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Str. Eksadaktylou 5, 546 35 Thessaloniki, Greece

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# **Transforming a small city through urban planning by integrating urban green spaces.**

## **Case Study: City of Nafpaktos**

**S. Ch.Fouseki<sup>1\*</sup>, K.Sotiropoulou<sup>1</sup>, V.Protopapa<sup>1</sup>,  
D.Karvelas<sup>1</sup>, E. Bakogiannis<sup>1</sup>, I.Kyriazi<sup>2</sup>**

<sup>1</sup>Rural & Surveying Engineer NTUA, Department of Geography and Regional Planning, National Technical University of Athens, Zografou Campus, 9 Iroon Polytechniou str, 15780 Zografou, Athens, Greece

<sup>2</sup> Civil & Structural Engineer and Civil & Structural Engineering Education (ASPETE)

\* Corresponding author: [so.fouseki@gmail.com](mailto:so.fouseki@gmail.com), Tel.: +30 210 7772969, Mob: +30 6984 078777

### **Abstract**

It's a fact that urban green spaces, such as parks, forests, green roofs, streams and community gardens are able to provide critical ecosystem services and further more to increase the citizens' quality of life. Most of Greek small cities, expanded without a plan in any direction, causing the common city sprawling problem. In many cases, no policies were held out in order to retain urban green spaces.

Nafpaktos, is a small city, that deals with the problem of limited urban green spaces. This study, aims to generate a city plan in which existing green spaces are pointed out and protected, and moreover new green spaces are located. Main goal consists the fact that each citizen must be able to approach an urban green space at the minimum time, set to 5-7 minutes by walking. A new transportation network is planned in order to avoid the usage of vehicles and also in order to transform the existing cycle lane network. More than 9km cycle network is designed in order to cover the entire city's center. Moreover, there is a specific plan designed in order to enhance existing pedestrian streets, which are expected to grow by 11 km at least. City's squares are recasted in order to achieve the best possible use of city's public open spaces. There for six already existing squares are reformed and three new places are added. Old house complexes located in the boundaries of the city's historical center are proposing to adopt green architecture design. Furthermore, local green points are promoted in specific locations after taking under consideration manners such as accessibility.

After taking consideration all of the above mentioned changes, it's a fact that this small seaside city, will become a sustainable, small, smart city, promoting sustainable transportation and open green places. Last but not least, after assimilating the proposed changes, the city can be transformed into a healthy city.

### **Keywords:**

*Cycle network, Open green spaces, Smart city, Sustainable city development, Sustainable transportation, Urban green spaces, Urban planning*

## **1. INTRODUCTION**

It is a fact that urban green spaces are an important contributor and can be a significant part in the process of achieving sustainable development. Urban green spaces are urban areas which were occurred that, natural or semi natural ecosystems were converted urban spaces by human influence. They are able to provide the connection between urban and nature and therefore they provide lots of ecological benefits which were established especially needs of urban people. This urges urban spatial pattern to develop a kind of diversity system to relate other spatial shapes and itself can provide city with ecological safety value (Wuqiang, 2012). In this regard, urban green spaces can provide social, economic, cultural and psychological services especially for the wellbeing of the urban dwellers and for tourists as well. Urban green spaces provide many functions in urban context that benefits people's quality of life. Therefore there is a wide consensus about the importance and value of urban green spaces in cities towards planning and constructing sustainable or eco-cities of 21st century

There are many ways to evaluate the nature of green urban spaces. First of all, one of the main factors in determining the nature of those spaces is their quantity in the city. Furthermore, existing qualities like activities and experiences, and perceived benefits to the users determine the utilization of green spaces. Last but not least, the functionality of those green spaces is equally influenced by the location and distribution (accessibility) in the whole city. Moreover, there are different ways to classify urban open space and greenspace, such as its size, how people use it, its intended function, its location etc. (Byrne and Sipe, 2010). Types of green spaces that serve different uses over the city, green space systems can be created as a result of efficient organization.

With urbanization it is a fact that life style was changed. In that direction, rural areas were transformed to urban areas. Sustainable development of cities and development of urban green spaces are very important, since almost half of the world population now live in urban areas. Moreover, it is an urgent need to improve the lifestyles of urban people and there should be a special focus on the consideration of environmental impact of human activities by raising awareness to the rational use of energy, water and food consumption and natural resources for environmental sustainability.

This paper assesses the city of Nafpaktos and furthermore it aims to generate a city plan in which existing green spaces are pointed out and protected, and moreover new green spaces are located.

## **2. THE ANALYSIS OF LOCAL PRECONDITION: CITY OF NAFPAKTOS**

Nafpaktos is a town and a former municipality in Aetolia-Acarnania, West Greece, Greece, situated on a bay on the north coast of the Gulf of Corinth, 3 km west of the mouth of the river Mornos. The town is located 9 km (6 mi) northeast of Antirrio, 18 km (11 mi) northeast of Patras, 35 km (22 mi) east of Missolonghi and 45 km (28 mi) southeast of Agrinio. The Greek National Road 48/E65 (Antirrio – Nafpaktos – Delphi – Livadeia) passes north of the town. It is the second largest town of Aetolia-Acarnania, after Agrinio.

### **2.1. Urban Transportation Condition in Nafpaktos**

The existing urban transportation network is relatively degraded as transportation is served only through public bus. In addition, the situation weakens the fact that the existing bus line covers only the main streets and its frequency of service is extremely low.

Inner city's road network length reaches 32.09km and the bus line uses only 4.35km. The fact that the bus route does not cover enough segments of the city prompts the use of private vehicles. Furthermore, in the city's center territorial area there are 10 public parking areas located. Eight of them are permanent spaces and two of them are seasonal spaces that are released for function only in summer when the demand of parking places increases due to the needs of tourist activity.

Regarding the pedestrian streets located within the urban fabric, they amount to a total length equal to 1.753.1m. but it has to be mentioned that many of them (less than 1km) are secluded and particularly inaccessible. Additionally, within the urban fabric there is a bicycle lane and its total length stands at 2.242m. Its main disadvantage seems to be the fact that it has inadequate signage leading to lack of users' safety. Moreover, the way it is designed doesn't cover the needs of many neighborhoods. These are the key elements that make itself unusable. The inner city covers an area of 1,34 square kilometers and the population is about 13,415 people according to the 2011 census. Also, according to the 2014 census, in the city, there are identified approximately 3,354 private car vehicles and 1,207 motorcycles.

## **2.2. Open Green Spaces in Nafpaktos**

Open space is any open piece of land that is undeveloped (has no buildings or other built structures) and is accessible to the public. Those spaces, can include:

- Green space (land that is partly or completely covered with grass, trees, shrubs, or other vegetation). Green space includes parks, community gardens, and cemeteries.
- Playgrounds
- Public plazas
- Public seating areas
- Schoolyards
- Vacant lots

It is undeniable that, open green space provides recreational areas for residents and help to enhance the beauty and environmental quality of neighborhoods. But with this broad range of recreational sites comes an equally broad range of environmental issues. Just as in any other land uses, the way parks are managed can have good or bad environmental impacts, from pesticide runoff, siltation from overused hiking and logging trails, and destruction of habitat.

Within the framework of this study, data related to the extent of such areas were collected from the municipality's technical department. Accordingly, the open green spaces located within the exact city limits were about 25,000m<sup>2</sup>. But, after inspection, the extent of those areas, decreased to 22,505,7 m<sup>2</sup>. It therefore follows that according to the existing situation, presence of green open spaces located within city limits amounts hardly 1.86%. The above translates into 1,68 m<sup>2</sup> per inhabitant. It's a percentage particularly low compared to international standards, which simultaneously is partially common in Greek cities.

## **3. PROPOSED PLAN**

As it is mentioned above, this study, aims to generate a city plan in which existing green spaces are pointed out and protected, and moreover new green spaces are located. Main goal consists the fact that each citizen must be able to approach an urban green space at the minimum time, set to 5-7 minutes by walking. A new transportation network is planned in order to avoid the usage of vehicles and also in order

to transform the existing cycle lane network. More than 9km cycle network is designed in order to cover the entire city's center. Moreover, there is a specific plan designed in order to enhance existing pedestrian streets, which are expected to grow by 11 km at least. City's squares are recasted in order to achieve the best possible use of city's public open spaces. There for six already existing squares are reformed and three new places are added. Old house complexes located in the boundaries of the city's historical center are proposing to adopt green architecture design. Furthermore, local green points are promoted in specific locations after taking under consideration manners such as accessibility.

### **3.1.Urban green spaces network**

A whole urban green spaces network is designed in order to achieve the above mentioned goals. This network consists of the followings:

- Greenbelts
- Green extensions
- Green ways
- Green links
- Green parks and
- Waterfront green corridor

Many studies and examples are considered such as the Mesoamerican Biological Corridor through Central America, the Southeast Wisconsin environmental corridors, the Pan-European Ecological Network for Central and Eastern Europe, the greenbelt of London and of Colorado and the Maryland Greenprint Program.

Green belt lands are contributing to the healthy ecosystems which underpin many natural processes supporting a range of services including pollination, soil fertility, flood defense, air filtration and carbon capture and storage. Green extensions put residents in contact with nature in their day-to-day lives through a system of residential public greenspace, shaded sidewalks, and riparian strips. Green links have the ability to connect separated green spaces. According to all the above mentioned, a whole urban green spaces network it's designed. In that direction city squares are recasted, six of the existing ones are fully reformed and three more squares are added.

The quality of cities depends on how the urban green spaces are designed, managed and protected. Urban green spaces not only play role to environment but also it contributes to social, economic, recreation, cultural, visual aspects and commercial developments in cities. Through an integrative approach, urban green spaces fulfil many functions in urban context that benefits people's quality of life. With the proposed plan, sidewalk network will increase by 11.2km. Also more than 3422,5m<sup>2</sup> come to be added to the existing open green spaces. Those areas are designed to be dispersed inside the city. Also more than 2.221m will be added to the pedestrian network. More specifically, in this proposed plan there are areas reformed to prakettes, small parks that offer passive recreational amenities (e.g. sitting areas, walking paths, etc.) for the surrounding neighborhoods and also a distrinctly park is designed to be located on the eastern area of the city, right next to its boundaries.

### **3.2.Turning abandoned urban areas into green spots**

Through this plan there is proposed and the idea of gaining more area of green and open public spaces, by exploiting some of existing abandoned urban areas. The main technique used is similar to the general ideas that many similar well known projects were based upon, such as The High Line's Fingers of Foliage (New York City), Latz Partners Landscape Park Duisburg Nord (Duisberg Germany) and the Green Alley at Boston Architectural College. Also another basic example used is the case study of brownfield redevelopment and green space management in Toronto.

In order to achieve the above mentioned development, all the abandoned buildings are recorded. From those fifty four building, sixteen are proposed to be redeveloped as green spaces. The criteria used to determine the suitable ones are at first their location and the density of green areas in their greater area, their accessibility and their extent. It has to be mentioned that those areas will be areas that combine green spaces theory and cultural points.

#### **4. CONCLUSION**

In order to meet social and psychological needs of citizens satisfactorily, green spaces in the city should be easily accessible and in adequately optimal in quality and quantity. Bringing green space to the urban landscape can promote and inspire a better relationship with the environment while supporting important services. Combining the main axes of this proposed plan it is safe to mention that existing problems of this city, such as urban sprawl can be limited. Moreover, through this plan stable bases are set for the city's future sustainable development.