

# **BEIJING CHAOLAI FORESTRY PARK ( LAIGUANGYING AREA)**

**Project Address:** West side of Laiguangying North Road, Laiguangying Township,  
Chaoyang District, Beijing

**City & Country:** Beijing, China

**Area(sq m):** 890000

**Year of Completion:** 2021

**Project Category :** Heat Islands and Fire Resistance

## **STATEMENT:**

The the 89 hectares Chaolai Forestry Park lays out a constellation of ecological and recreational programs together serve as an exemplar of complementing design process for the “Beijing plain afforestation” project, also called as the “one million acres of afforestation projects”.

Serving in the northeast Capital citizens, this park has held deep importance to the urban area by providing ecological value through more than 80 varieties of seedlings, more than 35,000 trees and shrubs, flood protection, improved air quality, increased habitat, and reduced maintenance demands.

It is commendable not only for integrating ecological upgrading principles to enhance urban forestry performance which lunches great importance to urban heat effect and lack of biodiversity, but also affording visitors experiences with thoughtful diversity and richness of natural experience. Balanced with spaces for running, playing, and socializing, exemplify sustainable design principles and create great memories rooted in an ecological setting.

The availability of space for people, and careful design and planning considerations that weave together human and ecological elements, deploy appropriate design expressions, create memorable places, and plan for longevity in accordance with its operational context.

## **NARRATIVE:**

### **Background - “The Beijing plain afforestation” project**

Beijing has experienced the most sustained urbanization process in the past thirty years which brought huge pressure to the people and city in the ecological aspect. The rapid expansion of the city, the rapid increase of the population and the vigorous development of the economy have brought serious threats to the biodiversity of Beijing, and at the same time, Beijing has been faced with more and more serious urban thermal environment problems.

However, 80% of the Beijing's forest area is concentrated in mountainous areas stressed more on the urban heat effect to the urban environment in plain capital areas.

“The Beijing plain afforestation” project launched in 2012 is to make up for this "shortcoming". After two rounds of one million acres of afforestation projects, the forest coverage rate in Beijing's plain areas increased from 14.85% to 31.4% in 2024 which formed the ecological green base of the capital plain area.

## **CHALLENGE 1 ECOLOGICAL NECESSITY**

The 89 hectares Chaolai Forestry Park takes an important part guaranteeing for the ecological security of the capital. It is also a large green space that takes into account biological habitat diversity and regional ecological security. Although the park has been included into the project of “The Beijing plain afforestation”, a large amount of construction waste remains in the park base and needs to be utilized on site. There are a large number of industrial parks and residential areas around it. Creating habitat space for animals and plants which was also greatly challenged by urban heat island threats.

## **CHALLENGES 2 FORESTRY HEALTH**

The tree species are still not rich enough. Problems such as the “pure forest phenomenon” has greatly affected the development of the park's biodiversity. Sub-healthy forest trees lack shrub layers and herbaceous plants is serious which are not conducive to biological habitats. Sparse forest habitats and shrub habitats are sparsely distributed, and good habitat areas are small and scattered, which greatly hinders the growth of animal and plant diversity.

By increasing urban forest coverage, greening area, plant community structure adjustment, light-colored traditional colors and permeable pavement, the site is transformed to increase biodiversity and mitigate urban heat island effect.

## **CHALLENGE 3 LOCAL SERVICES**

The process of urbanization has had a certain impact on traditional culture. With the diversification of cities and the mobility of the population, many traditional cultures have gradually faded away from people's lives, and the relationship between "people-park" is highly tense. The site was cleared and vacated with 26 hectares of land, connecting it with surrounding parks and forming an ecological corridor of more than 4.5 million square meters. It has the location advantage of connecting the suburbs and shoulders the important mission of ecological restoration and reconstruction of nostalgic memories

Taking forest health as the starting point, the project builds a near-natural forest model in the city, improves the stability of the tree canopy coverage, and enhances its ecological service function. Maximize the use of the site topography to create a flexible wetland space and a diverse and rich social interaction space. At the same time, it embraces regional culture, strengthens the sense of identity and belonging of regional culture, and forms a multi-dimensional integrated "people-park" A green system that effectively alleviates the urban heat island effect and promotes the resilience of forest biodiversity.



## **STRATEGIES 1 CREATING GREAT HABITAT**

The mixed structure of the park's flora uses planting techniques of different ages, multiple layers, and staggering to create a near-natural forest. A forest type composed of a variety of trees, dense vegetation, and ground cover that are mutually arranged, with both multi-level natural mixing and multi-level vertical structure, simulating the multi-layered communities formed by natural succession in the natural environment, dense forest areas Increase canopy closure to 0.65. At the same time, the forest functions should be improved by setting up a food source and nesting site for every 100 acres. Five species of fruit-rich plants such as berries, stone fruits, pods, and samaras are selected to attract attention. The coverage of the bush layer reaches 40%, and the height of the herb layer is 30 cm, coverage 30%. Extend and broaden the original habitat in the area, combine with the environmental site, add new habitat types, form forests, shrubs and other animal habitats to form habitats, attract local high-quality birds, insects, plants and other diverse biological species, and ultimately form a species-rich, self-regulating, self-repairing, and stable ecosystem. For habitat creation of sexual biological groups, birds, butterflies and dragonflies are selected as indicator biological groups, focusing on the construction of habitats for various birds, butterflies and dragonflies in the Beijing plain area, effectively promoting the restoration of forest animal ecosystems and biodiversity.

## **Strategy 2 Constructing the resilient**

Park green space patches are complex, peripheral boundaries are simplified, and woodland and hard surface patches are scattered. At the same time, the terrain is rationally planned, rainwater collection depressions are scientifically laid out, and the park's ditch water system and sunken green spaces are used for water storage, which can be absorbed. The amount of rainwater is about 12,709.2 cubic meters, and a small wetland has been constructed to provide water sources for small animals and at the same time reduce the ambient temperature through evaporation. The hard space in the park should be designed in a south-north direction as much as possible to reduce the duration of solar radiation in summer and create a more reasonable shading environment. In the selection of materials, cool materials are used, including light-colored traditional colored materials and permeable pavement, which account for 82% of the park's overall paving area. Plants are mainly coniferous and broad-leaved mixed forests, and selected plants with strong transpiration, strong carbon sequestration capabilities, thick leaves, and Plants with a large number of leaves can effectively alleviate the urban heat island effect.

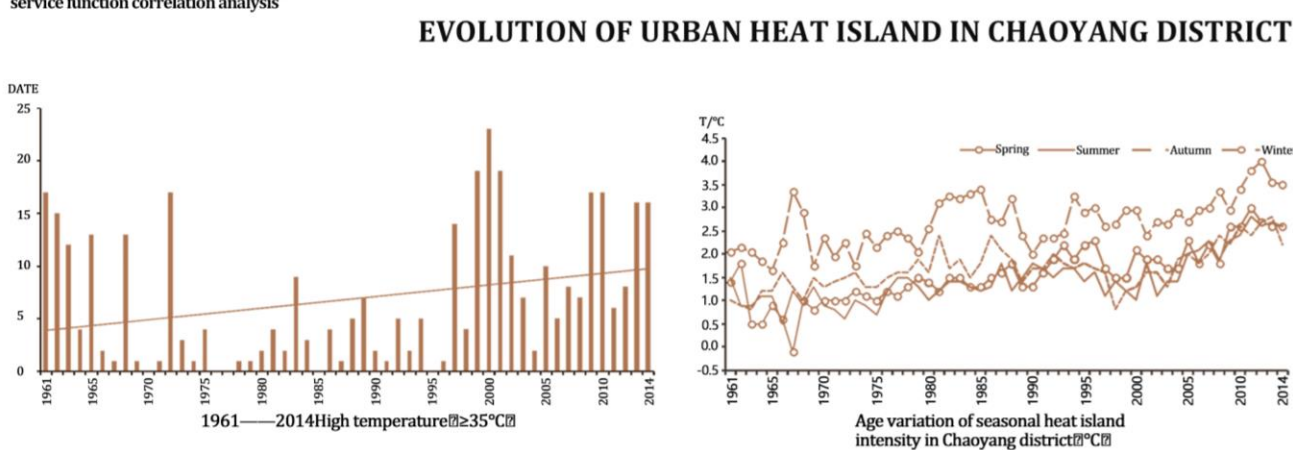
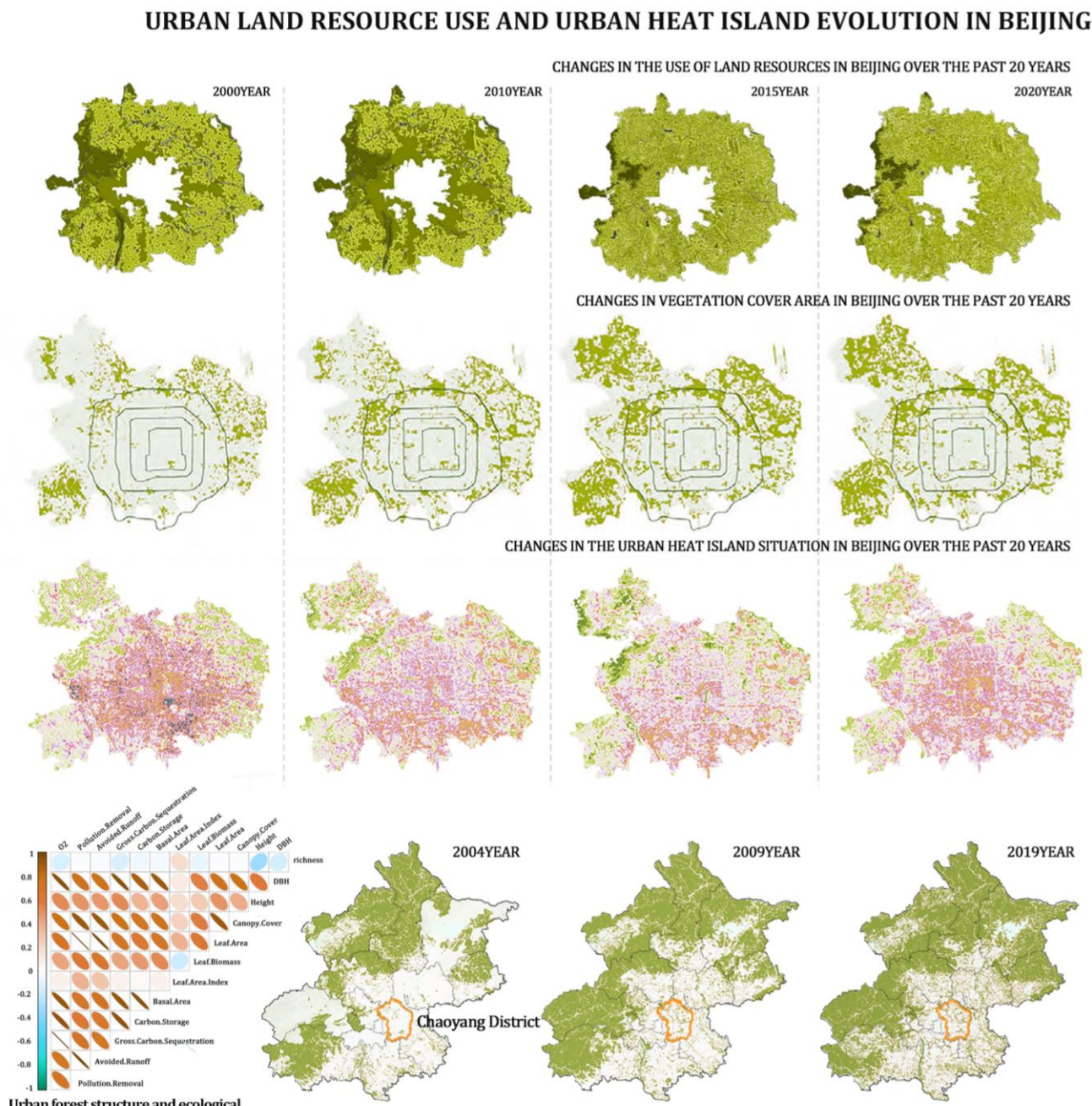
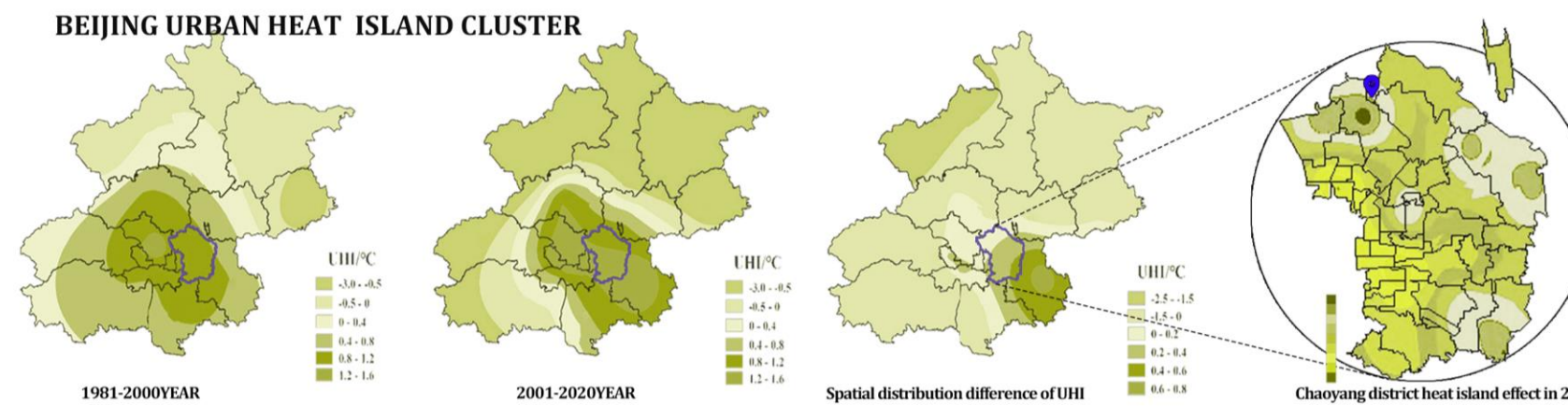
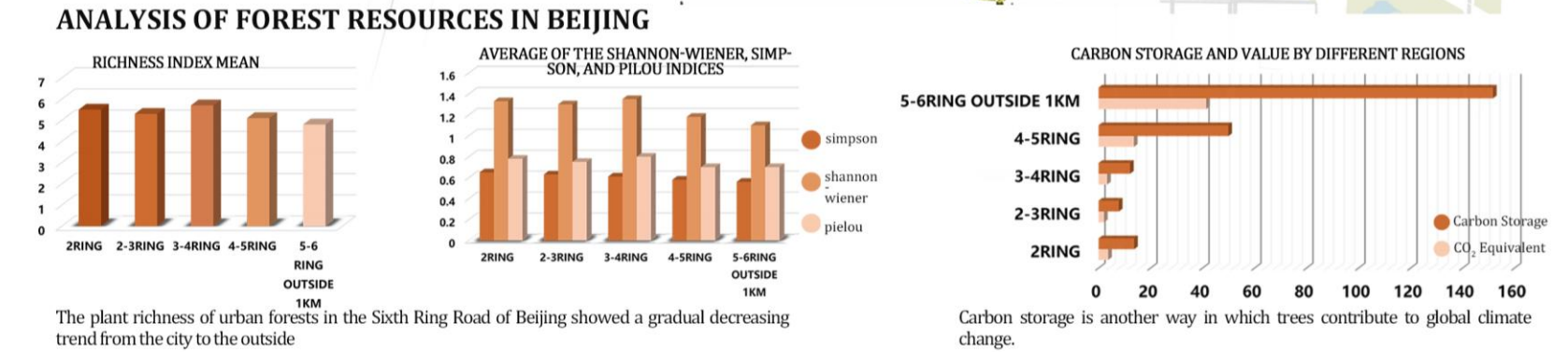
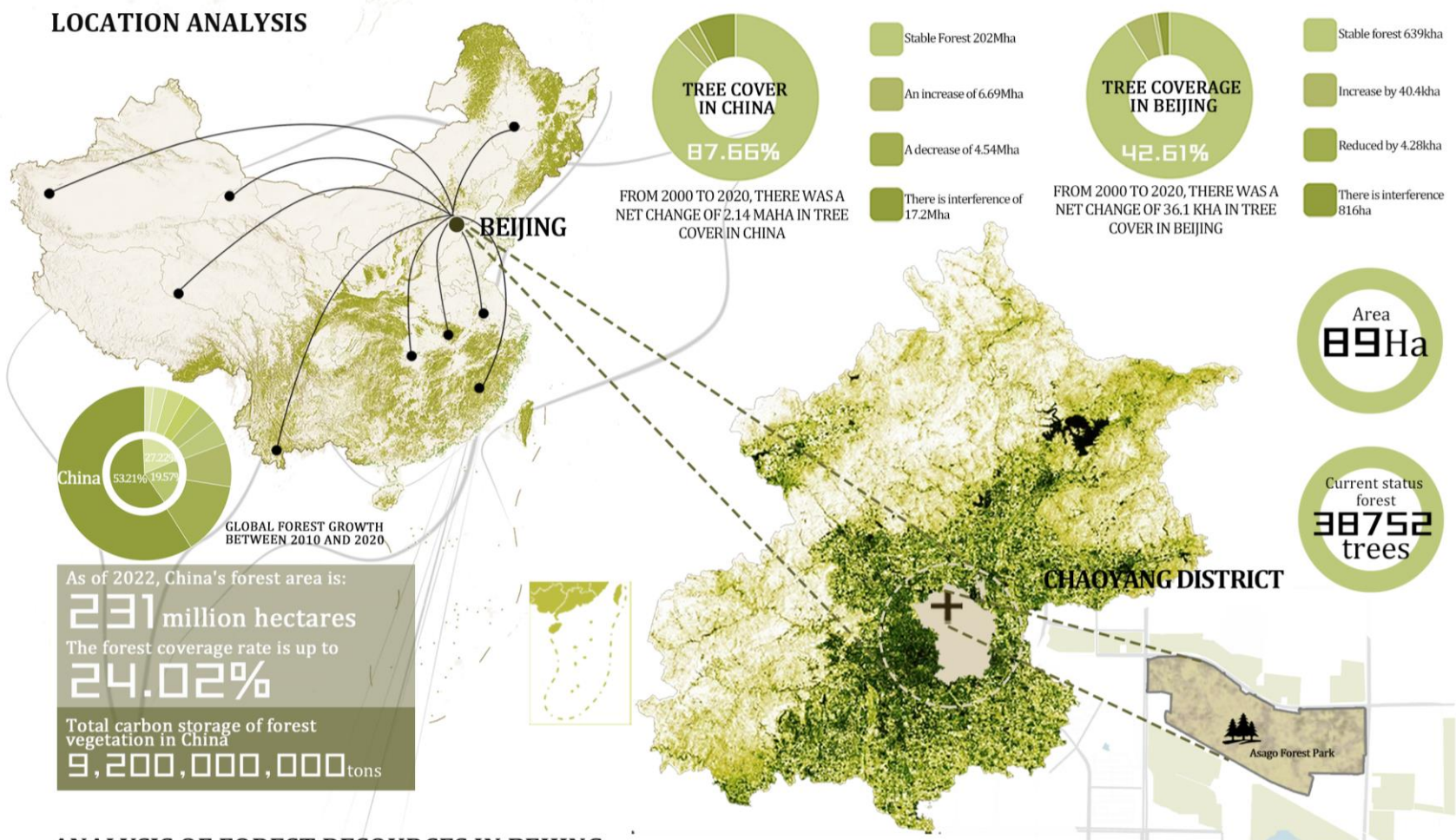
### **Strategy 3 Connecting to people**

With "culture" as the foundation and "memory seeking" as the clue, we sort out the beautiful life memories of the past and integrate them into the market, farming, pasture and other activity venues to arouse visitors' beautiful memories of the past and regenerate the cultural landscape of "returning to the local". Through the close combination of people and nature, forests and humanity, we can achieve the goals of urban ecological improvement and environmental optimization, and at the same time achieve long-term harmony between the city, people and nature.

Chaolai Forest Park puts forward some new ideas from the perspective of the harmonious coexistence of nature and people. It actively creates space for habitat restoration and conservation, puts the restoration of biodiversity in the first place, and at the same time takes into account the accommodation of low-income habitats. Interfering with leisure activities. After the park is completed, the negative ion content of 4,000 per cubic centimeter ranks first in Beijing, and there are about 100 species of birds. The park has a high degree of natural and humanistic value as well as social and economic significance.



# RESEARCH BACKGROUND



The rapid expansion of the city, the rapid increase of the population and the vigorous development of the economy have brought serious threats to the biodiversity of Beijing, and at the same time, Beijing is faced with more and more serious urban thermal environment problems.



# SITE ANALYSIS



The park has undergone “one million acres of afforestation projects”, although the number of forest land has increased significantly, a large area is a sub-healthy forest.



Organize and use the demolition construction waste on the spot . After professional technical treatment, it is mainly used as a road Pavement, micro-terrain filler.



There are two drainage ditches in the site, which are currently in existence and planned, and the water quality is poor and the water level is low all year round.

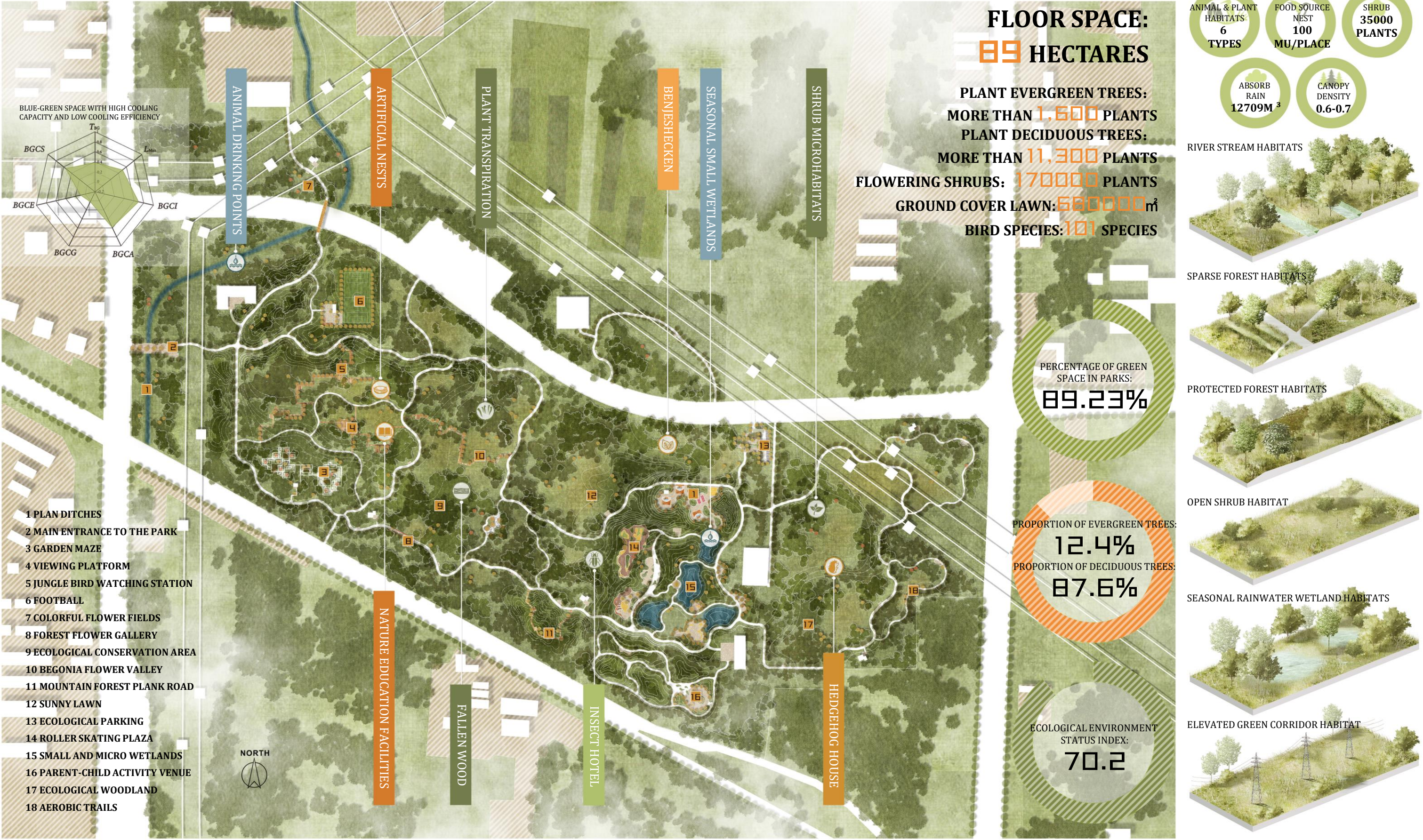


There are a large number of existing forests covering 64.59 hectares and about 38,752 trees in the project, mainly Chinese acacia, black locust, poplar tomentosa, Pinus tabuliformis and other trees. However, the forest is single and the growth is average.

A large amount of construction waste and forest health problems remain in the park base, and a large number of industrial parks and residential areas are distributed around the park, forming a hotspot area for population activities. The site faces challenges from the difficulty of creating biological habitat space and the threat of urban heat island. To improve the quality of green space and promote the harmonious coexistence between man and nature is a difficult problem for designers to reshape the site.



# FOREST HABITAT SYSTEM



Make maximum use of the site topography, create a flexible wetland space and diversified and rich social interaction space, form a "human-city-landscape" multi-in-one green system, effectively alleviate the urban heat island effect, and promote the resilience of forest biodiversity construction.



# SPECIAL DESIGN

## FOREST RECONSTRUCTION

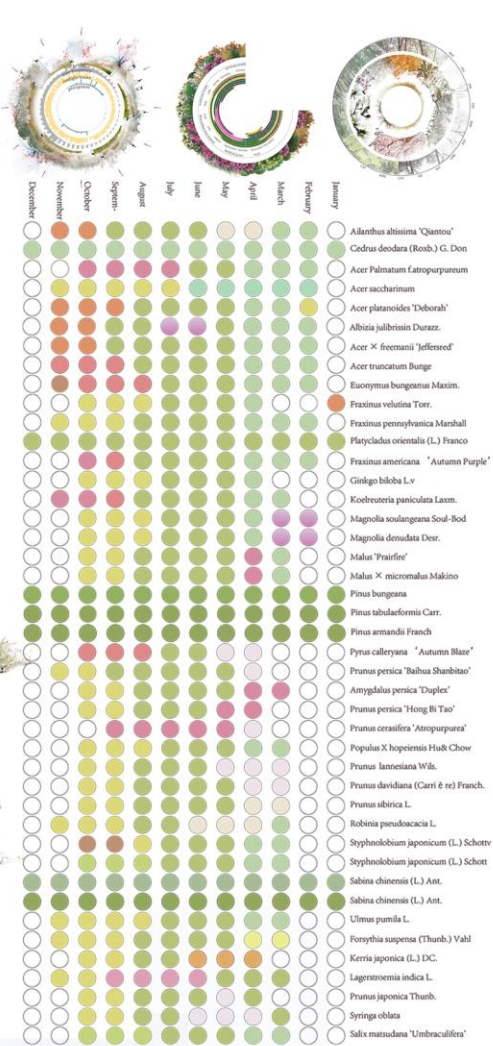
Under the guidance of ecological principles, through comprehensive design and engineering methods, the damaged ecosystem is restored, maintained and managed, and an ecological environment suitable for wildlife reproduction and survival is created. Create suitable habitats or design animal-friendly facilities to meet the basic survival needs of urban wildlife, such as foraging and drinking.

Retain the high-quality ecological resources of the site, and provide a good environment for forest development based on green spots.

On the basis of the native meadow, trees, shrubs and ground cover were scientifically replanted to form a forest structure with both horizontal and vertical levels of natural mixed and multi-level vertical structure.

A multi-layered community similar to that formed by natural succession in the natural environment was formed, and the canopy density increased to 0.65 in the dense forest area.

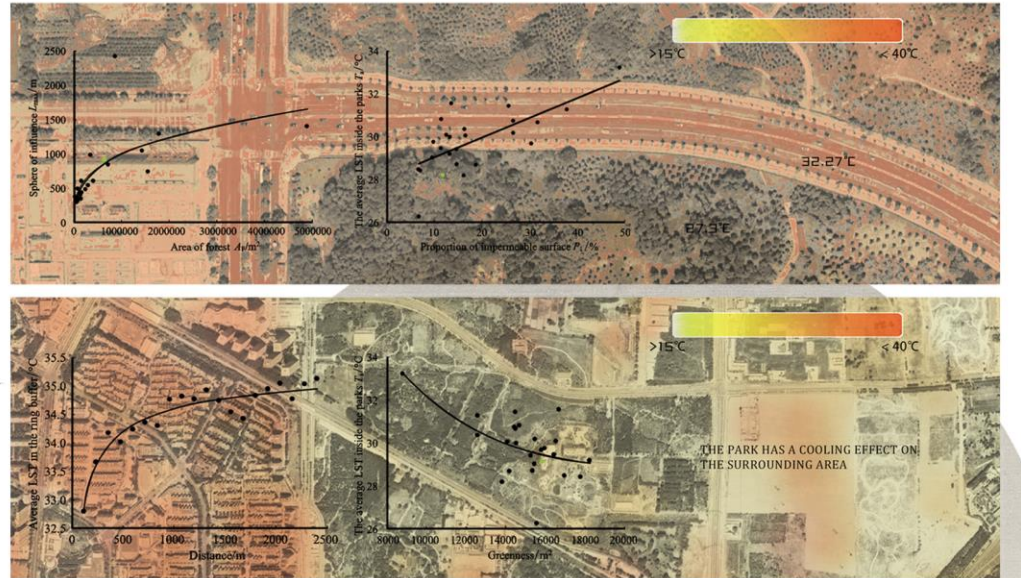
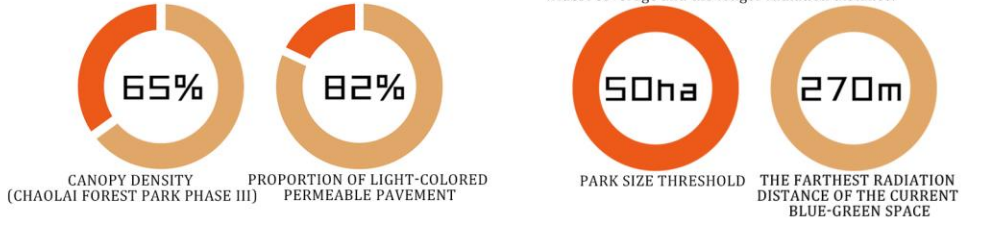
Improve forest function: Set up a food source and nesting place every 100 acres, select no less than 5 kinds of plants with rich fruits such as berries, stone fruits, pods, and wing fruits, and the coverage of the shrub layer reaches 40%, and the height of the herbaceous layer is 30 cm, and the coverage is 30%.



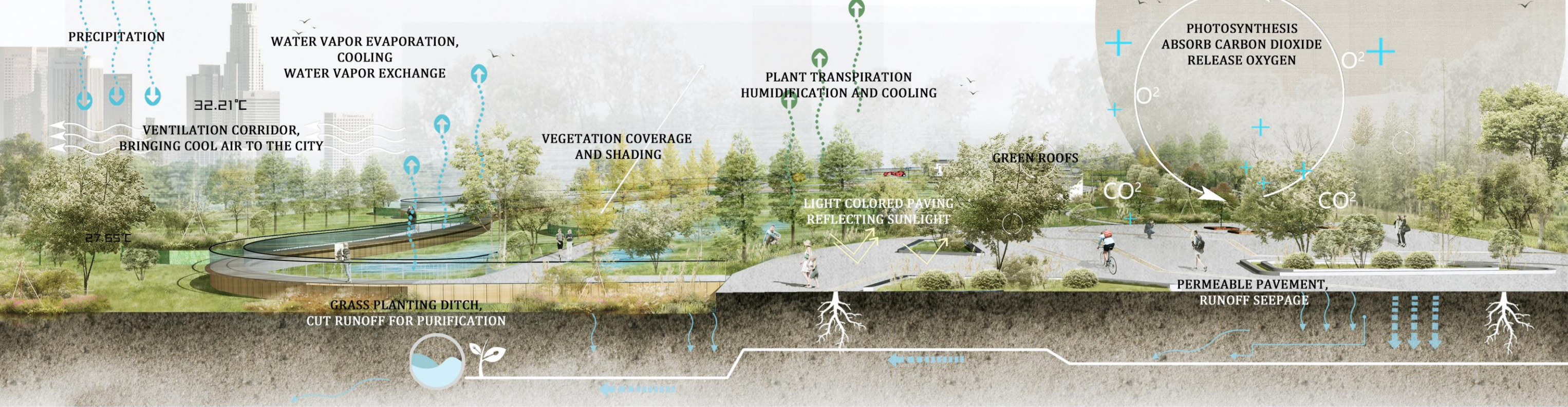
## MITIGATION HEAT ISLAND ANALYSIS

The plant configuration is mainly mixed forest with coniferous broad-leaved leaves. Plants with strong transpiration, strong carbon sequestration ability, thick leaves and large number of leaves are selected. Light-colored materials and permeable materials are used as paving materials to alleviate urban heat island.

- ① The average low temperature in the shade is lower than in the direct sunlight area.
- ② Light-colored permeable pavements are cooler than impervious-dark-colored pavements.



## COLD ISLAND WORKING MECHANISM



By increasing urban forest coverage, greening area, plant community structure adjustment, light-colored traditional colors and permeable pavement, the site is transformed to increase biodiversity and mitigate urban heat island effect.



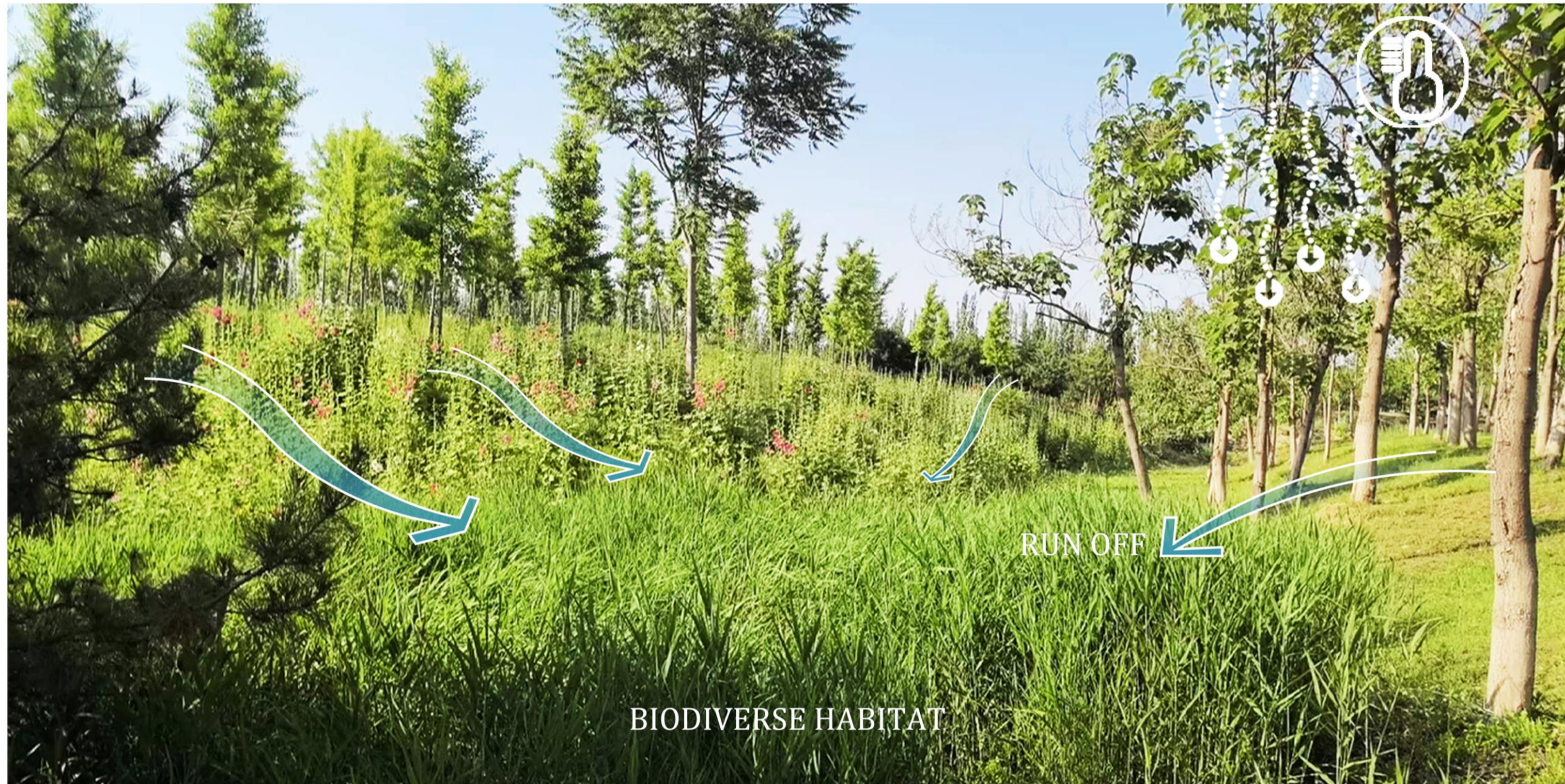
# FOREST HABITAT SYSTEM



The park respects the texture of the site, makes reasonable use of the terrain, and creates a near natural forest through different age, multiple layers and mixed planting techniques. The multi-layered communities formed by natural succession in natural environment were simulated to construct a multi-habitat. After the completion of the project, there are more than 80 varieties of seedlings in the site, more than 35,000 varieties of Joe irrigation, and about 101 species of birds.



# LID ANALYSIS



Reasonable terrain planning, scientific layout of rainwater collection concave, the use of the park trench water system and green space for regulation and storage, can absorb about 12,709.2 cubic meters of rainwater, build into a small wetland to provide water source for small animals, and reduce the environmental temperature through evaporation.



# CULTURAL LANDSCAPE



With "culture" as the foundation and "seeking memory" as the clue, it evokes the visitors' good memories of the past and regenerates the cultural landscape of "returning to the homeland".



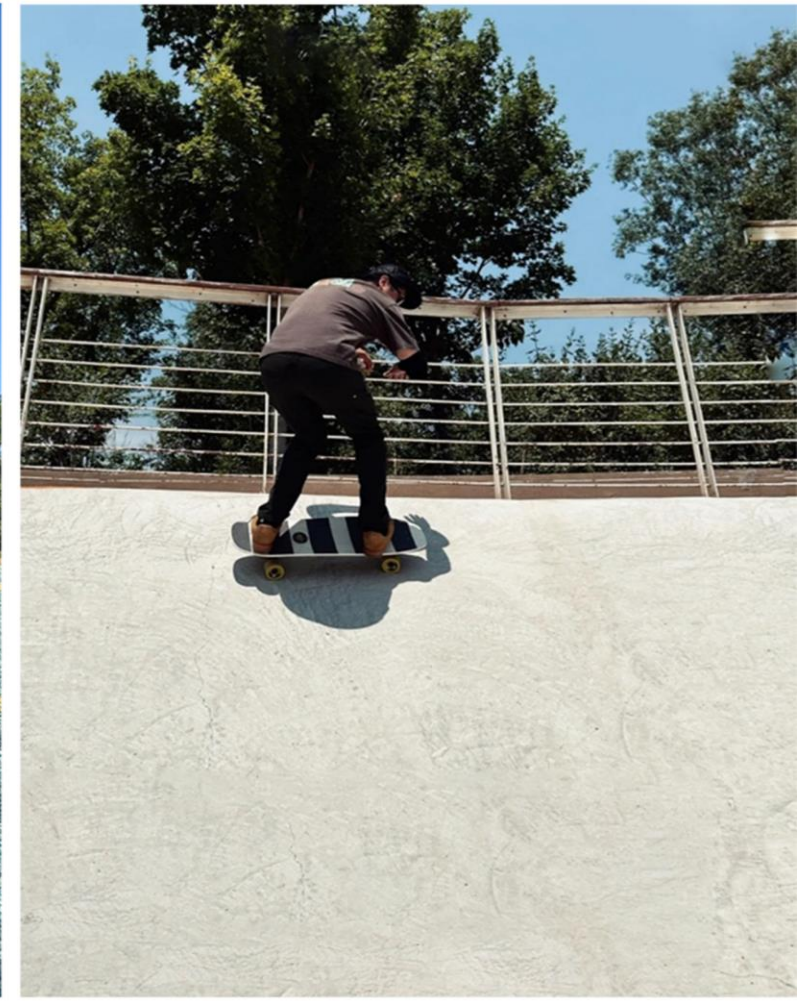
# LOW INTERVENTION RECREATIONAL HABITAT



**The act of "construction" actively creates space for the restoration and conservation of habitats, puts the restoration of biodiversity in the first place, and accommodates recreational activities with low disturbance to the habitats.**



# LIFE RECONNECTION



The project integrates into multiple activity places such as market, farming, and pasture, and achieves the purpose of urban ecological improvement and environmental optimization through the close combination of man and nature, forest and humanity, while realizing the long-term harmony between city, man and nature.