

# Establishing planning principles for urban parks in Vietnam

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## Abstract

Park plays a very important role in social and cultural life and becomes integral to urban spatial structure. It improves the environment, creates a beautiful green space, and takes cultural entertainment and sports activities place. People with no difference in age, gender, or income come to meet, exchange, rest, and relax. At the place, nature becomes familiar to people and becomes a crucial part of life. Furthermore, parks enhance the city's image, bringing tourists and significant economic activities. This paper studies setting up the principles of urban park planning in Vietnam, including eight general principles: sustainability and environmental principles; the principle of improving the quality of life; the principle of preserving cultural identity, spatial connection principle, park diversity principle, the principle of adaptation; safety principles, principles of education and three principles of spatial arrangement. These principles will be one of the bases for constructing and developing parks in Vietnam.

**Key words:** urban park, urban planning, planning principle, functional areas

## 1. Introduction

Parks are essential in creating a healthy and health-promoting urban environment, making the city more beautiful, attractive, and worth living for everyone. In addition to its positive environmental contributions, it is considered as the city's green lung, reducing greenhouse gas emissions, minimizing the temperature reversal effect in urban areas, and flood prevention (through surface water infiltration, integrating ornamental lakes with water regulation and storage lakes, applying flood drainage sections to canals, or biological canal systems (bioswale)[1]. Urban park also allows people to rest, entertain, and do exercise after stressful working hours. Besides, urban park is the space for cultural activities and to create the community cohesion.

Therefore, many countries believe that an ideal city should have an interconnected green network, in which the park area target of 9- 15 m<sup>2</sup>/ person is ideal for balancing green space and construction space. They are very aware that parks and green spaces in the city are one of the factors that create a better living environment for people and contribute to sustainable urban development.

In China, they consider parks as an important factor in the development of cities. The Chinese government has set many policies and goals to build and manage parks in urban areas, such as:

- Park planning to meet community needs;
- Implement a program to build and upgrade urban parks;
- Aim to preserve and manage cultural and natural heritage in parks;
- Encourage private investment and public-private partnerships to participate in the construction and management of parks to enhance resources and management skills in park development.

Meanwhile, Japan aims to preserve the natural landscape and create a green environment in the city. Parks and gardens in Japan often place great emphasis on relaxation and peace. Japan also encourages using modern technology to maintain and manage green areas.[2]

Parks in the United States often have educational and experiential goals. Educational and tourism activities in the park aim to help people better understand the natural environment and contribute to the protection of the country's natural heritage.

Parks in England are often closely linked to the nation's history and cultural heritage. Many parks are located in historic areas but designed and preserved modernly to serve residents and encourage social interaction.

Each country, depending on its specific context and economic and socio-cultural development conditions, has different park planning strategies, policies, and principles.

## 2. General principles

In Vietnam, through many changes, along with development opportunities, there are pressures from socio-economic issues, pressures from mechanical population growth, making the system of green spaces and parks also affected, narrowed, and not able to promote its functions, not meeting the needs and expectations of the people. Recently, this issue has received much attention from the government, professionals, and social community. Many policies and documents have mentioned public space that recognizes the critical role of public space in contributing to the quality of urban life and appearance. And acknowledging that public space needs to be must be protected from deterioration and encroachment. Besides, creating public spaces and parks contributes to creating a sustainable living space.

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Date of receipt: 20/10/2023  
Editing date: 9/11/2023  
Post approval date: 8/12/2023

Therefore, when applied in the Vietnam context, it is necessary to ensure general principles when planning urban park as follows:

- Sustainability and environmental principles
- Principles for improving the quality of life
- Principles for preserving cultural identity
- Principle of spatial connection
- Principles of park diversity
- Principles of adaptation
- Principles of security and safety
- Educational principles
- Sustainability and environmental principles:

According to the International Union for the Conservation of Nature and Natural Resources (IUCN), the concept of "sustainable development" is "development that can meet current needs without compromising the ability to meet needs of future generation... It is also understandable that sustainable development also means ensuring that effective economic development, society equality and that the environment is protected. Especially in urban park planning, sustainability and the environment play a vital role in balancing and improving the habitat, preserving natural features, preserving flora and fauna, and wild areas based on innovation. Ensuring the long-term maintenance of diverse ecosystems so that they keep fulfilling their various roles in the future. Urban park planning should not affect the natural environment and change the ecological cycle. That is one of the most successful approaches to addressing the environmental problems of urban spaces. In practice, sustainability in park design principles should require adapting to local conditions and contexts. Besides, sustainability is expressed in a self-resilient landscape that utilizes the least energy and can respond to ever-changing circumstances.

Core criteria to ensure sustainability and environmental principles in park design:

Environmentally:

Providing the green infrastructure: rain gardens, bioswales, bioretention ponds, constructed wetlands, water permeable pavers

Implementing water and energy conservation practices: greywater and rainwater harvesting systems, smart irrigation, water-wise plants, renewable energy in the construction of urban lighting and furniture, solar-reflective paving materials.

Waste management: centers for recycling, allowing for composting of the solid waste created in the park, producing urban furniture, pavements, and walls from recycled materials.

Promoting access to fresh, healthy, and low-cost food: local sustainable food production by utilizing community gardens.

Supporting and preserving biodiversity: preserving wildlife's migratory and breeding habits, creating habitat steppingstones.

Supporting disaster resilience

Socially:

Creating a place for people of all age: Establish spaces that accommodate activities for all ages and disabled people. Functional spaces meet appropriate physiological and

psychological needs (for children, it is necessary to arrange age-appropriate play areas that can easily observed, ensuring high safety when exercising; For older people who need gentle exercise, it is essential to set quiet, resting spaces, shaded walkways combined with reasonable places to stop...)

Building connected park systems within walking distance: Establishing a street network can serve both pedestrians and cyclists, a traffic reduction strategy, creating multiple access to the park; To meet the needs of all users

Economically:

Parks must be designed to balance capital expenses with operating and maintenance expenses.

Developing policies to mobilize funding from many different sources: funding from the budget, funding from planning and development agreements, funding from other social resources

Organizations and businesses participating in investing in park construction will have support mechanisms such as loans with low-interest rates from development support funds, develop investment funds, and preferential policies to support businesses when investing elsewhere, other locations in the city, reduce contributions to investment in infrastructure construction, minimize income taxes for businesses, and exempt land use fees for construction land which is not for commercial purposes.

Quality parks serve community benefits, meet their needs, and become a tourist destination, make the city more attractive and creating an urban brand. It also increases the value of real estate in the surrounding area and improves tax revenue.

- Principles for improving the quality of life

It's important to note that the primary function of a park is to cater to the community's needs and interests, enhancing the quality of life. Therefore, the park's design must be attractive and appealing to users, providing good opportunities and amenities. It is essential to improve and upgrade these facilities when necessary. For example, the facilities in service areas should be enhanced and served... In addition, park design should also meet the needs with the lowest cost, striking a balance between usage demands and financial resources[3]. How can the park serve all individuals with different financial abilities? Applying modern scientific and technological advancements in designing functional areas or in operation and management is also one of the principles to enhance the quality of the park. That makes expands and improves the park's ability to serve. Specifically, integrates advanced technologies, IOT sensors, and AI artificial intelligence to bring the community the best experiential space solutions and effective management solutions. These technologies may include sensors to measure the air quality, traffic, and noise levels and systems that analyze data collected by these sensors in real-time. For example, suppose a specific park area has a high user density. In that case, the park's management system can adjust lighting, water usage, and other factors to optimize the use of the area, minimize environmental impact, and enhance the park's adaptability to user needs.

In the context of the Fourth Industrial Revolution and digital transformation, applying science and technology in planning and management is becoming a trend. Whether they like it or not, every organization must transform, whether

a design consulting company, construction contractor, supervision consultant, or state management agency in urban and construction fields. Therefore, applying intelligent design and management solutions to enhance the quality of park usage while improving the community's quality of life is one of the essential principles in park planning in Vietnam.

In addition, to enhance the quality of parks, especially when renovating parks, it is necessary to encourage and create conditions for the community to participate in park management, protection, and utilization by listening and meeting their needs and promoting social interaction activities. Observing and analyzing park usage based on experience can be an essential tool to bridge the gap between user needs and urban park planning, design, and management and improve the quality of park usage.

- Principles for preserving cultural identity

Organizing events and festivals in the park will create a sense of unity and interaction within the community and serve as a form of education to enhance awareness among the people. Each region and locality in Vietnam has its own cultural heritage and unique cultural characteristics. Formed during the French colonial period, the park flower garden system is integral to Hanoi's urban structure. It serves as a space for social activities and interactions, reflecting the perspectives, lifestyles, and culture of the people of Hanoi. Therefore, recognizing the distinctive features of cultural history in researching, planning, and renovating the park is one of the essential steps to promote and preserve cultural identity. The question is how to integrate and highlight them into a compelling story.

Thong Nhat Park is one example, built on the voluntary labor of thousands of young people and students in Hanoi in the 1950s when the country was still divided by war. The design of Thong Nhat Park includes Bay Mau Lakes<sup>1</sup> (equivalent to 25 hectares), two peninsulas named Wind Island (representing the desire for freedom) and Coconut Peninsula, with many coconut trees - a species that reminds the image of the South (which was still not liberated at that time). Two islands, Thong Nhat Island and Hoa Binh Island, are connected to the shore by two small bridges symbolically connecting the two unified regions. Thong Nhat Park, which serves the needs of entertainment, rest, and relaxation, is an essential green space - a "green lung" and a "place" with historical and meaningful value culture for many generations of Hanoi people.

In Bach Thao Park, where various plant species from the French colonial period are nurtured and preserved, there is a temple called "Den Nui Sua" dedicated to Huyen Thien Hac De, a legendary deity who supported King Ly Thanh Tong in defending against foreign invaders, safeguarding the nation's independence and autonomy. He was also considered as a Tutelary God in the Ngoc Ha and Huu Tiep villages<sup>2</sup>. The name of the Sura Mountain originates from the fact that this place is abundant with Sura trees, a familiar type of tree in Thang Long land. The temple is currently structured in the style of "stacked roofs with two ridges" - a traditional

architectural style of the Vietnamese people. It stands out with decorative panels on the door canopy skillfully painted and delicately carved motifs, which have been recognized as historical and artistic relics at the City level since 2015.

Another example is Thu Le Park- located in Thu Le village, an ancient village dating back to the Ly Dynasty (11th century) with the legend of Linh Lang deity and Voi Phuc Temple[4]- a temple that has existed for at least 600 years since the Ho Dynasty (1400-1407) and has undergone multiple renovations[5]. The current architecture bears the mark of the architectural style of the Nguyen Dynasty. Through many historical upheavals, the temple still retains several precious relics. In particular, "Voi Phuc Temple is also known as Temples of ancient Hanoi in the West - one of the four sacred towns of Hanoi" (Tứ trấn Thăng Long)<sup>3</sup>[6]. Integrating cultural and historical values into parks can bring many benefits to the community, making parks a space for both tourism and education and preserving cultural and historical values of the country's nature.

Therefore, when designing a park, it is necessary to integrate the characteristic cultural elements into the organization of landscape architecture functions, incorporate traditional games, apply traditional architecture, exploit indigenous elements such as the use of local materials, the characteristic flora and fauna of the research area, etc. It will surely bring the attraction and contribute to promoting the cultural identity value while spreading the message of environmental protection in the city.

- Principle of spatial connection

Accessment to the park is one of the most critical issues related to its ability to meet its needs. This is reflected in the ability to walk (the radius of the parks) and accessibility for people with disabilities. For example, do the spatial organization, management in the parks, and multi-functional parks for the community have barriers or not? Is there a ticket to the entrance? or It is accessible for all people with different social statuses, sexes, and ages to join in the park activities. Research shows that distance influences park usage and the decision to visit. The farther and less accessible a park is, the less likely people are to use it. Furthermore, the connection principle also shows the connection between parks and residential areas, which are solutions to organize smart traffic systems, creating an easy and convenient network. Therefore, in researching and providing park design solutions in Vietnam, the principle of connection is also one of the general principles that needs attention. To implement this principle, it is necessary to consider the following issues:

Parks must be located in accessible positions, be usable, and serve the community's needs.

Parks can be arranged together or near essential community facilities such as schools, libraries, and community centers.

It is necessary to increase the connectivity between parks and residential areas through smart transportation

(1) Thong Nhat Park contributes 81% to the greenery structure of Hai Ba Trung district and has nearly twice the average green area compared to other inner districts.

(2) Prince Linh Lang, after being bestowed the title of "Đại Vương", ascended to become a saint. Linh Lang is one of the important deities in the Vietnamese religious system, revered in many places and serving as one of the protective gods for the capital city of Thang Long.

(3) "Tứ trấn Thăng Long" is associated with the birth of the capital Thang Long under the Ly Dynasty in the 1010s, a place to worship four gods who guard the four lifelines on the always peaceful land of Thang Long. Bach Ma temple in the East, worshipping the god Long Do; Voi Phuc Temple in the west, worshipping Linh Lang Dai Vương; Kim Lien Temple in the south, worshipping the god Cao Son Dai Vương; and Quan Thanh Temple in the North, worshipping Huyen Thien Tran Vu. These are the four most sacred temples in the capital because of their history and cultural beauty in Vietnamese beliefs.



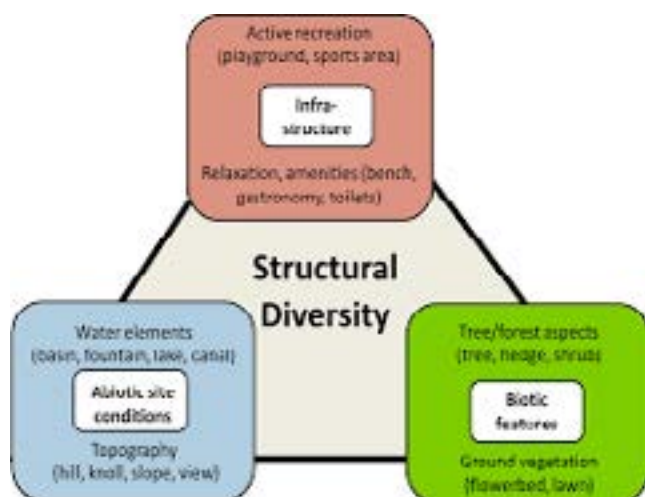


Figure 1. structural diversity of urban parks[7]

system solutions.

The park should be built alongside the major public transportation routes to increase the accessibility and convenience for the usage of public transportation, as well as for pedestrians and cyclists.

Implement traffic-calming strategies, provide multiple entrances to the park, and upgrade park entrances.

The park's location must have visibility (the ability to observe from main roads), as being visible from the street will create attraction and encourage usage.

- Principles of park diversity

This principle requires meeting users' diverse needs and abilities, especially those of minority ethnic groups, disabled people, and different age groups. This diversity is in the park's location (parks can be built on various terrains, creating richness and unique characteristics for each region or area).

The diversity of vegetation in the park

The layers of vegetation in the park help improving the city's air quality. Additionally, it adds beauty and provides shade for the park. However, the designer must understand the vegetation to ensure harmony and avoid disrupting the landscape.

In addition, diversity is in the functional structure (multiple

functional spaces serving different purposes) and the variety of entertainment options: indoor or outdoor, modern or traditional games, etc. It is diverse in recreational, cultural, educational, and scientific activities. Furthermore, the principle of diversity lies in the richness of design forms and the flexible use of styles and materials.

- Principles of adaptation

If change is constant, the ability to adapt to that change is essential. Culture, entertainment habits, and lifestyle changes can impact how parks are used and developed. The ability to respond to these changes is the essence of the principle of adaptation.

Adaptability throughout the year

Adapt to change in density of usage

Park development plans to meet new changes mean being suitable for many conditions and proactively changing flexibly to adapt to existing conditions. For example, during the COVID-19 pandemic, cities were forced to implement lockdowns and practice social distancing, changing the social lifestyle (trends in living and working online). That change affected the demand for using parks and increased the role of parks. As the demand for remote work and working from home increases, people are spending more time (and paying more attention) to the spaces around their neighborhoods, especially parks or nearby ecological landscapes, to meet the need for physical and mental health, work-life balance, etc. In addition, the development of information technology infrastructure and the trend toward new work environments allow workers to work right in the park if the infrastructure meets their needs (with amenities such as free Wi-Fi). This transition promotes creativity and increases labor productivity compared to traditional office work environments.

Design solutions must ensure adaptation to climate change. For example, optimizing spaces, encouraging intelligently controlled and comprehensive, diverse development, ensuring minor encroachment on the natural environment, and trying to keep a closed ecological environment and balance...

- Principles of security and safety

Safety and security are often cited as issues related to park users. From a park management perspective, opportunities to address these issues lie in approaches including education, community involvement, and landscape design. Safety concerns extend to park maintenance, such as the safety of recreational equipment, traffic, and

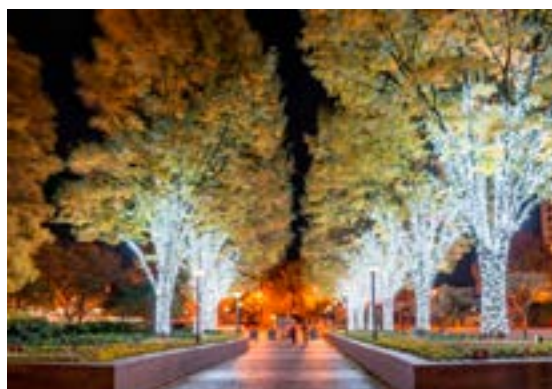


Figure 2. Well-lit spaces without hidden corners ensure a safe and secure environment for the park.[8]

infrastructure systems. For example, ensuring the safety of playground equipment requires careful consideration of design, spatial organization, and functional layout. Materials used and games provided must minimize the risk of injury, while the playing surface should not be excessively rough or slippery. Similarly, security principles are implemented by avoiding dark corners or blind spots in park design. In addition to the CCTV system, designing functional spaces that everyone easily observes is also one way to ensure the park's safety and security. The above view shows that, if viewed from a larger perspective, safety and security in park design also affect the quality of community life, ensuring that people have safe, convenient, and effective ways to come to and enjoy the park. Furthermore, safety and security are also reflected in the balance between freely used and controlled spaces.

- Educational principles

Urban parks are the perfect locations for improving the residents' bond with nature and advancing their knowledge, comprehension, and appreciation of nature. Education on the environment advances citizens' knowledge and enhances their perception as much as their behaviour for creating a resilient environment and community[9]. For instance, education on environment and guidance programs may include;

Urban park activity programs like walks in nature and exercising programs outdoors;

Voluntary works allow citizens to participate in routine activities and maintenance like cleaning, mowing grass, and planting;

Educational school trips, after school activities, outdoor events on a seasonal basis for both the youth and children;

Therapeutic landscapes and healing gardens for individuals who are challenged emotionally, physically, and mentally;

Developing a diverse park system is an opportunity for education, or, in other words, providing the community with information about the cultural history of an area, a period, or the values of the natural ecosystem and the relationship between humans and nature. Moreover, this is also a cultural bridge between regions, and if well organized, it can be a very effective tourism promotion product.

### 3. Principles of spatial layout

In addition to the general principles of multi-functional parks design in Vietnam, the author also proposed three basic spatial layout principles

Principles of free layout

Principle of taking advantage of natural conditions

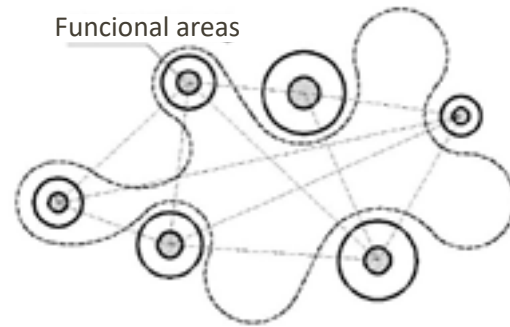
Principle of natural simulation

Principles of geometry

Combined principle

*Principle of taking advantage of natural conditions*

In ancient times, when the concept of a park had not yet been formed, vague gardens only served



**Figure 3. Principle diagram to take advantage of natural conditions[10]**

the rest and recreation needs of the ruling classes. Utilizing natural conditions in park design is a common principle because it creates a harmonious relationship with nature. As society continues to develop with modern science and technology involvement, this principle has become one of the core components in organizing park spaces. Furthermore, its advantage is that it limits aggressive interventions into natural landscapes, thereby contributing to environmental protection, conservation, and ecological balance. In addition, it can take advantage of all the benefits of natural landscapes to create unique characteristics and intense attraction for participants.

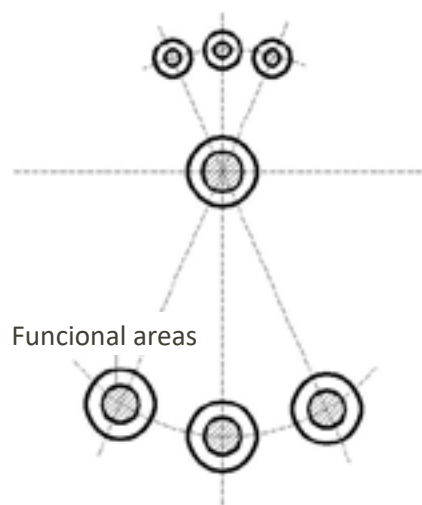
#### *Principle of natural simulation*

Principles of natural simulation are also common principles in park layout. This principle is usually based on the idea, the desire of the designer: Get nature as the source of creative ideas. Moreover, it is essential to understand that the natural simulation here is not a random copy but rather a natural one. Nowadays, many parks apply this principle in design and are highly effective in sensing and using space.

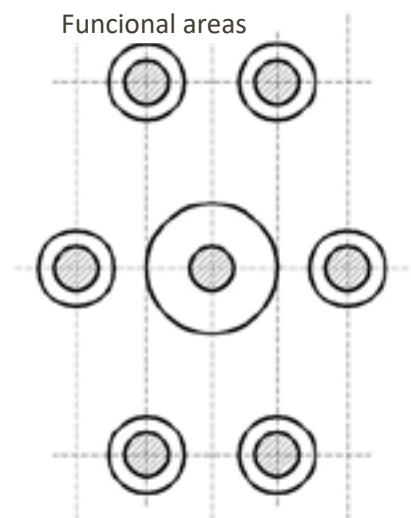
#### *Principles of Geometry*

The principle of using convergent ray lines

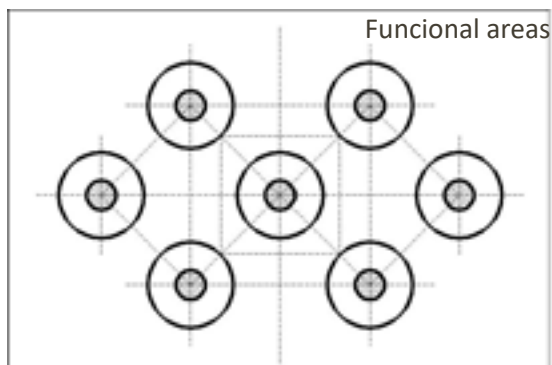
This principle is used with functional subdivisions located on routes, with directions towards the center and the main gate; design principles with convergent ray often create



**Figure 4. Principle of using convergent ray lines[10]**



**Figure 5. Principles of geometry with symmetry axes[10]**



**Figure 6. Principles of using regular geometric forms[10]**

spaces with spectacular panoramic images. In the process of developing parks in the world and Vietnam, the principle of using convergent rays is one of the preferred principles

#### Principles of geometry with symmetry axes

In the world, the principle of geometrical arrangement with regular symmetry axes has appeared since ancient Egypt, with a garden layout having two axes of symmetry perpendicular to the center. In the Renaissance, Barcoo, the garden art reached its apex with expressive language using the multi-axial symmetrical forms with the variations of the circular line to create park spaces having unique characteristics. In Vietnam, this principle is also used in park layout, with functional spaces arranged symmetrically through the central axis. Even in separate functional spaces, this method is also used, especially the symmetry axis, which is used extensively in the central space, creating the space

with distinct theme ideas.

#### Principles of using regular geometric forms

This principle is also a common principle in garden design, not only in the world but also in Vietnam. Geometric forms used in spatial design are primarily regular, such as square, circular, octagonal, and hexagonal. In the traditional design principle, squares and circles are two popular geometries. Derived from integrity in all social relationships, loyalty to the country, and family with gratitude, the square circle also reflects the Vietnamese people's philosophical view of human life. Therefore, the principle of using regular geometry is not only one of the principles commonly used in traditional garden design but also design principles that are still widely used.

#### Combined principle

In the design and construction of the park, combining design principles while respecting the natural terrain and using geometric techniques sometimes brings about high efficiency. For example, the principle of exhaustion, The system of backbones and symmetrical layout works, green trees, and water surface are arranged freely according to natural terrain conditions.

#### 4. Conclusion

Parks is always a hot topic and often receives the attention of everyone. Therefore, besides assessing the actual situation, the development of the park through each period, the development of history to see the change of structural morphology and the trend of the park design. Setting up the principles of urban parks plays a very important role. These will be the basis for the research, design, construction, and planning of the park system in Vietnam./.

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