

# Landscape Reconstruction of Huinan Campus of Sichuan University of Science & Engineering

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## Abstract

**The campus landscape can create a harmonious campus ecological environment and provide a beautiful and comfortable teaching, research and learning environment, which is of great significance to the construction of "double first-rate" university. Campus greening management is the basis of maintaining long-term, healthy and full development of campus landscape. Greening management can better maintain and protect the existing greening achievements and better disseminate the campus green cultural atmosphere. On the basis of in-depth understanding of the existing landscape construction in Huinan Campus of Sichuan University of Science & Engineering, the scientific decision is made and the reconstruction plan is given, so as to provide the basis for the later campus landscape design, construction and maintenance.**

## Keywords

**Campus landscape; Greening management; Reconstruction plan; Sichuan University of Science & Engineering.**

## 1. Introduction

Landscape is an important part of the overall planning of university campus, which plays an important role in the creating of campus atmosphere[1,2]. University campus is not only a place for students to study and live, but also a carrier of school culture and temperament. With the development of The Times, new requirements have been put forward for the campus landscape design. The plant configuration and plant variety selection on campus reflect the humanistic atmosphere of the university. The campus landscape can create a harmonious campus ecological environment and provide a beautiful and comfortable teaching, research and learning environment, which is of great significance to the overall development of the "double first-rate" university[3-5]. Campus greening management is the basis of maintaining the long-term, healthy and full development of campus landscape. Greening management can better maintain and protect the existing greening achievements and better disseminate the campus green cultural atmosphere[6,7]. Entrusted by logistics Group, our team is responsible for the landscape renovation project of Huinan Campus of Sichuan University of Science & Engineering. We first conducted a detailed investigation of the entire campus landscape, and then, based on the existing landscape, provide constructive suggestions for future campus reconstruction, so as to guide the later campus landscape design, construction and maintenance.

## 2. Case Study of Campus Landscape Design at Home and Abroad

The representative new campus of XiDIAN University and the west campus of Duke University are selected for analysis.

## 2.1. Landscape Analysis of Xidian University New Campus

The new campus of XiDIAN University is located in the southern suburb of Xi 'an, a famous historical and cultural city, which covering an area of 1.2 million square meters. The environment and landscape design of the new campus accords with the leading position of the school in the electronic information industry, and lays a solid foundation for it to enter the top university in the world. The design concept of "nature and rationality" is just like the new thinking of science and engineering colleges in the new era. The design of the new campus is fully understand and respect the campus cultural characteristics, grasp the regional characteristics, as well as the use of native tree species, in the embodiment of intensive, energy-saving garden characteristics at the same time, more vitality and originality. which is an innovation and breakthrough based on inheriting and carrying forward the cultural connotation of Xidian people. It reflects the freedom, openness and efficient characteristics of contemporary engineering colleges, thus greatly enriches the cultural life of the campus, and has the environmental landscape design standard of top international universities.

## 2.2. Landscape Analysis of West Campus of Duke University

Duke University, located in Durham, North Carolina, USA, is one of the world's leading research universities. The school's west square was designed in the 1920s by Olmsted brothers and Julian Abele of Horace Trumbauer Architects. The wide road and the central lawn surrounded by tall oak trees together give the square a sense of scale and weight. The borders of the square are planted with large areas of greenery, balancing the intricate appearance of the surrounding Gothic architecture. Although the plaza has been the most important place for gathering and daily activities in the campus for nearly a century, due to the long-term overuse and lack of maintenance, the aesthetics and quality of the plaza landscape have significantly declined.

Between 2007 and 2017, Reed Hilderbrand in collaboration with eight architects, completed five separate projects that transformed diverse functional Spaces, infrastructure, historic squares and campus paths into a unified and coherent area, demonstrating exceptional design leadership and sensitivity to the environmental context. Based on a careful reading of the historical context and design intent, landscape design team will originally designed by Olmsted brothers landmark west square was updated, for its gives the contemporary use at the same time, also with the overall landscape design method, make the original trees and lawn back to life, and to grow and continue for a long time. In order to integrate the underutilized plaza and the adjacent busy service area into a vibrant campus center, the landscape team attempted to create a contemporary landscape environment that would highlight the site characteristics, based on the campus material characteristics and typology, and around the establishment of the community and the participation of students. Over the past decade, these initiatives and efforts have culminated in a vibrant, networked campus that provides fertile ground for the coexistence of historical landscapes and contemporary functions.

## 3. Landscape Design Exploration of Huinan Campus of Sichuan University of Science & Engineering

### 3.1. Overview of Existing Landscape of Huinan Campus

Sichuan University of Science & Engineering is a typical multi-campus school, which has formed a pattern of one school, three regions and five campuses. Among them, Zigong Huinan Campus covers an area of 600 mu, with a green area of about 290,000 square meters. On the whole, it basically achieves the greening effect of the whole garden. However, there are several problems in the greening landscape of the campus:

Firstly, the school has been established for a long time, and the greening planning of the campus often changes with the changes of functional areas. There is a lack of unified planning, and the

landscape layout of garden plants is a little messy. Due to the scattered planning, the campus greening and the overall development planning of the school, the campus atmosphere and building style coordination is poor.

Secondly, due to historical and economic constraints and other reasons, some fast-growing tree species were planted in each campus in the early stage of school construction, with single tree species and dense plant spacing. These tree species have entered the peak or aging stage of their growth cycle, with decayed trunk and huge shade, and there are safety risks and obstacles to the growth of other plants. For example: poplar, yellow oak, ficus microphylla, trifoliolate tree, etc., some trees are serious diseases and insect pests, trunk column erosion form a hole, some trees crown thick shade resulting in poor growth or even no grass.

Thirdly, there are some unreasonable plant layout, unscientific plant configuration, unreasonable space utilization and other phenomena in the campus, which gives people the feeling that all kinds of nursery plants pile up together, just as the nursery land is relatively chaotic. At the same time, the specific area of the school lacks of personalized greening configuration, and the planning and design are similar, which cannot highlight the characteristics well. Each old campus is mainly covered by a single lawn, and no ornamental ground plants are planted. At the same time, some large trees are not covered by surface plants, and the soil is bare, which affects the perception.

Fourthly, the degree of beautification of important areas of the school is not enough. For example, around the stadium, dormitory area, administrative building, library, main entrance gate and other places as the external display window of our school, the landscape effect stays in simple greening, no landscape characteristics, can not make people remember deeply, lack of campus theme.

Fifthly, the variety of street trees and ground cover plants on campus is too monotonous, and the seasonal hue is not obvious. The main street trees in each campus are few in variety and lack the unique personality of campus roads (the paving is inflexible), which makes the whole campus look very dull. There is a single variety of ground cover plants in each campus. At present, the main street trees in the school are yellow kudu and ficus microphylla. Most of the ground cover plants in the area only have lawns and ophiopogonis, and the species are not rich. Sixthly, the campus landscape reveals the inadequacy of the campus cultural atmosphere. Each campus lacks some landscape sketches that reflect the disciplines of the campus, have a sense of The Times and characteristics, which makes the entire campus lack of signs and a sense of belonging.

To sum up, from the long-term development of the school, campus landscape should strive to reflect the purpose of the construction of ecological campus, the human and the nature harmonious coexistence and the sustainable development of ecological system, adhere to the construction of "ecological campus" goal, starting from the school the school situation, combining with the school each area green space landscape present situation and existing problems, on the premise of ensuring the campus the rate, through organized planning and implementation, prominent improve school green space landscape tastes and characteristics, at the same time satisfy the school about the requirements of teaching, research and practice, form a green ecological landscape with the characteristic of university.

### **3.2. Design Principles [8-11]**

As the saying goes, "it takes ten years to grow trees, but a hundred years to cultivate people", universities are places to cultivate talents, and the generation of their environment needs the nourishment of humanity and ecology. The construction of campus landscape design planning should be based on "one hundred university" goal, respect the concept of "organic growth", from the campus of "humanistic space" and "natural" space, probing into the fusion method of

dual space and model, used in the campus planning and layout, achieve "campus culture, humanism, multi-dimensional, ecological campus".

#### 1) Principle of integrity and systematic

Attention should be paid to the coordination of campus landscape and overall planning layout, people and environment, landscape and architecture, soft landscape and hard landscape, campus landscape and surrounding environment, old and new landscape, thus create a harmonious and comfortable campus landscape space, forming an organic overall campus style. By determining which activities each region will serve and the appropriate scale for each region, formal and informal Spaces can be grouped into a network in which individuals and groups can find their niche.

#### 2) Principle of unity

To create a sustainable, interconnected and proactive campus area that displays the history of the campus while having a positive impact on students' daily and academic life. The seemingly disparate projects are unified into a whole that connects the indoor and outdoor areas such as administrative areas, accommodation areas, teaching areas, and activity areas, as well as private and public areas.

#### 3) Principle of coordination

Campus landscape design should make full use of the existing topography, water, soil, local plant resources.

#### 4) Principle of highlighting regional cultural characteristics

Campus landscape design should pay attention to the deep integration of campus culture, regional culture and landscape environment, and emphasize the dialogue between reality and history. No matter it is landscape sketch or figure sculpture or characteristic plant, it needs certain cultural origin or historical reproduction. Specific performance for cultural characteristics of the campus nameplate, signs, lamps, seats, paving, etc. With landscape elements as the carrier, the campus spirit permeates into the physical environment, and fully highlights the school's educational philosophy, characteristics and regional culture.

#### 5) Principle of ecology

In campus landscape design, attention should be paid to the integration of landscape plants and local ecology. According to the soil, air, light, ventilation, rain, effective accumulated temperature and other conditions of the campus location, reasonable ecological goals should be established to improve the campus microclimate and make necessary responses and contributions to the ecological development of the area.

Ecology as the base, green priority, good landscape effect can not do without plant collocation design. In the planting design, evergreen and deciduous tree species should be combined, fast-growing and slow-growing tree species should be combined, trees, shrubs, flowers, lawns and vines should be combined, and the ground, walls, scaffolding and roof greening should be combined. While enriching the ecological landscape, attention should be paid to the fusion and transition of short-term and long-term landscape.

#### 6) Principle of artistic

The space level, color collocation and plant form selection of campus landscape should conform to the aesthetic habits of the public, so as to achieve a beautiful image, color coordination and good landscape effect.

#### 7) Principle of scientific

Suitable trees should be selected according to site conditions, so as to truly be "suitable for the site and suitable for the tree" and follow the growth law of plants.

### 3.3. The Landscape Reconstruction Plan of Huinan Campus

#### 1) Unified planning

Combined with the cultural characteristics of the campus, professional landscape team for landscape planning and design. Combined with the campus green landscape, suitable to increase the garden landscape pieces. Select the appropriate location to build characteristic ornamental garden, on Joe, in irrigation, flowers and plants under the ground, four seasons can be appreciated, three seasons have flowers as the standard, for teachers and students to create an elegant, comfortable learning and living environment. In combination with the campus cultural construction, increase the variety of colored plants and ornamental grasses, transform the existing rigid pavement, integrate landscape elements, and unify the design.

#### 2) Unified construction, and strengthen the later maintenance

Professional garden companies will be introduced to carry out unified construction according to the design. After construction, professional management skills training will be given to relevant personnel of logistics group participating in greening landscape management and protection, so as to improve professional management ability and management level of later maintenance and achieve good landscape management effect.

#### 3) Landscape improvement proposal

The overall landscape style of the campus should complement and integrate with the overall plan of the school. The planning and layout of the school has been determined in the early days of the school. The location of the building and the road network have been well planned. The planning of landscape transformation should be completed on the basis of these, so as to ensure the coordination with the overall planning of the campus. At the same time, according to the different school functional area division, according to the different plant allocation principle plant allocation, so as to optimize the plant structure.

1) Break the tradition that the green space is not allowed to enter the teaching building, transform the original ribbon green space with a width of more than 8 meters around the teaching building into a small garden, and set up some rest facilities, so as to better provide places for teachers and students to rest, relax and communicate.

2) Adopt the tree species with obvious seasonal hue change, enrich the school landscape color change. Rich colors can add more vitality to the campus. The changes of seasonal colors make the curve and outline of the forest canopy clear and enrich the landscape levels of the campus.

3) According to local conditions to increase the theme of cultural features of the landscape sketch, enrich the cultural connotation of university campus, strengthen the sense of belonging on campus. Landscape sketches generally carry certain humanistic emotional factors and have theme ideas. Different individuals' thoughts collide with landscape sketches in different ways, which can generate different associations and resonances and improve the cultural and emotional atmosphere of campus landscape.

4) Strengthen the road landscape construction, increase the campus vitality. The road landscape should conform to the contemporary science and technology, reasonable layout, people and cars diverging. The pavement should be composed on the basis of some color, so that the campus road is no longer a stereotypical impression, but the embodiment of vitality.

5) Highlight road markings and safety guidance. Road signs and safety guidance are the visual communication Windows of the campus, guiding people's direction of travel, and more importantly, reflecting the overall planning and cultural characteristics of the campus to make the whole campus smoother.

### 3.4. Specific Management Measures for Campus Landscape Maintenance

(1) Extensive publicity to maximize public participation.

As an important part of the sustainable development of the school, the initial planning and design of the campus greening project should not be limited to design companies and professionals, but should pay full attention to public opinions. At the beginning of the greening design, the way of public participation should be enriched and improved pertinently to ensure the representativeness and universality of public participation. On the one hand, it reflects the democratic and scientific nature of school decision-making; on the other hand, it also improves the sense of responsibility and care of teachers and staff for campus greening, which is conducive to the maintenance and management of greening in the future.

(2) Implement scientific classification and hierarchical management.

There are many kinds of plants on campus. Different types and levels of conservation standards can be established according to the characteristics of plants and the importance of their geographical location. Maintenance standards for groundcover, shrubs and trees on campus should be based on their different physiological characteristics. And the key parts of the school should achieve level 1 greening standards, so as to ensure the complete display of the school appearance. Off-campus locations can be considered as level 2. So in the management can be done coarse and fine, prominent focus, improve work efficiency.

(3) Improve the landscape maintenance technology.

At present, the school logistics introduced corporate management, the school greening management by the property company to take over the management. Property company greening professionals are few, most of the greening staff do not have professional knowledge, should regularly carry out technical skills training. In view of the important links such as green space management, seedling planting, soil, fertilizer and water management, tree shaping and pruning, disease and insect pest control, etc., regular gardening training courses and on-site practice teaching are carried out to combine theory with practice to improve the technical quality of workers.

(4) Establish the campus greening maintenance calendar.

List relative campus flora According to the existing tree species, and according to the content of the flora, formulate the monthly calendar for the greening maintenance management of the supervision university. Landscaping maintenance and management is a tedious and complicated work with scientific timeliness. The technical measures taken in different periods are not the same. Only by following the law of plant growth can it be properly maintained and managed in place. At the same time, according to the monthly calendar of greening maintenance management, the manager can specify scientific labor plan to reduce labor costs.

#### 4. Conclusion and Prospect

Based on the actual situation of Sichuan University of Science & Engineering, this paper puts forward the above overall landscape renovation Suggestions, and combined with the current situation of greening management of the university, gives a reasonable optimal management plan, in order to provide reference for the landscape design and renovation of the university campus. The landscape reconstruction exploration is limited to the landscape plan reconstruction of Huinan Campus, which mainly focuses on green landscape. It is the upgrading and reconstruction of the original landscape, and does not involve the reconstruction of architectural landscape with themes such as architectural appearance. It should be noted that the proposal of the scheme is restricted by land use conditions, capital scale and other factors. In the later stage, the landscape construction plan of the new campus, such as the eastern campus, is expected to start from the whole, and the comprehensive design can better reflect the school-running characteristics, humanistic feelings and landscape structure of the whole Sichuan Light Chemical Engineering University, so as to create more colorful campus landscape.

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