

The Urban Development of the Former Athens Airport

Prof. Spiro Pollalis¹, Angela Kouveli², Vassilis Kyriakopoulos² Alexandra Papagianni²,
 Natalia Papapetrou², Vasiliki Sagia² and Naya Tritaki²

¹Professor at Harvard University and CEO of Hellinikon SA, pollalis@gsd.harvard.edu

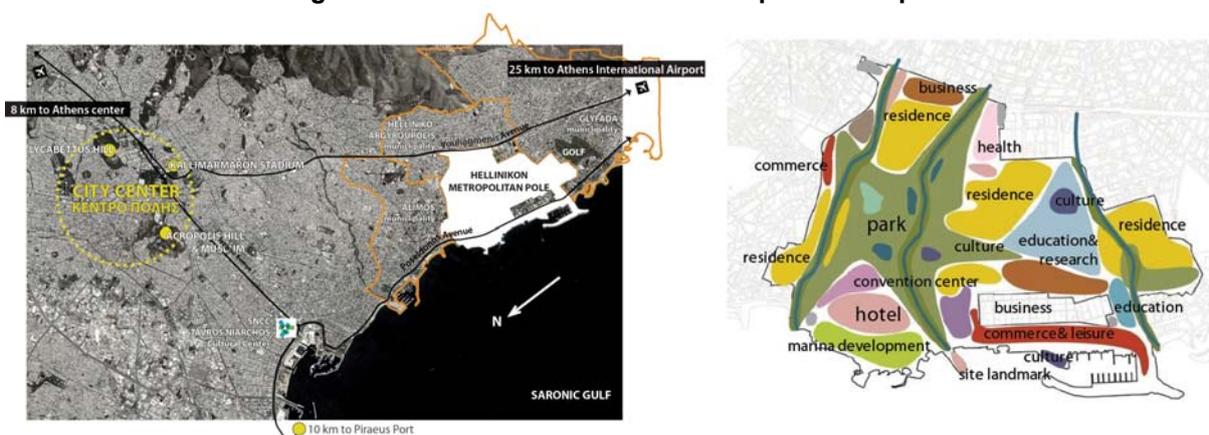
²Architects and Planners, angekli@gmail.com

Keywords: sustainability, mixed-use, park and seafront, community, synergy

ABSTRACT

Greece, in the midst of financial crisis, has an opportunity to develop the 6.200.000 m² state property of the former Hellinikon airport. The drivers are twofold: financial returns and an urban revitalization of Athens, with the potential to materially impact the life of 5 million Athenians. Strategically located 8 km southeast of downtown Athens, with a seafront of 3.5 km, a void in today’s urban grid and with a beautiful climate, Hellinikon is considered to be among the most desirable pieces of land worldwide. Hellinikon SA, the company established for the management and the development of the property, focuses on the daily operations of keeping the site running and making it development-ready. On top of that, Prof. Pollalis and his team have produced a master plan with its business model for a proposed development, addressing the key environmental, spatial, economic and social issues of the project. The master plan is a reference point and provides a framework to what is feasible, allow the people of Athens to express their desires, and the Greek government to make its strategic choices.

Fig. 1. Site’s location and the master plan concept.



The concept of the master plan is the creation of a second center of Athens to house businesses, to provide dwellings of standards of a western metropolis and to offer recreation. The ultimate objective is to provide a hub for the talented and highly educated Greek workforce to boost the national economy and be the impetus to regenerate the greater Athens area. The plan seeks to balance international competitiveness and financial growth with public benefit, engaged communities and integration with the surrounding urban environment. The strategy focuses on the creation of a sustainable development, a balance among protecting the environment, economic growth and social prosperity. The plan has adopted the four classifications of the Zofnass Program of Harvard University, directed by Prof. Pollalis: Quality of Life, Climate Change, Natural World and Resource Allocation, known as the “Envision” sustainability rating system, officially deployed in the USA.

The selected land uses aim to synergies. They include regional functions with emphasis on

culture, tourism and business, anchored in and around a much needed in Athens metropolitan park of 2.000.000m². The metropolitan park is part of the built space and provides a balanced management of natural resources. State-of-the-art urban infrastructure aims to reduce the environmental impact of the development and increase environmental awareness. A system of multiple local centers with public amenities within residential neighborhoods, inspired by the sub-sectors of the Ekistics theory of K. Doxiadis, forms the connective tissue of the plan. The creation of lively communities with distinct identities is based on pedestrian circulation, preserving historic structures on the site and constructing new landmark buildings and landscapes at the nodes of the development.

1 THE VISION

1.1 Setting the Objectives

The master planning of the former airport has been a multi-faceted process, taking into account many, sometimes contrandictory objectives. Needless to say, the starting point has always been to serve the public interest, now and in the future. A particularly difficult target at a time when international and domestic investors look for distress sales, governments want to show quick successes and to please investors and the public is disoriented after multiple sufferings downgrading their standards of living.

Thus, an approach of ensuring a starting of the development, with most of the benefits at the end, was determined to be the only realistic option, and the objectives for the development were set as follows:

- have an optimal immediate financial return to repay part of the national debt, as having agreed with the European lenders
- ensure long-term financial interest for the state
- regenerate the economy with high-paying jobs
- attract foreign influx of capital
- develop a part of the city with high standards of living, to serve as a model for the rest of Athens
- secure societal endorsement.

Regardless of the financial objectives, the central objective was set to develop a new vibrant city within the city of Athens, an economic powerhouse within an ill-planned metropolis, with all the ingredients of the iconic Greek components: a precious waterfront, ideal climate, access to the airport and to a highly qualified workforce.

The above seemed feasible given the location and size of the land, state ownership of the property in its entirety with almost no liens and few preexisting buildings. Greece, being part of the European Union with a 500+ million people and with proximity and friendly relations with the developing world, made us comfortable that the ambitious plan was within reach. We envision that the proper development of Hellinikon could transform it to a desirable place for intellectual property intensive operations of European and international companies.

1.2 Transformation of Athens

Athens, the capital city of Greece with a rich history, crowned with the Partenon, expands in the central plain of the Attica region, surrounded by sea, hills and large mountains. The city's topography could allow for a variety of urban landscapes and experiences. However, the successive concentration of population in Athens, within the recent past, has led to intensive exploitation of its natural land, to a dense urban space and, as a result, to an insufficient number of green spaces and to randomly distributed open public spaces. Due to the on-

going recession of the last four years and the limited economic resources, the maintenance of existing urban green areas has been mostly insufficient.

At the same time, both the lack of long-term integrated planning and the outdated building regulations and tools to mitigate Athens's unsustainable growth, has allowed for urban sprawl, unauthorized building and continuous fragmentation of public and private properties. Vast suburbs were created and large areas were degraded, especially in the city's center. The city's expansion was not combined with the development of adequate infrastructure services and facilities while significant pressure was put on peri-urban green areas and their ecosystems.

On the other hand, at a global scale, despite Athens's multiple assets and extensive potential, such as its key geographical location, unique historical monuments, mild climate and proximity to the sea, the city does not attract visitors nor it is a pole for international activities and events. For tourists, it is considered as a hub for visiting the islands and not as a destination. But tourism should not be defined only in relation to leisure. Educational tourism, health tourism, business tourism even culinary tourism, all reflect multiple opportunities, which the capital could develop and offer, especially given its workforce and the networking of its people with the western world.

A range of parameters is central to successfully tackling issues regarding the city's urban evolution, especially in the current historical circumstances. These include acknowledging the need for social involvement and cohesion, the imposed local and supra-regional implications, the unforeseeable economic framework, the need for alternative phasing scenarios and the need for minimizing the ecological footprint. The challenge for Athens is to promote, through a new narration and innovative interconnections, its existing complex urban and natural patterns that define its unique identity.

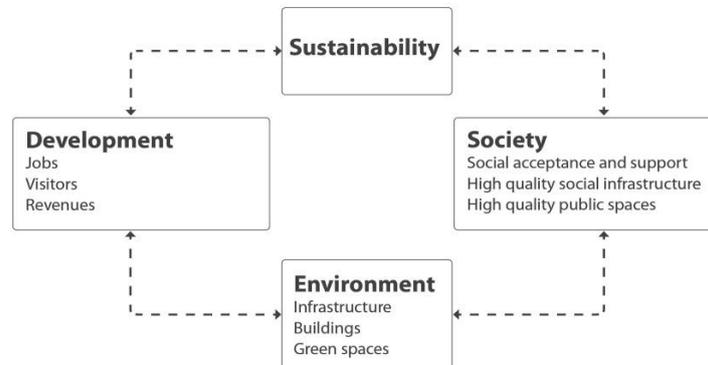
1.3 Sustainability

International experience shows that today's developments seek to be sustainable, both for the noble reasons of the survival of mankind but also to make them long-term financial successes. The development of the land of Hellinikon, in a precious corner of Europe, could not be an exception.

Sustainability includes three basic interconnected components. Environmental sustainability focuses on the protection and maintenance of natural functions and ecosystems. Social sustainability requires the availability of resources for the well being of individuals and communities such as food, shelter, education, work, safe living and working conditions, creativity, cultural heritage and inclusion. Economic sustainability concerns the consumption and production patterns, growth, development and productivity while promoting the use of resources in ways that are efficient, responsible and likely to provide long-term benefits. Finding a balance among the three is a challenge for most cities. In the majority of cases high quality of life and economic growth lead to a negative impact on natural systems and a significant ecological footprint. Vice versa, cities with small ecological footprints often face economic and social issues that affect the quality of life of their residents. However, the inherent features of cities provide significant potential in addressing such challenges: combining financial growth and the desired quality of life with a minimum environmental impact. For example, the concepts proximity and compactness that arise from the density of cities can reduce land occupied by buildings and allow for greater efficiency in organizing infrastructure systems.

Thus, our master plan was developed taking into account the overall resources to be consumed as well as the urban infrastructure for energy, transportation, water and solid waste in an integrated way, exploiting their synergies.

Fig. 2. Sustainability approach



1.4 The Public

The planning of large-scale urban projects in existing cities can regenerate the city, boost its economy and competitiveness towards alternative sectors, and provide for social welfare while protecting and restoring the natural environment. Proposals must take into consideration the multiple connections and interactions between the area redeveloped and the rest of the city, so that the dynamics of the interventions are multiplied across the city. The mix, distribution and location of the proposed land uses should accommodate both existing and projected needs, achieving a balance between financial growth and reinforce the larger social fabric. Rather than focusing only on innovative design gestures, proposals should also include provisions for upgrading and reducing stress on existing urban infrastructure and restoring disruptions imposed on natural systems by prior city growth. Finally, a phasing strategy based on a feasible business plan must be provided in order to achieve economic sustainability in the long-term.

Furthermore, equally important, regardless of the good intentions of the planners, the public must support the project, as it will affect their lives and the lives of their children. It is absolutely essential to meaningfully involve the public and to secure this support prior to any decisions to go ahead.

2 THE PLANNING

2.1 A Short History

In 1938, the private properties of the residential development in the 6.200.000 sqm Hellinikon site were condemned for the establishment of the then Athens airport. In 2000, the airport was relocated 25 km away in Spata and even since the Hellinikon site is basically empty. The relocation initiated a number of studies, proposals and political statements for its future development and a variety of perspectives and, sometimes, strong sentiments amongst the public. From the very beginning and until 2012, the political leadership promoted the idea of creating in Hellinikon the largest metropolitan park of Europe, which would be twice as large as the Central Park of New York, addressing the thirst of the public for green spaces. However, such political promises were unfounded, paying no attention to the lack of water, fertile soil, limited access to the site from the rest of Athens and the need for a large security workforce. A few years later, the needs for the 2004 Olympic Games led to building temporary facilities, introducing a gradual fragmentation. In 2004, with an impasse of what to do with the site, an international ideas competition was held for its development, which was

never materialized. A variation of the first award of the competition was proposed in 2008 by the government but was also not implemented. It should be noted that the different political decisions, the requirements of the competitions, as well as the academic proposals for Hellinikon were not accompanied by business plans for either construction or operation. Nevertheless, the many entries of the ideas competition and the academic studies have a wealth of proposed land uses and concepts that were studied in detail for developing our master plan.

2.2 Legislation Framework – Law 4062/2012

The development of Hellinikon is governed by Greek State Law 4062/2012, developed with the active participation of Hellinikon SA1. The law, taking into consideration Athens's need for green spaces, requires the creation of a metropolitan park of at least 2.000.000 sqm, addressing a strong social demand. The allowed land uses include tourism, business, theme parks, retail, leisure, waste transfer stations, waste recycling and treatment, cemeteries, education and research, residential areas, health, retail, and services to support the local residents, as well as the inhabitants of the surrounding areas. Consistent with the Greek Law, 50% of the land in urbanization areas should serve for open spaces and public benefit uses.

The total floor-to-area ratio is 0.60, and the coverage ratio on the entire site is 35%. Such percentages refer to the entire site, including the park and the public spaces, so they will be significantly higher in individual plots. The law requires the protection of streams crossing the site and the preservation of specific existing infrastructure facilities, historical listed buildings and archaeological sites.

2.3 Hellinikon Site - Location and Scale

A thorough mapping of the site's context through extensive analysis of its characteristics, its relation to the surrounding environment and its regional context, was essential for assessing the development's viability, perspectives and for developing a vision for implementation.

In a global context Athens stands in a region of strategic significance, with access to three continents within a four-hour flight radius. In a national context its central position to all the islands of the Aegean and Ionian Seas, within less than 1-hour flights or 7 hours boat trips.

Fig. 3. Location - Indicative Flight Hours



The site is 8km south of the Athens historic city centre, 25km from the new international airport and 10km from the Piraeus port. Its distance from the wilderness of Mount Hymettus

¹ Greek State Law 4062/2012 (FEK A'70/30.03.2012), <<http://www.ypeka.gr/Default.aspx?tabid=506>> [Accessed 12 May 2013]

is about 1km. In terms of current municipal jurisdiction, the site falls within the administrative borders of three different municipalities: Hellinikon-Argyroupolis on the east, Glyfada on the south and Alimos on the north side. Its west side is on the Saronic Gulf.

Comparisons of different scales and features were carried out to understand the scale of the site. A comparison of Hellinikon to the development of the former Riem Airport in Munich, a site of similar size and use, indicated that the planning for Riem included mixed land uses, such as business, commercial and residential, combined with a metropolitan park. A similar comparison to Monaco is quite interesting in terms of coastline size and land uses density. The comparison shows that Monaco is only 33% of the Hellinikon area but they both have the same length of 3,5 km seafront and have similar capacities of their marinas. Well known international metropolitan parks were also compared, showing that New York's Central Park is only 54% of the site's surface, London's Hyde Park & Kensington Gardens area is 40%, while the Parc de la Vilette in Paris land equals to 9% of Hellinikon site. The metropolitan park of 2.000.000 sqm is 33% of the site.

Fig. 4. Comparisons of different scales and features.



Before the relocation of the airport, two main users, the civil aviation authority and the air force occupied the site. Only a few years later the continuous, successive and without planning addition of land uses and multiple public and private sector users led to the separation of the site into disconnected segments managed by different organizations. Currently the site is surrounded and divided by fences and only specific sections are accessible to the public. This discontinuity does not only disorient a pedestrian and distort the sense of scale, but also forms a gap within the dense urban fabric of the neighbouring municipalities and between the mountain of Hymettus and the coastline.

2.4 Design Considerations

Throughout its history, the property has hosted a wide range of activities, altering the natural landscape. The area's natural topography is mild with an average terrain inclination of about 2% from west to east. Historical maps indicate that several streams used to cross the site. These streams formed natural corridors connecting the mountain and the sea. In large parts of the former airport, the natural inclination has been levelled completely and most of the streams have been covered as part of landscape changes made to accommodate the needs of the airport. This created significant elevation differences towards the perimeter of the property. The coastal front has also been altered through successive reclamation of land, infills and the development of marine facilities.

Intense and industrial activities, often involving contaminating substances, and the multiple structures of different scales on the site have had had a strong impact on the quality of the topsoil. Across the former airport area, around 70% of the total surface is covered by hard, water impermeable surfaces and the remaining unpaved areas are often compressed, characterized by small depths of topsoil (5-25 cm) and a high stone and gravel content. The conditions are unfavourable for retaining moisture and for providing sufficient nutrients to plants.

3 THE STARTING POINTS OF THE MASTER PLAN

3.1 Sustainability

An integrated approach to sustainability forms the core of the master plan. The social, environmental and economic aspects of sustainability were taken into consideration across different spatial scales, ranging from city level to neighbourhoods and buildings. Planning decisions were based on sustainability objectives developed by the Zofnass program of Harvard University. The program develops methods and tools for the implementation of sustainable solutions in urban planning and particularly urban infrastructure. The objectives were organized in four categories:

- Quality of life, aiming for growth, wellbeing and creation of strong communities.
- Climate change, including strategies for reducing green house emissions, mitigating urban heat island effect and protecting against climate threats.
- Resource allocation, proving a framework for the efficient management of energy, waste, water and materials.
- Natural world, focusing on minimizing the impact of new development or restoring the impact of existing, on natural systems, processes and resources.

The former airport is a site with significant potential for financial growth due to its location, size and adjacency to the sea. It is the last large undeveloped area in the dense metropolitan complex of Athens. The site of the former airport also includes landmarks and traces of important milestones in the history of the city and holds an important place in collective memory. But the exploitation of the site so far has isolated it from the urban fabric and has caused significant environmental degradation. The master plan is a composition of these parameters. It proposes a mix of new and existing land uses aiming to restart the economy and cover existing and projected needs of the surrounding and wider Athens areas. The synergies of land uses and their configuration in the space aim for community engagement, safety and a stimulating environment. Attention is given on integrating a model urban infrastructure. Transportation planning is proposed to be organized on pedestrian circulation and public transit with a minimum need for car use within the site. Waste and energy management are proposed to be based on the principles of decentralized, distributed systems. A large portion of the municipal waste produced will be processed and reused on site and energy will similarly be generated through renewable sources applications. Despite the addition of new construction, significant natural systems of the site are proposed to be restored. The streams crossing the site are revived and framed by green buffer zones reinforcing the connection between the neighbouring mountains and the sea, promoting habitat connectivity. Finally extensive paved areas are replaced with native vegetation and water permeable materials so as to gradually restore hydrological and nutrition cycles.

3.2 Design Strategies and Ekistics

The Ekistics theory of K. Doxiadis was adopted during the planning process to define the design strategies for a sustainable development in Hellinikon, both as an analysis and design instrument, but also in an enhanced way of the original Ekistics to address sustainability. Ekistics's original concept sought for a balance between 5 interrelated elements: Nature, Men, Society, Shells and Networks, therefore proposed an harmonious allocation of populations across neighborhoods, settlements and cities in a interscalar interconnected system.

The first design strategy for organizing the urban model concerned connections and the various circulation networks. First, the landscape features and the existing networks were

analyzed. Attention was then given on the connection of each proposed land use with both the immediate and interregional surroundings by establishing new traffic and circulation networks that would anchor the site with the existing urban grid. Walking proximity, a basic quality of Ekistics, was implemented in the urban model design, through an autonomous pedestrian pattern, an alternative system of connectivity with minimum environmental impact.

The second design strategy, defined as mixed-use development and open space strategy, suggested the implementation of various land uses, infrastructure, and public spaces with the aim to provide a safe, stimulating, sustainable and self-sufficient environment. The allocation of land uses took into consideration the site's topography, the adjacency to a network of similar uses located within the region, as well as a feasible phasing strategy for the project.

3.3 Development Strategy

Despite the unique site, the development faces certain issues that need be properly addressed. The local real estate market has collapsed as a result of the stalled economy, with thousands of available residences and office spaces in the market. Severe taxation on real estate has made the situation even more difficult, while the banks have no funds for loans and the country risk has resulted to high interest rates. With another project of this scale, these issues could have stopped thoughts for development. However, the potential of the site and the strong belief that the economy will change soon, make us feel very positive that the opportunity is there. It is like the piece of marble that contains the statue and waits for its Michelangelo to get it out.

A simple first answer is to create a market for visitors. Near the new airport, the historic center of Athens and the islands, it could be a destination for those willing to have either a second home or just stay in urban resorts. Proper taxation exemptions and preference in processing immigration could be drivers to success. However, aiming to create a new market for a development has proven difficult in other projects in the past. So, we have chosen to have such a market only as secondary and focus on reigniting the economy, as the first strategic option, prioritizing public demand.

This choice is made to secure social sustainability and shift the impact of economic benefits to the middle and upper middle class. As a result, we have organized the implementation of the development according to an economically feasible phasing plan. We believe that the development of Hellinikon is not a real estate project but a process for triggering the economy. It is envisioned as a mixed-use development with public and specialized services and facilities that will enable Athens to compete with other Mediterranean cities.

Thus, the initial focus is on the establishment of dynamic core job generating industries, which will act as attractors, such as healthcare, research and innovation centers, educational institutions, entertainment and hospitality. Then, at a second level, is the construction of state-of-the-art infrastructures in energy, water, solid waste, transportation, telecommunications, landscape and security. The aim is to promote self-sufficiency of the development and integration within the rest of the city. We believe, such actions will make the site desirable and will be enablers for high-impact activities. Then, additional services will be introduced, such as local integrated services, innovative zone, seed capital and business incubator clusters, vital infrastructure, healthy living etc. Real estate is the final step. The construction of new neighborhoods, homes and high-rise condominiums, the residential services, the exploitation of office and retail space and finally the potential creation of shopping malls should be regarded as the completion of the development or of each phase, as supporting the specific job-generating facilities as they are being established.

Fig. 5. Hellinikon's Four Steps of Development

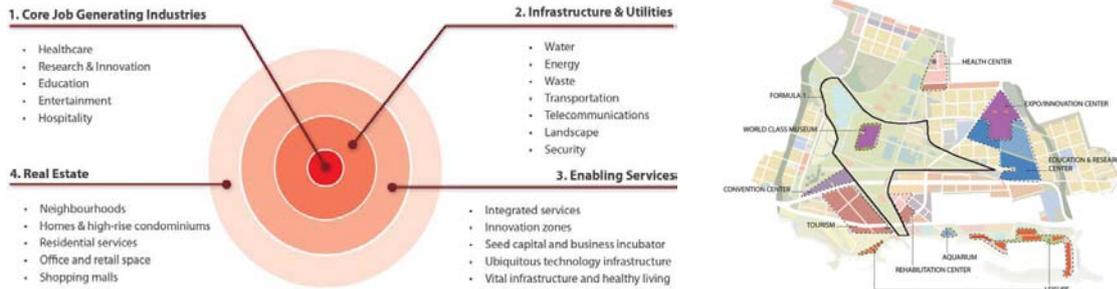
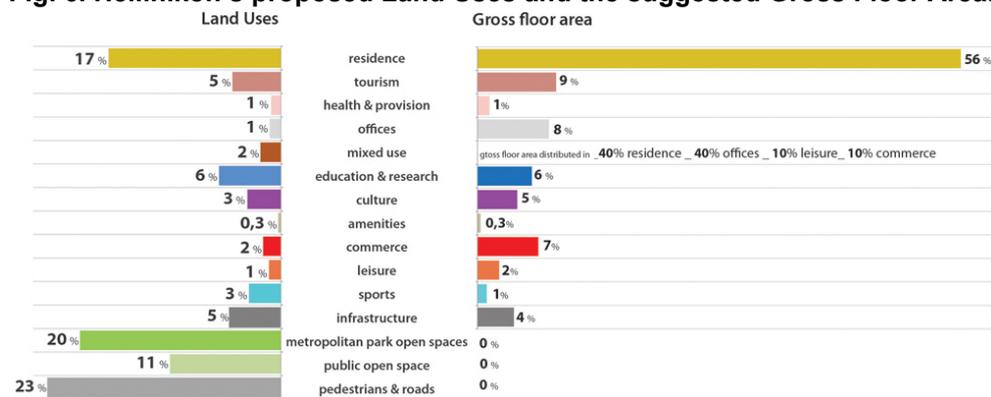


Fig. 6. Hellinikon's proposed Land Uses and the suggested Gross Floor Area.



Along with the overall economic strategy, other parameters influence the sequence of the development. Locations with environmental issues, existing buildings and medium or long-term institutional constraints are the three main considerations for each lot within the site. Taking the above constraints into consideration, we defined a no-obstacle area for immediate availability, which is almost 2/3 of the site. Further parameters are related to approval and permitting timelines. The optimistic scenario indicates a long-term implementation process estimated to last 25 years. A matrix of construction cost/per phase was developed to illustrate phases of development along with their economic data and assumptions. This matrix related to real-time geographic data of the site consists of an ongoing geodatabase for the project's optimum management, while mapping potential scenaria provided throughout the decision-making process and during the projects' implementation.

4 THE MASTER PLAN

Fig. 7. Urban development model and Land-use plan



Departing from sustainability, Ekistics, and the adopted development strategy, we developed the urban development model shown in Fig. 5. This model was produced following specific steps and making planning decisions, as outlined below.

Fig. 8. Hellinikon's three first suggested phases of development



4.1 The Metropolitan Hub

The optimum shape and location as well as the proposed uses within the 2.000.000m² Park were challenges for developing a metropolitan hub and the largest urban green area in Athens, while simultaneously addressing the park's connection with the surrounding municipalities. Within this framework, the park was placed at the northern part of the site, which is mostly unbuilt and with unpaved areas. With the intention to create a sustainable, safe and accessible green space, we proposed the design of a «starfish» shape, with an increased perimeter and shorter crossing paths compared to circular or rectangular shapes. The larger perimeter of the park multiplies the number of adjacent properties. Additionally, the built areas penetrating into the park's mass improve urban integration, accessibility and the feeling of security. A ring road at the perimeter of the park increases accessibility and has various activities placed along its course, intended for recreational use by pedestrians and cyclists. A central concept to the landscape design of the park was the development of a green corridor, consisting of trees and tall vegetation, crossing the heart of the site, from Vouliagmenis Avenue to the sea, connecting museums and facilities located in the park.

Fig. 9. Optimum shape of the Metropolitan Park and the natural connections.

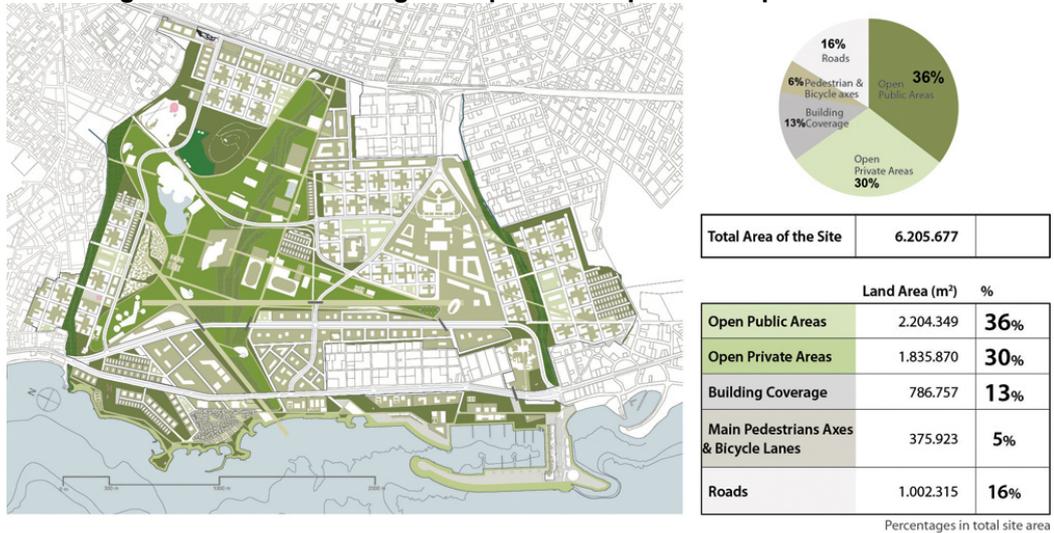


4.2 Nature Connections

Physical characteristics of the site such as the climate, the existing streams and the proximity to the sea and Mount Hymettus are taken into consideration to restore part of the local ecosystems. The design and location of new green spaces aimed to enhance the network of clusters of natural life within the wider area of the development. Central to this approach was

the restoration of the streams at the northern and southern side of the area. They can gradually evolve into shelters for local flora and fauna, serving also as alternative open spaces for pedestrians and green corridors that lead to the sea.

Fig. 10. The network of green spaces and paved - unpaved surfaces



The benefits of the soft-scapes created in the former airport site and the complementary vegetation zone expanding parallel to the sea are multiple. Flooding risks are reduced with the restoration of streams. The construction of extensive buffer zones and green surfaces allow for the absorbance of large quantities of rainwater. This improves the recharge of the aquifer, assuming proper pavements. The local microclimate is enhanced and the urban heat island effect is mitigated. Finally air is cooled through evapo-transpiration and less heat is stored within the urban fabric as paved surfaces are avoided. At the same time, the vegetation proposed for the different green areas was comprised by climate adapted Mediterranean species of low maintenance costs and minimal needs for water. Native plants will protect water resources with no fertilizers and will create a distinctive Mediterranean identity for the overall development.

4.3 Enhance the Coastal Front: The Relocation of Poseidonos Avenue

Two major road axes currently serve the site. Vouliagmenis Avenue is the east boundary of Hellinikon site and Poseidonos Avenue, on the west, crosses the site and divides it into the coastal area and the former airport area. At the same time, the activities occupying the coastal area, intercept the access along the 3.5km seafront. As part of our plan, Poseidonos Avenue is relocated on one of the existing airport runways, with multiple benefits. The coastal area is enlarged, allowing lively clusters of “attractors” between the seafront and the roadway. The existing runway is reused and will not be demolished, while the frontage of properties overlooking the new Poseidonos Avenue is being doubled. Furthermore, the relocated Poseidonos Avenue serves as a central axis and gives the opportunity for dense, mixed use land-uses to develop in the heart of the site, providing a 24/7 liveable and safe environment.

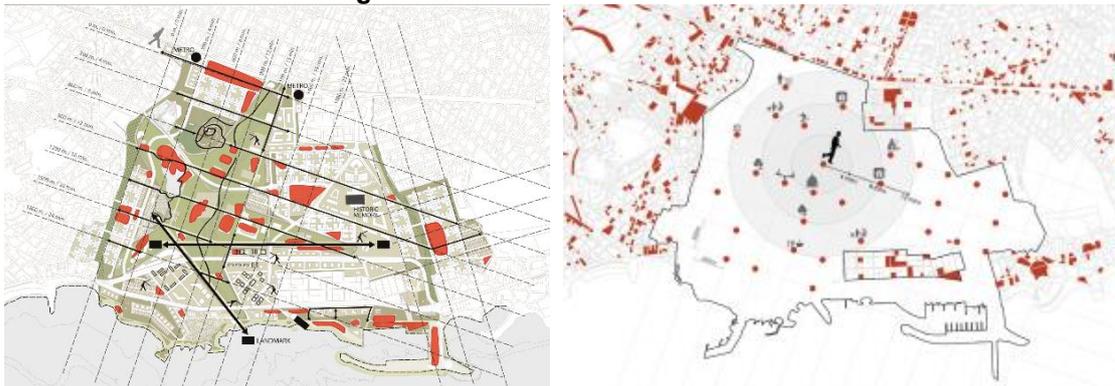
Fig. 11. Poseidonos relocation



4.4 Circulation

Priority has been given to the creation of easy and safe to use pedestrian routes throughout the site. The plan introduces an autonomous 300mx300m grid of pedestrian and bicycle routes. On each node/junction of the grid, cultural and commercial activities provide a stimulating and safe environment. Referring again to the concept of proximity, the density of the network was defined by the average time required for a pedestrian to cover 300 meter which equals to approximately 6 minutes in slow pace. This strategy enhances community engagement and awareness, minimizes car use and improves public health.

Fig. 12. Enhance Pedestrian traffic



The local roads follow the pattern of the surrounding urban grid in order to create a sense of integration and orientation. The proposed road network provides new access points to the site restoring connection with the urban fabric. Furthermore a variety of public transportation options are incorporated in the design, aiming to maximize access to the site and connectivity with the rest of the capital while minimizing car usage and greenhouse emissions. The existing auxiliary tramline leading to the tram depot is converted to a fully functional line and new tram stations are added. For serving internal traffic, four circular routes with electric minibuses are proposed. Finally, a sufficient number of parking areas are also provided, based on demographic data estimates and the proposed activities in each area.

4.5 Sustainability Awareness

A state-of-the-art of the art infrastructure and sustainability awareness to residents and visitors to encourage good practices is fundamental to urban planning. The main infrastructure projects, such as an on-site waste and wastewater treatment facilities, are intentionally located in close proximity to public spaces. More specifically, wastewater is treated in facilities within the park and the reclaimed water is reused on site. To secure water

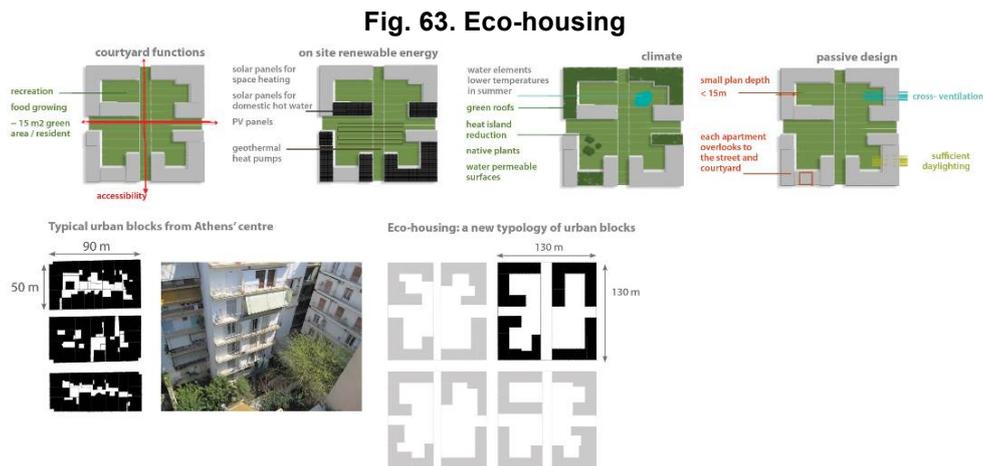
supply during demand peaks, a water reservoir is included. The interdependence between park and urban development is a key feature towards achieving balance in using on-site resources.

The proposed solid waste management plan aims to minimize the volume diverted to landfills. Waste is treated as a resource and the stress on existing urban infrastructure is reduced. The long-term goal is self-sufficiency of the site and minimization of its impact on the urban infrastructure of the region.

4.6 Sustainability at the Building Scale

A fundamental strategy to reduce greenhouse emissions is to minimize the energy use in buildings, with the incorporation of state-of-the-art environmental features.

A typology of urban blocks with apartment buildings is proposed as a residential development. A typical proposed eco-housing block measures 130mx130m and buildings are organized around its perimeter. A single semi-private courtyard is created at the center of the block, which can be developed to host activities regarding leisure, sports and cultivation of the residents. The fragmentation and deterioration of courtyards that is typical to the urban blocks of Athens is avoided and the benefits and functionality of open green spaces are maximized.



The enclosed shape of the courtyard offers wind protection during winter and shading during summer creating a favorable microclimate for occupants. The building design should ensure that at least all south facing surfaces have adequate solar access during winter.

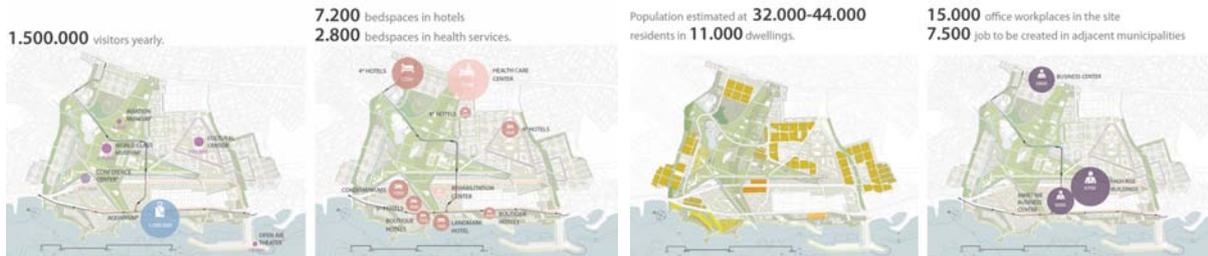
4.7 Demographics

The population, based on the capacity and the types of the approximate 11.000 dwellings, is projected to range from 33.000 to 44.000 people, depending on the assumptions. The types of dwellings in different areas define higher and lower densities within the site resulting to spatially different needs for public facilities and amenities. According to Doxiadis Ekistics grid and the population estimates, the new settlement in Hellinikon is considered a small polis or Sector Type V. This requires three types of community centers including amenities that will cover the inhabitants' everyday needs.

Estimates based on building types and their floor areas show that, in addition to its residents, the site is expected to have 1.500.000 visitors per year to its aquarium, its Convention and exhibition center, its Museum in the park, the aviation museum and the open door museum, also in the park. It will also have 7.200 hotel beds, 2.800 hospital beds, including

rehabilitation. 15.000 permanent jobs are expected within the site at full development, with another 9.000 supporting jobs outside the site.

Fig. 14. Demographics



4.8 Types of Development

The following table provides a summary of the land area and the floor area for each use, according to the master plan.

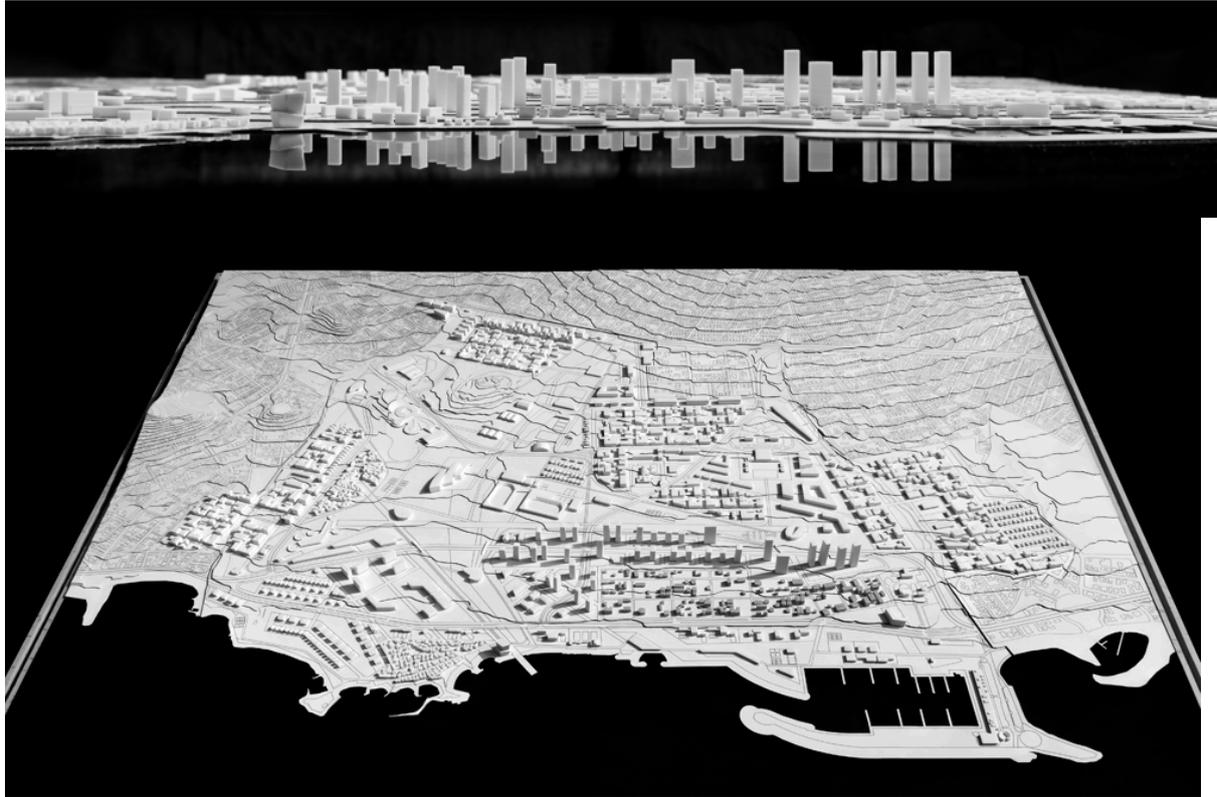
Table 1. Investment opportunities and Proposed Land Uses

HELLINIKON'S URBAN DEVELOPMENTS MODEL PROPOSED USES	LAND AREA (sqm)	BUILT AREA (sqm)
RETAIL IN MARINA	11.500	4.300
LEUSURE FACILITIES IN MARINA	57.500	35.500
AQUARIUM IN MARINA	7.400	11.000
HOTELS IN MARINA	60.000	75.000
ECO-HOUSING	667.500	1.335.000
800 sqm PLOTS	115.800	46.400
1600 sqm PLOTS	20.800	8.300
PARK NEIGHBORHOOD	37.700	30.200
APPARTMENTS IN HIGH-RISE RESIDENTIAL DEVELOPMENT	49.300	87.000
APPARTMENTS IN MIXED-USE HIGH-RISE BUILDINGS	-	106.000
SEAFRONT NEIGHBORHOOD	30.000	17.600
LUXURY VILLAS	46.500	18.500
COASTAL FRONT PLOTS	16.000	6.400
MARINA APPARTMENTS	22.100	16.000
RETAIL (INCLUDING SHOPPING MALL)	105.000	215.000
BUSINESS AND OFFICES	65.000	145.000
HEALTH CENTERS (HEALTH & REHABILITATION)	60.000	43.000
CONVENTION CENTER	43.500	60.000
HOTELS (7, STARS, 5 STARS, 4 STARS BOUTIQUE HOTELS)	186.000	166.000
RESEARCH AND EDUCATION	276.000	115.000
INCUBATOR CENTER	116.500	18.000
MUSEUMS	62.600	106.100

CONCLUSION

“Responsibility” is the word that encompasses the challenge to develop the former Athens airport. In the middle of an unprecedented economic crisis with 27% unemployment and the economy stalled, we have a piece of land at hand with a highest promise. We are responsible to serve the public interest and make the best possible deals with the private sector, which will eventually develop the site, in whole or in parts. Our horizon is the long term, believing that the recession is temporary. Knowing that the master plan of a site like the former Athens airport is a spatial manifestation of a business plan, we paid particular emphasis on the feasibility of the proposal, accompanied with assumptions, numbers, and a sequence of events, determining the development stages. This master plan is a proposal that deploys the potential of the site and serves as the basis of discussion and public discourse. It may or may not be implemented but will be available as a reference point, so the development of the site, in whatever form, will meet the expectations of the Greek people who should fully support it, a fundamental ingredient to success.

Fig. 7. The Model. On top, the skyline of the development when completed, as will be seen from the sea.



REFERENCES

1. Alexandros Kyrtis, "Konstantinos A. Doxiadis, Essays, Plans, Settlements", Athens: Ikaros, 2006
2. UNFPA 2007. State of World Population 2007: Unleashing the Potential of Urban Growth. United Nations Population Fund, New York, USA.
3. Zofnass Program for Sustainable Infrastructure at Harvard University and the Institute for Sustainable Infrastructure, "ENVISION - A Rating System for Sustainable Infrastructure", 2012
4. Living Planet Report 2012, Biodiversity, biocapacity and better choices, WWF
5. <http://www.environment-agency.gov.uk/research/library/publications/115654.aspx>
6. <http://www.ypeka.gr/Default.aspx?tabid=506>.
7. http://www.hazliseconomist.com/uploads/speeches/RT2012_B/Pollalis_ENG_ppt.pdf
8. http://www.ekathimerini.com/4dcgi/_w_articles_wsite2_1_29/04/2012_439865
9. http://www.ansamed.info/ansamed/en/news/sections/economics/2012/05/29/Greece-Former-Hellinikon-airport-privatisation-turning-point_6951344.html
10. <http://forums.capitallink.com/greece/2012/pres/pollalis.pdf>
11. http://www.nytimes.com/2012/11/18/business/privatizing-greece-slowly-but-not-surely.html?pagewanted=all&_r=0
12. <http://www.spiegel.de/international/europe/advertising-executive-peter-economides-has-an-idea-for-saving-greece-a-843681.html>