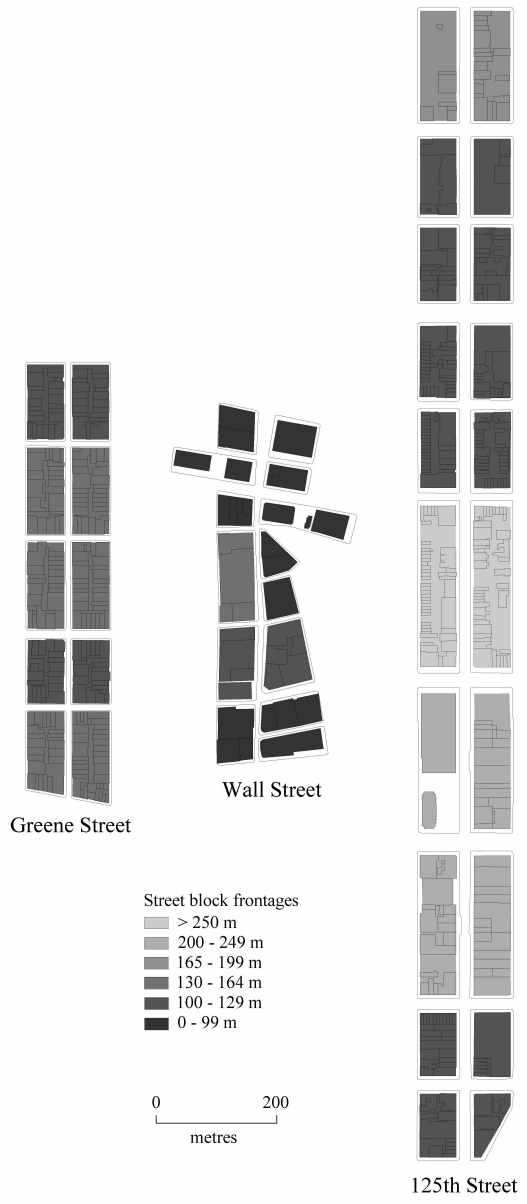

Figure 5. Dimensions of street block frontages.

have higher percentages of buildings built in the first period than the city as a whole (Table 2). Half of the ten blocks in Greene Street are entirely comprised of buildings built before 1940.

Dimensions of street blocks

Wall Street has by far the shortest average frontage width and 125th Street the longest (Table 3 and Figure 5). This suggests that the blocks of Wall Street provide greater scope for interaction, while interaction is less favoured in some blocks in 125th Street.

Alignment of buildings

There is a clearly dominant alignment in Greene Street (Table 4). In contrast, the

Table 3. Dimensions of street block frontages

	Maximum (m)	Minimum (m)	Mean (m)
Greene Street (10 blocks)	144.7	105.3	131.9
Wall Street (20 blocks)	146.4	29.9	66.6
125th Street (14 blocks)	268.8	105.0	162.0
Manhattan			100

Table 4. Alignment of buildings

		Percentage importance of dominant alignment	
		Side 1	Side 2
Green Street		86.7	85.4
Wall Street	Broadway – Pearl Street	55.6	50.0
	Pearl Street – South Street	80.0	75.0
125th Street		68.9	65.4

Table 5. Ratio of building height to street width

	Ratio	Range	Street width (m)
Greene Street	1.1:1	1.0:1 – 1.2:1	14.0
Wall Street	4.8:1	2.3:1 – 7.9:1	19.8
125th Street	0.4:1	0.2:1 – 0.7:1	32.9

Source: Department of City Planning, New York City

Table 6. Land use

	All buildings	Residential	Non-residential	Non-residential as Proportion of total
Greene Street	92	29	63	0.68
MCD 2				0.56
Wall Street	26	5	21	0.81
MCD 1				0.81
125th Street	170	7	163	0.96
MCD 9, 10, 11				0.33
Manhattan				0.48
New York City				0.12

MCD:Manhattan Community District. MCD 1 includes Wall Street, Civic centre, Tribecca, Ellis Island, Liberty Island and Governor's Island. MCD 2 comprises West Village, Greenwich Village, South Village, Noho and Soho. MCD 9 includes Hamilton heights and Manhattanville. MCD 10 comprises Central Harlem. MCD 11 includes East Harlem.
Source: Department of City Planning, New York City

Figure 6. Wall Street, Greene Street, and 125th Street: relationship between building height and street width. Photographs by the author.

Table 7. Results of assessment

	Greene Street	Wall Street	125th Street
Accessibility of streets	–+	–	–+
Accessibility of plots	+	+	+
Age of buildings	+	+	+
Dimensions of street blocks	–+	+	–+
Alignment of buildings	+	–+	–+
Ratio of building height to street width	+	–+	–
Building use	+	+	+

+ High degree of urbanity –+ Medium degree of urbanity – Low degree of urbanity

western part of Wall Street – between Broadway and Pearl Street – departs markedly from a single alignment. In all three streets the two sides of the street are similar.

Ratio of building height to street width

The ratios of building height to street width are significantly different for the three streets (Table 5 and Figure 6). Wall Street, with a ratio of 4.8: 1 is canyon like. In contrast, 125th Street with a ratio of 0.4: 1 is very open, having both a greater street width and much lower buildings. The ratio varies greatly within Wall Street, but hardly at all in Greene Street.

Building use

The three streets have a high percentage of non-residential use (Table 6 and Figure 7). 'Mixed residential and commercial use' (NYC-DCP classification) predominates in Greene Street, which is the street with the most balanced admixture of uses, but 'commercial use' predominates in the other two. The highest percentage of non-residential use is in 125th Street, although its surrounding tissues of Manhattanville and Harlem are almost exclusively residential. Greene Street also has a higher percentage of non-residential use than its surrounding neighbourhoods of Soho, Noho, South Village, Greenwich Village and West Village.

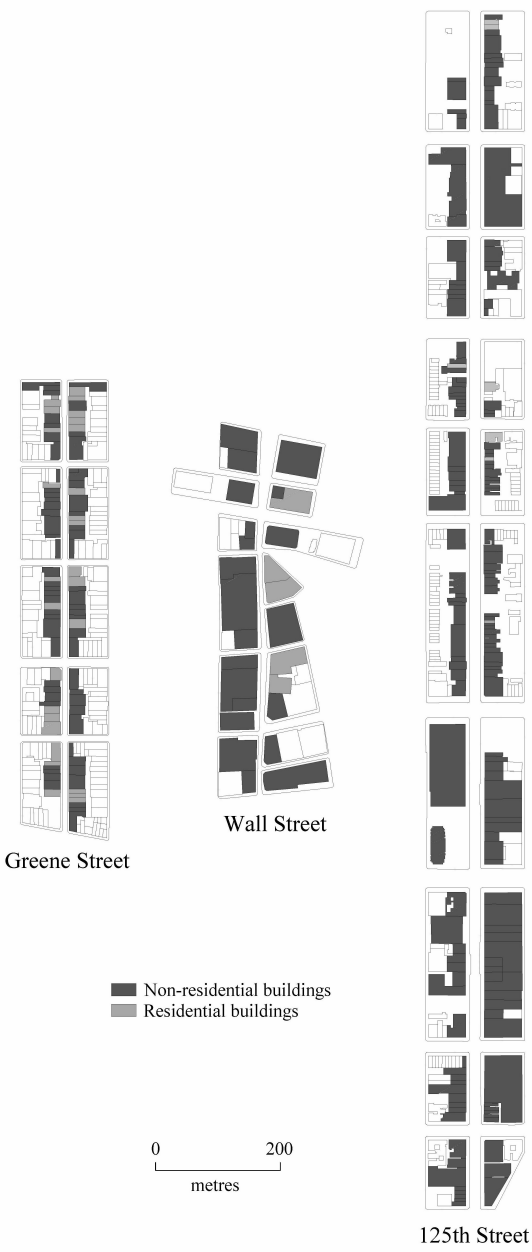

Figure 7. Building use. Source: author's survey, 2011.

Results

Table 7 provides a synthesis of the results. The assessment is underpinned by a concept of urbanity as being something (both social and spatial) that is expressed in the built environment in the main elements of urban form – streets, plots and buildings. In general, a high degree of urbanity should correspond to high degrees of accessibility, density and diversity of these elements.

Bearing in mind this concept of urbanity, Greene Street and the street network of Soho and of Manhattan as a whole perform well. Both Greene Street and the Soho neighbourhood more generally have a high incidence of relatively small plots, accompanied by an admixture of uses. Urban interaction is favoured by the integration of the street network. Greene Street has an 'enclosed' and 'continuous' street section: building heights are very similar to street width, and almost all buildings conform to a dominant alignment. These unifying features are emphasized by the quality of the buildings, mostly built during the last one-third of the nineteenth century.

Wall Street is characterized by a combination of relatively small blocks and large buildings. It is plausible that the street pattern and the block dimensions 'afford' (to use the terminology of Gibson, 1977) a strong interaction between the businesses of Wall Street and a wider area of Lower Manhattan. The character of Wall Street is strongly influenced by its land and building uses, and by 'time' – it is indeed a major street in the urban history of New York. The high ratio of building height to street width is of course especially noteworthy. A weakness of Wall Street's morphological basis is its poor integration in the street network of Manhattan as a whole.

Unlike Wall Street, 125th Street is a structural axis of the Manhattan street network. It contains a very high percentage of non-residential uses: twice as high as that of Manhattan as a whole and three times higher than that of the surrounding neighbourhoods of Manhattanville and Harlem. This is associated with a highly integrated network. Three-quarters of the existing buildings were built before 1940. A problematic aspect of the morphological basis is the street cross-section. The width of the street, 30 m, is emphasized by the presence of vacant plots.

Conclusion

Although current debates on cities often consider the key role of territory and urban structure in the process of urban development, they frequently lack a sound morphological dimension. There are various reasons for this deficiency. Disciplines that should be analysing and designing the city, notably urban planning, have been debating other issues. Furthermore, urban morphologists themselves have been tardy in communicating their work to a wider audience, notably its important contribution to the description, explanation and prescription of contemporary urban form. The lack of a strong morphological basis to much of the current thinking about cities has been a major spur to the construction of the methodology outlined in this paper. *Morpho* needs to be further developed and tested in a variety of environments and at various scales, not least with regard to its application in planning practice.

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References

Caniggia, G. and Maffei, G. (1979) *Composizione Architettonica e Tipologia Edilizia: 1. Lettura dell' Edilizia di Base* (Marsilio, Venezia).

Conzen, M. R. G. (1960) *Alnwick Northumberland: a study in town-plan analysis*, Institute of British Geographers Publication 27 (George Philip, London).

Conzen, M. R. G. (1981) 'The morphology of towns in Britain during the industrial era', in Whitehand, J. W. R. (ed.) *The urban landscape: historical development and management* Institute of British Geographers Special Publication 13 (Academic Press, London).

Duany, A. (2002) 'Introduction to the special issue: the transect', *Journal of Urban Design* 7, 251-60.

Gibson, J. (1977) 'The theory of affordances', in Shaw, R. and Bransford, J. (eds) *Perceiving, acting, and knowing* (Erlbaum, Hillsdale) 67-82.

Hillier, B. (1996) *Space is the machine* (Cambridge University Press, Cambridge).

Hillier, B. (1999) 'Centrality as a process: accounting for attraction inequalities in deformed grids', *Urban Design International* 4, 107-27.

Hillier, B. (2009) 'Spatial sustainability in cities: organic patterns and sustainable forms', in Koch, D., Marcus, L. and Steen, J. (eds) *Proceedings of the 7th International Space Syntax Symposium* (Royal Institute of Technology, Stockholm) 1-20.

Hillier, B. and Hanson, J. (1984) *The social logic of space* (Cambridge University Press, Cambridge).

Hillier, B. and Penn, A. (2004) 'Rejoinder to Carlo Ratti', *Environment and Planning B: Planning and Design* 31, 501-11.

Hillier, B., Turner, A., Yang, T. and Park, H. (2007) 'Metric and topo-geometric properties of urban street networks: some convergences, divergences and new results', in *Proceedings of the 6th International Space Syntax Symposium* (Faculty of Architecture, Istanbul Technical University, Istanbul).

Holanda, F. (2011) *Arquitetura e Urbanidade* (FRBH Edições, Brasilia).

Jacobs, J. (1961) *The death and life of great American cities* (Random House, New York).

Kropf, K. S. (1996) 'Urban tissue and the character of towns', *Urban Design International* 1, 247-63.

Kropf, K. S. (1997) 'Typological zoning', in Petruccioli, A. (ed.) *Typological process and design theory* (Aga Khan Program for Islamic Architecture, Cambridge, MA) 127-40.

Lees, L. (2010) 'Planning urbanity?', *Environment and Planning A* 42, 2302-8.

Maitland, B. (1984) 'Towards a minimal theory of urban structure', in Gosling, D. and Maitland, B. *Concepts of urban design* (Academy Editions, London) 153-5.

Marcus, L. (2010) 'Spatial capital: a proposal for an extension of space syntax into a more general urban morphology', *Journal of Space Syntax* 1, 30-40.

Mashhoodi, B. and Pont, M. B. (2011) 'Studying land-use distribution and mixed-use patterns in relation to density, accessibility and urban form', unpublished paper presented to the *Eighteenth International Seminar on Urban Form*, Montreal, 26-29 August.

Muratori, S. (1959) *Studi per una Operante Storia Urbana di Venezia* (Instituto Poligrafico dello

Stato, Roma).
Ratti, C. (2004a) 'Space syntax: some inconsistencies', *Environment and Planning B: Planning and Design*, 31, 487-99.
Ratti, C. (2004b) 'Rejoinder to Hillier and Penn', *Environment and Planning B: Planning and Design* 31, 513-16.
Sayed, K., Turner, A. and Hanna, S. (2009) 'Cities as emergent models: the morphological logic of Manhattan and Barcelona', in Koch, D., Marcus, L. and Steen, J. (eds) *Proceedings of the 7th International Space Syntax Symposium* (Royal Institute of Technology, Stockholm).
Siksna, A. (1997) 'The effects of block size and form in North American and Australian city centres', *Urban Morphology* 1, 19-33.
Slater, T. R. (1978) 'Family, society and the ornamental villa on the fringes of English country towns', *Journal of Historical Geography* 4, 129-44.
Slater, T. R. (1981) 'The analysis of burgage patterns in medieval towns', *Area* 13, 211-16.
Ståhle, A., Marcus, L. and Karlström, A. (2006) 'Place syntax – geographic accessibility with axial lines in GIS', unpublished paper, School of Architecture, Royal Institute of Technology, Stockholm.
Turner, A. (2007) 'From axial to road-centre lines: a new representation for space syntax and a new model of route choice for transport network analysis', *Environment and Planning B: Planning and Design* 34, 539-55.

A morphological encyclopaedia for the ISUF website?

At the same time that a Working Group led by Ivor Samuels is reviewing additional content for the ISUF website (pp. 40-3, this issue), Michael Conzen, as ISUF President, is urging other substantive changes to the existing website content. In particular it is suggested that a morphological encyclopaedia should be developed, with contributions from all of the research and practice traditions and nationalities represented by ISUF's diverse membership.

Currently the most-visited and most-downloaded website pages are the Glossary and Bibliography. Yet the content originally uploaded is now dated and anglo-centric. Despite an invitation on these web pages to email updates and additional material, only a handful of suggestions have been received over the past 5 years. Moreover, there are other potential contributions that could usefully extend the website, and provide useful and authoritative information to both new users and existing ISUF members.

This could form a 'morphopaedia' (Michael Conzen's working title): this could and should be a first point of call for those interested in urban morphology – the Wikipedia equivalent. However, as ISUF needs *authoritative* content this would not be a true 'wiki' resource but content would be mediated by an editorial team. Those wishing to contribute to discussions on developing this resource, or to contribute new material, are invited to contact Peter Larkham.

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Meeting of the Council of ISUF

The next meeting of the Council of ISUF will take place during the Conference of ISUF to be held in Brisbane, Australia, 17 to 20 July 2013. Any matters that members of ISUF wish to bring to the attention of the Secretary-General of ISUF, Dr Kai Gu, should be communicated to him at the School of Architecture and Planning, University of Auckland, Private Bag 92019, Auckland, New Zealand (e-mail: k.gu@auckland.ac.nz) by 1 June 2013.