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## Study the Plant Design Of City Strand Water Space

### ÉTUDE DE LA CONCEPTION DES INSTALLATIONS DE NORMES D'EAU DANS L'ESPACE URBAINE

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**Abstract:** The environment view more and more pays attention to water body and have no water ineffective, but strand water space design in the view in have become a necessary link. The plant allocation of strand water in the city grass also wants to pay attention to be reasonable of match, processing very the wonderful pen then living a flower, whereas indescribable then. This text mainly introduced the meaning of strand water view design in checking the foundation of related data and put forward the concept of strand water plant and to the understanding of the strand water space plant landscape .From the strand water space plant landscape art, the application of strand water plant and it elaborates the plant view in strand water space at main allocation method etc. in the park.

**Key words:** Strand water space of city; Plant design; Way to planning; The art of design

**Résumé** L'environnement voir plus et plus attentive à l'eau et le corps n'ont pas d'eau inefficace, mais la conception d'espace brin d'eau dans la vue en sont devenus un lien nécessaire. La répartition des plantes d'eau dans l'herbe brin ville veut aussi faire attention à être raisonnables du match, un traitement très belle plume qui vivait alors une fleur, alors indescriptible alors. Ce texte introduit notamment le sens de la conception de visualiser brin d'eau dans la vérification de la Fondation de données liées et de mettre en avant le concept de l'usine d'eau brin et à la compréhension du paysage brin d'eau de l'usine de l'espace. De l'art brin d'eau de l'espace paysage végétal, l'application de l'usine d'eau brin et il élabore la vue des plantes dans l'espace de l'eau au fil etc principale méthode d'allocation dans le parc.

**Mots clés:** L'espace d'éteincelle aquatique de ville; La conception de l'usine; Le moyen de la planification; L'art du design

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## INTRODUCTION

Waters are the cradle where cities emerge. Because waters bring harmonious and balanced development between man and environment, they make up of the most dynamic area of the city - waterfront district. Thus, people began to explore and use the waterfront district to different extents in recent years, such as Baltimore Port plan in the U.S. (XU, YAN, 2000), Granville Island renovation plan in Canada (LIU, 1999), circular city park of Hefei in China (WANG, 1998), Funan River greenbelt around Chengdu in China.

With the revitalization of the urban waterfront district, waterfront green land planning and design is re-examined. This is mainly because the urban environment has been destroyed during the urban development. Especially, most of the landscape waters are eutrophic and the green land is of too much artificial polish. This makes the precious natural ecologic information lack in the city while people are eager to get close to nature, which attracts the designer' attention on the relationship between man and waterfront. Designers begin to understand that plants are more effective to prevent water

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and soil loss, that micro-organisms are more lasting than chemicals to keep the water clean, and that muddy revetment are more economical and permanent than cement revetment.

## **1. OVERVIEW OF WATERFRONT SPACE**

### **1.1 Definition of Waterfront Space**

Waterfront space is a special spatial location in the city and the transition space from the city to the waters. It refers to "the part of land, building or town adjacent to rivers, lakes or oceans." According to different adjacent water bodies in nature, waterfront can be divided into the riverside, seaside (ZHANG, ZHANG, 2006).

### **1.2 Waterfront Space Landscape Design**

Urban waterfront landscape design is the corresponding planning and design of waterfront, facility, environment and so on centering about the waters (such as river and lake) in the city. Because the urban waters are different from wild waters in character and rivers are different from seas in nature, this article is only limited to the design study of waterfront landscapes in urban areas adjacent to rivers.

In waterfront space, air is fresh and view is wide. In the design, the space publicness, functional diversity, water body accessibility, and plant diversity should be emphasized to create a place that residents and tourists are eager to stay for relaxation.

#### **1.2.1 Place publicness**

In order to make the waterfront green land a real public place and the public wealth for all citizens, various enclosure phenomena that prohibit the citizens from entering must be prevented. If a lot of such phenomena exist, they will impede the freedom and continuity of public activities, and cause great obstacles for the formation of good urban landscape and public green land.

#### **1.2.2 Functional diversity**

Waterfront space should provide various functions such as relaxation green land, shady walk, yacht wharf, and viewing platform. For the design of space division, various activities of people should be considered with points, lines and faces combined. Line—continuous line with the shady walk as the main part; point—key viewing places or sightseeing objects in this line such as key buildings, ancient trees; face—larger green space for activities extended around the main line such as central squares, parks (Japan Society of Civil Engineers, 2002). These spaces can be combined with culture, entertainment and service buildings.

#### **1.2.3 Water body accessibility**

Getting close to water is human nature. Lingering between water and sky and roaming around in the twilight is undoubtedly a great pleasure and relaxation. However, the waterfront spaces in many cities are often faced with the threat of the tide and flood, thus the flood control public facilities are constructed such as levees, floodwalls. As for these facilities, waterfront terraces with different heights can be adopted in practice: shown in the cross-section of Chicago Lake design. According to the flood cycle, three levels of construction are set up, namely, a low platform without building, a middle platform allowing temporary buildings, a high platform with permanent buildings constructed, which solves the problem effectively (WU, 2002).

#### **1.2.4 Increase plant diversity**

This kind of community has big species diversity, strong adaptability, which is appropriate habitat for urban wildlife. It not only improves urban climate and plays an important role in maintaining ecological balance, but also provides a variety of landscapes and entertainment places for the city. In addition, the increase of soft ground and vegetation cover, together with the planting of tall trees, provides shade and reduces heat radiation. Urban waterfront green should adopt natural design. The plant disposition of different levels of flowers, low shrubs, and tall trees should be in conformity with the natural plant community structure.

## **2. APPLICATIONS OF WATERFRONT PLANTS**

### **2.1 Definition of Waterfront Plants**

The term, waterfront plants, appears relatively late. So far nobody has ever put forward the concept of water plants clearly. I believe that the waterfront plants refer to those that are able to complete the life cycle in the waterfront environment including trees, shrubs, herbs, vines along the coast and aquatic plants in shallow water near the shore. Among them trees and shrubs are those such as: weeping willows, Mexican taxodium mucronatum, nyssa biflora, tamarix chinensis, sapium sebiferum; herbs are those such as: asparagus cochinchinensis, hosta; vines are those such as: ivy; aquatic plants are those such as: reed, typha minima, calamus, arrowhead.

### **2.2 Landscaping Art of Waterfront Plants**

#### **2.2.1 Color art**

##### **(1) Application of Cool Colors and Warm Colors**

If waterscape is arranged into open, lively scenes in the garden, the decorative plants with warm colors should be used to achieve the contrast and eye-catching effects. If a quiet atmosphere needs to be created, the plants with cool colors, such as purple, dark green, and black green, should be used next to the water. Plants with cool colors can make people feel that space is reduced and give people quiet feelings (GUO, 1990).

##### **(2) Foreground and Background**

In the combination of various shades of green, light plants make the composition bright, while dark plants make the composition stable. As the background of bright or light plants, dark plants can contrast with light plants to make the plants next to water full of sense of layers.

#### **2.2.2 Line art**

Flat straight water surface should make full use of plant forms and lines for the composition to enrich the levels of water space. For example, willows planted at the waterside form a linear contour of soft branches sweeping the surface of water; tall trees such as taxodium mucronatum, metasequoia and glyptostrobus form contrasting line shape with the water level in the space; tall straight taxodium mucronatum make the space filled with a sense of strength; elegant roystonea regia planted at the waterside constitute a free and easy scene. In addition, the plants, whose branches extend to water, form fine lines.

#### **2.2.3 Creation of artistic conception**

Waterscape often constitutes a unique, profound scene in Chinese gardens. Boundless reed catkins and gentle ripples look like snow, the water and the sky merge in one color, autumn scenery is beautiful with profound artistic conception; Plum blossoms with waterfront dotted form the elegant scene of "sparse shadows reflect aslant in the clear and shallow water, and scented fragrance floats around under the dusk moon"; In West Lake scenery of "orioles singing in the willows", weeping willows make the shade around the lake, and the beautiful scenery of the breeze blowing, willow whirling, cloud turning in the sky, and orioles singing make people lingering; The ecological requirements of willows and reeds are similar, and they are poetic combination. The branches of willows dance in the wind, and produce catkins in the spring, while in the reeds a large number of birds and waterfowls often dodge and reed catkins float in the air in autumn. Thus, during every spring and autumn, the water is covered by the vast expanse of boundless white catkins looking like smoke or mist, one is "thousands of catkins floating in the spring", the other is "dancing wildly with red leaves in autumn", which has always been the beauty causing poetic inspiration (SHI, YU, 2001).

### **2.3 Disposition of Waterfront Plants**

#### **2.3.1 Isolated planting**

The isolated tree next to water is set mostly for shade, view or composition, or to highlight a particular species. For example, the salix magnifica, on the inner bank of the scene of "three pools reflecting the moon" in Hangzhou, has strong hydrotropism with low branches near the water resulting in different and beautiful "dance postures", and some horizontal branches stretch far over the water; Some curve upward, and constitute the composition frame for viewing the scenery while sitting on the coastal stones; others droop into the water in a prone position, which is very interesting (ZHU, 2003). The disposition of salix magnifica by the shore in the form of isolated planting, together with lawn, not only highlights the uniqueness of its species and enriches the line art of beautiful waterfront, but also meets the need for shade. Therefore, for the disposition of isolated planting by the shore, we should improve in the four areas, namely, species, shape, gesture and color, to meet higher demands, and satisfy the need for two important roles of beauty and shade.

### **2.3.2 Linear planting**

In China linear planting is a common way for waterfront plant landscaping. The species mainly used is weeping willow, which is usually by regular shore such as lake shore and river bank. For example, willow and peach are planted in linear planting on both sides of Bai Causeway of West Lake in Hangzhou, that is to say, the linear planting of willow, peach and lawn creates the scene of red peach blossoms and green willows, which become a popular passageway landscape for tourists (LI, 2000); The linear planting of two rows of palmetto is adopted for Palmetto Causeway of Guangzhou Lihua Lake. Because of the strong light reflected and the phototaxis of palmetto, palmetto grows slanting towards the water, which seems moving (ZHU, 2003). Therefore, for the linear planting of trees at the waterside, the two aspects of tree species and planting density should be considered, which can display very different scenes.

### **2.3.3 Mass planting or group planting**

Mass planting or group planting of waterfront plants is most commonly used. Thus, for group planting at the waterside, the three aspects of species variety, group beauty and relative group amount compared with the water need to be considered, so as to create different effects.

Different waterfront plant species adopted for mass planting or group planting will bring different effects. For example, 2.5m-3.0m tall cotton roses planted in mass on both sides of the water, in other words, cotton roses and lawn in mass planting, form a secret "flower bay"; Reeds, ferns and other landscaping plants are often planted in mass planting on the side of lake, pond or brook, or on the mudflats and marshes of large lakes, from which "rural rustic fun" is resulted; *Taxodium mucronatum* forest planted in group planting on the soil shore of Hong Lake in Shenzhen form the tall "green barrier" at the waterside, which also become a background for low flowers at the waterside (LI, 2000). Therefore, for mass planting near water, the two aspects of species variety and planting density need to be considered, so as to make a piece of open woodland suitable for activities and a scenery dense forest at the waterside.

### **2.3.4 Two forms of water body plant disposition**

#### **(1) Regular Water Body**

The forms of garden waterscape are diverse, and generally are divided into two categories, namely, natural style and neat style, with the former including pools, streams, waterfalls, etc. and the latter including regular pools, regular waterfalls and fountains, etc.(YU, 1987) The article is only focused on the plant disposition beside regular pools. Regular pools have clean edges and clear contour mostly of geometric shape. For large regular pools, the main role is for reflection and thus these pools are often kept smooth as a mirror with very few plants around, so as not to obscure the reflection in the water and cause pollution by fallen leaves into the pool. Around the pool, lawn or flower terrace is suitable to be arranged for open view. For small pools, aquatic plants are often planted, and even the vegetation can be planted in the entire water, or bonsai can be placed evenly and neatly.

#### **(2) Natural Water Body**

Large surface water bodies: for plant disposition on large water surface, large layout is generally adopted, that is, planting tall trees in mass planting or band planting. The seasonal change in shape and color of plants along the water body is an important factor to construct beautiful waterscapes. Through proper plant disposition, the waterfront landscapes can show beautiful sceneries in each of the four seasons.

Small surface water bodies: such water bodies are common in natural-style pools or small streams. For quiet natural style pools, it is not proper to plant colorful flowering shrubs. As for the plant disposition and species selection, some tall trees are best fit to show the simplicity and serenity of nature. The disposition of bamboo, palms and other monocots beside the natural-style pool can bring people simple, quiet, elegant and friendly feelings (SU, 2000).

## **3. OTHER LANDSCAPING OF WATERFRONT PLANTS**

Waterfront lies between water and land. For the plant landscape, we need to consider not only the effect of viewing from the land, but also the effect of the water landscape. We can mimic the ecological community structure of natural waterfront vegetation and adopt the design for nature (LI, 2000). We should take the green ecological benefits as the main objective. In addition to the emphasis on plant spectator requirements on the basis of traditional plant landscaping, we need to take the vertical terrain design into account and simulate the typical landscape features (such as estuaries, beaches, wetlands, etc.) formed during natural formation process of water system, so as to create suitable terrain environment for waterfront plants and restore the ecological quality of urban waterfront areas.

For a waterfront landscape in Nanjing lovers' garden, water tolerant *taxodium mucronatum* and *taxodium ascendens* originated from the marshland of North American are selected to be planted at the waterside, while *metasequoia* that are neither water tolerant nor drought tolerant are planted a little far away from the waterside. These three species have the

same shape and they are all tall and conical with harmonized outer contour, while their colors are quite different. They show varying degrees of green in summer and strikingly different colors in autumn. *Taxodium mucronatum* is red brown while *metasequoia* is dried yellow. Because *taxodium mucronatum* is planted on wet land at the waterside, a lot of breathing roots grow out and root-like phenomena have emerged at the end of large roots. The clear reflection of the landscape can be seen from distance.

There are two characteristics for the waterfront landscaping in Japan: (1) show the river landscape by planting trees. Trees commonly planted at the waterside are: willow, cherry, pine, bamboo, and so on. These species are important factors that represent the waterfront landscape in Japan; (2) the local style for the structure of plant species is united to the style for the water. For example, to emphasize the city axis symbolically in the center area of the city, the regularly planted ginkgo trees with beautiful shape and the weeping willows with equal sense can effectively emphasize the continuity. Instead, high, medium and low irregular trees need to be arranged to express the sense of gentle and friendly (Great London Authority, 2004).

## CONCLUSION

In recent years, tremendous progress has been made in urban waterfront landscape design. However, it must be acknowledged that there are still many complex and contradictory issues in both design research and practical operation. This article explored the design techniques of the waterfront green space and the applications of waterfront plants based on the principle of "people-oriented". In modern society, people are more and more concerned about environmental issues, and green landscape is directly related to our living environment. Therefore, the landscape design and construction of waterfront space as the essential green land of a city is worth our careful consideration.

## REFERENCES

- GUO Yuanjiong. (1990). *Garden Art* (PP 28-52). Beijing: Agriculture Press.
- Great London Authority. (2004). Improving London's Open Environment-Spatial Development Strategy for Great London. (Germany) Funchal Horn / Schmalscheidt. *Basic principles of urban design on plant - space - waterscape* (P127). Shanghai: Shanghai People's Fine Arts Publishing House.
- Japan Society of Civil Engineers. (2002). *Waterfront Landscape Design*. Dalian: Dalian University of Technology Press.
- LIU Jian. (1999). Success Example of Integrated Redevelopment on Urban Waterfront - Renovation of Canada Granville Island. *Overseas Urban Planning*, (1), 36-42.
- LI Shangzhi. (2000). *Landscaping Art of Aquatic Plants*. Beijing: China Forestry Publishing House.
- SHI Xiuming, YU Huizhen. (2001). Flowers Disposition of Jiangsu Writers' Freehand Scenery and Garden. *China Garden*, (6), 71-74.
- SU Xuehen. (2000). *Plant Landscape* (P119). Beijing: China Forestry Publishing House.
- WANG Lianqun. (1998). Urban Public Activity Space - Thoughts on Construction of Hefei. *Anhui Architecture*, (4), 8-10.
- WU Baona. (2002). On Waterfront Environment Design. *Journal of Guilin Institute of Technology*, (22), 324-327.
- XU Yongjian, YAN Xiaopei. (2000). Study on Tourism Development of Urban Waterfront- Successful Experience of North America and its Enlightenment. *Economic Geography*, 20 (1), 99-102.
- XU Dejie, ZHOU Wuzhong. (2002). *Artistic Conception on Plant Landscape*. Nanjing: Southeast University Press.
- YU Shuxun. (1987). *Garden Beauty and Landscape Art* (PP 123-124). Beijing: Science Press.
- ZHANG Zhenyu, ZHANG De. (2006). *Urban Riverway Landscape Design*. Beijing: China Construction Press.
- ZHU Junzhen. (2003). *Plant Landscape Art of Chinese Gardens*. Beijing: China Building Industry Press.