

TRANSITIONAL STREETS

NARRATING STORIES OF CONVIVIAL STREETS

CONFERENCE PROCEEDINGS

3rd CITY STREET CONFERENCE 2018

Ramez G. Chagoury Faculty of Architecture, Arts & Design
Notre Dame University-Louaize

31 October – 3 November 2018





PORTUGUESE ATLANTIC SEASHORE STREETS: THE PRODUCTION PROCESS INTERPRETATION

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ABSTRACT

The lead role and the wide morphological diversity of streets, avenues, seashore promenades and roads that conform the articulation line between city and water on Portuguese coastal settlements was acknowledged by Forma Urbis lab during the elaboration of the “Morphological Atlas of the Portuguese City”. The genetic relation with the site, the formation and transformation period and the dynamic of the occupation and use of the place may explain this contemporary morphological diversity.

In the current context in which climate change promotes a gradual but inevitable sea-level rise, it is essential to know the diversity of this type of urban element - the seashore street - as well as to develop extreme flood models in order to define measures and design their adaptation to climate change, coordinated both with the cultural heritage of the urban spaces and the needs and aspirations of the populations, who understand them as irreplaceable references both in their daily lives and as representation stages of the exceptional events of society.

Considering that only the knowledge of the past allows imagining the future, the present paper focus on the production process of this specific type of street in the Portuguese context. The exemplary Sesimbra pilot case study is used to infer and illustrate the theoretical evolution phases that shaped each moment of the proto-urban and urban waterfront giving origin to the existence of this so specific and vulnerable type of urban element.

KEYWORDS

Seashore streets, production process, systemic decomposition.

INTRODUCTION AND BACKGROUND

The Research on a Vulnerable Space of Mediation

The Portuguese coast has about 943 km in mainland Portugal, 667 km in the Azores and 250 km in Madeira, totalling an Atlantic margin with more than 1800 km. Numerous coastal towns and villages dot this line of mediation between land and water, which defines and limits one side of the coastal belt where 80% of the Portuguese population lives.

The articulation between city and water on Portuguese coastal settlements is shaped by a wide morphological diversity of linear urban element type that plays a lead role on these urban contexts. Forma Urbis Lab research team acknowledged this typological richness during the elaboration of the Morphological Atlas of the Portuguese City, namely on the research phase that deals with the urban element “street”. The genetic relation with the site, the formation and transformation periods and the dynamic of the occupation and use of the place may explain this contemporary morphological diversity, but a systematic dedicated approach to the “rua marginal” or seashore street is yet to be done.

On the other hand, one of contemporary climate change effects is a gradual but inevitable sea-level rise as acknowledged in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2014), particularly the contributions of Working Group II on Coastal Systems and Low-Lying Areas. Therefore, the knowledge of the formal diversity of this type of linear urban element - the seashore street - is essential, as well as to develop extreme flood models - including not only projections for Sea Level Rise but also astronomical tides, storm surge events, wind waves and swell, and interannual variability in sea levels - in order to define adaptation measures to climate change effects. Considering the key urban role and meaning of these spaces, the design of these measures must be coordinated both with the cultural heritage of each seashore street and the needs and aspirations of the populations, who understand them as irreplaceable references both in their daily lives and as representation stages of the exceptional events of society.

Therefore, “The Portuguese Atlantic Seashore Streets. Interpretative reading and Design in Climate Change context.” research project underlying main idea is the construction of an essential reference framework for the design of waterfronts based on their memory and adapted to an inevitable becoming, namely to climate change effects from sea-level rise, addressing an urban space typology that plays a lead role in the mediation between city and sea: Portuguese Atlantic Seashore Streets.

To achieve the goal of the research, there was a convergence of research units of the University of Lisbon on urban morphology, led by Forma Urbis lab (CIAUD/Faculty of Architecture), and on climate change, led by CCIAM and IDL (Faculty of Sciences). This original convergence will allow stemming from the morphological knowledge on the origin, evolution and current state of the diversity of Portuguese Atlantic Seashore Streets, for the design of innovative solutions of adaptation measures and pathways to an expected and urgent scenario of sea-level rising.

The research thus unfolds into 5 sequent phases: starting with the 1) Interpretative reading of Portuguese Seashore Streets through the elaboration of a Morphological Inventory of the diversity of cases; followed by the 2) Development of extreme flooding models based on projections for Sea Level Rise for 2050 and 2100; and 3) The compilation and selection of a set of adaptation measures for specific case studies to respond to projected sea level rise impacts, creating alternative adaptation pathways with the

engagement of key stakeholders using Scenario Workshop and Adaptation Pathways methodology; finally, it will take place a 4) Research by design approach of urban and architectural answers on future scenarios materializing sea-level rise adaptation measures in academic projects. This phase will frame a Final Master's Project theme for students who will devise divergent, alternative, design solutions from the common adaptation pathways established on the previous phase. Finally, the research also contemplates its 5) Dissemination through an itinerant exhibition, a synthesis book and a closing seminar.

Currently the research is in its first phase, therefore, considering this early stage of development, the present paper addresses a single key aspect for the study and understanding of Portuguese Seashore Streets, namely of its shape: the production process of the seashore street, defining the theoretical evolution phases that shaped the seashore street as we know it nowadays.

The Morphological Inventory: A Reading on Shape and Time

When first addressing an urban element, such as the seashore street, one should choose the focus of the research. Given the goal of the research project - the construction of a reference framework for the design of waterfronts based on their memory and adapted to a sea level rise context - both morphology and morphogenesis are essential subjects for the study. The other components of the city are not ignored, but the importance of the shape and its origin and evolution for the research of this specific element of the city is acknowledged, as the city shape is understood as the cultural product that is most resistant to time.

Regarding the understanding of time in the urban object, Carlos Dias Coelho transfers for the urban context the three historical times of Fernand Braudel - from the shorter to the longer: the individual time; the social time; and the geographical time - and considers three times regarding the city longevity: the shorter time of the life of the individual, the intermediate time of the urban uses and behaviours, and the longer time of the built spaces.

"The time of spaces and buildings is the third time and this is the one that deciphers the importance of the built city as a physical object, always changing but nonetheless stands out by its resistance and ability to be reinterpreted." (Dias Coelho, 2014)

Thus it may be inferred that shape is one of the most resistant components to the passage of time and a key component not only for the study of the city but to the definition of its identity.

Furthermore, regarding the subject of urban morphology research, Anne Vernez Moudon considers that:

"the development of a typo-morphology offers a rich data base on forms and form-making processes. And more importantly, to morphogenetic research grounds this design work in the history of city building." (Moudon, 1994)

The study of seashore streets shape and time is therefore addressed on the ongoing first phase of the research project within the context of the elaboration of the Morphological Inventory, which considers the interpretative reading of Portuguese Atlantic Seashore Streets.

The first question an elaboration of an inventory places is which elements to include and which to exclude. Therefore, it requires the survey of the universe of study, along

the Portuguese coastline, from which a representative corpus might be selected. This representativeness of the cases is based on diversity criteria regarding geographic coverage; origin; formal features; and vulnerability to sea-level rise of the urban elements in question - the seashore streets. Seeking representativeness by examples, on the other hand, does not exclude the arbitrariness that is part of any choice, even if a thorough knowledge of the study universe exists.

The second question that concerns the built up of an inventory is how to represent or characterize the elements that compose it in a way that is useful for its interpretation. The interpretation of a complex urban object requires its simplification. In this sense, a segmented and decomposed approach of its shape allows to reduce its complexity and reveal qualities and patterns otherwise hidden. As Gandelsonas states, drawing is a process that allows us to see formal configurations that are not perceived in reality and therefore affects how we see the city (Gandelsonas, 1991) and in Jacobs work on Great Streets (Jacobs, 1993) it is particularly evident the emphasis given to the representation of the limits of the street, the elements that compose the space, the relation between buildings and street or revealing the uses and atmospheres.

The coding of the graphic representation of the seashore street is therefore essential for its morphological analysis, and according to Anne Vernez Moudon, morphological analysis must consider the shape, resolution and time. (Moudon, 1997)

Regarding shape, we are interested in the shape of the seashore street, its limits and the mediation role it plays between the built fabric and the sea. For this task we choose classical rigorous architectural representation pieces, i.e., plans and cross-sections, drawn at the same scales in order to allow the comparison, grounded on the previous work of the research team in the Morphological Inventory of the Portuguese City.

Regarding resolution levels, the question is which are relevant for studying the seashore street. Seashore streets are urban elements, therefore it is possible to elementary decompose them from the surrounding urban fabric. However, the importance of its context requires a wider resolution covering the whole urban area. These two resolution levels allow to study the seashore street on its context in two different framings: one that relates the seashore street with the surrounding private space - plot structure and built fabric - and adjoining public spaces using 1:500 to 1:2000 scale; and another one that relates with the settlement - urban layout - and its support territory - topography - on a wider 1:5000 scale that allows us to read the street on the context of the public space of the city and on the territory it is inscribed.

Regarding time, although the observation of reality is made in the present moment, this moment is understood as the result of a sedimentary process that occurred since the first establishment or occupation. In other words, although the observation of each of the case studies is made in the present, the understanding of the city as an edification that is continuously built in time, whose spaces are the result of an accumulation of operations, wills and events, even when we isolate a fixed moment, that moment contains all the past moments that contributed for the present configuration.

The necessary interpretative reading of the moments that conformed these elements is therefore made through a theoretical reconstitution. In order to enable it, a collection of cartography, iconography and historical photographs is composed for the reconstitution of the past moments that allow its description at the present time since the origin. The systemic decomposition of three two-dimensional strata drawings - the site (represented by the topography); the urban layout (public space); and the built fabric - and its critic

restitution is used as an essential drawn base for the interpretation of the permanencies and transformations of each period, allowing to define evolution phases that compose the production process of the seashore street.

INTERPRETING THE PRODUCTION PROCESS OF THE SEASHORE STREET

Interpretation Methodology

The research considers that only the knowledge of the past allows conceiving the future. Given the importance of the origin and evolution of the shape of the seashore street for its knowledge, the paper focuses on an interpretation of the production process of the Seashore Street, understanding this interpretation as an evaluation and description of the succession of the effects of the operations and events that occur in the waterfront space in the course of time.

Methodologically, the stratigraphic recomposition of the morphological elements that characterize the evolutionary process of the seashore street, as well as its relation with the urban settlement and the sea, allow to isolate the transformation operations and the composition elements of the mediation space between land and sea that are specific of each period of development or evolution phase. The diachronic understanding and study of the production process thus becomes possible and even evident with this isolation of operations and elements that configure in each period the waterfront, as well as this isolation renders possible the identification and description of each phase according to the permanencies and transformations that occur, allowing to infer the relation between a prior conformation and a consequent formal result, thus distinguishing and defining the evolution phases according to the specific characteristics observed.

The Theoretical Evolution Phases: The Sesimbra Case

Given the historical cartographic, iconographic and photographic information available and the essential and exemplary nature of the pilot case study of Sesimbra, whose seafront will be partially submerged in a sea level rise scenario of +5 meters (Proença, 2017), it has been selected as a representative example of the universe of study to test the methodological approach that allow to infer and define the theoretical evolution phases of the production process of the seashore street.

The following evolution phases reading is specific of the Sesimbra case study. Nevertheless, through rational abstraction it is possible to describe its characteristics, defining theoretical evolution phases that may be transferred and acknowledged in other case studies in the future.

Phase 1. Coastal settlement establishment

The geographical position occupied by Sesimbra determined its relation to the sea. Similarly to other coastal urban fabrics, the relation with the sea is structuring from the primordial choice of the founding site. Without an urban settlement there can be no seashore street, thus the establishment of the coastal urban settlement corresponds to the first phase of the production process of the “*rua marginal*”.

This attraction effect of the sea is particularly acknowledged from the unification of the Portuguese territory, allowing the population to gradually transfer and eventually abandon

the medieval castle that sits on the hilltop to the seashore of the bay, establishing a lasting occupation, that by 1536 was given the status of “freguesia”, an autonomous territorial administrative unit part of a municipality. (Serrão; Serrão, 1997)

Initially, the sea was used as a productive space or communication infrastructure, the sea supplied fish and seafood and, in early historical periods, long distance travels were faster and safer by sea than by land. The mediation between urban space and water was at this early phase played by the beach sand, which supported boats and fishing gear. Given to the infrastructural and productive role of the sea, the shape of the waterfront space is the residual result of the independent edification of buildings that accommodate sea related functions - such as shipyards, boathouses or fishing activity support - which condition the appropriation of the adjacent beach sand by fishnets and boats.



Figure 1: A VILA DE SEZIMBRA. Plan of Sesimbra with the project for an unbuilt fortification, c. 1568-1570, attributed to Mateus Fernandes III. (Serrão, Serrão, 1986)

Early cartography of Sesimbra village, namely the representation of Sesimbra from 1568-1570 c. (Figure 1) that depicts the unbuilt project for the fortification of the village, represent the urban shape with a fair degree of accuracy, presenting an orthogonal grid of urban blocks, probably from the XVIth century, in the western part of the village with distinct morphological characteristics from the presumably older and more irregular eastern part of the urban settlement. Nevertheless the different morphological characteristics, there is a common irregularity in both the alignment of the seashore built front and the coastline contour, which is defined by a sinuous and irregular continuity of natural slopes and rocks.

Regarding this observation, we might infer that the buildings implantation seems to be more related to topographical features: it seeks the proximity of the sea and the fresh water that runs on the valleys but also chooses a safe level regarding sea level, high tides and wave undulation, therefore defining a residual and irregular contour that follows the coastline natural features over the definition of a straight geometrical alignment. (Figure 2)



Figure 2: Phase 1 - Coastal settlement establishment. Residual space between the natural coast line and the XVI century settlement of Sesimbra. 1:5000.

Phase 2. Elementary addition of land/water mediation structures

A second evolution phase is related to the operation of elementary addition of land/water mediation structures. Given that the relation between land and sea is not always peaceful, in this category of elements we include both protection and connection structures.

The identification and isolation of these mediation structures, from the observation of historical iconography, cartography and the late XIXth and early XXth century photographs, highlights their independence regarding each other.

In the case of Sesimbra, the most significant and lasting elementary addition is undoubtedly the Santiago Fortress, built in 1648 following the design of João de Cosmader by the order of the king D. João IV, but other, more discreet mediation elements are also present such as ramps and piers that connect specific buildings or platforms to the beach and the sea. (Figures 3 and 4)



Figure 3: Protection walls, piers and ramps in the Sesimbra waterfront, early XXth century. (unknown author; Artur Pastor)

In synthesis, this evolution phase is characterized by the autonomous addition of protection structures such as walls, in some cases larger military fortifications, and of connection structures such as ramps and piers. These elements, in the beginning more precarious, progressively became more permanent and solid. The conformation of the seashore proto-urban spaces often stemmed from the functions that occupied the marginal buildings - mainly shipwrights, fisheries and boathouses - and the individual use given to the adjacent areas, therefore originating a set of autonomous spaces in the urban seafront, while the beach continued to be a supporting space of fishing gear and boats. (Figures 3 and 4)



Figure 4: Phase 2 - Elementary addition of land/water mediation structures. Sesimbra. 1:5000.

Phase 3. Margin geometrization

This lasting reality suffered transformations in most cases during the decades of 1930 / 1940. In that period, in several coastal settlements the construction of a continuous wall supported a horizontal plan in the coastal edge of the urban nucleus, associated to the consolidation or construction of ramps and staircases that fulfilled the role of articulation with the beach and the sea. This surface was the embryo of the “*rua marginal*”, the ground that the seashore street would occupy.

In the Sesimbra case study, this margin geometrization occurred gradually, it started from the fortress, that exists in the middle of the bay, adjacent spaces and extended towards the east and west edges of the bay, supported in the common idea to create a modern urban space, a promenade avenue that mimicked the seaside promenade spaces of touristic European cities that would, in time, transform the urban character of the fishing village. (Figure 4 and 5)



Figure 5: Transformation of the west side waterfront of Sesimbra. Early XXth century vs. mid. XXth century. (unknown author; António Passaporte)

The linear space that configured the coastal urban margin conferred continuity to the pre-existent autonomous spaces that composed the margin of the urban fabric but allowed them to keep a certain identity within the seashore ensemble, particularly due to the public use buildings that characterized each part of the urban seafront. The geometrical shaping and the connection of the seafront with the structuring axis of the urban layout converted the seashore street on a main urban element of the urban structure.

This geometrization of the margin was also associated to the alignment of the built seafront and the replacement of pre-existent buildings not only promoted the regular straight alignment of the seafront of the urban blocks but also the transformation of their uses. The fishing related functions, such as shipyards, fisheries, boathouses and fish processing and preservation factories, were gradually but irreversibly replaced by touristic and leisure functions, such as restaurants and hotels. (Figure 5 and 6)



Figure 6: Phase 3. Margin geometrization. Sesimbra. 1:5000.

Phase 4. Partition and embellishment

A fourth evolution phase, in some cases partially contemporary to the geometrization of the margin, is the partition and embellishment of the seafront linear space. In the Portuguese context, with the exception of few coastal villages, such as Cascais and Estoril, and restricted to a fringe of society that already had leisure activities connected to the use of the beach and the sea in the end of the XIXth century, it was essentially from end of the first half of the XXth century that the fishing related occupations of the urban sea margins began to coexist and overlap with another phenomena associated to a cultural transformation of the society, in which leisure periods and, later on, summer tourism gain widespread prominence.

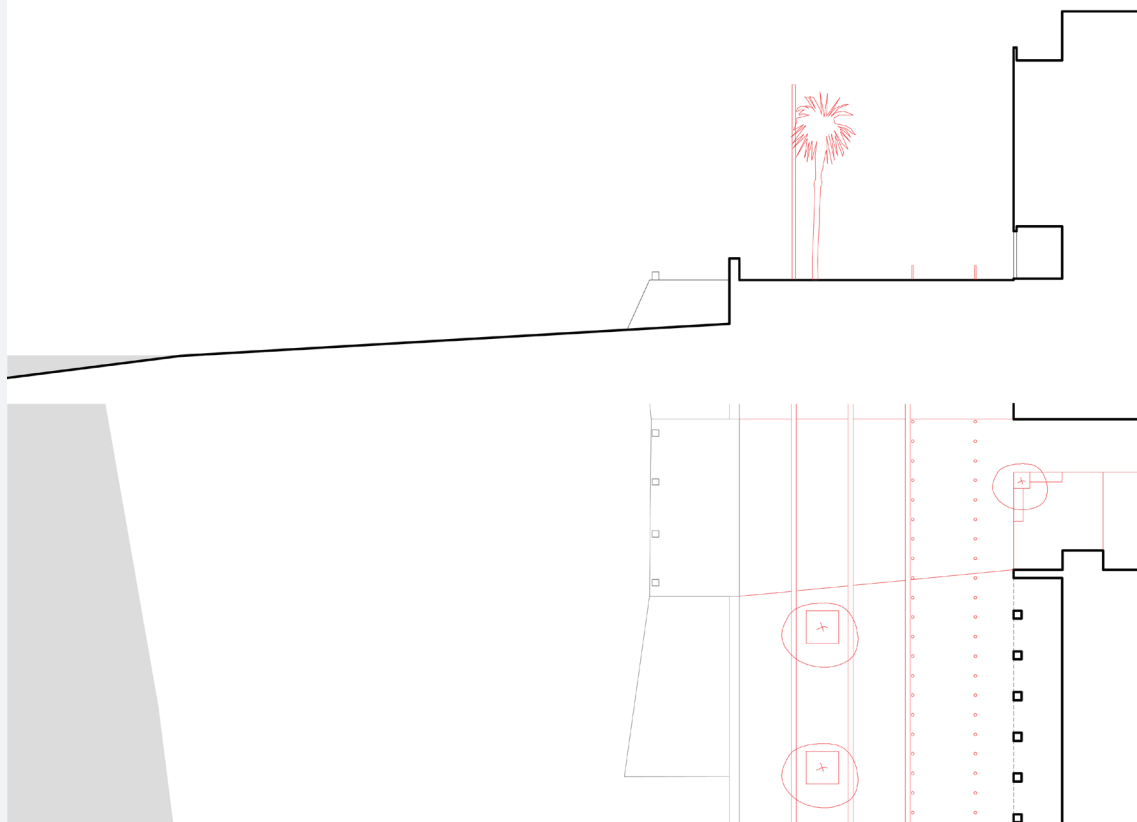


Figure 7: Phase 4. Partition and embellishment. Cross section and plan of a section of the eastside of 25 de Abril Avenue (seashore avenue).



Figure 8: Eastside view of 25 de Abril Avenue taken from the Sesimbra fortress.

These social changes had a physical impact not only in Sesimbra but also on the waterfront spaces of coastal Portuguese settlements, which suffered more or less deep transformations: shading elements were placed on the beach, wide sidewalks for strolling and seashore drives were opened, paved and sometimes planted with tree lines. These transformations redesigned the coastal urban edges with generic composition elements that repeat on most cases with the aim to constitute promenade spaces along the ocean margin. From that moment on, the seashore street or avenue became an evidence. (Figure 7 and 8)

Linear spaces limited by buildings on one side and with the other side opened to the Atlantic Ocean, supporting leisure uses and exceptional urban functions, replacing the former fishing related buildings. On several of these settlements, seashore streets started to play the multiple roles of public buildings representation space, leisure space, framing space of the ocean view and mediation space between the city and the sea.

SYNTHESIS AND CONCLUSION

The characteristics above described based on the Sesimbra case study evolution process are common to the wide diversity of cases of Portuguese seashore streets.

Although the leisure and tourism vocation is nowadays underlined on urban seashores over the early infrastructural and productive roles, the essential identity representation role of the society on these mediation spaces between land and sea carries on. Seashore streets and avenues remain the main stages for social, political and religious demonstrations, and the specificity of each case seems to lie on how in each context the pre-existence was embraced and preserved, namely the site and the heritage elements.

This initial approach to the Sesimbra pilot case study allowed to acknowledge a set of operations with different characteristics: (1) the settlement establishment as a building operation autonomous in relation to the seashore; (2) the elementary addition of mediation structures as an individual answer to a specific need between land and sea; (3) the geometrization of the margin as a heavy operation of regularization of the seashore; and finally (4) the partition of the seashore space as a light operation that allows to shape physical platforms according to the envisioned uses of the space.

The order of occurrence, the simultaneity or the inexistence of a given phase or even the existence of different phases is a possibility that must be tested in the remaining cases of the universe of study to fully build the set of theoretical evolution phases of the Portuguese seashore streets. Even to test the hypothesis that the contemporary shape of each seashore might be the result of a specific chaining of evolution phases that occur over time in a given coastal space.

On the contemporary context of climate change that inevitably will transform the urban waterfront spaces, the usefulness of the definition of the evolution phases of the production process of the seashore street is also to create a set of theoretical operations to frame the adaptation design of Portuguese waterfronts to sea level rise based on their own memory.

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ON STREETS: MAPPING AND ANALYZING STREETSCAPES

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DESCRIPTION

The purpose of this track is to bring together experts, practitioners, and citizens that use different mapping and visualization techniques for understanding city streets and how these function. We welcome contributions that bring forward researcher-driven methods, such as GIS-based ones, but we also aim for studies depicting the use of mundane mapping approaches and tools (ranging from hand-drawn mapping and sketching to the use of Google Maps / Google Earth or Open Street Maps). We look in particular for accounts of mapping or visualizing open urban data as means to open up reflection and action on shared urban commons.

KEYWORDS

Maps, visualizations, urban data, open data, GIS, mundane, urban commons.



ON STREETS: PORTUGAL MORPHOLOGICAL INVENTORY

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ABSTRACT

The research project “The Street in Portugal” that has already been completed is a sequel to the work carried out on the “The Square in Portugal”, part of the Morphological Atlas of the Portuguese City. By taking on the challenge of fact-finding, undertaking graphic restitution and illustrating the main examples of streets in Portugal, this body of work aims to be representative of the diverse typology, the state of development, dimensions and usages of this particular type of public space. Our approach was to take public spaces that are generically labelled streets, even if the varied terminology in Portuguese is differentiated. As urban features, the selected spaces are an integral part of the urban fabric, possessing a formal, functional hierarchical relationship with the other features that they comprise. In this way, the spaces chosen are always approached as being part of a whole.

A file of spaces considered to fit the typology of streets will be outlined. This will contain basic information, remissive locations and identification of photographs. From an ensemble of some cases, the selection was made bearing in mind criteria such as the object’s quality, typological and territorial representativeness. The second phase consists of sketching features for graphic restitution and bibliographic fact-finding for 100 cases. Lastly, after the features to be included had been decided on, additional factors were integrated to provide complementary data about each case study, namely photographic work and characterization texts.

This paper presents the results of the research project that we aim to be an instrument for both practicing and teaching urbanism. Its operational nature rests on the ability to be a reference for contemporary urban structures.

KEYWORDS

Streets, inventory, urban-form.

INTRODUCITON

At the beginning of the 21st Century, the practice of urbanism, the philosophy of intervention in cities and the idea of the city itself were showing less utopian signs than in bygone eras, due to several factors. These include the crisis of modernism and its models of returning to built cities as points of reference, as well as the perspective of, if not disjunction in cities, then at least their illegibility in terms of traditional urban morphologic concepts.

Despite the awareness that urban forms have always evolved throughout history and, as such, will find new meanings and configurations in the future, it is possible to find a set of reference examples for each type of urban space, which once suitably treated, may become a reference chart that will enable a comparison between the broached cases, with similar cases of distinct cultural universes, and as material for the production of contemporary urban spaces.

The inventory of Portuguese streets is part of a wider project to draw-up a “morphological atlas of Portuguese cities”, of which the initial two parts have been concluded, the first on the layout of the city and the second on the urban feature “the square”. This research was funded by the General Directorate for Land Planning and Urban Development for the mainland and the Regional Directorate for Land Use and Water Resources in the case of the Azores.

The results of this research gave rise to two pieces of work, published in 2007 in three volumes focusing on mainland Portugal (Dias Coelho, C. & Lamas, J. et al. 2007): “A Praça em Portugal, Inventário do Espaço Público. Continente” {Squares in Portugal, a Public Space Inventory. Mainland} and in 2005, for the volume depicting cases in the Azores Archipelago. These publications were awarded the 2009 National Academy of Fine Arts Prize “for the quality of historical research, analytical and critical vision” and the “Ignasi de Lecea 2007-2008” Prize conferred by the Public Art & Urban Design Observatory of the University of Barcelona, for projects or research that improve the production, management and dissemination of Public Art and Urban Design. Having completed the inventory of the “street” element, which closed the first part of the Atlas dedicated to the public component of the city, the team turned to address the private component of the city with the realization of the inventory dedicated to the block and to the plot. The last stage of work on the Atlas is now being developed, and is dedicated to the building.

The plan is to build on the previous volumes by compiling two more, thus concluding the study and publication of the public components of cities.

BACKGROUND: PREVIOUS STUDIES

The project here being presented has as an immediate precursor, work undertaken for the General Directorate for Land Planning and Urban Development and for the Regional Directorate for Land Use and Water Resources of the Azores Archipelago, on “The Square in Portugal”, an approach to one of the two main urban elements of public space.

Graphic fact-finding, classification and work of comparative analysis works with the first treatises on urbanism at the end of the 19th Century, introducing methodological issues and objectives for producing spaces and other urban features. As a precursor, the German cultural world stands out, where urban productions of the time were consistently debated and where a great deal of the fundamental tenets of the field of urbanism

were laid down. Reinhard Baumeister, on the topic of urban aesthetics in his theoretical work "Stadterweiterung" (Baumeister, R. 1876), published in 1876, puts forward some research tips for the practice of urbanism, among which we should highlight suggestions about the need to observe former squares and streets, outlining a comparative analysis methodology to be applied to these urban features.

However, this work would only be built on by Camillo Sitte and published in his 1889 work "Der Städtebau nach seinen künstlerischen Grundsätzen" (Sitte, C. 1889). Sitte's book, more than a treatise, must be considered as almost a manifest of urbanism as art.

It would be Joseph Stübben who, upon drafting a treatise on urbanism "Der Städtebau" (Stübben, J. 1890), as part of a huge 1890 encyclopedic work on architecture, the "Handbuch der Architektur", tried to approach knowledge of the subject in a methodical way, influencing authors at the turn of the century, who expressed many of Stübben's ideas in their writings. Of the five parts of Stübben's treatise, the second – "the plan scheme" – is specifically dedicated to urban form, with the particular inclusion of a large number of examples of "good urban growth" and methodical graphic processing, with plans and cross sections of spaces deemed to be more characteristic of European cities. This acted as a support for this "methodical" way of having a plan, which comparatively analyzed the main urban structures – streets and squares – and established a set of principles that their design should respect. In this way, "types of streets", their characteristics, dimensions, their relationship with structures and between themselves, as well as the relative importance in the scope of the plan itself and the city, are dealt with. It can be said that Stübben used the examples to illustrate the universe of urbanism that he tries to organize, distancing himself from the more controversial debates of the time, in favour of an encyclopaedic approach to work, primarily establishing the main concepts of this new field of knowledge. The graphic documents of Stübben's treatise take on a role as an instrument for studying urbanism and city production, meticulous in their method of representation of the different urban features chosen as examples.

It was certainly due to this quality that many of the graphic documents of Stübben's treatise were used by Raymond Unwin in his treatise "Town Planning in Practice" (Unwin, R. 1909), which was published in 1909 and had an enormous influence on the Anglo-Saxon countries.

Thus, in the 20th Century, publications on urbanism and in particular treatises, could no longer omit representations of cities and their diverse urban features as study and conceptual aids.

As for essays on typological classification, these were put forward first of all by German town planners with essentially functional purposes and, for this reason, they presupposed prior selection around something that they wished be illustrated or proven.

In Pierre Lavedan's work "Geographie des Villes" (Lavedan, P. 1959), first published in 1936, he classified the different morphological features of the city, among which was what he called "the street". His analysis and classification of the morphological features of the city proffered valuable wisdom on ways of achieving layouts, a fact that garnered him severe criticism. His peers especially criticized him for preaching "more urbanism than geography". Lavedan tackles "the street" in the chapter dealing with the city's "free spaces", alongside public squares, gardens and waterways. He was trying primarily to define their importance and *raison d'être* so as to then proceed with a typological classification organized by functions, location (in the urban fabric) and structure (morphology). The analysis and classification process put forward by Lavedan, through

The construction of this framework helped define a set of criteria for the selection and classification of case studies, based on the representativeness and diversity of the universe being addressed. The classification table was based on research and consolidation of knowledge, through the study of previous cases on this subject, with the purpose of clarifying concepts and methodologies.

The output of this work was tested with the pilot cases, evaluating its efficiency while, in parallel, establishing criteria for the classification of cases to be placed in the inventory at a later stage.

In this way, the classification framework provided a basis for a careful and uniform choice of the various typologies of the urban element “Street”.

Thus, from a wide universe of streets, and based on bibliographical research, previous work undertaken by the team and the knowledge of its researchers, a previous selection of case studies was carried out to help determine a representative sample of the existing streets in the national territory. From this sample of previously selected cases, about one-hundred were chosen for development, thus incorporating the remaining number to overcome representational failures in certain typologies, as well as territorial coverage or any other imbalance, and thus finalize the number of cases in the inventory. The election of these final cases was based on evaluation criteria that consider the typological table referred to in the previous point. This final choice sought to delimit an expressive sample of the great variety and morphological diversity of the streets in Portugal

GRAPHIC AND PHOTOGRAPHIC ELEMENTS

For an initial sample of about seven pilot cases, the preparatory tasks of the surveys that led to the graphic restitution of the morphological elements under study were elaborated and allowed to stabilize norms and criteria of representation, scales and complementary elements.

These cases were duly evaluated, with the objective of stabilizing the pieces that were to be developed.

Subsequently, field research was carried out for the entire national territory. These missions had the objective of selecting and collecting information in situ to proceed with the graphic restitution of the morphological elements, for later characterization in inventory.

After the criteria of representation in the different scales were verified, and the graphical representation of the inventory and of each street in particular was stabilized, the “Graphic Construction of the Inventory” was developed, carried out simultaneously with the field missions. This procedure allowed the data collected and treated to be evaluated qualitatively and comparatively in a phased manner. The inventory considered the elaboration of several drawn pieces, namely: the urban layout with the location of the street in scale 1: 5000 (Figure 2); plan 1: 2000 for the representation urban context or the morphological unit where the street is established (Figure 3); plan 1: 1000 for the representation of the plots, building forms and public space of the street (Figure 4); two cross sections at a scale of 1: 500 for the three-dimensional representation of the street (Figure 5) (Figure 6).

To complement the information of the drawn pieces, environmental photographs were introduced to characterize different aspects of the street, such as: urban atmosphere, buildings, trees alignments, public uses, appropriation and details. (Figure 7)

To this end, about thirty digital photographs were taken for each inventoried case and about fifteen were selected, as the model-layout of the publication provided for the use of six pictures.

As in the previous work of this research team on “Squares in Portugal”, black and white photography was exclusively chosen for reasons of uniformity of treatment, balance of recent interventions or degraded situations, and final cost of publication.



Figure 2: Street
Localization: Rua do
Raimundo in Évora
urban layout



Figure 3: Street
urban context: Rua
do Raimundo. plant at
1:2000 scale

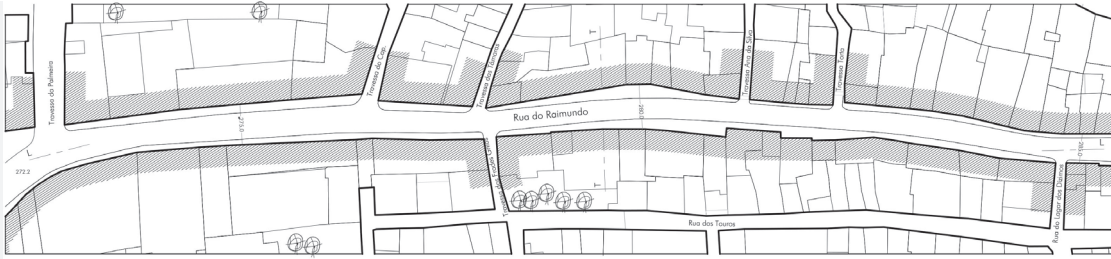


Figure 4: Street sample plant: Rua do Raimundo. plant at 1:1000 scale

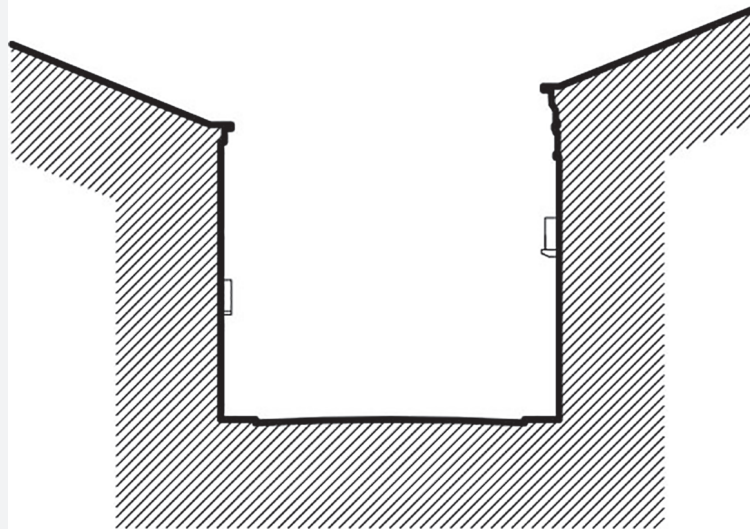


Figure 5: Street transversal cross-section: Rua do Raimundo. section at 1:500 scale



Figure 6: Street longitudinal cross-section: Rua do Raimundo. section at 1:500 scale



Figure 7: Street atmosphere, Rua do Raimundo: Photography by Nuno Soares

COMPLEMENTARY ELEMENTS OF CHARACTERIZATION

The characterization of each case also considered the description text. These were based on a specific bibliographic collection for each street and the urban context where they are inserted. The elaboration of the individual characterization texts was produced from a previously conceived “reading-key”.

In each text, the urban situation was characterized in a synthetic way, according to the importance of the street in its context, the historical evolution and the production process, the morphological characteristics and current activities.

Thus, each entry had a uniform text size, irrespective of the characteristics or complexity of the urban element concerned. A sense of synthesis was required so that all the records in the inventory, where the texts are inserted, had comparable characterization parameters.

The main objective of the text was to characterize and accurately describe each urban element. Each text, individually, refers to the observation of the current state of the street, considering its integration in a specific geographic and urban context with which it is related. The characterization text also includes the description of the evolutionary process (formation throughout the time) regardless of its genesis, as a functional and spatial role in the built city.

Each text considered the following sentence in its elaboration of a “reading key” with the following structure:

- Context - Framing the street in the city and its relationship with the place where it was established; current and previous toponymic designation, when relevant; relationship between the street and context (typological characterization of the street in relation with the urban area where it is inserted and its geographical location)
- Formal characterization of the Street - Description of the spatial structure of each street, considering: the characterization of the street layout, the cross section and the built forms/façades; characterization of the boundaries of the Street: [beginning and end / public and private / built and lots]; the singular and reference elements, architectural details, urban composition and tree alignments.
- Origin/Evolution - Description of the genesis and historical evolution of the Street, revealing and framing its origin and the main moments that influenced its formation process, taking into account: the framework of the act that is at the origin of the street, the elements that acted as generators of the street; the striking historical moments; major interventions and forming process.
- Public Activities and Functions - Description of activities and the current urban role of the Street; public uses of the urban space, mobility organization and places of permanence.
- Bibliography - Selection of texts oriented to each case study.

ELEMENTS OF SYNTHESIS: CONTEXTUAL AND COMPARATIVE CHARACTERIZATION

As a way of integrating the data obtained in the inventory, relating them from some topics and contextualizing them in the production of the European city and the non-

European city, it was understood that, like other publications with the same purpose, this morphological inventory contained a set of thematic essays, with two main sub-themes: the first one, addressing the subject of the street in the Portuguese context from different perspectives, and the second set of essays addressing the subject of the street with the international context outside the Portuguese culture.

On the other hand, a set of synthesis information was produced to allow a critical approach to the studied universe and which includes the introductory text of the street inventory, as well as a set of comparative tables that represent a general vision of the whole universe studied, from certain parameters or elements produced, such as the serialization of cross-sections or even through plant samples. (Figure 8)

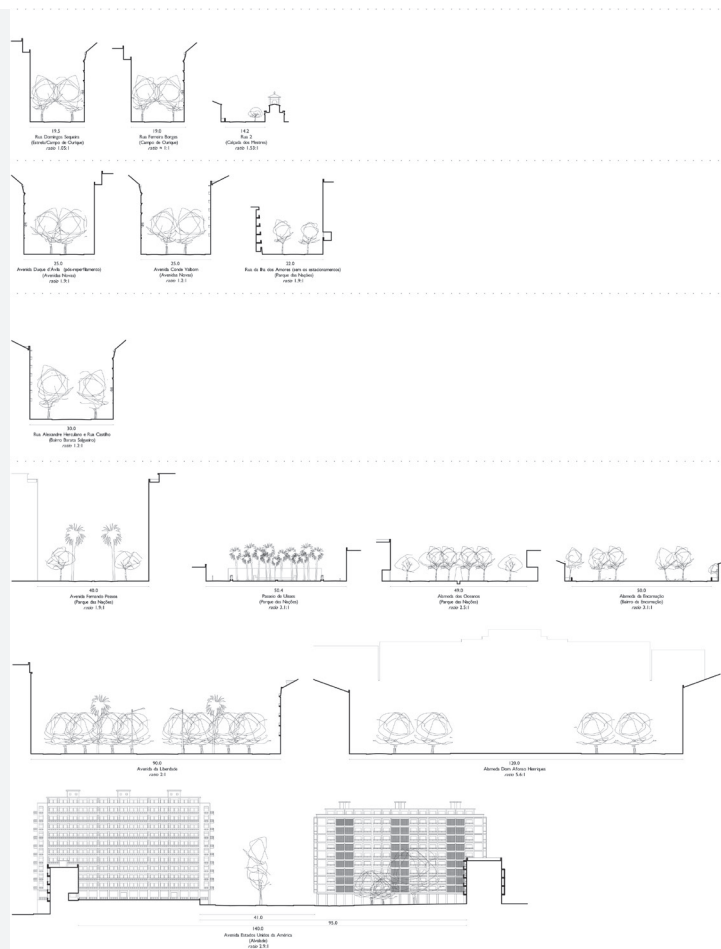


Figure 8: Comparative table – cross-sections of Lisbon streets

FINAL REMARKS

The work, both as a whole and in each of its constituent parts, aims to satisfy three main objectives. The first is to provide a didactic and pedagogical tool for the study and teaching of architecture and urbanism that will prove as fundamental as cartography itself.

The second is to provide a tool that can be used for reflection on and for the practice of urbanism, not by proffering models that are immediately operational, but rather by providing types that consist of tangible, well-known examples that are dealt with in such a way that they can be taken as reference points for the conceptual stage in itself.

The third, and most ambitious, objective is to set up a thorough database of readily available, high quality information, which will enable not only the team, but all specialists in this subject area to have access to a unique source of material for conducting and extending research on urban morphology topics, standing as a resource bank of material on Portuguese cities.

A number of theses (Dias, C., et al., 1994) and books have been published by the Forma Urbis LAB research group (Dias Coelho, C. et al 2013) (Dias Coelho, C. et al. 2014). All of these have already used information produced in this inventory as base elements.

The inventory of the streets will be published together with the components of the “private city” providing, for the first time, articulated documentation covering all scales of the city, as well as the main components of the urban fabric.

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