

**UNIVERSITY COLLEGE LONDON**

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## **\_PARK INTERPRETATIONS**

AN EXPLORATION OF THE SPATIAL PROPERTIES AND URBAN PERFORMANCE OF  
REGENT'S PARK, LONDON AND PEDION AREOS PARK, ATHENS.

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I, Penny Papargyropoulou, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

## **\_ABSTRACT**

*The aim of this report is to investigate the effect that the spatial properties of urban parks have on their performance, in terms of their usage and their relation to the surrounding urban grid. The intention is to contribute to a broader understanding of the park space type, through the investigation of two case studies; Regent's Park in London and Pedion Areos Park in Athens, Greece. The study focuses on the examination of the spatial characteristics that make an urban park successful and the role of the urban context. Firstly, landscape theories and ideas such as order and disorder in the gardening types are explored, and contrasted with space syntax literature. The purpose is to examine the influence of such concepts embedded in the design on the performance and usage of the parks. Secondly, the methodology of the study is presented, followed by the findings that have occurred, using space syntax standard methods. Space syntax is used both as a tool to examine the performance of the parks as well as a theoretical model, in order to define the park space type. Lastly, the findings are discussed in the light of landscape design theories and relevant researches. The conclusion is that both parks present emergent movement and occupation patterns, strongly connected to their spatial and visual properties. It is suggested that parks are unique in their topological characteristics, being distinguished by the vast freedom of choices offered to their users by the spatial configuration.*

**\_Key words:** *Regent's Park, Pedion Areos, park space type, landscape design, space syntax.*

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## CHAPTER I

### INTRODUCTION

Open spaces are one aspect of the urban environment that is of great importance in daily life for people who live in urban areas. Often the importance of urban open spaces is forgotten in the debate about architecture and the built form, yet, the value of urban open spaces lies in the many different benefits and opportunities that they can provide.

The main objective of this research is to conduct an exploratory study towards identifying the dynamics of open spaces and human occupation in the context of large scale city parks. Visitor experience and the urban performance of parks are the key issues that this report sets out to investigate, within the context of landscape design and the typologies that can be found in park layouts. Landscape design is defined by Rogers in her book "Landscape Design: a Cultural and Architectural History" as a fundamental relationship between people and place, a partnership between art and nature, and, increasingly between art, nature and technology (2001: 24). It involves the spatial organization of outdoor places to meet human needs and desires while protecting and enhancing natural environments and processes. According to Dee, whilst landscapes are living, dynamic, 'bio-cultural' systems, they can also be thought of as complex, spatial 'structures' (2001: 1). As such, it is the aim of this report to explore the spatial characteristics of parks, in relation to their performance in terms of their connection to the city grid and their everyday usage.

The initial interest in this topic involves the case of large scale parks in Greece, which are underused and problematic in their management and maintenance. In cities like Athens, there should be 15-25 square meters of green space per resident; a number defined by the European Union (in Raptis 2006). However, the percentage of urban green spaces today is 2 square meters per person, illustrating the lack of open spaces and the continuous rise of building masses. Even in the light of these poor numbers, no efforts are being made to increase the quantity of green spaces, but, on the contrary,



the quality and image of the existing ones is disappointing, with parks being trespassed for different uses, others being transformed into car parks, resulting in very low occupation numbers.

On the other hand, public parks in Britain constitute part of the history and the culture of the country and they are, and have always been, attractive and vibrant places to visit. Their value in the social and economical life has been recognized by the community and their proper management and regeneration is part of the current debate and a primary concern of the government.

It is these differences that gave the initiative for this study, with the aim to find the underlying reasons for the under-usage of Greek parks, in contrast to English ones. It has to be noted that there are significant cultural and climatic differences between the two countries that may affect both the maintenance and the occupancy and movement rates in the parks, but it is the spatial characteristics of the layouts that are investigated in this research and they are considered to be the most important ones, since the values and benefits of a well-designed and managed park are acknowledged all over the world. Therefore, the aim of this report is to look more closely at the spatial properties of two parks, one situated in the centre of Athens, Greece, called Pedion Areos, and Regent's Park, the largest grassed area in Central London.

Designed with the principles of French formal gardening, the Greek park is considered to be unsuccessful, with low visiting rates and many signs of antisocial behaviour. Regent's Park, on the contrary, accepts thousands of visitors every day, offering a wide variety of activities. It constitutes an example of naturalistic English gardening, with various kinds of paths, open spaces and vistas. It is this contrast between the two garden typologies that is investigated, in the context of the background of the theory of garden and park layout types and the actual performance of the selected parks.

The exploration of the case studies is considered to be meaningful within the framework of space syntax, as it provides both an appropriate tool to

examine the spatial performance of the parks, and in the same time, it is supported by an extended body of theory, offering the opportunity to work towards an interpretative 'model' for parks, to act as a guide to understand the way parks work and attempt to answer the questions: what are the spatial characteristics that make a successful park?; what is the role of the urban context ?; and how can a successful park be designed?

More specifically, this study intends to answer the questions: what is the relation between large scale urban parks and the surrounding urban grid and how does this affect the pattern of movement and usage in the park?; how are visitors distributed in the park and in what way is the pattern and level of movement and occupation related to the spatial configuration?

The report is organized in six chapters, with the first one presenting the background of the study, defining the research questions, and mapping the contents of the work. The second chapter examines relevant theories, connecting them to the space syntax body of knowledge. Landscape theories and the conflict between English and French gardens are presented and ideas such as repetition and geometrical order are being brought into question, being contrasted with space syntax literature.

In the third chapter, the study areas are presented, accompanied by illustrations. The background of their generation is described, along with their current situation. Following that, the research methods and the reasons for their selection are being explained in detail. Direct observations, axial and segment analysis and visibility graphs construct the body of the methodology used, in order to investigate the syntactic and spatial properties of the parks.

In the fourth chapter the numerical and statistical data are brought together, in order to contrast, the spatial and space use characteristics of the two parks. The data, from the on-site observations are presented, revealing the occupation and movement patterns within the parks, and correlated to space syntax measures.

The findings described in the fourth chapter, are interpreted and discussed in the light of relevant bodies of literature and space syntax theory, in the fifth chapter. The role of the typologies used as design guidelines in the parks is investigated, in terms of the spatial effects and the consequent usage rates. Furthermore, the relationship between the pattern of occupation and the visual fields constructed in the parks are being compared to similar findings in the research of open public spaces conducted by Campos. Lastly, the parks are being explored on a more theoretical basis, using space syntax theory on museums (Hillier and Tzortzi 2006) as a model in an attempt to construct a guideline for an analytic park theory and the park space type is described as the spatial representation of the concept of 'generic function'.

An overview of the discussions and the findings is presented in the last chapter, linking back to the initial questions. The visitor experience in both parks is found to be profoundly connected to the spatial layout and the visual properties of the parks, while the park space type is suggested to be unique amongst the built forms, offering vast freedom to the visitor, while enhancing inter-visibility and numerous activities.

## CHAPTER II

### LITERATURE REVIEW

In this chapter an overview of relevant theories is presented. Regent's Park has been designed with the principles of naturalistic English gardens, while Pedion Areos layout has been influenced by the French formal gardening style. Thus, the history of the ideas and the concepts embedded in these two gardening types are described, providing the theoretical background for the spatial analysis that will follow. Moreover, since space syntax is central to this research, relevant ideas are compared and put into contrast with other theories presented. This review draws mainly on the writings of Marc Treib on landscapes and gardens (2005), the work of the Dutch landscape architects Steenbergen and Reh (1996), the cultural and architectural history of landscape design by Elisabeth Barlow Rogers (2001), the contrast between English and French gardens examined by Yves Abrioux (2003) and the writings on the impact of the spatial characteristics on human experience explored by space syntax theory, mainly through the work of Bill Hillier (1996, 1999, Hillier et al. 1984, 1987, 1993, 2006).

Regarding the question of how urban parks or landscapes can be classified into categories, the concept of type can play a useful role. According to Steenbergen and Reh, a type can be perceived as "a scheme, derived from a historic sequence of designs having a clear formal and functional resemblance" (1996: 10). The authors suggest that until now the concept of type was linked theoretically to the way the garden was constructed, but nowadays it is also associated with the technique of the design. The dynamics of the designs and the thinking behind them can be understood by rediscovering the originality of historical garden concepts.

In "Landscape design: a cultural and architectural history" (2001), Rogers suggests that the background of landscape design resembles a history of human culture. It is argued that it is fundamentally related to the values of time and space, but, at the same time, it is seeking to demonstrate how philosophical concepts, and not only ideas of beauty, are expressed through

art – in this case an art that modifies and shapes nature (2001: 22). According to Rogers, some of the most important garden ideas have been based on allegory. Christians and Muslims appropriated allegory in the recurring metaphor of paradise as a garden in literature and art. They have both used a model of orderly paradise, a symbolic relationship of landscape and heavenly reward. Four watercourses in Islamic gardens and four paths leading from a central fountain in Christian ones represent the four paradisiacal rivers mentioned in the Quran and the Bible (2001: 22).

This sacred idea of the metaphysical space, as Rogers describes it, kept the garden enclosed and by definition a place set apart from its cultivated rural surroundings and wild nature (2001: 23). However, according to the author, after the birth of systematic science and the greatly increased reliance upon reason as a governing principle, the garden no longer represented itself as an enclosed space, and its axes were given apparent elongation, as if to join the actual horizon (Rogers 2001: 23). The French formal garden, perfected in the seventeenth century by the landscape architect André le Nôtre, is the principal representative of this type.

Formal design in French gardening, according to the writings of Marc Treib, involves the straight line, usually geometry, and often symmetry. "It assumes an architectonic stance, and it anthropomorphically asserts the human mind and hand" (2005: 87). As Treib states, French gardening is based on repetition of related forms and their alignments within an explicit ordering system, designed so that each fragment restates and contributes to the power of the whole. The axis provides the overriding structure to which each element refers and is expanded to the infinite (2005: 89). Based on these principles, gardens like the Versailles and the Vaux le Vicomte were created, providing a paradigm, even for city planning, according to Rogers, as a form of urbanization, involving the construction of wide straight lines, often radiating from a prominent monument, with prestigious structure (2001: 22).

Following the French example, as Steenbergen and Reh argue, the early 18<sup>th</sup> century English landscape gardens were, without exception, based on

rational and formal systems, which later on were often retained in the form of a 'hidden order' (1996: 14). The development of the subsequent landscape garden, however, witnessed a steady, yet progressive, move away from the geometric layout, influenced by the theoretical establishment of the scientific concept of nature and space. As well as art, scientific fields such as astronomy, geography, physics and mathematics began to unfold. The development of the concept of nature and space in the first half of the 17<sup>th</sup> century is best illustrated, according to Steenbergen and Reh, by the theories of the French thinkers Rene Descartes and Blaise Pascal. Together they laid down the foundations for the work of Isaac Newton in the second half of the 17<sup>th</sup> century, opening the way for a more naturalistic way of thinking (1996: 137).

English landscapers, as Waymark suggests in her book "Modern Garden Design: Innovation since 1900" (2003), also drew on the work of their contemporary biologists, who claimed that nature was the equal of man, and therefore that man should not dominate nature. From this, it was derived that a garden should be a part of the landscape, from which it should be almost indistinguishable on its boundaries. It followed that gardens should be neither geometric nor architectural, as these gardens were anthropocentric – i.e., man-centred (2003: 61).

French formal gardens could be labeled as formalistic in that they are characterized by apparent and distinctly perceivable order or form. What Treib suggests in his paper "Trace upon the Land: the Formalistic Landscape" is the distinction between formalism of intention or instigation, and formalism in the final shape of a landscape, or in his own words 'whether formalism is found in the concept or in the conception' (in 2005: 40). The question, therefore, is whether a naturalistic garden is more formalistic, than one that has been managed to such a degree to grow in an intended form, that is, in apparent constructed geometric order. According to Treib, naturalistic gardens are more formalistic, at least in ideas. The concept embedded in this argument is that not only is the architect able to channel nature into a new order, but by understanding nature so well it is possible to coerce it or even

recreate it in its own image. Thus the relation of the concept and the conception in formalistic terms is almost paradoxical to Treib: what seems most formal when seen is less formal in conception, and vice versa (2005: 40). In order to support this idea, he uses the example of naturalistic Japanese gardens, with their abstract and symbolic aesthetics, where the human mind has not only understood the natural forms, but also the ordering principles behind nature, and is now attempting to recreate nature in its own form, selectively, and even improve upon it (2005: 43).

According to the paper "Body, Eye and Imagination" presented by Yves Abrioux in the 4<sup>th</sup> International Space Syntax Symposium (2003) both the French and the English manners of gardening reveal two distinct modes of pursuing a common end: that of exercising power through spatial layout. It is suggested in a way that in both styles the intention is apparent and deterministic in the overall layout and its experience, in agreement with the formality of the concept and the conception, suggested by Treib. Abrioux states that "whereas the French manifestly conjoins severely orchestrated movement with strictly semanticised layouts and iconographical programmes, the English apparently courts freedom of physical and intellectual movement" (2003: 12). However, it is argued that this overt liberty can equally be considered as a measure of the extent to which a more subtle management of cultural and cognitive competences has learnt to dispense with the overt disciplining of bodies and minds. In either case, Abrioux argues, drawing from the ideas expressed by space syntax that the design of the garden functions as a species of spatial machine constraining movement in order to define vistas or framed views, each of which determines a specific mode of interpretation (2003: 12).

The distinction between the French formal gardens and the English naturalistic landscapes lies in the opposition between formal and informal, formalistic and naturalistic, man-made and natural, and order and non-order. Order, according to Treib, regards a systematic and perceivable way of establishing the relationship of one element to another, as in the order of things. Chaos, in contrast, is the absence of order (2005: 30). However, the author suggests that

in landscape theory the definition of disorder can become more flexible and it can be suggested that chaos is “less the total absence of order than the manifestation of an order that cannot be visually perceived” (Treib 2005: 30). Thus, a French formal garden could be described as an ordered landscape, whereas an English naturalistic garden appears to have a disorder like the one described above: an order that cannot be easily perceived.

Geometry, as Treib states, is but one possible means of ordering, which has been extensively used as a means of arranging landscapes, especially in the West (2003: 35). A reason for the practice that Treib refers to is a series of ideological associations with geometric figures such as the square, particularly when related to the cardinal points; and the circle, which implies a central locus, a center of the world (2003: 35). A parametric shape grammar has been generated by Stiny and Mitchell (1978) in order to identify particular architectural styles, providing with the ideological backgrounds and the meaning of shapes such as the axis and the square. Under the general heading of geometry could be included various subsections such as symmetry and repetition. These values seem too apparent in the case of the French formal garden which pushes geometry, symmetry, and repetition to an extreme. In less apparently ordered gardens, such as the English landscape garden, the rhythm and the intention of the design become more complex. These gardens, as Treib argues, demand a greater involvement and discernment from the observer (2003: 37).

According to Treib, geometric orders are direct, or ‘fast’ in the terminology of minimalist sculpture and painting. And by fast, it is implied that they can be read, at least as to their structure, almost immediately. In naturalistic landscapes “the elements unfold, often in a choreographed sequence, so that prior segments of experience must be held in mind. Meaning and an understanding of the ordering system, come after the fact” (Treib 2005: 36-37).

The perception of an orderly or a non-orderly configuration becomes a matter of both the scale of inquiry and the experience of the observer. As



Treib argues, order is easily sensed at the micro-scale as for example in cellular structures viewed through a microscope. In turn order can be also sensed at the macro-scale: the patterns of cities and forests, for example, all clearly emerge as structured when seen from the air (2005: 30). But, it is suggested that order is more elusive at the scale of the human being. At the scale of the human body a difficulty can be found in detecting order and structure, since an overall view cannot be sensed. The perception of the whole becomes possible through the identification of similar relations found in the system and signs of order.

Therefore, what distinguishes French gardens from English ones is not only the opposition between the man-made and the natural but also the degree of readily perceptible order in their layouts. And, as Treib states, humans seem to seek order either in the perception of spaces or in their conception.

Landscapes are ordered so as to become psychologically "comfortable" (2005: 31). Treib argues that the conscious shaping of elements on the land, carved from a wilderness, parallels the furnishing of an interior, to make an outdoor room comfortable on a very large scale; it is suggested that ordering is an act of domestication (Treib 2005: 29-32).

According to Abrioux, the suggestion that no overall view of an English garden can be achieved without a map, reaffirms the idea that this style is best suited to individual experience. The author argues that the French style in contrast, embeds the ideas of privilege and a closed, hierarchical social structure, which are underlined by the existence of a grand vista from a vantage point, enabling the perception of the whole of the system (2003: 9).

In "Other Spaces: the Principles of Heterotopia" (1967), Michel Foucault establishes two principal classes of order, relating the ability of perception with a part to whole correspondence. As Foucault states, the power of 'homotopic' order derives from the coherence between the parts and the whole. From the macro to the micro scales, continuity pervades the complete entity; at any point the correlation between the part and the whole is apparent. It is this homotopic order that governs the composition of classical

landscapes and architecture. The relationships of part to part, and part to whole, govern the design of the totality. 'Heterotopic' order, on the other hand, results from collision. It celebrates disparity, and the fracture and collage of elements of varying formal properties. Order appears to derive almost by accident.

The relation between part and whole is also the key idea to another distinction, conceived first by Julienne Hanson in the paper "Order and Structure in urban design; the plans for the rebuilding of London after the great fire of 1666" (1989) and clarified subsequently by Bill Hillier (1996, 1999). It is the structure-order distinction, related to the way layouts are shaped and perceived by the passer-by. Spatial complexes are intelligible to human beings in two ways, according to Hillier: "as artifacts we move about in, and learn to understand by living in them; and as overall rational concepts, which can be grasped all at once, and which often have a geometrical or simple relation to nature" (1996: 234). The first is defined as structure, the second as order. Their difference lies in the fact that an ordered complex is characterized by similar things in similar relations and can therefore be grasped as a single concept, while, a structured built form, like the actual ones, lacks such simplicities, and appears irregular. But, as Hanson argues "an apparently disorderly layout may turn out to be well-structured and intelligible to its users, whereas a highly-ordered architectural composition may in fact be unstructured when we experience it as a built form" (1989: 22).

In an ordered system, according to Hillier (1996) there is a repetition of the parts, which relates to the whole. On the other hand a 'structured' complex has no such order. Elements can scarcely be identified, let alone repetitive elements. However, it is argued that such a system has powerful spatial patterning which appears to originate in function (Hillier 1996: 235). According to Hillier, it is the non-local, or extrinsic, properties of spaces that are critical to the movement dynamics through which a complex evolves its essential structures. The non-local properties are described as those which are defined by the relation of elements to all others in the system, rather than those which are intrinsic to the element itself (1999: 170).

In order to capture the quality of a 'structured' environment as being comprehensible and easily navigable, a measure of the degree of how easily and fast a building or a built environment can be understood has been introduced by space syntax, recognised as 'intelligibility'. The definition of an intelligible environment is given in the paper "Creating Life" (Hillier et al 1987) where it says that "The property of 'intelligibility' ... indexes the degree to which the number of immediate connections a line has – which can therefore be seen from that line – are a reliable guide to the importance of that line in the system as a whole" (1987: 237). It is argued that the whole can be read from the parts. Therefore, the definition of intelligibility concerns the relationship between local visual cues and the global properties of a space within the system.

It is implied by space syntax theory that it is intelligibility that mediates between, and directly affects the relationship between cognition and configuration. But how are these terms defined and what is their relation with human perception of space? Spatial cognition is concerned with the acquisition, organisation, utilisation and revision of knowledge about spatial environments, real or abstract, human or machine. Perception and cognition both refer to inferred processes responsible for the organisation and interpretation of information, but perception has a more direct sensory referent than cognition. Therefore, according to Downs & Stea, "cognition is the more general term and includes perception as well as thinking, problem solving and the organisation of information and ideas ... Cognition occurs in a spatial context when the spaces of interest are so extensive that they cannot be perceived or apprehended either at once or in a series of brief glances. The large-scale cognitive spaces must be organised and committed to memory and contain objects and events which are outside of the immediate sensory field of the individual" (1973).

Configuration, on the other hand is defined by space syntax theory as a set of spatial relationships where each relation affects and is affected by all others in the set. A spatial configuration is therefore different from a pattern of spaces or a spatial structure in that it is addressed to the whole of a complex

rather than to its parts. For a spatial configuration to be cognizable, its disparate spatial relations must be cognizable. In other words, in order to achieve a conceptual understanding of a large-scale environment, its distinct spatial relations must be first perceivable. Intelligibility, therefore, stands between these concepts, providing the step from perception to cognition. Through this relation, the primacy of space is suggested, as a fundamental building block of human cognitive systems, while relationality constitutes the key to the existence of all spatial configurations. It is through these representations that a system such as a landscape garden or an urban park can be approached, in order to identify the role of the spatial elements in human perception and cognition.

The American cultural landscape historian John Brinckerhoff Jackson defines landscape as “a space on the surface of the earth; intuitively we know that it is a space with a degree of permanence, with its own distinct character, either topographical or cultural, and above all a space shared by a group of people” (1984: 23). This definition suggests that basic to all landscapes is the presence and accommodation of human beings as individuals or in society, serving their physiological or psychological needs.

According to Woudstra and Fieldhouse, in the 19<sup>th</sup> and the 20<sup>th</sup> centuries public parks provided a place where the new industrial class could meet their so-called betters in a safe, respectable and structured setting (2000: 12). Today, urban parks address to people of all ages and all walks of life. Historic parks, like the ones explored in this report, were designed to improve the urban environment in many ways, as Woudstra and Fieldhouse illustrate (2000: 19): financially, by raising the value of the property around them; practically, by cleaning the air and being lungs for the city; physically, by providing a place for sport and exercise; and psychologically, by providing a place where people could relax and enjoy the sight of trees and grass. If one looks at the role of parks today one finds that all of these points are still valid.

This review has described the two gardening styles that have influenced the layout of the parks under consideration. The differences in their conception

have been highlighted, as well as the role of geometry and ideas such as symmetry and repetition have been explored. The distinction between order and disorder has been defined in various ways, in an attempt to examine the role of the relation between part and whole in a park and the connection this has to human perception and cognition. In the light of these underlying ideas in the layout of the parks, it is the aim of this research to value their role in their urban environment as well as to examine the actual experience of human beings in their usage, entertainment and stimulation in the premises of the parks.

## CHAPTER III

### **\_RESEARCH METHODS**

Following the review that includes the background of the ideas embedded in the design of the two case studies, the methodology of the research is presented, consisted of direct observations and syntactic tools. First, the case studies are presented, followed by the methods used, as well as the reasons for their selection.

#### **\_Case studies**

Regent's Park occupies an area that had been enclosed as a hunting park by King Henry VIII, under the name Marylebone Park. The public part of the current Regent's Park was designed by the architect John Nash in 1811, in order to promote the sale of adjacent residential properties. It was not until 1835 that the general public was allowed into the sections of the park.

Although its location has been considered at the time as distant in relation to the heart of London, its connection to Westminster has been accomplished by the creation of a new processional route, Regent's Street, developed by the same architect (Tate 2001).

The layout of the park reflects its origins embedding a classic English naturalistic style, with a few formal influences evident in some of its parts. Three of the principal physical elements of the layout – the Broad Walk, the Boating Lake and the Inner Circle – are more or less related, and the Inner Circle encloses an almost separate second park within the park, as can be seen in figure 1. Regent's Park is one of the biggest parks in central London, accommodating a wide range of activities and land uses, in addition to the Regency terraces. These include London Zoo, the Regent's Canal, the London Central Mosque, an open air theatre, Regent's College, Winfield House – the residence of the United States Ambassador, two other residences – the Holme and St John's Lodge – and numerous cafes, kiosks, gardens and play areas. It has been shaped in such a way as to provide a variety of open spaces, including both large grass areas and more secluded open spaces (fig. 2-5).



## REGENT'S PARK

1. Primrose Hill
2. Regent's Canal
3. Outer Circle
4. London Zoo
5. The Broad Walk
6. Readymoney Fountain
7. Winfield House
8. Cumberland Terrace
9. Cumberland Green
10. London Central Mosque
11. Hanover Terrace
12. Boating Lake
13. The Holme
14. Open Air Theatre
15. Queen Mary's Garden
16. Inner Circle
17. St John's College
18. Chester Terrace
19. Sussex Place
20. Regent's College
21. Avenue Gardens
22. Clarence Gate
23. Cornwall Terrace
24. York Gate
25. Park Square
26. Park Crescent

Figure 1: Regent's Park



**Figure 2:** Regent's Park: Typical paths crossing the park



**Figure 3:** Regent's Park: the north to south axis and large grass area on the north part



**Figure 4:** Regent's Park: views from the Inner Circle



**Figure 5:** Regent's Park: pupils and sunbathers by the lake



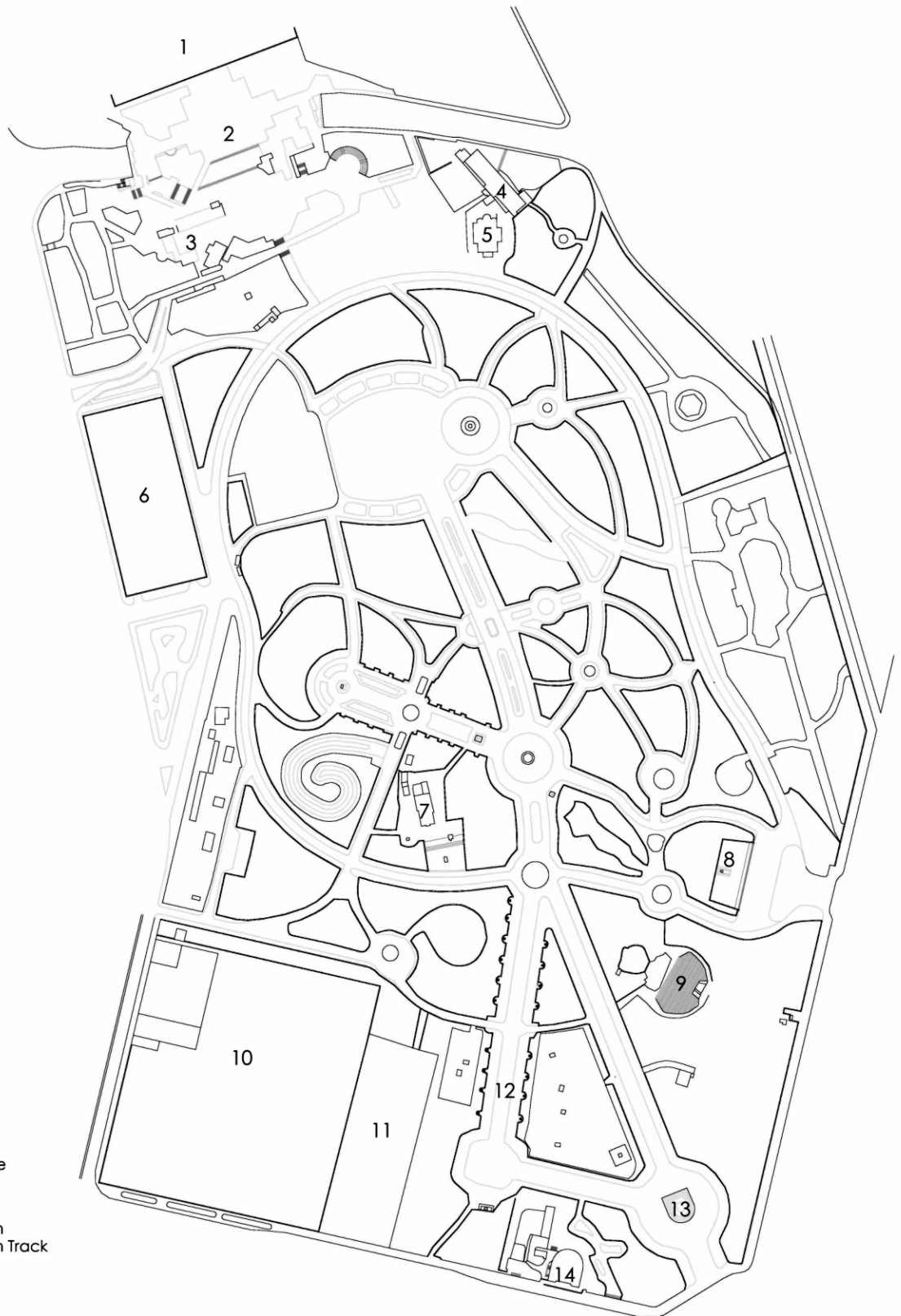
Pedion Areos was created in the late 19<sup>th</sup> century as a training area for the Athens Guard and later for the Hellenic Army Academy. In 1934 it took its present aspect as a public park, influenced by the French formal gardening style, adopting a network of linear streets and narrow curved paths, as seen in figure 6. It has been created in memory of the heroes of the Greek revolution in 1821, whose busts have been located on both sides of the Axis of Memory (Raptis 2006).

The park is situated in the centre of Athens, acting as a natural border between two mainly residential neighbourhoods, Kipseli in the north and Eksarhia in the south of the park. As does Regent's Park, Pedion Areos accommodates an open air theatre, two churches, playgrounds, one café and several kiosks. A large area on its west side has been taken over by a sports association, which has its track course located in the premises of the park, restricting public access. Planting in most of the spaces of the park is very dense, consisted of bushes and trees, obstructing the access, and therefore constituting as accessible only the areas that are not planted (fig. 7-10). On the whole, it is considered as problematic and not well maintained, and this sense of underperformance is reflected on its low usage numbers.

The two examples used in this research provide a productive comparison of a typical English park with a Greek one, in order to try to bring to light any spatial properties that affect their usage.

### **Direct observations**

In order to capture the movement and occupation patterns in Pedion Areos and Regent's Park, onsite observations were carried out during the weekdays of 19<sup>th</sup> to 23<sup>rd</sup> of June 2006 in Athens and 3<sup>rd</sup> to 7<sup>th</sup> of July 2006 in London. In both cases the weather was sunny and warm, with temperatures reaching 38°C in Athens and 28°C in London. The observations consist of the gate method and the static snapshots method. Both are standard methods used at the space syntax laboratory for gathering data on how people use space and they are taking place without taking account of people's intentions. What is being observed is their collective activity with the aim to retrieve



### PEDION AREOS

- 1. Courts of Justice
- 2. Labour Day Square
- 3. Delear Cafe
- 4. 28th Primary School
- 5. St Charalampos Church
- 6. Military Geographical Service
- 7. St Taksiarhes Church
- 8. Athina's Statue
- 9. Open Air Theatre
- 10. Panellinios Sports Association
- 11. Panellinios Sports Association Track
- 12. Axis of Memory
- 13. King Konstantinos Statue
- 14. Green Park Cafe

**Figure 6:** Pedion Areos Park



**Figure 7:** Pedion Areos: Typical paths crossing the park



**Figure 8:** Pedion Areos: the two axes crossing the south west part of the park



**Figure 9:** Pedion Areos: views from the eastern area of the park (Labour Day Square)



**Figure 10:** Pedion Areos: children in a playground and in the central parts of the park

something of the objective properties of the built environment (Grajewski and Vaughan 2001).

One of the objectives of this study is to examine the relation of the parks with their urban environments. Do they work as barriers to the movement flows of the city grid or do they enhance through-movement? To answer these questions, the gate method has been considered as the most appropriate one. Therefore, the number of people entering and exiting the park at each entrance and the people moving on both directions on the street outside the entrance points (not crossing the parks) are being counted. The absolute numbers and the ratio of the inside to the outside movement are being used to measure first the movement potential at the edge of the parks and second the 'park proportion' of that movement, providing a contrast between the two parks.

People crossing these gates have been counted during two days for five minutes, in four time periods (morning, noon, afternoon and early evening). For the purposes of the research people were divided into different categories according to their sex (men, women), age (pensioners, teenagers and children) and appearance (tourists, working people [suits] and casuals). The last categories were identified by their clothes and the things they were carrying such as briefcases, backpacks, cameras etc.

Another issue that this reports sets out to investigate is the pattern of movement and occupation in the parks. The snapshot method has been selected, covering every space which can be publicly accessed in both parks. This method involves, in this case, a moving observer which walks from space to space, taking a mental snapshot of the activity precisely at the moment at which the space was observed (Grajewski and Vaughan 2001). An itinerary was found in the case of both parks, which covered all of the spaces to be observed. Pedion Areos and Regent's Park were observed at five time periods, in order to capture the possibly different movement and occupation rates. The different categories that people were recorded were the ones used in the gate method as well, and the various forms of

occupation were split in static – sitting, standing, having a picnic – and dynamic – walking, running, playing, involved in a sport – activities.

As any kind of research this one also has a number of limitations. First of all, the observations took place in the summer, during some of the warmest days in both Athens and London. This fact suggests that the movement and usage patterns recorded are most likely at their peak and that the data would probably be much different if recorded during cooler days or in the winter. What must also be noted is that the gate counts and the snapshots have taken place during working days and not at the weekend, because it was in the scope of the research to identify the existing pattern of usage on a typical weekday. Furthermore, the big scale of the parks has rendered the simultaneous snapshot observation impossible, thus, data from more than one day have been combined in order to produce an overall image of a snapshot observation for each time period.

### **Syntactic analysis**

The data collected from the direct observations are overlapped and examined in conjunction with the information retrieved by space syntax tools and diagrams.

The axial map (see appendix A) is used in order to highlight the underlying properties of spaces, with relevance to their position in the system under consideration. In both parks the axial lines are drawn as lines of sight and movement and where roundabouts are found, the visibility and accessibility through the roundabout is the criterion in order to decide the way the line is drawn. One key property of the axial map is integration (see appendix A), picking up the most important lines of movement in the parks and also highlighting the powerful lines that connect the park with its urban surroundings. Moreover, segment analysis (see appendix A) is used in order to compare the spatial properties of the two parks in more detail, revealing some more or less geometric properties of space, which render the comparison between the two systems more explicit.

A very simple yet informative representation used by space syntax is the justified graph (see appendix A). Justified graphs of Pedion Areos and Regent's Park from their main entrances are drawn in this report, in order to reveal differences in their structure and to identify deeper spatial relations that determine the character of the configuration.

Two more syntactic representations that highlight the visual properties of spaces are used in this case. The first one is the isovist, defined by Benedikt in 1979 (see appendix A). Isovist fields, according to Benedikt, correspond in some way to movement patterns of people and it is for that reason that it is considered as a meaningful tool for the purposes of this study; however an approximation to it is used, which illustrates the visual steps from a selected point to every other point in the system.

Another method, related to the visual perception of space, is the visibility graph analysis (see appendix A). This tool appears to be most meaningful for this kind of research, since it allows the analysis of large open spaces with a much higher degree of resolution than an axial map would, covering every space of the park, and not only the predefined paths where movement is occurring. Moreover, the study of public squares in the city of London by Campos (1997, 1999) has illustrated that the location of static people is closely related to the visual properties of the open space. Similar findings have turned up in the study of bodily experience in Parc de la Villette, where different forms of bodily experience have been linked to various conditions of visibility (Ribeiro 2005). For the purposes of this research, therefore, the visibility graph analysis is overlapped with the data from the snapshot observation, and a pattern of occupation related to visual properties is identified.

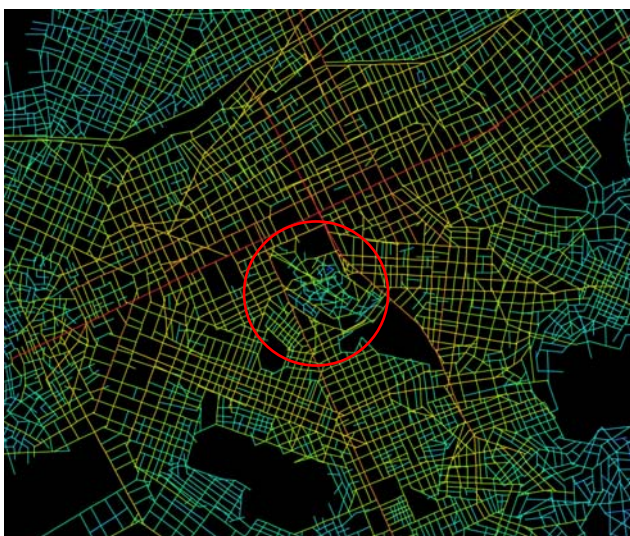
The syntactic analysis has been performed in Depthmap, the software application created by Alasdair Turner in 2001. The figures presented in the following chapter have been selected as the most essential, while a full list of illustrations can be found in the appendices.

## CHAPTER IV

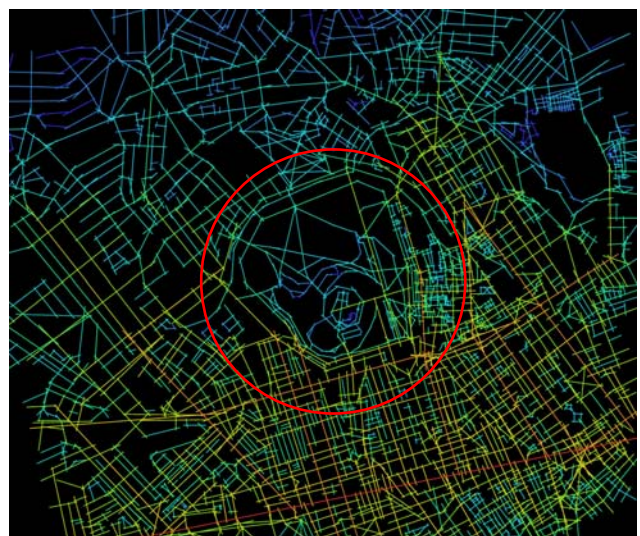
### FINDINGS

In this chapter, the findings of the study in terms of configurational differences are presented first, followed by the entrance data. The snapshot data are overlapped with the visibility graph analysis, establishing a correlation with the movement and occupation patterns.

The image of the two parks on the axial map (figures 11&12) is quite different. Although both parks are situated, as already mentioned, in the centre of the city and close to global integrators, Pedion Areos seems to be a very dense system of lines, which is very segregated, compared to the surrounding powerful lines. Conversely, the lines crossing Regent's Park are consistent with the surrounding urban tissue, in terms of the integration values; both integration and the density of the urban grid are fading from south to north. An important line of movement is highlighted by the global integration analysis, crossing Regent's Park from south to north and connecting in that way the West End with Camden, through the park. In Pedion Areos, on the contrary, no significant lines of movement are picked up by the integration analysis, even though the streets circling the park are very well integrated in the city, illustrating the fact that the park is more or less detached from the urban grid.



**Figure 11:** axial map of PA showing global Integration, illustrating the segregation of the park compared to the surrounding urban grid.



**Figure 12:** axial map of RP showing global Integration. Both integration and the density of the grid are fading from south to north.

These properties of the parks, which can be straightforwardly identified on the axial analysis are summarised in syntactic terms in the table below. The table suggests that while Regent’s Park is almost six times larger than the Greek park, 113 lines are crossing Pedion Areos, when Regent’s Park has only 187 and an even greater cut up of the lines of the Greek Park is illustrated by the high number of segments. The relation between the line length of the park and the surrounding area –as well as the segment length – suggests that the spatial properties of Regent’s Park are more or less in agreement with the surroundings, while Pedion Areos’ lines and segments are almost half the size of the neighbouring ones.

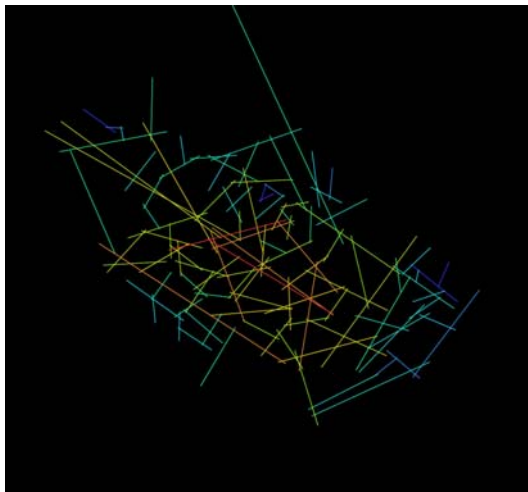
The average global integration of the Greek Park is higher than Regent’s Park, probably due to the fact that Pedion Areos is next to the global integrator of Athens, Patision Street. Compared to the average integration of the surrounding area it is evident again that Regent’s Park is more consistent with the urban grid, surrounded both by more integrated, in the south, and more segregated areas in the north, while Pedion Areos is much less integrated than the surrounding city. The axial and segment connectivity illustrate that more choices are given in the Greek Park, but, the great cut up of lines and the number of lines –and line length – per m<sup>2</sup> indicate that more decisions must be made by the visitor in Pedion Areos and more changes of direction are needed, in order to reach either to the centre of the park or to cross through it.

Park	square area (m <sup>2</sup> )	no axial lines	no segments	line length (m)	line length surroundings (m)	segment length (m)	segment length surroundings (m)	axial line per m <sup>2</sup>	line length per m <sup>2</sup>	aver global integration	aver global integration surrounding	Axial connectivity	Segment connectivity	Aver choice
RP	1659.2	187	524	413.53	477.61	94.521	105.612	0.113	0.249	1.237	1.413	4.441	4.346	7730.3
PA	297.9	113	459	253.88	377.34	33.706	60.325	0.379	0.852	1.588	1.906	6.678	4.808	7218.3

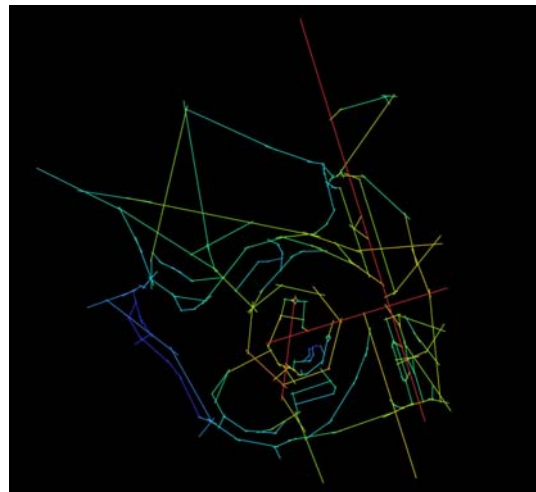
**Figure 13:** Table including the syntactic properties of the parks and their surrounding areas.



Another property that underlines the performance of the two parks is their integration core, brought to light by the axial map. In the case of Regent's Park the integration analysis highlights as the most integrated part, the north-to-south axis, which can be identified as a shallow integration core (Hillier and Tzortzi 2006) since it is directly connected to the city grid (figure 15). On the other hand, Pedion Areos has a deep core, as the axial analysis picks up as most integrated the lines that cross the insides of the park (figure 14).

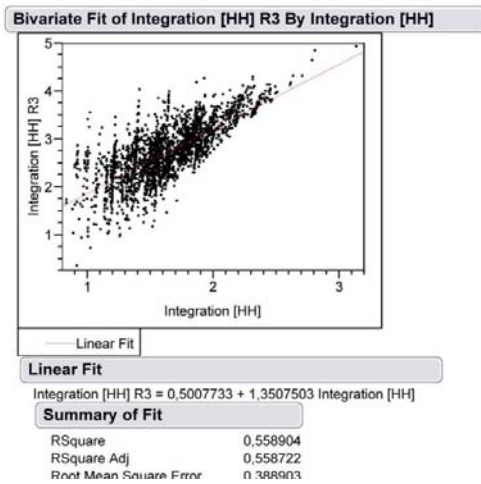


**Figure 14:** axial map of the lines than cross through the park, showing the deep integration core of Pedion Areos.

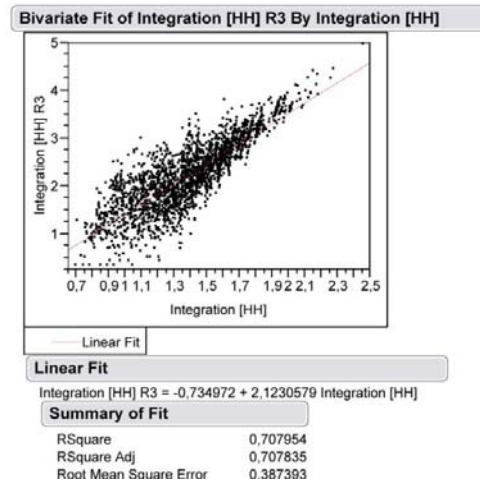


**Figure 15:** axial map of the lines crossing Regent's Park, illustrating the shallow integration core.

The correlation between the global and local integration (the measure of synergy) in the case of the area surrounding Regent's Park, is 0.707, as illustrated in figure 17. In the Athens map the same value is 0.56 (figure 16), revealing in both cases that an understanding of how the local areas relate to each other as a whole can be achieved. When the lines tested are only the ones passing through the parks, Regent's Park shows a very good correlation, with a coefficient of 0.71 (figure 19), similarly to the whole system, whereas Pedion Areos had a surprisingly good correlation of 0.74 (figure 18), a fact that can be attributed to the dominant lines that penetrate from the south east and influence the result. Excluding the lines that affect the scattergram, the synergy value becomes 0.58, consistent to the value of the surrounding area.

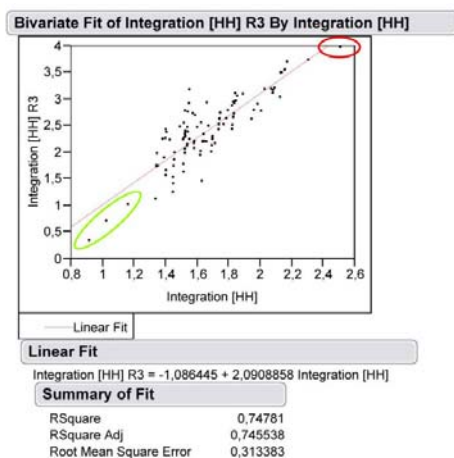


**Figure 16:** synergy of the area surrounding PA (Athens), showing a good correlation between local and global integration.

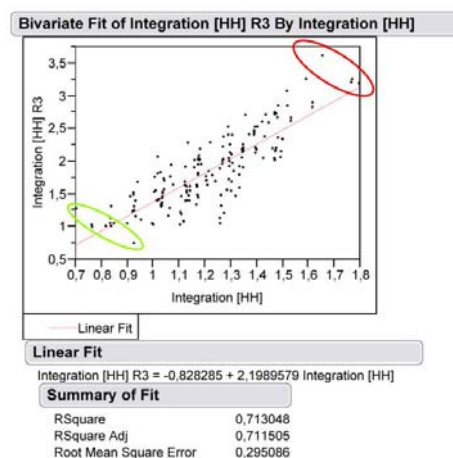


**Figure 17:** synergy of the area surrounding RP (London), illustrating a very good correlation between local and global integration.

Regent's Park scattergram (fig. 19) suggests that the most segregated spaces are found in the Inner Circle while the most integrated lines are the ones crossing the four entrances in the south, where the city centre and the denser fabric is situated. Two linear sequences in the upper part of the scattergram can be observed, suggesting that the system is bifurcated; its most integrated part, the southern, is divided into west and east, illustrating in this way the different character in these areas. Overall it can be suggested that Pedion Areos is a much smaller, denser and segregated system, strongly organised around the dominant alignment in the south east part. Regent's Park is much larger and comparatively fragmented, yet in agreement with the surrounding urban grid, appearing like a city itself with differentiated areas.



**Figure 18:** synergy of Pedion Areos, illustrating as most integrated the line that is penetrating in the park from the west side.



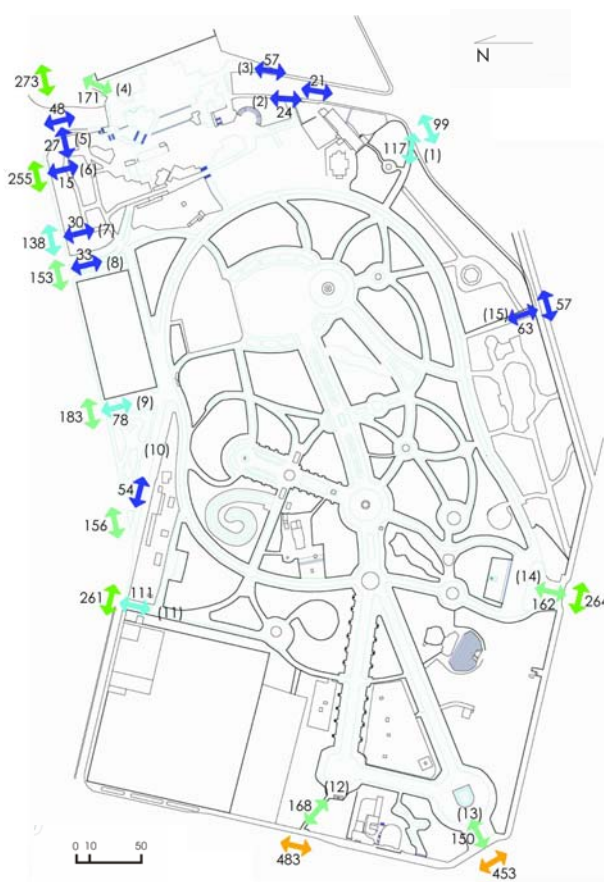
**Figure 19:** synergy of Regent's Park, showing the differentiation of the park into southwest and southeast.

## Entrance analysis

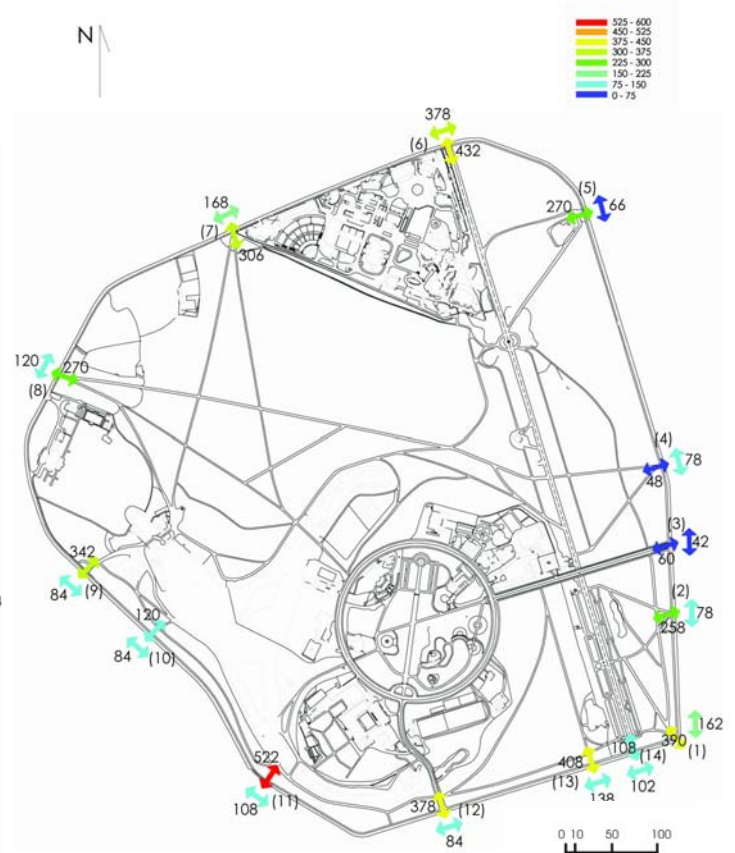
Following the syntactic contrast of the parks, the relation with their surrounding area is explored. As has been described earlier, people moving inside and outside the parks have been counted in order to capture the relation to the surrounding streets as well as to identify the busiest entrances.

As can be seen in figure 20, the movement rates in Pedion Areos are on the whole quite low, illustrating the under-usage of the park and in a way its disconnection to the urban tissue. The busiest entrances are the ones on the southwest part (12, 13, 14) and entrance 4, on the northeast corner. The two entrances on the west are the ones situated by the busiest streets, as well as entrance 14 which is also accepting movement from a vertical road.

Entrance 4 seems to be influenced by the fact that it is situated closest to the office area, accepting many workers who cross the park. On the north, the entrances are on the whole under-used, compared to the movement on the street and on the east entrances 15, 2 and 3 are poorly used, as is their surrounding area.

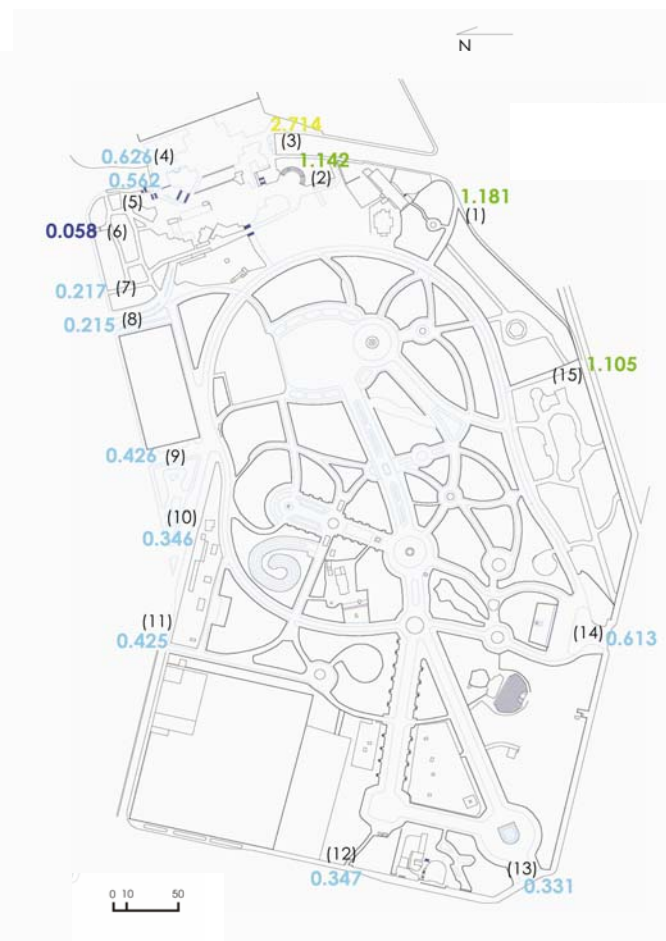


**Figure 20:** average number of moving people per hour inside and outside the entrances of PA. The busiest entrances are on the southwest and entrance (4), on the northeast.

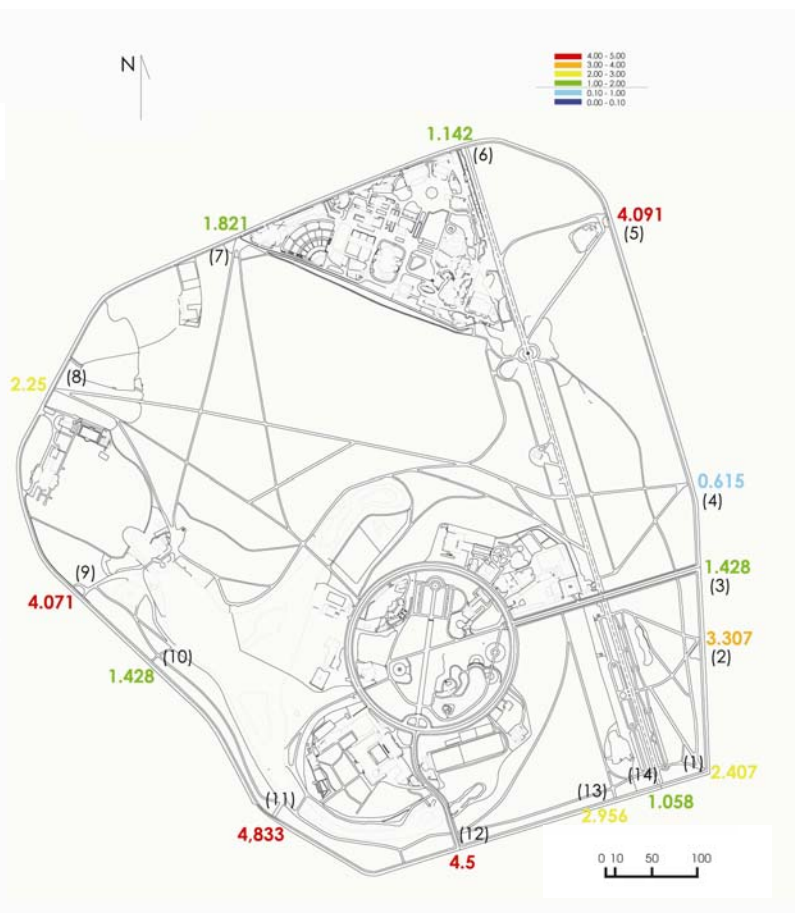


**Figure 21:** average number of moving people per hour inside and outside the entrances of RP. The busiest entrances are on the south part, closer to the offices and the city centre.

In Regent's Park, the average number of people crossing each entrance per hour is 279, much higher than Pedion Areos where on average 84 people cross each entrance per hour. The busiest entrances, as can be seen in figure 21, are found in the south of the park (11, 12, 13, 1), closer to the city centre and to the denser urban grid, in accordance with the previous analysis which has illustrated the southern part as the most integrated. The entrance at the south of the major north-south axis (14) has poor movement rates, compared to its neighbours, a fact that can be explained by its disconnection to the city grid, since it is leading to an enclosed private garden of the surrounding residences. The two entrances of the north part, 6 and 7, have high numbers of moving people, 432 and 306 respectively, affected by the position of the zoo. The entrances that seem to be under-used are 3 and 4, located at the east of the park, accepting 60 and 48 people per hour.



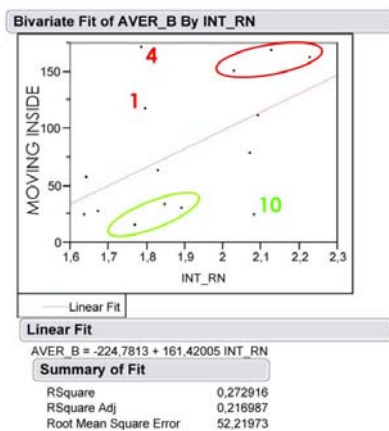
**Figure 22:** ratio of people moving inside to those moving outside of PA. Most entrances have a ratio below 1, meaning that the street is used more than the entrances.



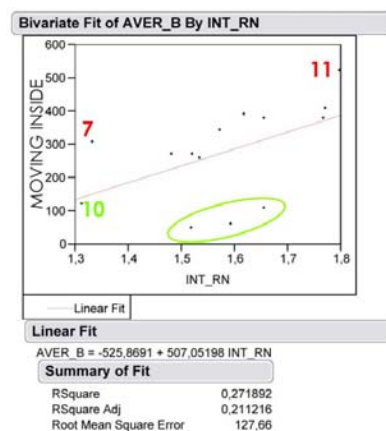
**Figure 23:** ratio of people moving inside to those moving outside of RP. Most entrances have a ratio over 1, illustrating the fact that they are used more than the street.

Figures 22 and 23 illustrate the ratio of people moving inside the parks to the ones moving on the street. It appears that these are two completely opposite cases, with Pedion Areos having an overall ratio of 0.687, while Regent's Park has a ratio of 2.564, illustrating a greater usage of the paths inside than of the 'Outer Circle'. The entrance that is most highly used, number 11, has also the highest ratio, suggesting that people use the vertical roads, straight from the city centre. Overall, it can be argued that the park is working as an attractor and also encourages through movement, distributing people in the city through the vertical roads and not through the surrounding street, which is working more as a quiet closed circuit. Only four entrances of Pedion Areos are accepting more people than the ones moving on the street and these are located in the areas that, as previously observed, are more deserted. On the whole, Pedion Areos is discouraging through movement and is not taking advantage of its central position to accept more visitors.

The scattergram showing the correlation between people entering and the integration values of the entrance lines of Pedion Areos (fig. 24) is highlighting entrances 1, 4, 12, 13 and 14 as over-performing, relative to their integration values, which have been described as the busiest ones. The entrances on the north, 6, 7, 8 and 10, appear to be under-used, as already mentioned. Figure 25, showing the correlation for Regent's Park, is picking up entrances 3, 4 and 14 that under-perform, entrance 14 being the one that is not connected to the city. On the other hand, entrances 7, affected by the zoo, and 11, affected by the city grid, seem to be used over expectations.

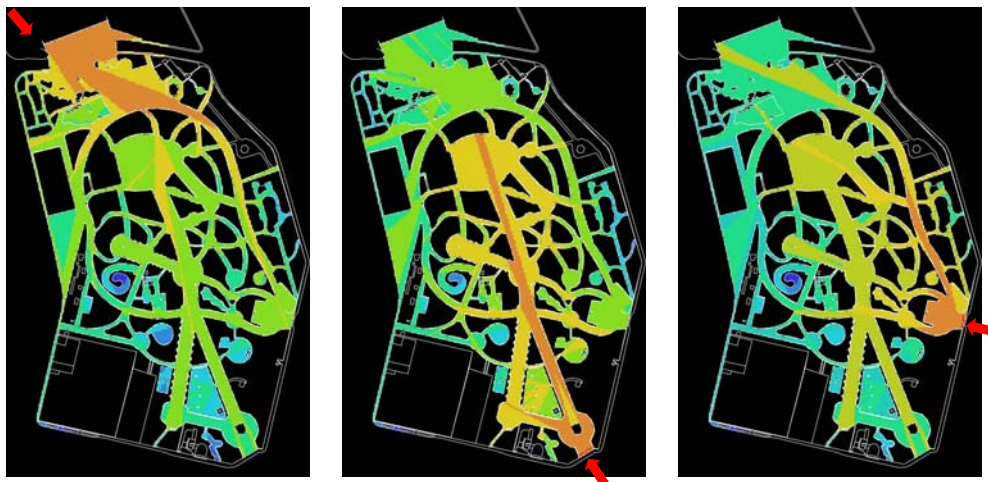


**Figure 24:** relation between people moving inside and the integration values of the entrance lines of Pedion Areos. Not a good correlation can be found due to the spatial characteristics that prevent through movement.

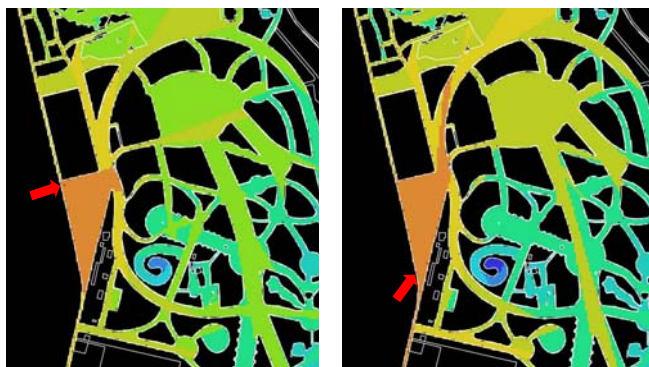


**Figure 25:** relation between people moving inside and the integration values of the entrance lines of Regent's Park. Again, there is not a good correlation, due to the size and the differentiated parts of the system.

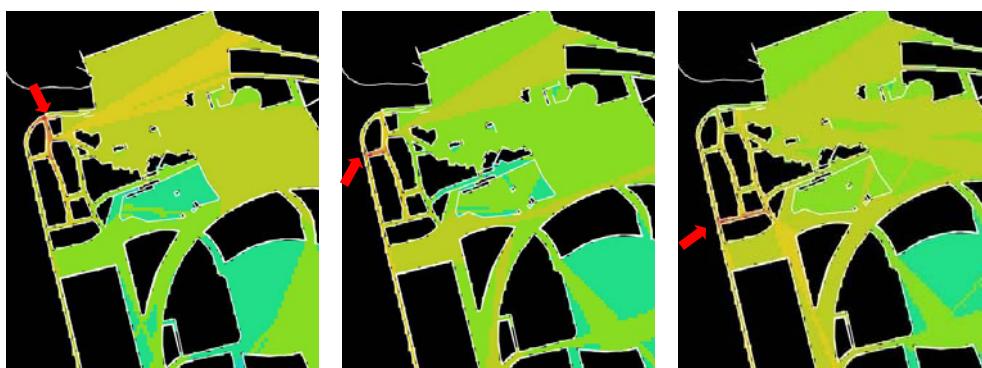
Examining the visual properties of Pedion Areos, entrances 4, 13 and 14 that have been observed to have high usage rates, have also large visual fields, as can be observed in figure 26. It seems that these isovists penetrate to the insides of the park, offering a lot of information to the passer-by. On the contrary, the isovists of the entrances 9 and 10 (fig. 27), while appear to be large, do not offer visibility inside the park, justifying in a way the lower usage numbers. Entrances 5, 6, and 7 have very poor visual fields (fig. 28), suggesting a correspondence to the low movement numbers that they have given.



**Figure 26:** visual step depth from entrances 4, 13 and 14 respectively. The busiest entrances have also large isovists, offering information to the insides of the parks.



**Figure 27:** visual step depth from entrances 9 and 10. Although they appear wide, they do not penetrate in the inner parts of the PA.



**Figure 28:** visual step depth from entrances 5, 6 and 7 respectively. The poor visual information agrees with the observation data, which has illustrated the under-usage of these entrances.

The overall visual step depth representation from the entrances of Pedion Areos (see appendix B), indicates poor visibility to the inner parts of the park, which can be distinguished by a circular road that seems to work independently of the lines that connect the park to the urban fabric. This fact could explain in a certain way the 'high' usage rates of the entrances characterized by isovists that are penetrating in the insides of the park. Moreover, a pattern of through movement can be identified on the southwest to northeast direction, since most people use these entrances. Therefore, it can be inferred that Pedion Areos is crossed by people on an east-west axis, supported by the surrounding busy streets and the visual properties of the entrances. In contrast, the north to south connection is discouraged by the circular layout and the poor visual properties of the park, which are keeping the inner spaces of the park segregated and disconnected from their surroundings.

The visual step depth analysis of the entrances of Regent's Park (see appendix B) does not seem to correspond very well to the situation observed, since most entrances provide large isovists, especially on the north part of the park, and at the same time, for some of them the movement rates are not that high. In general, what appears to be influencing the accessibility of the park is not the visual properties of its entrances, as a lot of visual information is given by most of them, but the relation of the park with its surroundings.

The city centre, where the offices and the shops are situated is on the south side, attracting most of the movement towards its direction. Both the observation data and the axial analysis reveal a powerful movement through the park on the north-south axis, while it can be suggested that a good connection of the park with the city is also achieved in the west part. The side that not as well connected to the urban grid is the east, illustrated by the under-performing entrances 3 and 4, and that could be due to the character of the blocks at this part of the city. A sequence of elongated urban blocks is facing the east side of the park, while, right behind them, large complexes of social housing estates have a totally different geometry, reducing the scale of space and creating segregation, as can be seen from the axial map. It is

possibly the influence of these spaces that causes the lower movement rates at the east side of the park, when the rest of the entrances are adequately connected to the city.

### **Movement and occupation patterns**

The study of the edge of the parks is followed by the outcomes of the analysis of the actual usage, which has been performed by the snapshot observation method, explained earlier in the study.

In the case of Pedion Areos Park, the overall numbers of static people are quite low. Contrasting the data from the five periods observed it turns out that the 'peak' hour of usage is the late evening (see appendix C). It is the time when most people are seated on the east-west axis, watching the passers-by, since this is the busiest movement axis, as well (fig. 29). The open spaces are occupied by children involved in dynamic activities, such as practising a sport or participating in a game. On the other hand, at noon (see appendix C) the park seems empty, with few pensioners and casuals occupying spaces close to the main entrances and some 'suits' walking through the park, coming from the eastern part. The lack of users of the park during lunch time could be explained by the fact that there is no lunch break for the working people in Greece; therefore, it does not constitute a 'picnic' space for officers. Nonetheless, the patterns of occupation and movement appear more or less the same in the different time periods with a variation in density and the types of users; in the morning, it is pensioners that prevail in the park, while, later on in the day, as the park becomes crowded more children and teenagers use the spaces provided.

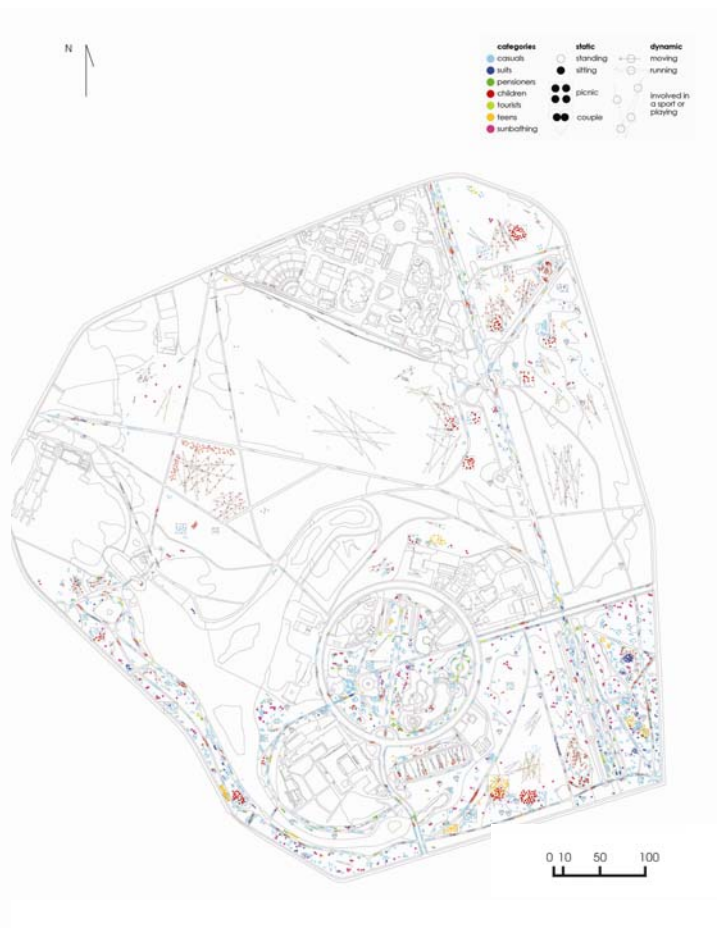
Both lunch time and late evening (see appendix C) are competing as the busiest time periods of Regent's Park. The patterns of occupation and movement are more or less the same, similarly to Pedion Areos, with different densities and categories of people. The north-south axis is highlighted by this analysis as well, as very powerful in terms of movement, while, as far as occupation is concerned, the northern large open spaces tend to host organised dynamic activities, such as sports and games, whereas in the



southern part of the park, spaces are occupied by smaller groups of people, which are usually sitting or having picnics. Overall, the park is highly used during the whole of the day (fig. 30), with the less busy hour being the morning, and furthermore, both movement and occupancy are denser in the southern parts, accordingly to the outcomes obtained by the entrance analysis.



**Figure 29:** snapshot observation PA. Overlapped data from five time periods, picking up the southwest to northeast axis as movement and occupation core.



**Figure 30:** snapshot observation RP. Overlapped data from five time periods, showing the north-south axis of movement and the southern areas as more occupied.

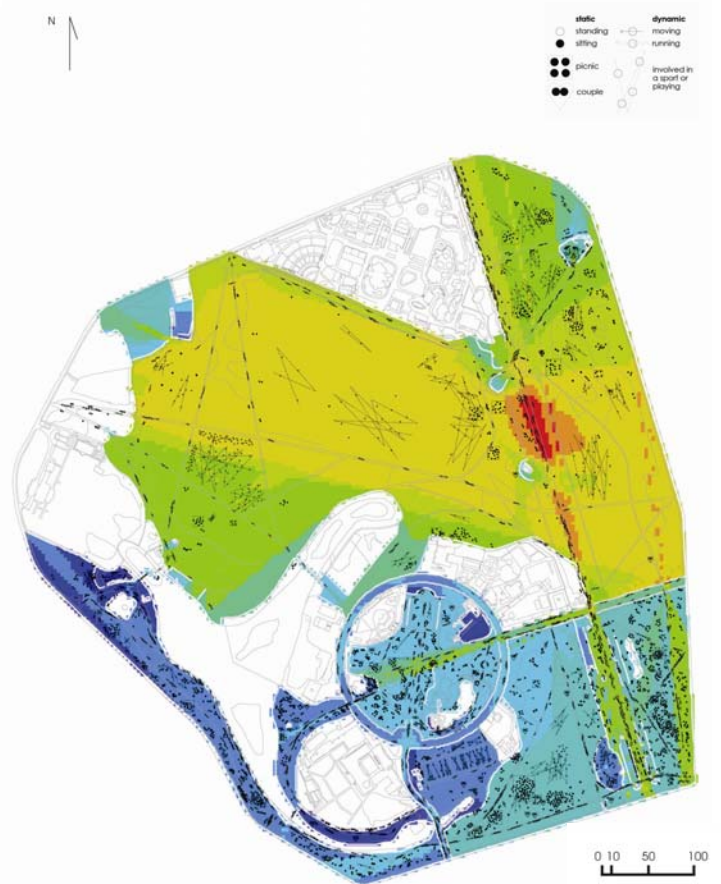
It has been observed that certain categories of people tend to occupy spaces according to their depth from the city boundaries. In both parks pensioners have been recorded to occupy spaces that are deep in the system, such as the Inner Circle in Regent's Park and the deeper parts of the intersecting spaces of Pedion Areos. Officers (or suits), on the contrary, appear to occupy places that are shallow in both parks. This most probably has to do with the time that each type of people has available, and, as a

result, the pattern of usage is affected, while a kind of 'clustering' of the different categories emerges.

When the observation data are combined in one map and overlapped with the visibility graph analysis, interesting results come about. In the Athenian park, the VGA, as can be seen in figure 31, illustrates the overall low visibility that prevails in the premises of the park, with the convex spaces that are inaccessible to work as obstacles of movement and visibility. The most visually integrated spaces are the ones situated on the southwest-northeast axis, a finding that agrees with the previous analysis and points out the importance of this direction. The observation recordings are in total accordance with the visual properties of the park, since people are both occupying and moving on spaces situated on the visibility integration core. The VGA results correlate with the outcomes of the isovist analysis as well as the axial map, stressing out in this way, the visual and spatial property of the park to direct movement and occupation on an east-west direction, dividing the park to north and south, without enhancing the connection between these two parts.



**Figure 31:** Visibility graph analysis of PA overlapped with combined snapshot data from five time periods



**Figure 32:** Visibility graph analysis of RP overlapped with combined snapshot data from five time periods

In the case of Regent's Park, because of its different character in its various parts, a combination of four separate VGAs has been attempted (see appendix C), in order to capture the visual properties of each distinctive part of the park (the northern part, the Inner Circle, the southeast spaces and the western part by the lake). The analysis has proved that the overall visibility graph (fig. 32) correlates much better with the observation data, capturing the north-south movement axis and the visibility variations of the distinctive parts, illustrating large visually integrated spaces on the northern part and more segregated ones to the south. It appears that the most organised and programmed activities, both static and dynamic, such as picnic or sports, are occurring in the most visually integrated and open spaces. Smaller groups of people, who have visited the park in order to sit and relax, prefer to settle in places where there is less visibility and they are not visually exposed.

## CHAPTER V

### **\_DISCUSSION**

In this chapter the findings are brought together and interpreted with relevance to the theories and ideas presented earlier in the report, in the light of the initial research questions.

Both axial and segment analysis have illustrated the rather complex and labyrinthine layout of the Pedion Areos Park, which is dominated by a primary alignment, affecting the synergy value. The onsite observations have illustrated that its spaces are not easily accessible and traversed by the visitors, a fact that is being additionally emphasised by the deep integration core of the system. The lack of visibility in the majority of the convex spaces of the park is intensifying these characteristics, which are in accordance with the actual performance of the park.

Regent's Park on the contrary, seems to have higher numbers of visitors, while its layout, with its shallow integration core and its wide visually integrated areas is enhancing co-presence of various categories of people and different kinds of occupation. It is these properties of the park as well as the range of activities provided that, according to Tate, "are reflected in the fact that visitors generally stay longer than in any of the six Royal Parks in central London" (2001: 83).

According to Abrioux, "the classical French garden lays out terraces, canals, sculptures, basins, parterres, trees and bushes in a manner which has the effect of coercing the visitor into severely disciplined modes of moving through it, contemplating its vistas or participating in the minutely choreographed rituals of court life" (2003: 9). Not being a classical example, but still having adopted the principles of French garden design, Pedion Areos seems to have the effect described above on the visitor, predetermining in a way the paths of movement and the specific spaces that will accommodate the static users.

What Abrioux suggests on the semantic fields of the English landscape garden is that they often appear more complex. "They are typically regarded as freely giving themselves up to appreciation by an individual sensibility. However, the exercise of this faculty remains essentially rule-bound" (2003: 9). The author argues that the naturalistic can become formal in its actual perception, or as Treib suggests, and has already been mentioned, a naturalistic garden can be "formalistic in the conception" (2005: 40). Therefore, while Regent's Park has a more 'flexible' structure, offering choices to the visitors and providing a variety of spaces with different characteristics, the performance of the park illustrates in a way that, in this case as well, similar patterns of occupation are repeated in specific spaces while movement is distributed on the syntactically defined more important axes.

The above highlight in a way the fundamental idea of space syntax that space both reflects and affects human behaviour. According to Hillier, "a pattern of space in a complex can affect the pattern of co-presence and co-awareness of collections of people who inhabit and visit the complex" (1996: 379). However, the layout of Pedion Areos is much more deterministic, a fact that is also being illustrated by the good synergy value, affected by the central alignment of the park. Its structure, even though it is labyrinthine, is well defined and dominant, but still the lack of visibility and the deep integration core suggest a rather difficult perception of the whole of the park.

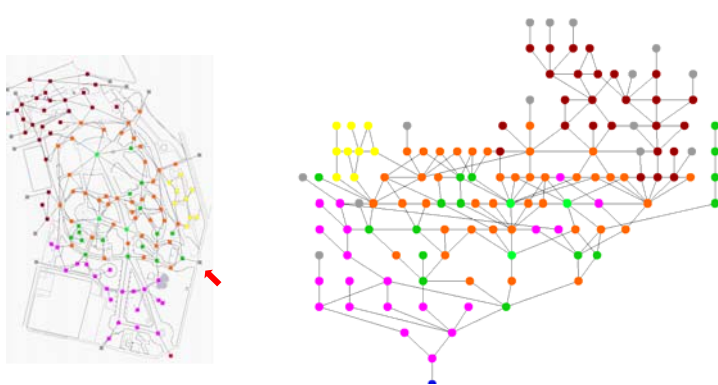
Regent's Park, conversely, has a rather good synergy value which is also reflected in the actual experience of the park, without having such a deterministic layout. This can be attributed to the fact that its naturalistic design has produced more freely accessible and less well-defined spaces, offering more choices and possibilities of discovery in its differentiated parts.

The occupation patterns in both parks seem to correlate very well with the results of the visibility graph analysis. More specifically, it is suggested that the more visually integrated spaces tend to attract organised activities performed by large groups, while most people, who visit the park in smaller groups and are involved in activities such as eating, reading or simply relaxing

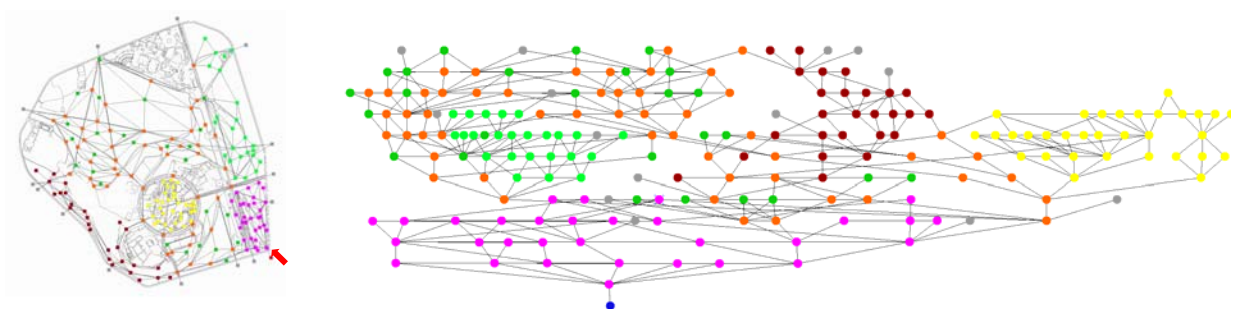
prefer to occupy more visually segregated spaces. Campos, in her research on public squares, argues that the pattern of static occupancy of such spaces is inversely related to the increasing degree of the convex spaces' visual connections to the surrounding area, regardless of the activities that people are engaged in (1999: 1). The activities that have been observed in this study consist of relaxing, eating/drinking and reading, similarly to the activities, in the case of Regent's Park, observed to occur in the less visually exposed spaces. Therefore, this model is relevant to this research, since, in this case as well, most people prefer to settle in more visually segregated spaces. However, in this case, as parks are much larger systems and offer a greater range of activities than public squares, the most visually integrated spaces are also preferred for certain group activities, such as sports or games.

### **\_Towards a model for parks**

Following the more general findings, a more theoretical spatial approach is attempted, which aims to identify the generic characteristics of the spaces that constitute a park. In order to do that, the graphs of the two parks have been drawn, where each node represents a convex space and the relations of permeability are expressed by lines that connect the nodes.



**Figure 33:** justified graph of PA from entrance 13. It is rather deep, resembling more to a building j-graph.



**Figure 34:** justified graph of RP from entrance 1. Although there are many spaces the j-graph is rather shallow.

In figures 33 and 34 the justified graphs of the two parks from entrance 13 in Pedion Areos and entrance number 1 in Regent's Park can be seen. The colours represent different spatial entities of each park. This representation is capturing in an apparent way the relations of depth between the spaces. On the whole, the justified graph of Regent's Park is quite shallow with many deep rings and a lot of links, while Pedion Areos has a much deeper graph, even though there are fewer spaces, which could also be attributed to a museum space, consisting of strategic gathering points and deep interconnected rings (Hillier and Tzortzi 2006: 298).

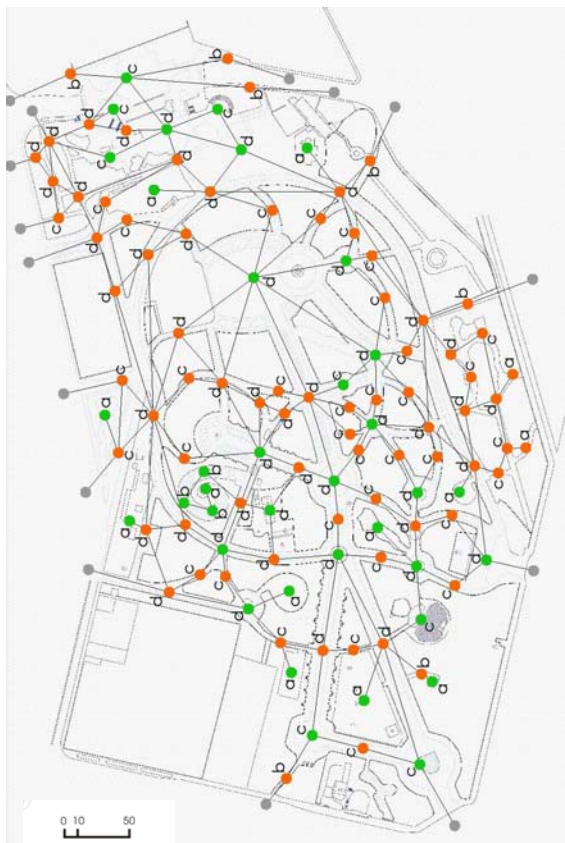
Furthermore, space syntax has developed a theory related to the graph representation, which supports that each space can be assigned with a typological identity, according to how it fits into a local complex and so acquires potentials for occupation and movement (Hillier 1996: chapter eight).

Spaces, therefore, according to Hillier, can be divided into four topological types. First, there are spaces with only one link, which can be characterized as dead-end spaces and have no through movement, thus, they are mostly occupation spaces. These are marked as 'a-spaces' in the graphs. Then, 'b-spaces' are the ones that have more than one links and are connected with one or more dead-end spaces, so all movement through a b-space must eventually go back the same way. 'C-spaces' have more than one link and lie on at least one circulation ring, meaning that there is an alternative way to return to this space. Finally, 'd-spaces' have more than two links and lie on more than one rings, encouraging in that way movement (Hillier 1996: 318-320). It is suggested that in general, b- and c-spaces increase segregation, since they enhance sequencing, while a- and d-spaces tend to increase integration, by producing shallow systems, where there is no need to pass through a lot of spaces to reach a destination (Hillier 1996: 321-327).

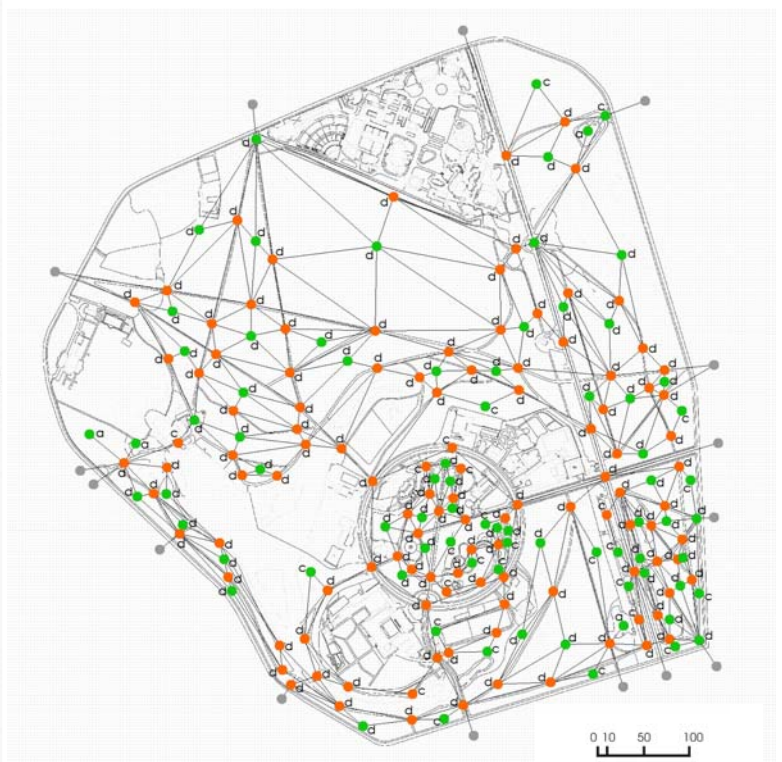
These ideas, which have also been used in order to define the museum-gallery space type by Hillier and Tzortzi (2006), are applied in this case, as the tools to capture the generic spatial properties of the two parks. Thus, as can

be seen in figure 36 the vast majority (83%) of spaces in Regent's Park can be characterised as d-spaces, while in Pedion Areos (fig. 35) there seem to be c- (37%) and d-spaces (42%) more or less equally distributed in the system. These numbers illustrate the effects of the topological properties to the experience of the users of a space, as Hillier and Tzortzi describe, in that the more d-spaces, then the more there is choice and potential for exploration, while the more the c-spaces, then the more constraint the visitor will be to particular sequences (2006: 299).

In the cases of the two parks, Regent's Park seems to offer a lot of freedom and a wide spectrum of choices, whereas in Pedion Areos movement is more restricted and random encounters with other visitors are less probable. Even though Pedion Areos has a higher number of average axial and segment connectivity, suggesting more choice, it also has a lot of c-spaces, revealing that the high connectivity value results from the d-spaces, where a lot of lines intersect. Therefore, c-spaces encourage sequencing and at the same time, too many lines cross the decision points, causing rather disorientation than freedom of choice.



**Figure 35:** Types of spaces of PA.  
a: 11.31%      b: 8.69%  
c: 37.39%      d: 42.61%



**Figure 36:** Types of spaces of RP.  
a: 2.08%      b: 0.00%  
c: 14.58%      d: 83.34%



The ideas explored above have been used in the analysis of the museum-gallery space type, as already mentioned, bringing to light amongst others, the characteristics of Tate Britain and Tate Modern. In Tate Britain, according to space syntax laboratory, around two thirds are d-spaces, offering a certain exploration potential and choice of pathways for visitors, while in Tate Modern, less than one third are d- and more than two thirds c-spaces, with much greater constraints on exploration and choice of routes. According to the research performed, this is reflected in what many experience as the very different 'feel' of the two galleries (Hillier and Tzortzi 2006: 299). Moreover, the shallow core of Tate Britain has been shown to create a sense of dynamic informal encounter, which also has the additional, emergent effect that is called 'churning': "people moving within the gallery continually re-encounter not only those moving in and out of the gallery, but also those they have encountered previously, perhaps on entering the gallery. As people tend to unconsciously survey those with whom they are co-present, a re-encounter event can also be a conscious or unconscious recognition experience, a kind of minimalist version of meeting someone for a second time" (2006: 292).

The much greater scale of Regent's Park renders the perception of such an effect difficult, however, it could be suggested that the 'churning' effect is expanded in this case, emerging through the inter-visibility of people rather than face to face encounter, as in Tate. Therefore, the shallow integration core and the d-spaces of Regent's Park indicate an enhancement of inter-visibility and a sense of encounter, whereas Pedion Areos appears to be more difficult in terms of finding one's way while discouraging at the same time visual connection amongst its visitors.

It appears that, in general, parks, unlike other built forms, tend to be comprised, in their majority, of d-spaces, since they usually offer the opportunity to the visitors to have access to all the spaces, surrounding the one they are occupying, as no built obstacles are intervening. This property constitutes the park space type unique and renders possible the actual perception of a system where every space is a d-space. Hillier and Tzortzi refer to a system of d-spaces as a "grid of spaces, which is virtually impossible to

understand and visit in an orderly sequence, and offers so much choice that without other constraints every visit is a new but unmemorable experience" (2006: 299). In the case of parks, it is true that it is not feasible to visit every space in the system in one sequence, but visitors experience the freedom given to them by the spatial configuration by creating sequences and patterns of movement. This property can be identified in Regent's Park, while Pedion Areos is structured more or less like a building, constraining movement and having a deep j-graph, as already mentioned.

Nonetheless, what people seem to do in parks is, by and large, moving and occupying spaces. They can be involved, as it has been illustrated, in organised activities or other facilities may be offered in the premises, but on the whole, the purpose of a park is to accommodate static and moving people, with no precise function involved in its program. This property of the park is corresponding to the definition of 'generic function', a concept used in space syntax theory to describe the elementary properties of a building or a built environment in order to work, regardless of the specific functions that are performed.

More specifically, generic function is defined by Hillier as the "properties of spatial arrangements which all, or at least most 'well-formed' buildings and built environments have in common, because they arise not from specific functional requirement, that is specific forms of occupation and specific patterns of movement but from what makes it possible for a complex to support any complex of occupation or any pattern of movement" (1996: 313). Since a park has no specific functional requirement and its basic aim is to have people moving through while others are occupying space statically, it can be suggested that it could be considered as the embodiment of generic function, the closest spatial approximation of this theoretical concept. This idea is also supported by the fact that a park is comprised mostly by d-spaces, providing freedom of choice to the visitors, since the generation of other types of spaces suggests that the complex becomes more well-defined and 'qualified' to accommodate a specific use.

This more theoretical approach is mostly based on the Regent's Park analysis, since Pedion Areos is considered as a rather problematic example, which does not constitute the case. Nevertheless, in order to construct a more accurate and global model of understanding the park space type, more case studies need to be analysed and put forward to the issues mentioned in this research.

## CHAPTER VI

### **\_CONCLUSION**

This report, by presenting briefly the background as well as the relevant literature to landscape design and by examining, at the same time, the spatial properties of parks through space syntax methods has aimed to contribute to a broader understanding of the way these open spaces work and to reveal their hidden configurational properties. It intended to make a first step towards the filling of the gap that the lack of relevant researches in the world of space syntax has created by introducing a model of understanding the park space type as well as human behaviour in its premises.

The spatial properties of the parks under consideration have been recognized as well as the emerging movement and occupation patterns, which follow the visual properties in both parks. Pedion Areos has been identified as a rather labyrinthine layout, with a powerful structure predetermining visitor experience of the park. A relatively evident, in all the analytic methods performed, pattern of both, movement and occupation has been detected in an east-west direction, while the north to south movement has been argued to be discouraged by the layout and the poor visual information given to the visitors, resulting in a disconnection of the city grid.

Regent's Park, on the other hand, has been described as a more 'flexible' layout, offering choices to the visitors and encouraging the encounter of different categories of people as well as the development of various types of activities. Furthermore, a powerful north-to-south axis of movement has been identified, enhancing the movement through the premises of the park in order to get from one part of the city to the other, while distributing at the same time the visitors at the numerous spaces provided in the park. A pattern of occupation has also been detected, situating the denser occupancy in the southern parts of the park, closest to the city centre, which provide at the same time less exposure to the public gaze.

The characteristics mentioned above have been identified in the generic spatial properties of the parks – in their topological spatial relations and their integration core – and an assumption has been suggested, referring to the park space type as the embodiment of space syntax' concept of generic function.

In an attempt to answer to the question posed at the beginning of this study 'what makes a successful park', the Project for Public Spaces (PPS) suggests four main ingredients that make great public open spaces: accessibility, activities, comfort and sociability<sup>1</sup>.

This research suggests that it is the spatial features of a park that can influence the 'ingredients' mentioned above and thus the performance of a public space. The properties of the spatial design can be measured through the choices and the freedom that is given to the visitors – i.e. the supremacy of d-spaces – the variety in the ratio of visibility, offering both, large visually integrated spaces and more private ones, the existence of axes that enhance movement through the park and finally, the possibility of encounter and interaction among the visitors, achieved by a shallow integration core.

As it has already been mentioned, in order to reach to interpretations in a more confident manner it is essential that more parks should be examined and analyzed in a pertinent way. Such an exploration would bring to light the spatial properties of other types of parks and open spaces, and therefore a better understanding of the park space type could be achieved.

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<sup>1</sup> According to PPS, "accessibility includes such factors as linkages, walkability, connectedness and convenience that can be measured through behavior mapping of use, pedestrian activity and traffic data. Activities include uses, celebration, usefulness, and sustainability and are measured by property values, changes in land use, and retail sales. Comfort includes elements such as safety, good places to sit, attractiveness, and cleanliness. These can be measured through crime statistics, building conditions, and environmental data. Sociability involves dimensions such as friendliness, interactivity, and diversity and can be assessed by studies of street use, diversity of users, and social networks" (in Francis 2003: 14).

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## APPENDIX A

### METHODOLOGY

**Space syntax notations** are “embodied” diagrams, in that “they are not simply a representation of a real-world space but rather contain implicit meanings related to the experience of being situated in that real-world space” (Conroy-Dalton 2005). In that sense, space syntax diagrams embed by definition properties of spaces which are related to human experience and are expected to be in harmony with human mind’s spatial representations.

The **axial map** is defined as the fewest and longest straight lines of sight and access which cover the system and pass through every convex space (Hillier and Hanson 1984: Chapter 3).

**Integration** measures the degree to which each line in the map is present on the simplest routes to and from all other lines measuring in a way the importance of a space within a system, its potential for ‘to’ movement (Hillier et al 1987, 1993).

The axial map can be broken into segments, which in turn can be connected together as a network. This procedure produces a **segment map**, where the most important lines can be distinguished in more detail, since different parts of the same line can attain different values. According to Alasdair Turner, “when the segments are examined globally according to the average amount of turning it takes to get to any other line within the system, urban environments take on results much like integration analysis, but on a finer scale” (Turner 2004: 26).

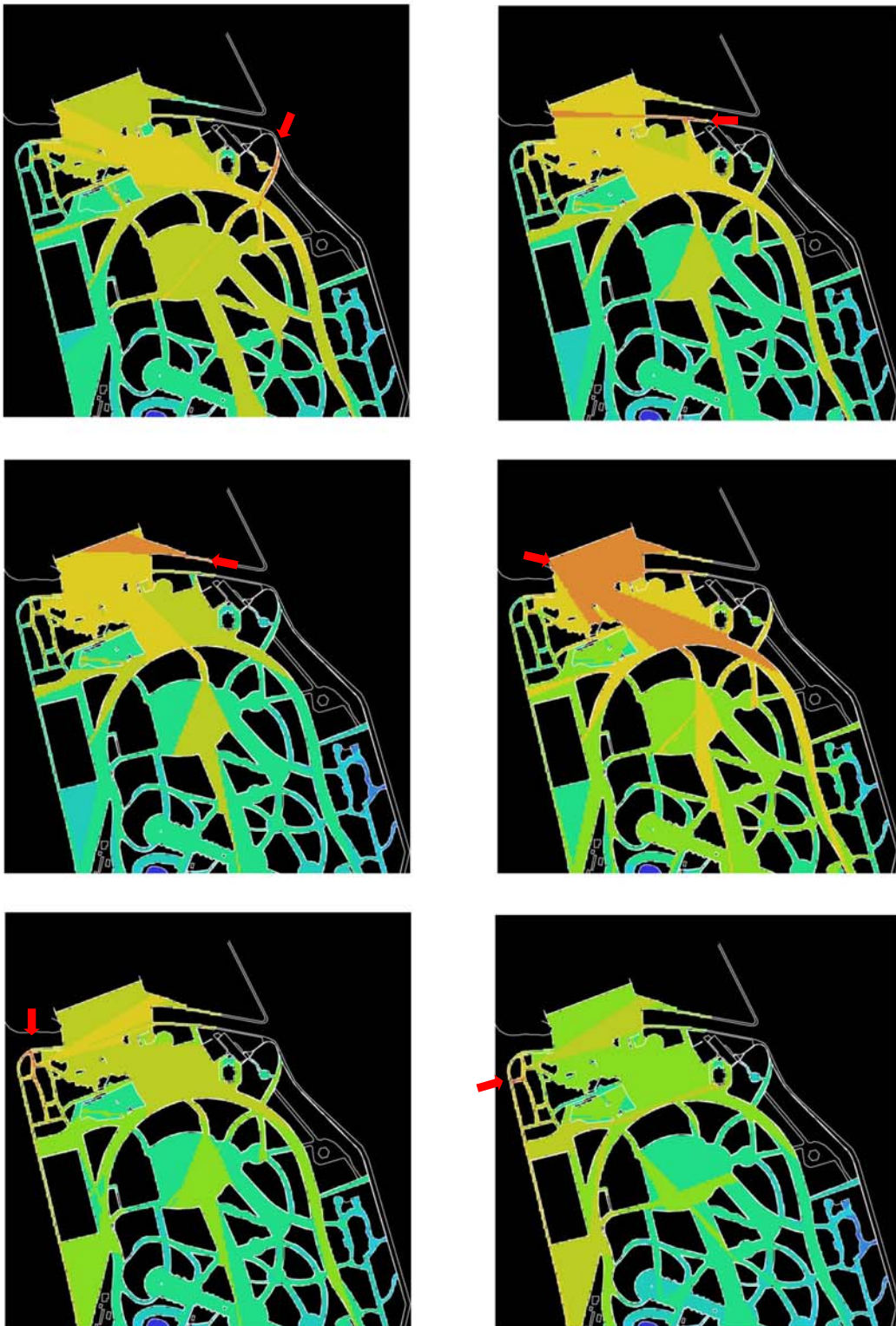
In the **justified graph** representation, spaces are represented as small circles, or nodes, and the relation with other spaces as lines, or links, joining the circles. By drawing a justified graph from a space in the system, or usually the space outside, the relations of permeability are being illustrated and the structure of the configuration is visually clarified.

The **isovist** of a space is a representation of everything that can be seen directly from it. The definition has been established by Benedikt in 1979, who proposed that a space is perceived as a collection of visible surfaces not occluded by physical boundaries such as walls or partitions.

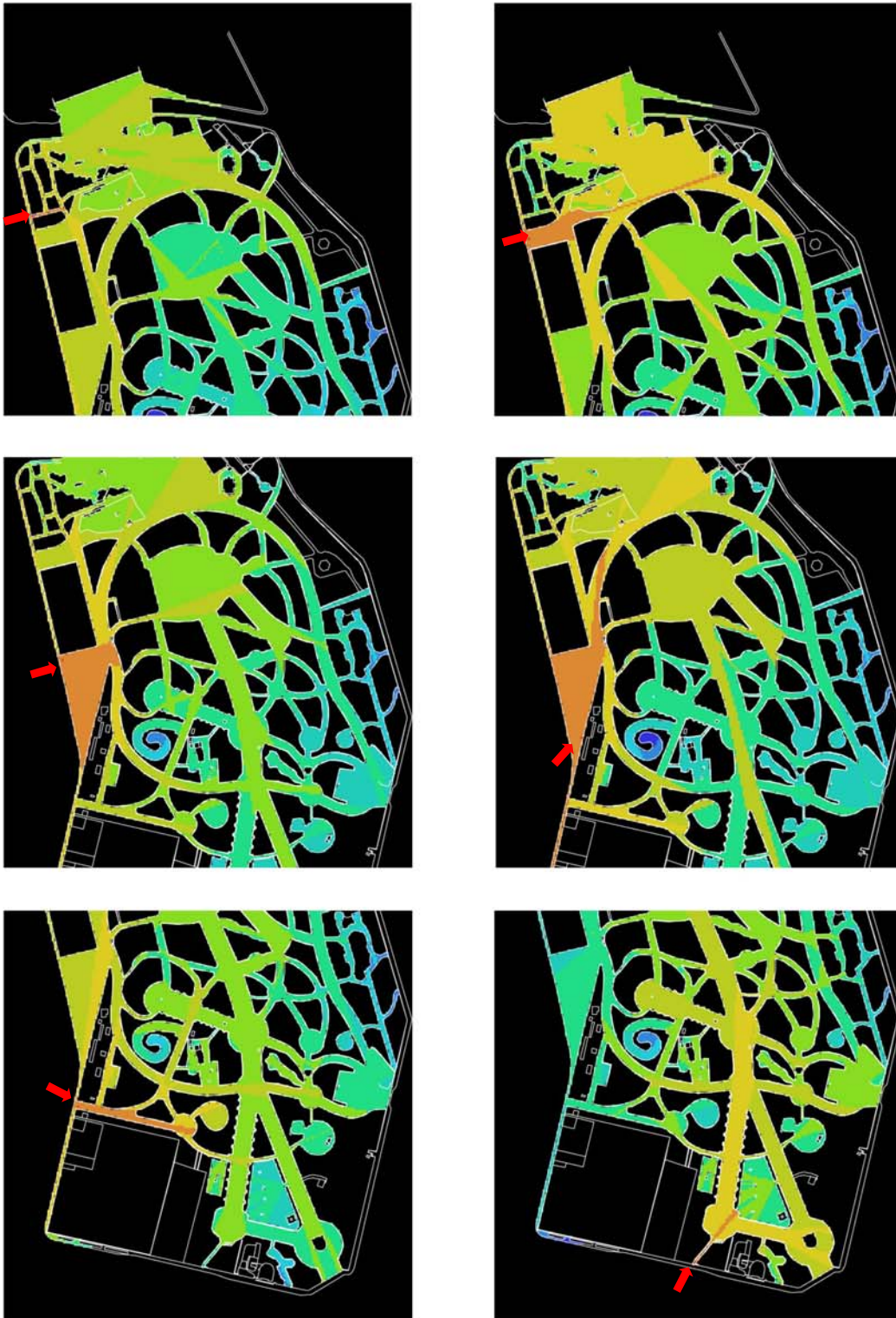
**Visibility graph analysis** (VGA) is performed through the simple act of establishing a grid of isovist locations. A graph is then created, where each point of the grid is connected to every other point that it can see. Local and global syntactic measures can be calculated for each of the generated points and then represented with different colourings of the points. The visual integration of a point, which is used in this study, is based on the number of visual steps it takes to get from that point to any other point within the system (Turner 2004: 1); the most visually integrated points are coloured red, while the most segregated are blue.

APPENDIX B

\_VISUAL STEP DEPTH ANALYSIS



**Figure 37:** Pedion Areas.  
Visual step depth from entrances 1, 2, 3, 4, 5 and 6 respectively.



**Figure 38:** Pedion Areas.  
 Visual step depth from entrances 7, 8, 9, 10, 11 and 12 respectively.



**Figure 39:** Pedion Areas.  
Visual step depth from entrances 13, 14 and 15 respectively.

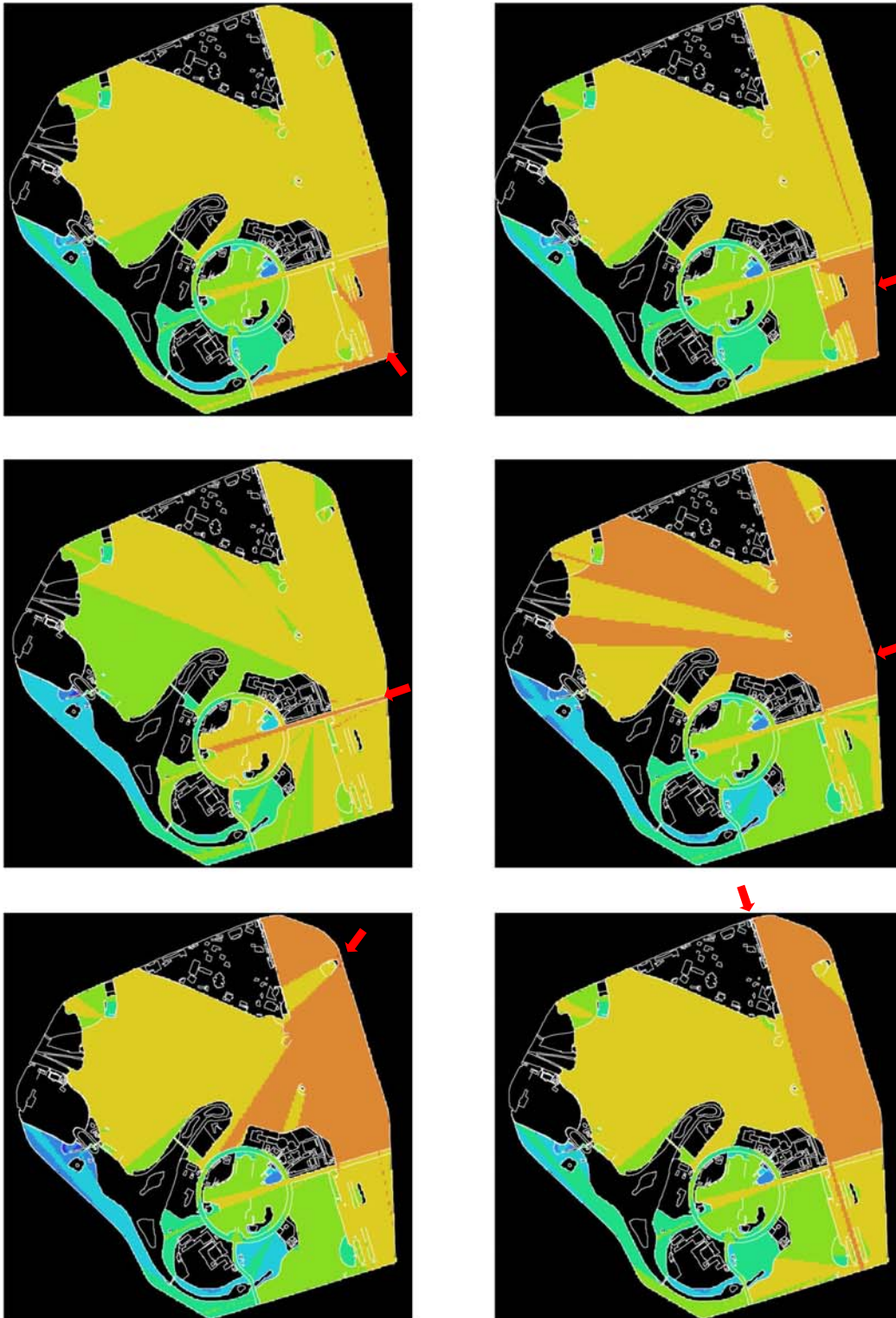


Figure 40: Regent's Park.  
 Visual step depth from entrances 1, 2, 3, 4, 5 and 6 respectively.

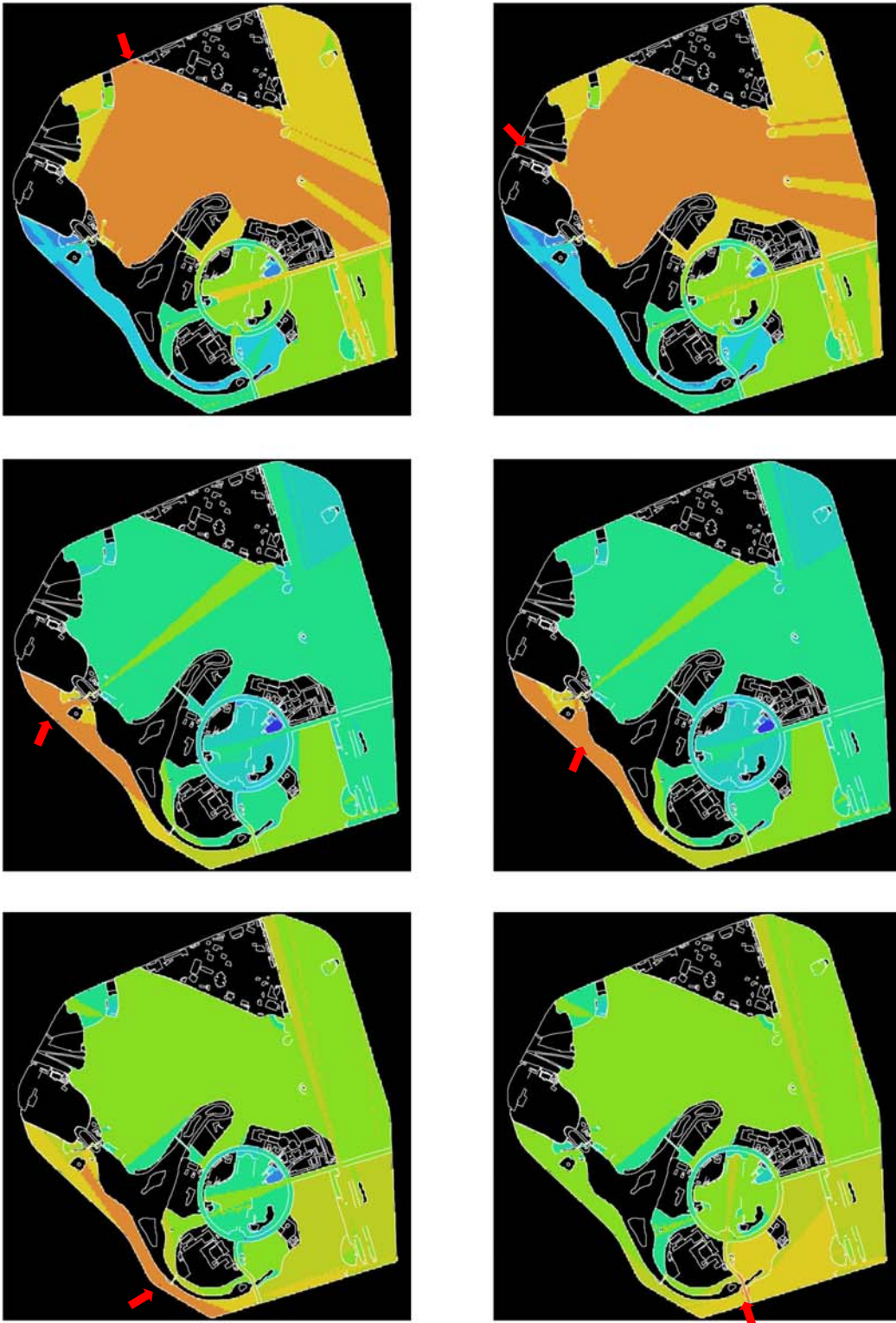
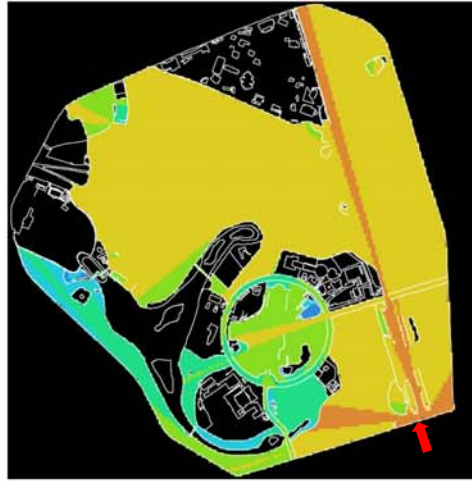
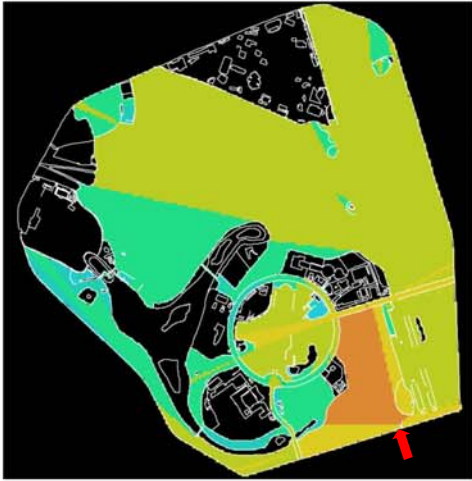


Figure 41: Regent's Park.  
 Visual step depth from entrances 7, 8, 9, 10, 11 and 12 respectively.





**Figure 42:** Regent's Park.  
Visual step depth from entrances 13 and 14 respectively.

APPENDIX C

\_SNAPSHOT OBSERVATION



Figure 43: Pedion Areas snapshot observation 11.00.

0 10 50



Figure 44: Regent's Park snapshot observation 11.00.

0 10 50 100



**Figure 45:** Pedion Areas  
snapshot observation 13.00.

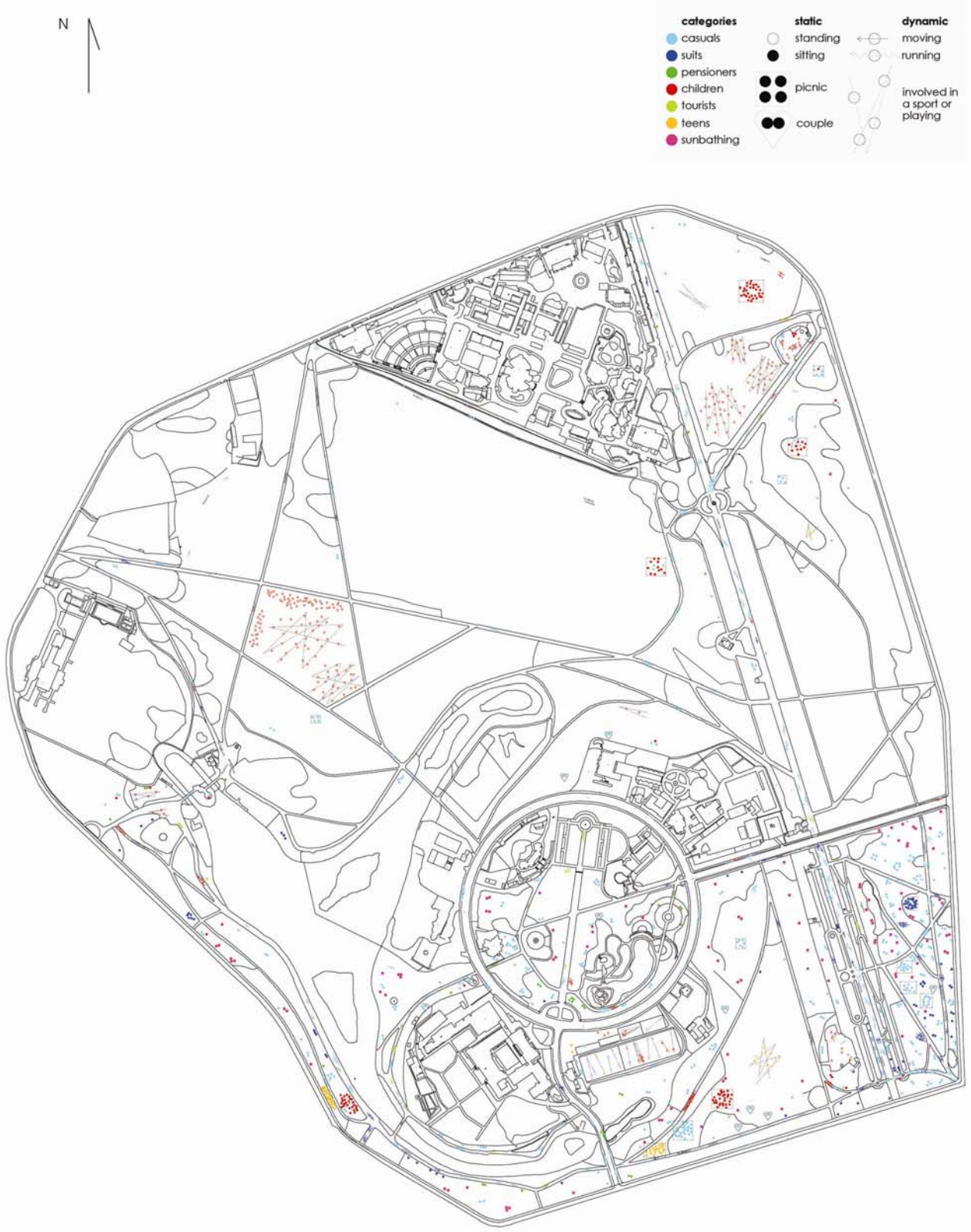


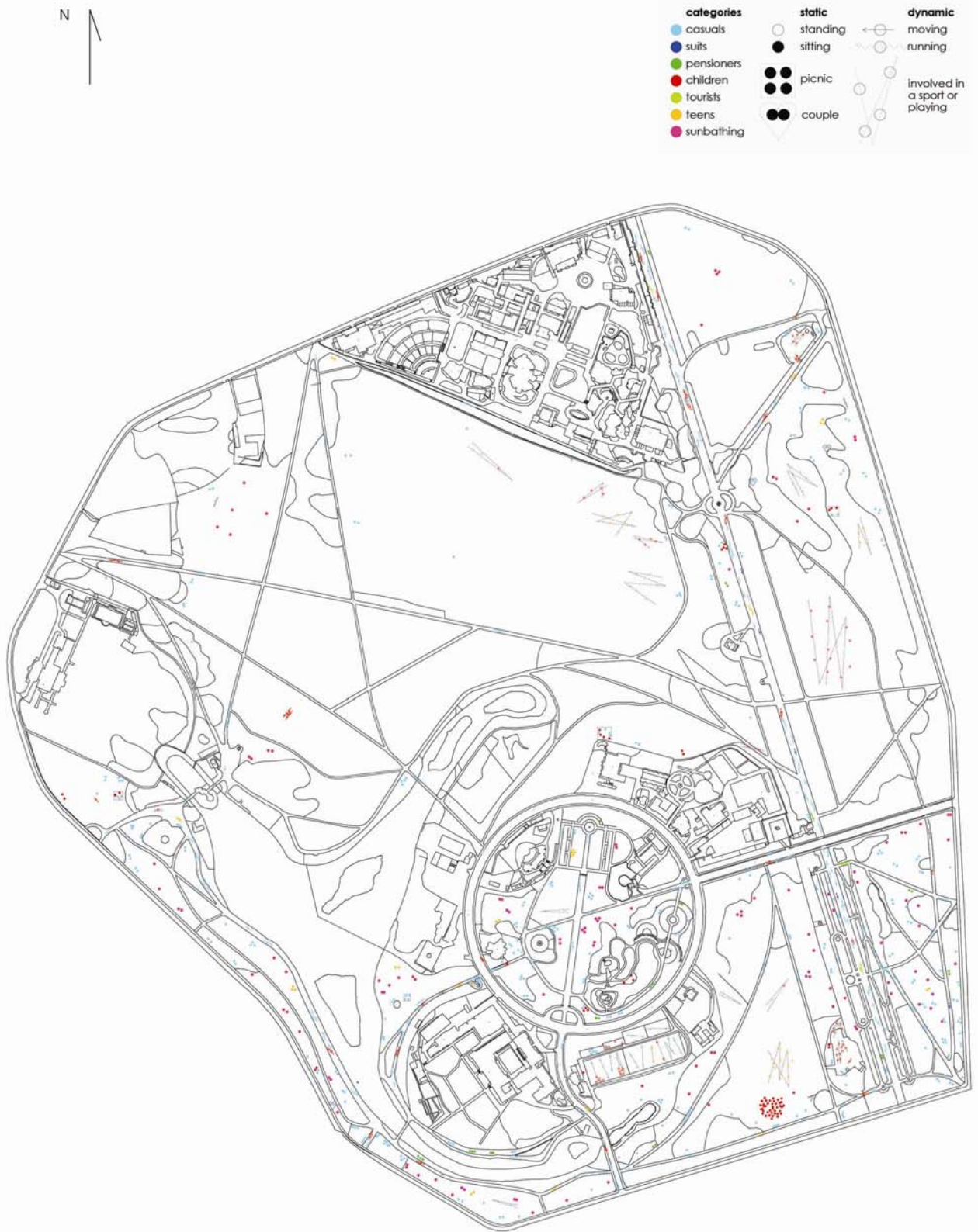
Figure 46: Regent's Park snapshot observation 13.00.

0 10 50 100



**Figure 47:** Pedion Areas  
snapshot observation 16.00.

0 10 50



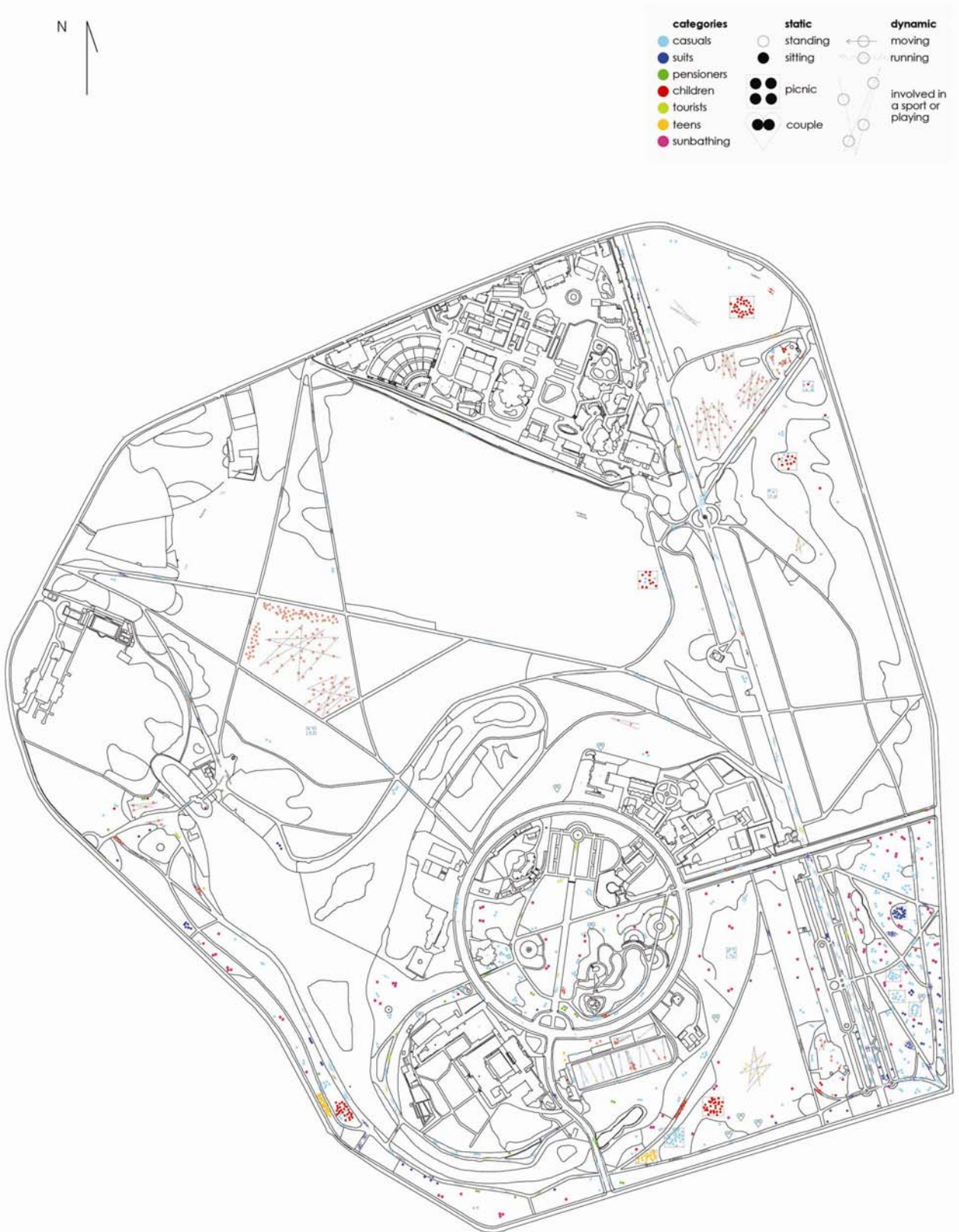
**Figure 48:** Regent's Park  
snapshot observation 16.00.





**Figure 49:** Pedion Areas  
snapshot observation 18.00.



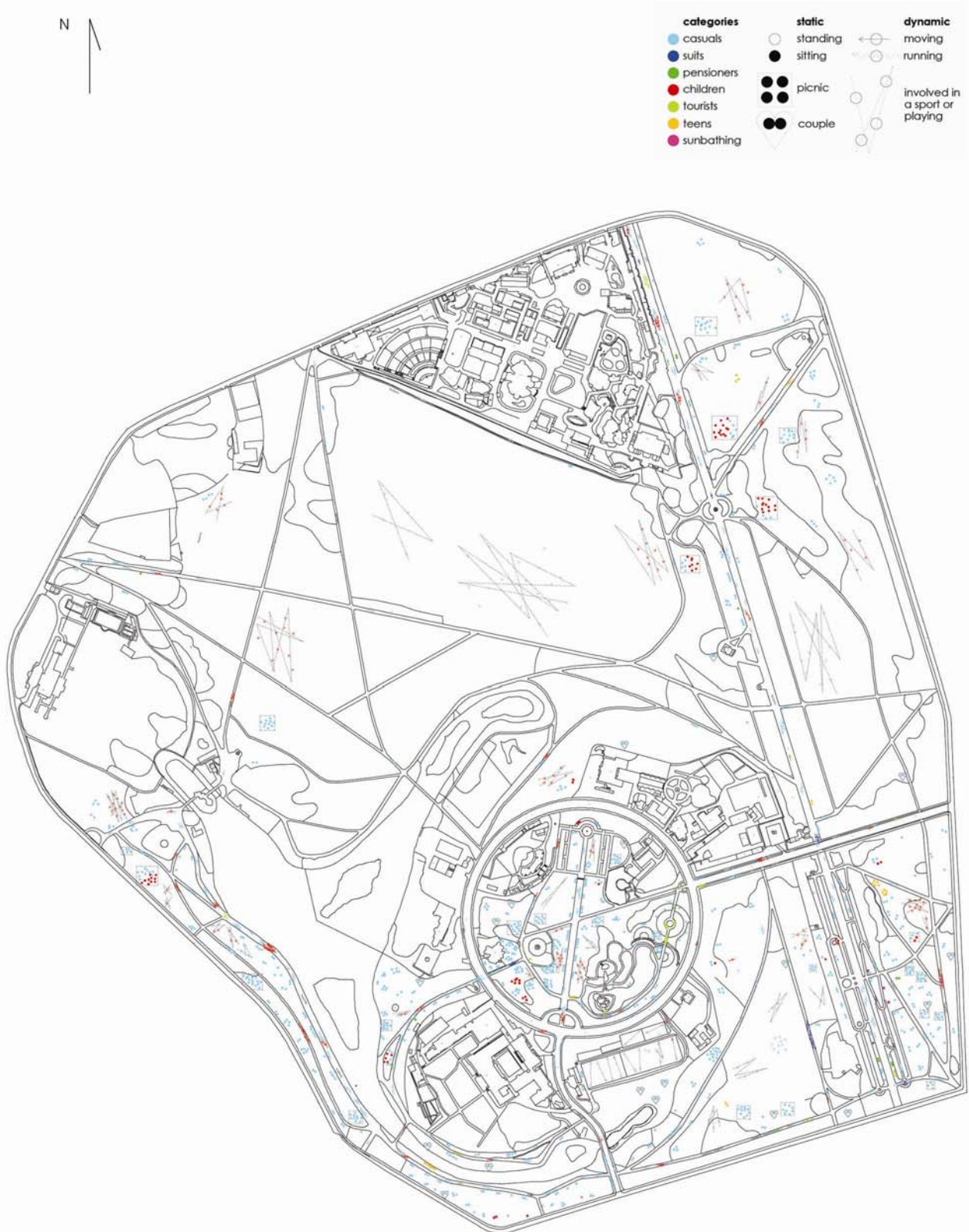


**Figure 50:** Regent's Park snapshot observation 18.00.

0 10 50 100



**Figure 51:** Pedion Areas  
snapshot observation 20.00.

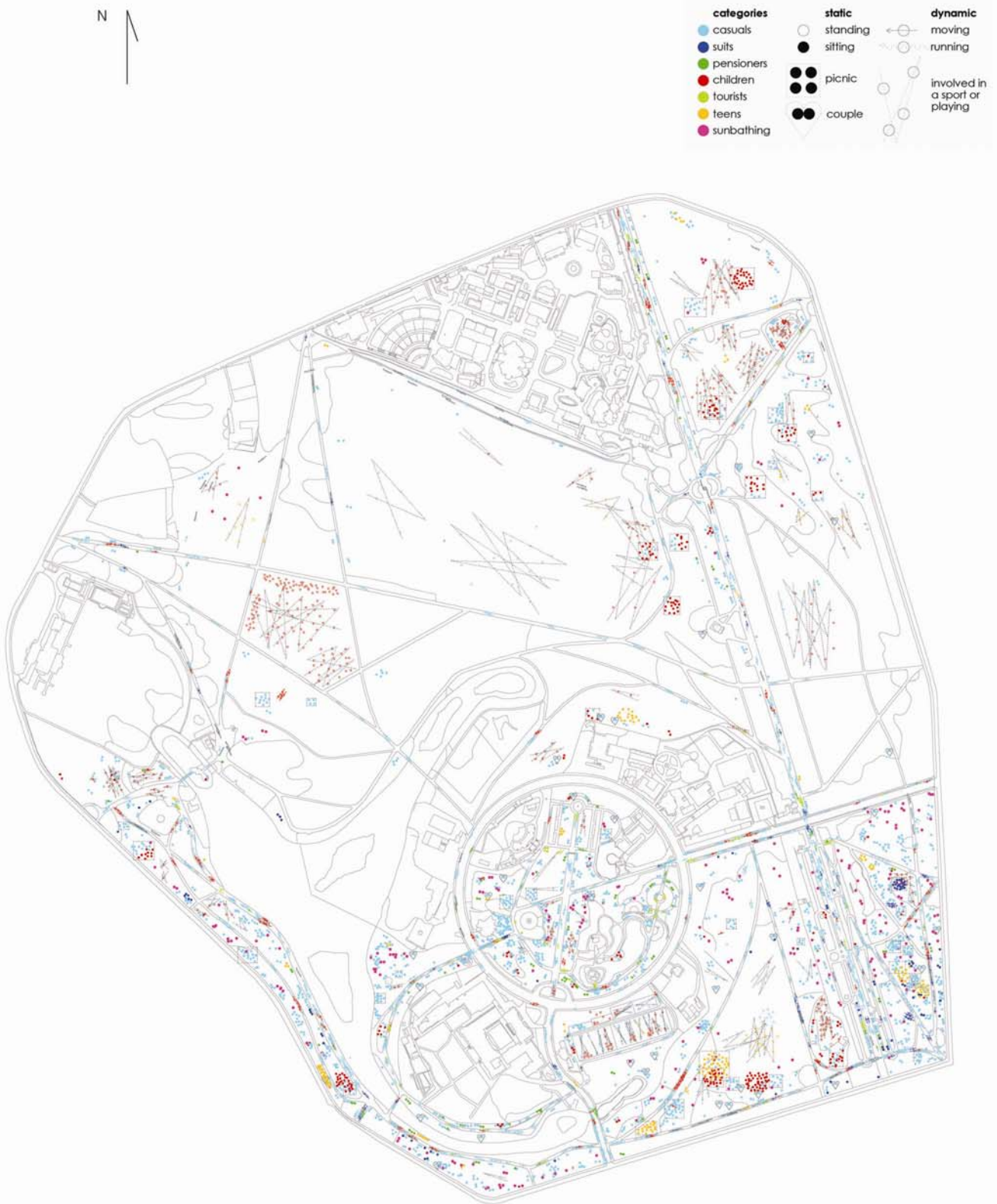


**Figure 52:** Regent's Park snapshot observation 20.00.

0 10 50 100

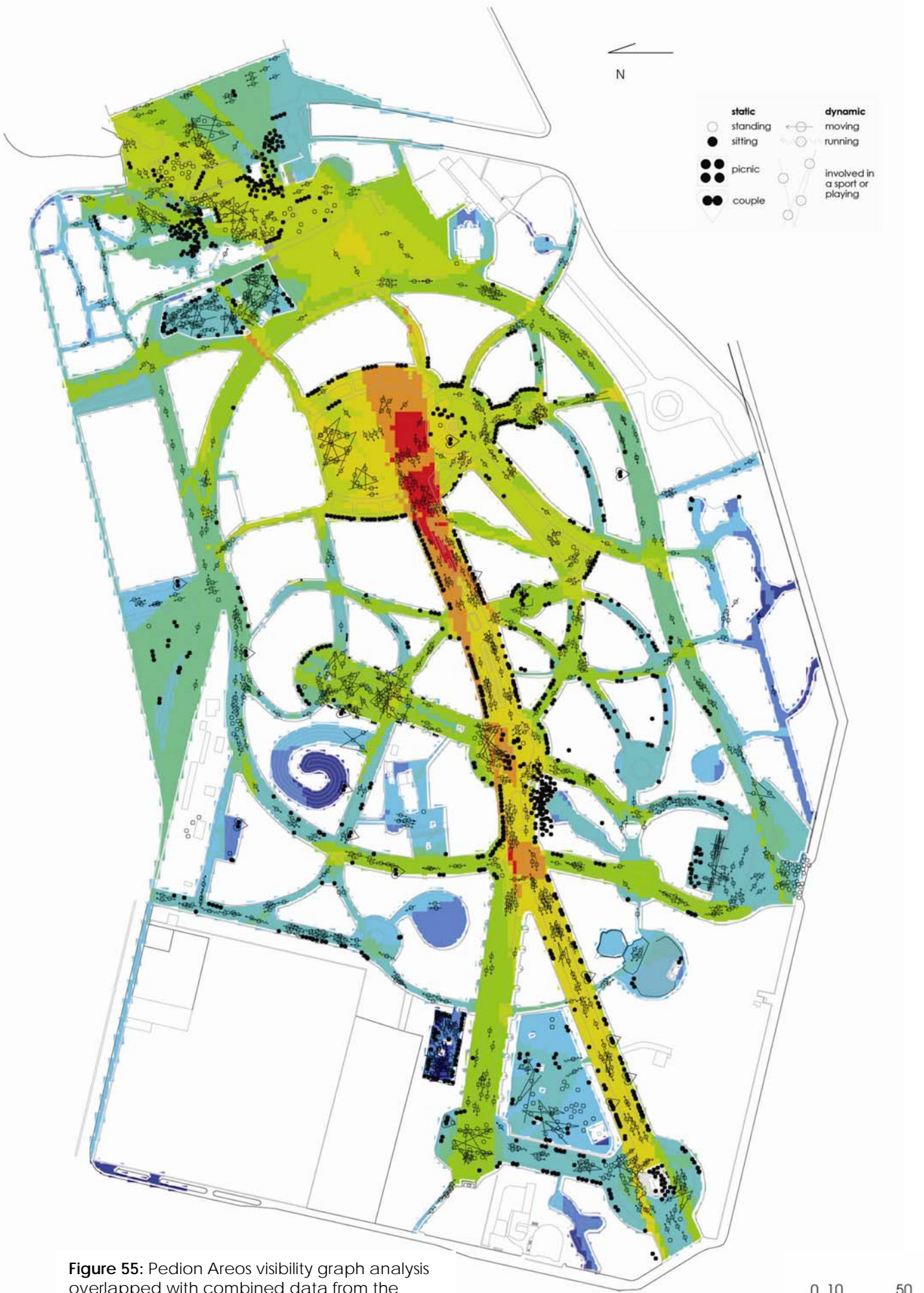


**Figure 53:** Pedion Areos snapshot observation. Overlapped data from five time periods.

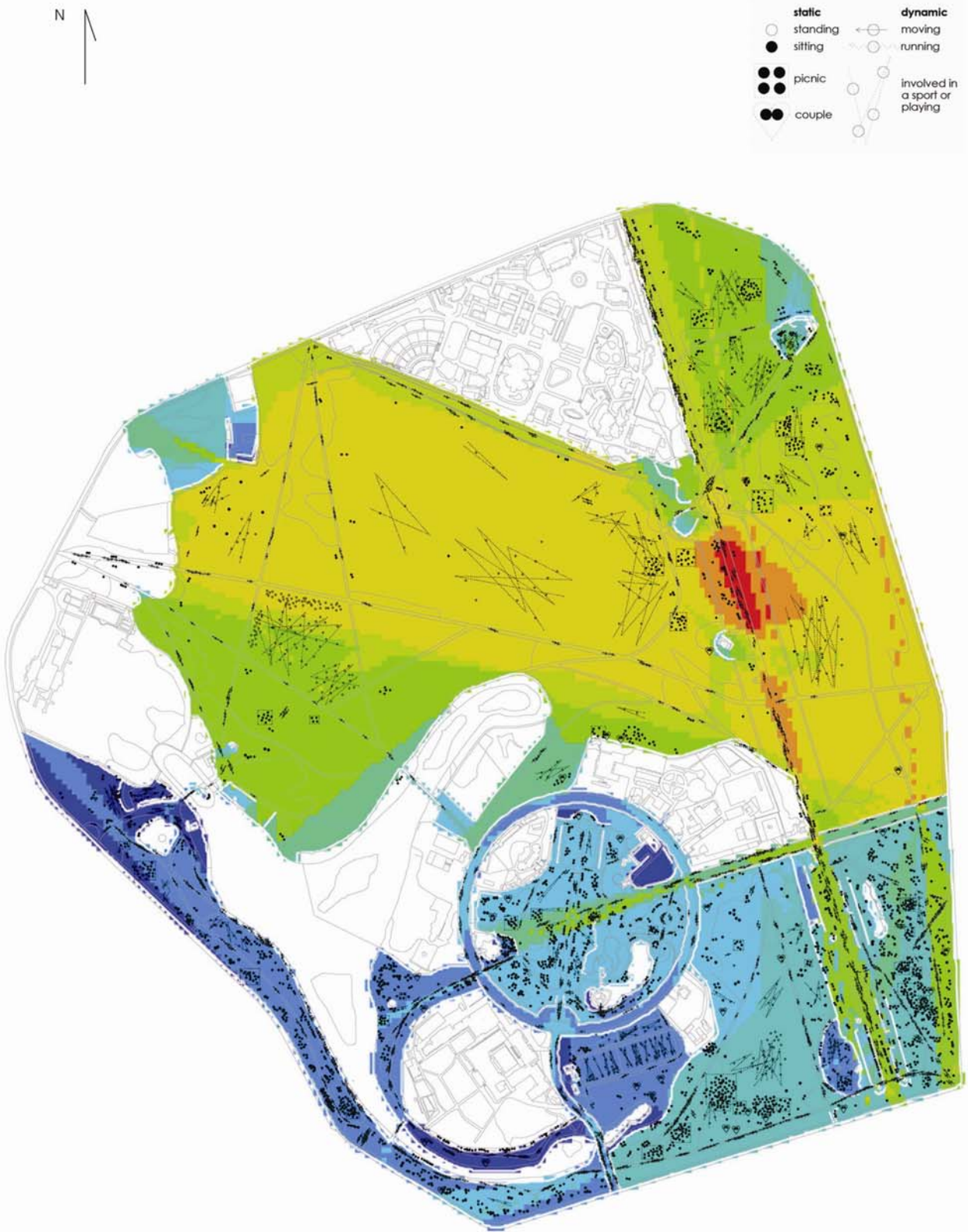


**Figure 54:** Regent's Park snapshot observation. Overlapped data from five time periods.

0 10 50 100

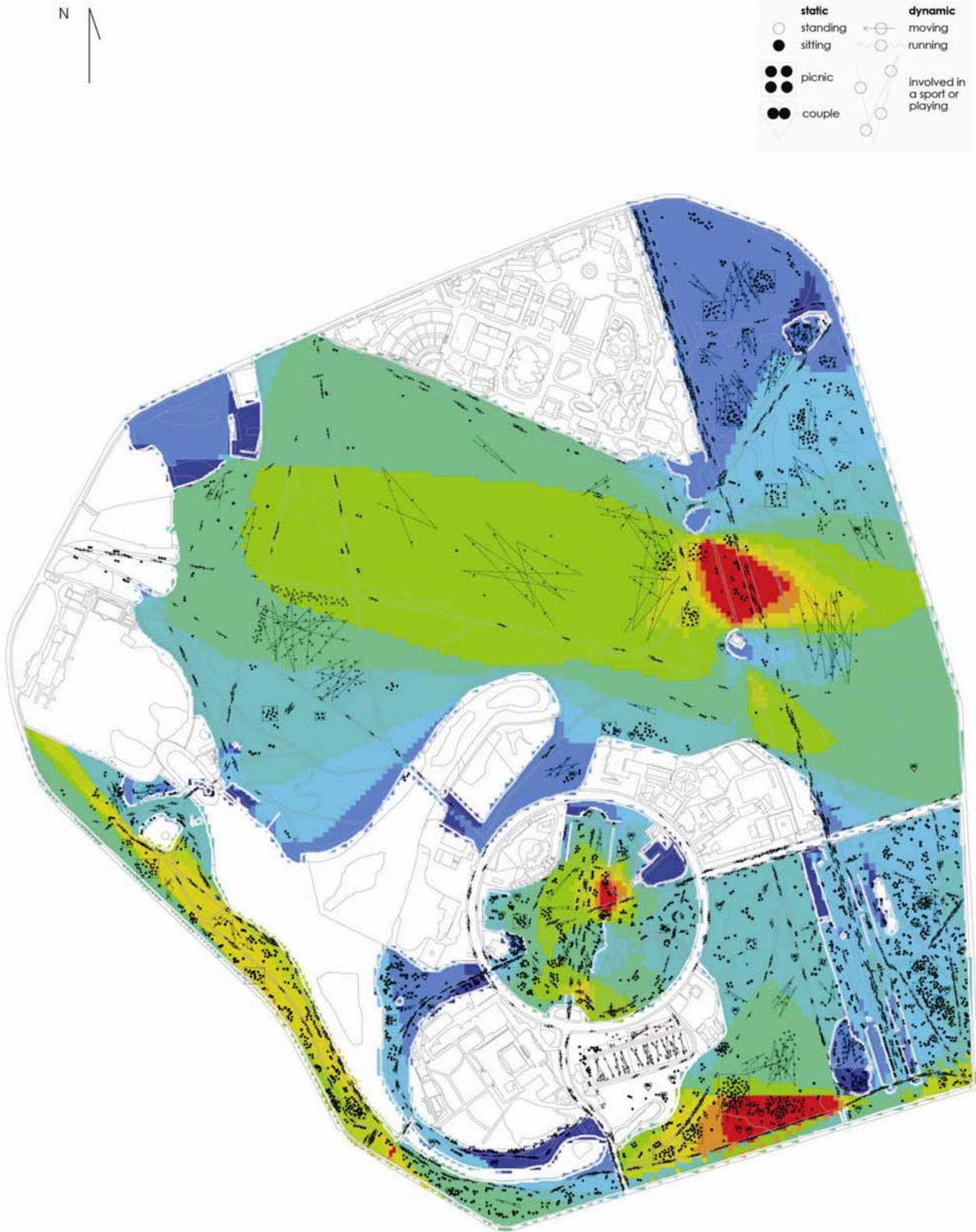


**Figure 55:** Pedion Areos visibility graph analysis overlapped with combined data from the snapshots.



**Figure 56:** Regent's Park overall visibility graph analysis overlapped with combined data from the snapshots.

0 10 50 100



**Figure 57:** Regent's Park four separate visibility graphs for the differentiated areas, overlapped with combined data from the snapshots.