

Urban morphological research and planning practice: a Portuguese assessment

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Abstract. *This paper assesses the 2006 Plano Director Municipal of Porto, Portugal as a contribution to the ISUF Task Force on Research and Practice in Urban Morphology. It focuses on the application of the urban tissue concept and is in three parts: i) an assessment of the plan and its typological approach; ii) an assessment of the results on the ground; and iii) an assessment of the planning process, developed under the framework of the plan.*

Keywords: urban morphological research, planning practice, assessment, plans, urban tissue

Over the last 3 years the relationship between urban morphological research and planning practice has attracted renewed interest internationally. A theme issue of *Built Environment* has focused on 'Urban morphology and design' (see, for example, Çalışkan and Marshall, 2011) and the last volume of *Urban Morphology* included a considerable number of viewpoints on this theme (see, for example, Ding, 2013; Hall, 2013; Scheer, 2013).

Looked at more broadly, this is a theme with a long tradition within the different approaches to the study of urban form. Within the process typological approach, one of the most remarkable cases was developed by Muratori at the end of the 1950s. In 1959, Muratori applied the results from his research on the urban history of Venice (particularly on the three typical systems of tissues that

characterized the Venetian urban fabric over time) in the design competition for the *Barene di San Giuliano* – see Muratori (1959) for his seminal book on the Italian city and Cataldi (1998) and Maretto (2013) for the design process.

Within the historico-geographical approach three concepts have been extensively explored. The concept of the morphological region has been successfully applied in England, namely in a plan for Barnt Green (Whitehand, 2009) and in the residential character study of Stratford-upon-Avon (Larkham *et al.*, 2005). Based on similar principles, the concept of urban tissue has been applied in a number of French local plans – including St. Gervais (Samuels, 1999) and Rennes – and in design guides and supplementary planning guidance for some English towns, such as Stratford-

upon-Avon and Rotherham (Samuels, 2008). Another concept that has been explored in practice is that of the fringe belt – Kropf (2001) describes its application in the design guide of Stratford-on-Avon District. Hall (2008) presents the contribution of urban morphology to day-to-day control of development in the English town of Chelmsford, and to the numerous incremental decisions that shape the form of urban areas. From space syntax, concepts such as spatial configuration and methods such as axial analysis and segment analysis have been used in various contexts, including planning documents and urban design projects.

Despite the existence of this relationship between theory and practice in the different approaches to the study of urban form, the effective use of morphological theories, concepts and methods in planning practice remains limited. A more effective understanding of how and where urban morphology is being used successfully is needed. An interesting case of assessment is that undertaken in Asnières-sur-Oise. Some years after preparing the *Plan d'Occupation des Sols* (POS) for Asnières-sur-Oise (Samuels, 1993), Samuels and Pattacini (1997) went back to the French town to assess the implementation of the plan, drawing on a number of interviews with the principal actors involved in the process. The assessment addressed a number of key issues, such as the construction of political consensus for the morphological approach, the availability of adequately trained staff for plan preparation and implementation, and the feasibility of controlling design detail.

The ISUF Task Force on Research and Practice in Urban Morphology

At the end of 2011, the President of ISUF launched a Task Force to report on ways in which ISUF could build better bridges between researchers in urban morphology and practitioners. The Task Force promoted discussion of ways in which ISUF could provide leadership and it prepared an interim report with concrete suggestions for action

(Samuels, 2013). That report contained four main proposals: i) the publication of an ISUF manifesto; ii) the recording and publishing of relevant coverage of urban morphology in higher education curricula; iii) the production of a good practice catalogue of how and where urban morphology is being used successfully; and finally, iv) the creation of an urban morphology manual. In early 2013, the Council of ISUF started promoting the development of assessments that would make a direct contribution to the third recommendation of the Task Force: namely, that a good practice catalogue should be prepared that set out 'how, where and why urban morphology is being used successfully'.

This paper describes an assessment of the 2006 *Plano Director Municipal* for Porto. The selection of Porto reflects the well articulated typological approach developed in this plan. The assessment is in three parts: i) the contents of the plan, with a particular focus on its typological approach; ii) the results 'on the ground'; and iii) the planning process (including the involvement of different agents) developed under the framework of the plan. Benefiting from a first appraisal of the plan carried out soon after its ratification in 2006 (Oliveira, 2006), this study traces the implementation of the plan over the last 6 years. It focuses on a sample of 50 building permits, 34 of which have already been implemented, and is supported by 20 interviews of politicians and practitioners from the local authority, and the architects and developers of a number of the projects.

Assessing the plan

The *Plano Director Municipal* (PDM) is the main instrument of the Portuguese planning system. It establishes the model for the spatial structure of the municipal area and defines the strategy for local development. The plan is composed of a regulatory code, maps identifying the different land uses, urban systems, and operative units for planning and management, and a further map depicting local rights of way and planning restrictions. These

are complemented by a report and a number of planning studies which are not legally binding. The preparation of the plan is undertaken by the local authority. After its approval by the municipal assembly it has to be ratified by Central Government.

Porto is the second city of Portugal and the centre of a metropolitan area with 1 700 000 inhabitants. The city recorded its maximum population (327 000) at the beginning of the 1980s. It had 237 000 inhabitants in 2011. Population decline was mainly due to the relocation of population within the metropolitan area of Porto, particularly to the surrounding cities of Maia, Valongo, Matosinhos and Vila Nova de Gaia which, in the period between 2001 and 2011, had population increases of between 4.7 and 12.6 per cent.

The preparation of the PDM of Porto

After recognizing the need for the introduction of changes to the PDM of 1993, Porto City Council decided to suspend the plan and prepare instead a statement of temporary measures that were intended to cover the period of preparation of the new plan. The studies started under the supervision of an external planning team which carried out all the different stages of the planning process, including the presentation of a first version of the plan to the City Council. In the meantime, a change in the presidency of the Local Council meant a change in planning policies that had guided the preparation of the plan, giving rise to delays and the presentation of several versions of the final proposal, which was now the responsibility of the Local Planning Department. The plan was approved by the City Council in 2005 and ratified by the Central Government in January 2006.

One of the main goals of the plan is to maintain the character and urban identity of Porto. Other strategic goals include the rehabilitation of public space and the built environment, the rationalization of transport systems (although the main transport enterprises, including the light rail, were not involved in plan preparation), the reduction of

existing social and territorial imbalances between the eastern and western parts of the city, and the rehabilitation of historical quarters and the central area.

The four main components of the plan – objectives, land use, urban infrastructure and systems, and mechanisms of plan implementation – accorded well with the fundamental problems of the city. Two problems deserved particular attention in the plan – the piecemeal destruction of built forms and built heritage and the steady degradation of environmental quality (the canalization of streams, the high levels of pollution, the increasing amount of impermeable land, and the chronic shortage of open green areas).

Overall, the linkages between the different parts of the plan are quite successful, but the linkage between the objectives and the mechanisms of plan implementation is not entirely satisfactory. One of the reasons for this could be that the objectives correspond to the most general level, and the mechanisms to the most specific level of plan proposals. An analysis of the impact in relation to each objective shows that the different parts of the plan have the highest impact in the case of those objectives concerned with maintenance of the identity of Porto and the rehabilitation of public space and the built environment.

Public participation in plan making had occurred during three periods between 2003 and 2005. The analysis of this process revealed three main findings: i) the number of comments was relatively small (632 written comments); ii) the quality of the comments was quite varied, although it should be noted that 14 per cent of these have been accepted and incorporated into the plan; and iii) there was a reasonable stimulus to public participation by the Local Authority.

Tissues

After the definition of the main goals of the PDM, a typo-morphological analysis was carried out to identify the distinct tissues constituting the city of Porto. Ten tissues were identified, and their main characteristics form

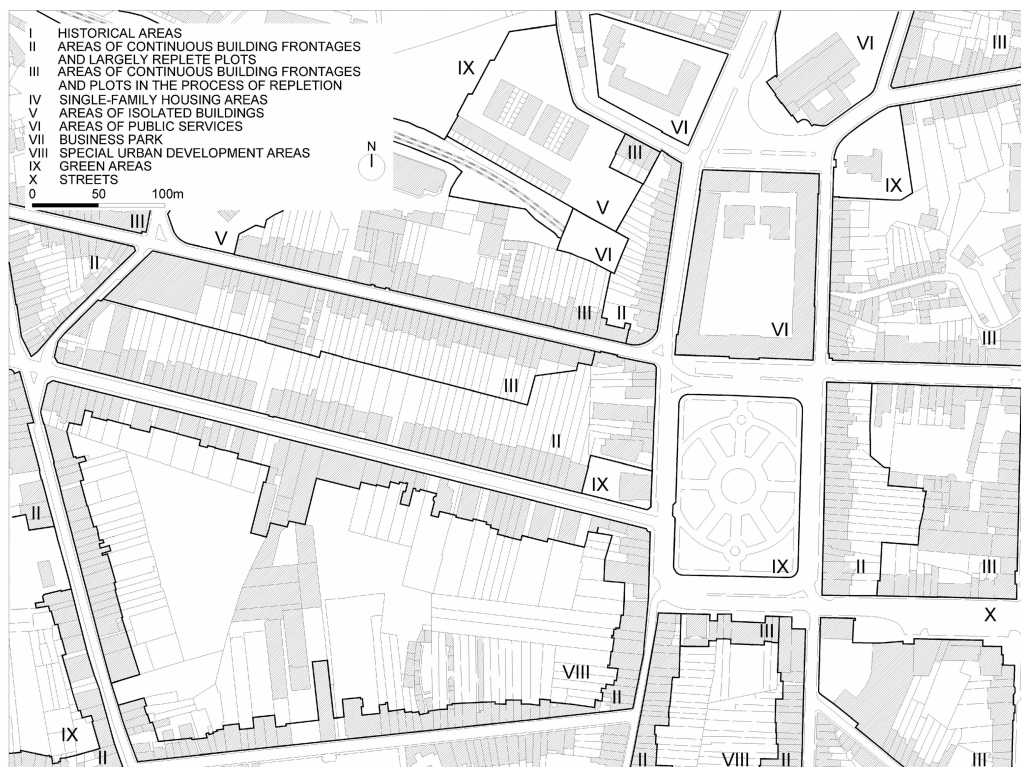


Figure 1. The tissues of Porto.

the basis for the different regulations (Figure 1). Many of these tissues are similar to morphological regions in Conzenian terminology (Conzen, 1960).

‘Tissue I: Historical Areas’, of medieval origin, corresponds to the most ancient urban fabric of Porto (Figure 2). The streets and plot series of this urban tissue are very irregular. There is a high building density. Buildings are narrow, normally three storeys high, with some as high as five storeys. Although buildings are always positioned at the front of the plot, building coverage is very high. The PDM requires the maintenance of streets, plot series and buildings. If the rehabilitation of an existing building proves to be impossible, the new building should maintain the height, the alignment, the type of roof, the façade design, and the materials of the existing buildings of its block. Mixed uses are allowed in this zone and in the next two zones.

‘Tissue II: Areas of Continuous Building Frontages and Largely Replete Plots’

comprises a part of the city that was partly built according to plans prepared in the second half of the eighteenth century, and includes buildings dating from then until the beginning of the twentieth century. In this zone, streets and blocks are regular; the plot is normally a rectangle with an average width of 6 m and a depth that can attain 100 m. Most of the blocks of this tissue have a continuous commercial use on the ground floor. The new buildings should maintain the heights and alignments (front and rear) of the adjoining buildings, and the existing relationship with the public space. The interior of the blocks should consist of private green spaces.

‘Tissue III: Areas of Continuous Building Frontages and Plots in the Process of Repletion’ includes buildings dating from the eighteenth century to the second half of the twentieth century. Rebuilding in the twentieth century, sometimes on a single plot, has created large disparities within some plot series, because of the excessive height of the

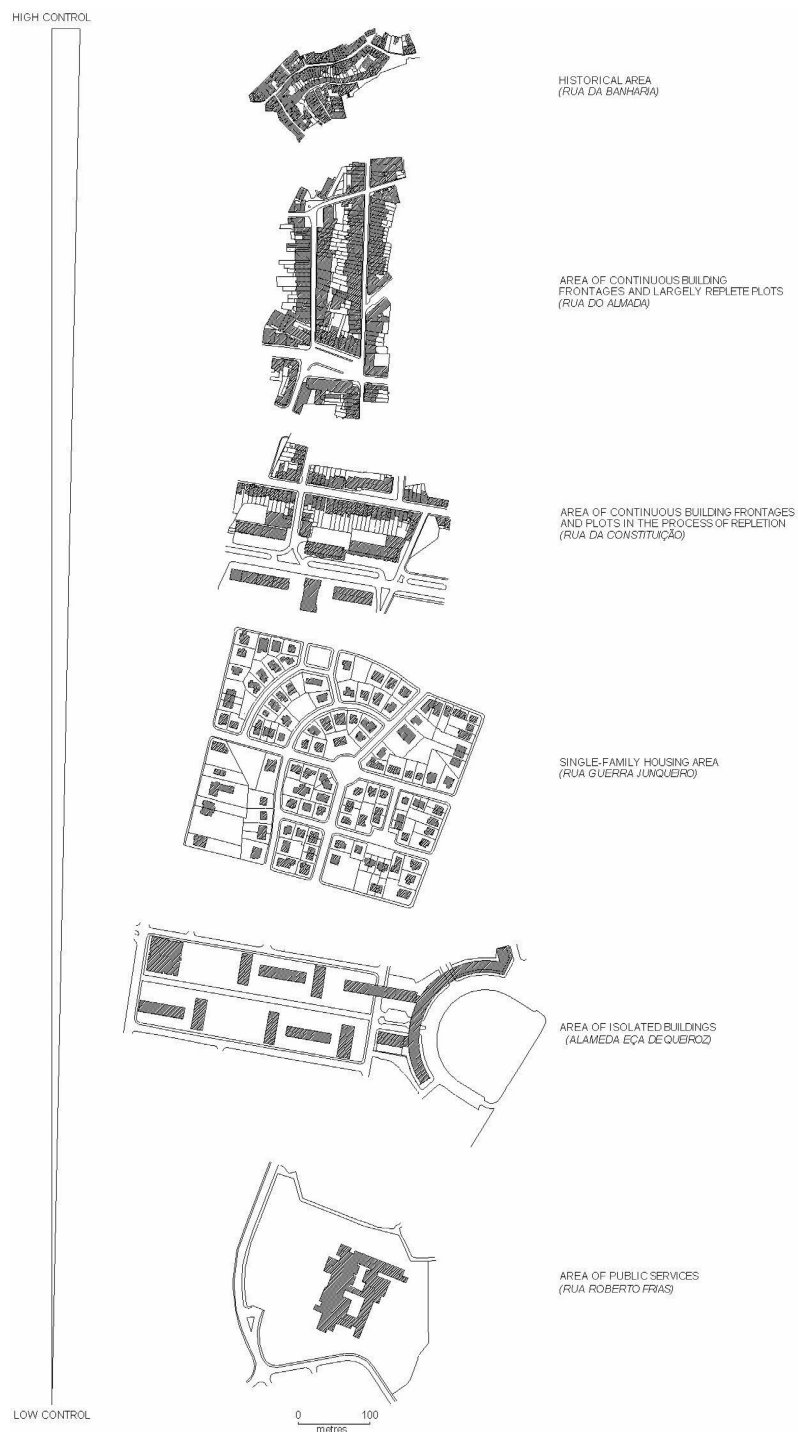


Figure 2. Variations in control of design detail in different tissues.

new buildings and their poor design (for example, excessive diversity in materials and building elements, such as windows). In the core areas, commercial uses tend to be retained on the ground floor, but away from these

areas, the ground floor of many buildings is used for warehousing and there have been increases in the coverage of plots. Unlike in the previous tissues, some new streets are proposed in the PDM. The other main pre-

scriptions are that new buildings should follow existing alignments (front and rear) of adjoining buildings, their height should not exceed the width of the street, building coverage should be less than 70 per cent of plot area, and interiors of street blocks should consist of private green space.

'Tissue IV: Single-Family Housing Areas' consists of two different types of housing development, with different dimensions, built in different parts of the city. Both types have streets with a regular pattern, plots of various sizes, and detached or semi-detached houses of two or three storeys, with gardens or patios. The main prescriptions in the plan are for the maintenance of the dimensions of the plot series, maintenance of the main alignments and heights of surrounding buildings, and a maximum building coverage of 60 per cent of the plot area.

'Tissue V: Areas of Isolated Buildings', based on a Modernist model, also consists of two different types of housing – working-class dwellings and private houses of a higher standard. Plot ratio was the main criterion used to control this type of development in Porto. In almost all cases this has led to the production of an undefined public space. The main prescriptions for the buildings are that building coverage should be less than 65 per cent of plot area, the main alignments of the surrounding buildings should be maintained, and a plot ratio of 0.8:1 (building area/plot area) should be employed.

'Tissue VI: Areas of Public Services' includes large plots that contain, or are proposed to contain, public buildings. Other land uses are allowed under certain conditions. For new buildings, building coverage should be less than 75 per cent of plot area.

'Tissue VII: Special Urban Development Areas' consists of areas of residential expansion or urban restructuring. These areas correspond to the Operative Units for Planning and Management (OUPM). Here the greatest changes are proposed or expected. Lower order plans should be prepared that provide more detailed guidance. However, an analysis of Porto's planning history over recent decades

shows that the production of such types of plans has been very rare.

'Tissue VIII: Business Park' comprises an industrial area planned in the 1940s. The strategic metropolitan location of this tissue led to the formulation of an ambitious project: to transform this industrial area into a business park. There are already business enterprises in this zone intermixed with industrial uses. The main prescription for the new buildings is that a plot ratio of 0.8:1 should be established. A lower order plan should be prepared providing more detailed guidance.

The nature of 'Tissue IX: Green Areas' and 'Tissue X: Transport Areas and Streets' does not require amplification.

Figure 2 shows how the control of design detail varies: from high control (for the most important elements of urban form) in the 'Historical Areas' and 'Areas of Continuous Building Frontages and Largely Replete Plots' to low control in the 'Areas of Isolated Buildings' and 'Areas of Public Services'.

Assessing the results 'on the ground'

This assessment benefited from a first appraisal of the plan immediately after its ratification in 2006. That appraisal included the analysis of 50 building applications relating to seven tissues (the Business Park, Green Areas and Streets were excluded). Thirty-four of these applications (including 28 new building developments and the reconstruction of six old buildings) had already been implemented by 2013, but 16 had not been implemented (Table 1 and Figure 3). This might be explained by the severe financial crisis that the country has been facing over recent years. Each of the erected buildings was analysed according to an assessment framework structured in three parts: i) general data on the building development; ii) conformance to the plan guidance (that is, the regulations for each tissue); and finally iii) comparison between the building development and existing developments in the same street.

Table 1. Sample of permits/buildings

Tissue	% of city	Permits	Construction of new buildings	Reconstruction of old buildings	Not built
I. Historical Areas	1.7	6	2	3	1
II. Areas of Continuous Building Frontages and Largely Replete Plots	3.5	5	1	1	3
III. Areas of Continuous Building Frontages and Plots in the Process of Repletion	17.5	22	13	2	7
IV. Single-Family Housing Areas	10.9	10	8	0	2
V. Areas of Isolated Buildings	13.5	3	1	0	2
VI. Areas of Public Services	14.2	3	2	0	1
VII. Special Urban Development Areas	3.4	1	1	0	0
VIII. Business Park	1.9	0	0	0	0
IX. Green Areas	14	—	—	—	—
X. Transport Areas and Streets	19.4	—	—	—	—
Total	100	50	28	6	16

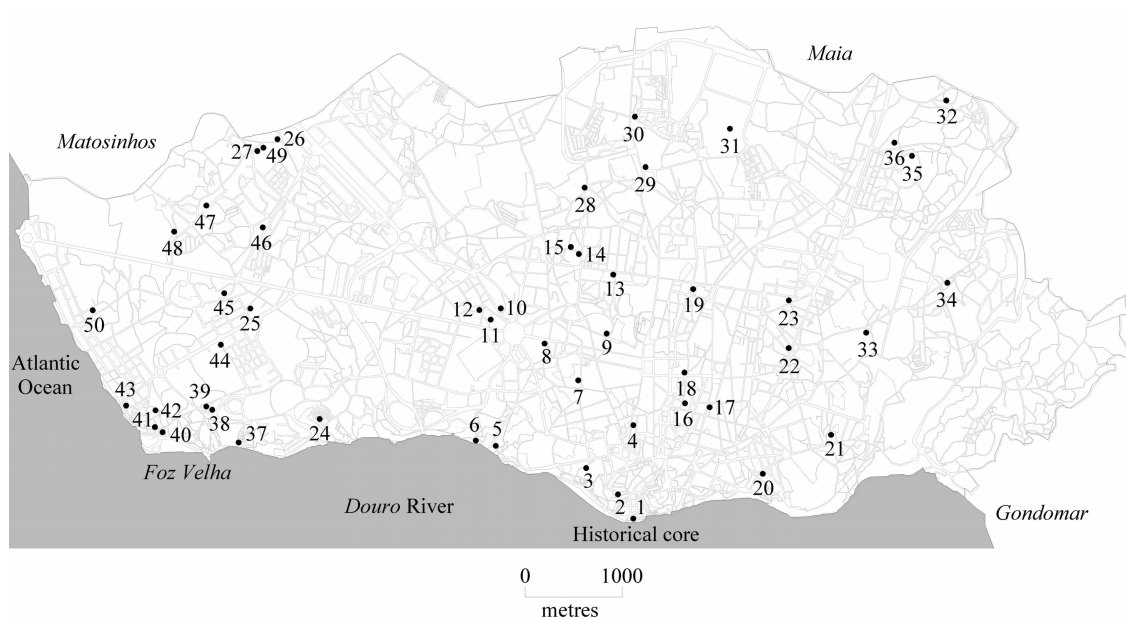
**Figure 3. Location of sample permits/buildings.**



Figure 4. Historical areas. (a) Reconstruction of an old building (1 Rua da Reboleira). (b) Reconstruction of an old building (2 Rua das Taipas). (c) Construction of a new building in conformity with the guidance of the plan (42 Rua da Trinitária). (d) An existing building in Rua da Trinitária designed in accord with the previous plan.

Tissue I: Historical Areas

The five sample building permits in Historical Areas that have so far been implemented include the construction of two new buildings, in the so-called *Foz Velha*, and the reconstruction of three old buildings in the historical core of the city. Four of these five buildings (see, for example, Figures 4a and 4b) follow the main guidance of the plan. But one does not (Figure 4c): while maintaining the height and alignment of existing buildings in its block, it does not have the roof type, façade design and materials of existing buildings. It thus fails to conform to three fundamental aspects of the regulations for this area.

The four building developments that do

conform to the plan are problematic in another respect. While the façades of these buildings have on the whole been reconstructed to high quality standards, their interiors have been totally replaced by designs that have no respect for the traditional house types of Porto. In one case (Figure 5) the existing staircase has been replaced by a new one and a lift. Because of the new distribution of rooms and interior walls, the central window on each floor on the northern façade has been removed. The new arrangement of the spaces includes a store, an office and seven small dwellings. Figure 6 illustrates a different internal change. The building façades and main structural elements of the building – the type of roof and the stairs – are maintained, but the distribution of rooms

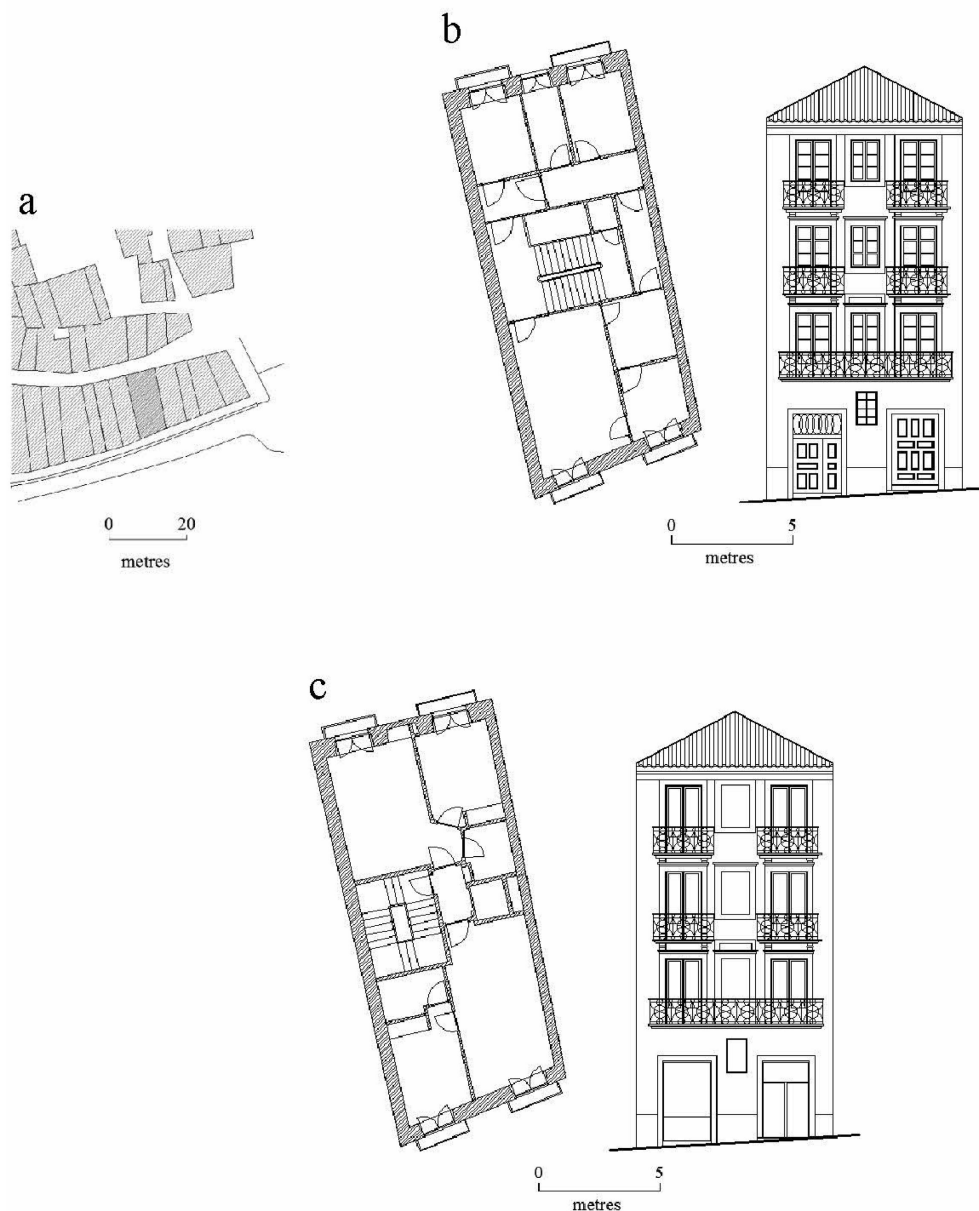


Figure 5. Transformation of internal structure and façade. (a) Location plan. (b) Floor plan and northern façade before transformation. (c) Floor plan and northern façade after transformation.

and spaces within the building is largely new. The new arrangement includes a store, two offices and three small dwellings (including a duplex dwelling with a new staircase).

The debate on façadism illustrates the complexity of a full adoption of urban morphological principles in planning practice (Barke, 2013). Should urban morphologists be content with the recognition of the importance of

conserving the traditional frontage or should they insist that conservation plans recognize that buildings in their entirety are inseparable from their history and settings? Furthermore, it could be argued that in addition to architectural, typological and building/plot relationships, there are other aspects of urban morphology with significant claims to recognition in the planning process (Barke, 2013).

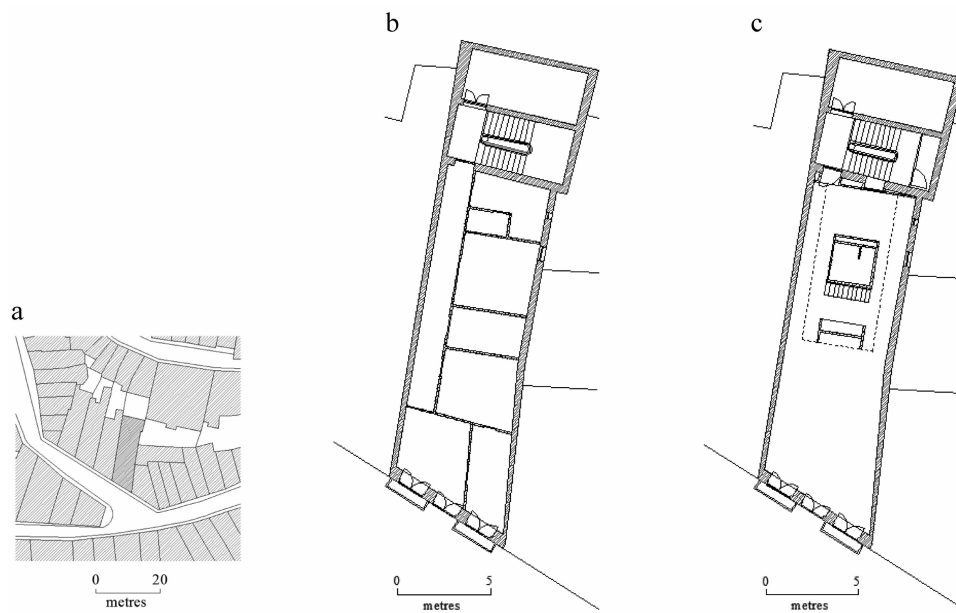


Figure 6. Floor-plan transformation. (a) Location plan. (b) Floor plan before transformation. (c) Floor plan after transformation.

Finally, a comparison between these developments and other existing buildings in the same street erected according to the previous plan reveals a significant step towards maintenance of the character and identity of Porto. Figure 4d shows a building of eight storeys erected in conformity with the plot ratio of 5.0:1 specified in the previous plan.

Tissue II: Areas of Continuous Building Frontages and Largely Replete Plots

Three of the building permits in the Tissue II sample have not yet been implemented. The reconstruction of, and addition to, an old building in *Foz Velha* and the construction of a new building in the historical core of the city are included in the sample (Figures 7a and 7b). The two buildings conform to the plan regulations for this type of urban tissue. They accord with the heights and alignments of adjoining buildings and maintain the existing relationship with public space, including commercial uses. However, an analysis of the new building (Figure 7b) raises the issue of the quality of architectural design. Although the

building is an attempt to adapt to the architectural style of this type of tissue (for example, the design of the windows), the outcome is unsatisfactory (excessive simplification and lack of consideration of proportions in the design of different building elements). Nevertheless, a comparison of the building with other buildings erected under the guidance of the previous plan makes evident the advantages of the new approach. Figure 7c shows one of these buildings which is four storeys high, erected on a larger plot that has been created by the amalgamation of two plots.

Tissue III: Areas of Continuous Building Frontages and Plots in the Process of Repletion

Almost one-fifth of the municipal area is comprised of this tissue. Fifteen of the 22 sample projects have so far been built. These include the construction of 13 new buildings and the reconstruction of two old ones (Figure 8). Almost all buildings conform to the PDM. In the case of the two exceptions (see, for example, Figure 8b), the height of the new



Figure 7. Areas of Continuous Building Frontages and Largely Replete Plots. (a) Reconstruction of, and additions to, an old building (43 Rua Senhora da Luz). (b) Construction of a new building (16 Rua do Bonjardim). (c) An existing building in Rua do Bonjardim developed under the previous plan.



Figure 8. Areas of Continuous Building Frontages and Plots in the Process of Repletion. (a) Reconstruction of an old building (12 Rua do Padre Alexandre). (b) New building erected in accordance with the plan (11 Avenida 5 de Outubro). (c) An existing building in Rua do Padre Alexandre developed under the previous plan. (d) New building erected in accordance with the plan (19 Rua Faria Guimarães).



Figure 9. Single-Family Housing Areas: construction of a new building erected in accordance with the plan (44 Rua João de Barros).



Figure 10. Areas of Isolated Buildings: construction of a new building (5 Rua D. Pedro V).

building exceeds the width of the street. One of these is covered by an exception included in the plan regulations (the so-called *Actos Válidos* that preserves rights acquired before the plan came into force) but the other is not.

Figure 8c shows a building erected on a large plot (no plot amalgamation preceded its construction), in accordance with the previous plan. In terms of height and architectural style, there is no respect for the seven adjoining houses. Under the framework of the new plan the construction of this building would not be possible.

The new building in Figure 8d conforms to the plan, but raises another important issue. In many parts of Porto plots are rectangular, with an average width of 6 m and a depth of up to 100 m. In the second half of the twentieth century, a number of houses within these plots were demolished and replaced by apartment buildings on the same plots. In many cases the replacements were narrow buildings of two apartments per floor, and the difficulties of designing an apartment of an acceptable standard in these conditions are manifest.

Tissue IV: Single-Family Housing Areas

Eight of the 10 sample building permits in these areas have so far been implemented. The developments are on the whole consistent with the plan, in their maintenance of the frontage

of the plot series, conformity with the main alignments and heights of surrounding buildings, and respect for a maximum building coverage of 60 per cent of the plot area. In two cases, however, the local authority did not insist on conformity with the heights of surrounding buildings.

Figure 9 shows a new building that conforms to the plan regulations for this type of urban tissue. One of the articles of the regulatory code specifies that all houses should have direct access to the public street. However, one of the storeys – the basement or the ground level – can be common to all houses. In practice this article has led to the creation of closed condominiums or gated communities in many parts of the city. This is one such case. The building development maintains the frontage of the plot series (although with a blind wall) and the main alignments and heights of surrounding buildings. But in building plan and volume it is quite different from surrounding buildings. The fact that the promoter of this development offered land to the local authority for the opening of a new street linking two important streets in this part of the city may have led to a more flexible attitude by the local authority.

Tissue V: Areas of Isolated Buildings

Only one of the three sample building permits



Figure 11. Areas of Public Services. (a) New building at 10 Avenida da Boavista. (b) New building at 8 Avenida da Boavista.



Figure 12. Special Urban Development Areas: construction of a new building at 28 Rua de Monsanto.

in Areas of Isolated Buildings has so far been implemented (Figure 10). Covered by the exceptional regime of the *Actos Válidos*, the building does not conform to the plan in terms of building density – although the plan specified a maximum plot ratio of 0.8:1, this building has a plot ratio of 1.6:1. The main problem, however, is not this increase but the fact that this building and the corresponding tissue is largely regulated by an abstract index.

Tissue VI: Areas of Public Services

The fundamental prescription for this tissue is that building coverage should be less than 75 per cent of plot area. Figures 11a and 11b

show the two sample developments that were erected under this plan framework. Both conform to the plan regulations.

Tissue VII: Special Urban Development Areas

The sample includes one building permit in the Special Urban Development Areas (Figure 12). The plan is generally quite permissive in the regulation of these areas. It took 9 years for the local authority to grant the permit for this building. Ten storeys in height, it was erected on a former agricultural plot and was markedly out of character with the neighbouring single-family houses of one or two floors and apartment buildings of three to five storeys. It is inconsistent with the implicit strategy for this OUPM, yet it conforms to the plan regulations.

4. Assessing the planning process

This section provides a more ‘qualitative’ view of plan implementation and development control. It draws not only on quantitative data but also on a set of 20 interviews, carried out in 2006 at the beginning of the PDM’s implementation and in 2013, with politicians (four interviews), officials of the local authority (eight), architects (four) and developers (four) of some of the building developments included in the sample.

Local politicians

The preparation of the PDM began in 2000 during a socialist administration. At the end of 2001, a conservative administration, still in power, was elected. Yet, this political change seems to have had minimal effect: though it delayed the preparation and approval of the PDM, the typological approach proposed was not questioned. In fact, wider built heritage concerns were introduced and development control in some tissues has become stricter. Nevertheless, over the last 12 years the political support (through political discourse and programmes) of planning practice was not constant. Moreover, it can be said that the potential of this plan, in urban form matters, is not fully understood by the local politicians. Arguably the complexity of the typological approach makes it difficult to communicate in an effective way to non-experts. It could also be that the local politicians are not fully committed to achieving the main goal of the plan – the maintenance of the character and the urban identity of Porto.

Local authority officials

The PDM was prepared by a planning team including, over the 5 years of preparation, 24 people. The work was coordinated by three external consultants with lengthy experience of planning in Portugal: Manuel Fernandes de Sá, responsible for the design of the typological approach, José António Lameiras, responsible for the drafting of the regulations (a key element for the success of this innovative approach), and António Babo. The team was composed of six architects, six engineers and one planner. These thirteen professional graduates were complemented by three draftsmen, two trainees and four secretaries.

Many practitioners and academics argue about the difficulties of developing morphological approaches in planning practice. The Porto plan shows that, despite these difficulties, it is possible to develop such an approach. One of the crucial aspects of the development of this approach was the involve-

ment of adequately-trained staff, particularly architects, who were trained in universities which, despite the focus on exceptional buildings (see Oliveira, 2012) also developed their capacity to undertake systematic and extensive morphological analysis.

In 2006, when the implementation of the plan was started, the departments of planning and development control in the *Direcção Municipal de Urbanismo* comprised 167 staff of whom 34 per cent were graduate professionals. The disciplinary background of the different professionals in 2006 was as follows: architecture (47.4 per cent); engineering (39.0 per cent); law and management (3.4 per cent each); and economy, history, sociology and planning (1.7 per cent each). One of the negative aspects of this process (not unusual in Portugal) is that the team that prepared the plan was not, with few exceptions, the team that has been implementing it over the last 6 years.

Analysis of the 50 planning applications, and 20 interviews, shows that – despite some exceptions – the local authority officers were able to cope with the level of complexity implied by the urban morphological controls.

Architects

In Portugal, as in many other countries, architects developing projects for private or public promoters tend to look at planning practice and development control with suspicion. While Porto's architects are not an exception, most of those interviewed agreed that this plan is a step forward towards a type of regulation that is more sensitive to existing built forms. In this sense, it can be said that the Porto plan is supported by both architects and local authority officers.

Developers

In general, in Portugal the scale of operations of developers and promoters is smaller than in most European countries. The interviewees included developers of various types and with

different strategies and goals. For most of the developers interviewed the advantages of this plan in relation to the earlier plan were not clear. As in the case of local politicians the potential of the plan with regard to urban form was not fully understood by the developers. The main reasons expressed for having doubts about the plan were an overall reduction of maximum building volume in the different parts of the city, a more complex type of regulation (as opposed to the 'simplicity' of indexes and ratios), and a higher degree of discretion exercised by the local authority officers.

Conclusions

The assessment of the plan, the planning process and the 'results on the ground' made evident the contribution of the plan, and its typological approach, to maintaining the character and identity of Porto. However, the full potential of the plan is not fully understood by some key actors, namely politicians and promoters. Efforts should be made to communicate the complex contents of the plan in a more effective way. Perhaps the use of graphic illustrations could be explored. Currently, the plan does not present illustrations of what can and cannot be built. A PDM comprises first, a number of elements that are legally binding, and secondly, other elements that are not legally binding. The content of the first is established by the Portuguese planning system and cannot be changed or include drawings illustrating the range of acceptable types of plots, buildings or architectural features. However, the content of the second is not established in this way, so the incorporation of drawings in these documents is possible. More effective communication could contribute to a greater degree of agreement by all concerned and the production of even better results.

Despite the strengths of this approach, which is unique in the Portuguese context (Oliveira and Sousa, 2012), there is room for improvement. The Portuguese planning system establishes that a plan should be

revised 10 years after ratification. Over this period, the monitoring of the transformation of the different urban tissues is crucial as it provides the basis for new rules for transformation. However, the introduction of changes should conform to the design specifications in the plan.

The appraisal of the regulations for the Historical Areas is, in general, satisfactory. Nevertheless, in one case the officers departed from the plan by failing to insist that the type of roof, façade design and materials were consistent with those of existing buildings. The prescription for maintaining these elements should be reinforced in the regulatory code. However, there is a further problem that needs to be addressed. While the façades of these buildings are being reconstructed their interiors are being demolished and replaced by new ones with no respect for the traditional house types of Porto. If there is concern only with maintaining façades, it would seem that an urban morphological approach is not very different from an approach that treats the urban scene as a sort of stage set.

Appraisal of the regulations for the second and third tissue types is generally favourable. However, there is a need for greater control of architectural design. In the case of the Single-Family Housing Areas, closed condominiums have been constructed in certain cases. A regulation is needed that requires individual dwellings to open to the public street: a requirement supported by other morphological approaches, notably space syntax.

In the case of tissues V, VI and VII the regulations have in some cases compromised the character and the urban identity of Porto. In practice, the regulation of these tissues has been mainly based on plot ratios and not on morphological criteria. At least in the Areas of Isolated Buildings and the Areas of Public Services there is the scope for form-based regulation. Indeed an interim version of the plan, before approval, included more morphological criteria in the regulation of the Areas of Isolated Buildings. The Task Force is particularly concerned about the relative absence in the literature of analyses of these types of tissue. Assessment of the Porto plan

tends to reinforce the notion that the application of urban morphological approaches is easier in traditional urban tissues than in modern tissues. Perhaps this reflects the fact that the pioneers of urban morphology started from the analysis of historical tissues.

Yet, as Barke (2013) argues, there is no logical reason why this should be the case. Whilst many aspects of urban morphology relate to heritage, distinctiveness and place identity (engaging strongly with communities and their livelihoods and well-being), the same principles apply to all localities. Indeed, urban morphological principles have as fundamental a role to play in place making in new areas as in historical ones.

This assessment has also highlighted the importance of a number of different elements for the success of form-based regulation: the capacity of the Portuguese planning system to accommodate this approach; the work of the local authority officers in not only plan making and plan implementation but also in enforcement; the training of Portuguese architects beyond the usual focus on exceptional buildings, so that they become accustomed to the development of extensive morphological analyses; and finally, the importance of consensus building and of finding the right balance between effective communication and technical complexity.

The assessment of the Porto plan is the first study developed under the framework of the ISUF Task Force on Research and Practice in Urban Morphology. It has clarified the advantages of developing systematic assessments of planning practice to understand how, where and why urban morphological approaches are being used. These assessments should contribute not only to improve local planning practice, through a learning process, but also to gather evidence of the benefits of using urban morphology so that more local authorities are persuaded to adopt it. Since professionals tend to acquire most of their approaches during formal training in universities, efforts should be made to understand how urban morphology is being, and should be, taught in different universities in different countries. Urban morphologists

should be able to offer a range of approaches to those concerned with prescribing future urban forms. In this respect, urban morphology should pay less attention to criticizing, modifying and transforming the wealth of its already sophisticated concepts, methods and techniques, and pay more attention to creating the conditions for their dissemination – perhaps by better packaging and marketing. The future work of the Task Force should address these matters.

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