



LANDSCAPE DESIGN OF XI'AN XINGFU FOREST BELT

Xi'an, Shaanxi Province, China

PROJECT STATEMENT

The Xingfu Forest Belt, located in Xi'an, China, is a former protective green barrier between an industrial and residential area that has been transformed into a vibrant green infrastructure connecting different economic sectors.

The project involved the collaboration of several disciplines, including landscape architecture, civil engineering and urban design. The project includes 72,000 square metres of green space with a coverage rate of 85%, 12 kilometres of road reconstruction and a three-level underground space of 920,000 square metres. The underground space includes commercial and public service facilities, a 7,600-space car park, and 2 comprehensive pipeline corridors and 5 metro stations. The landscape architects took into account the existing infrastructure and structures, collaborated with the architects and clients, and worked with experts in soil and plant sciences, storm water management and emergency shelter planning.

The design concept aimed to create a green infrastructure that connects the two sides of the site and extends from the ground to the underground space, with a focus on sustainability and local plant species. The project is a unique example of how a historic green space can be transformed into a future proofing green infrastructure with multiple functions.

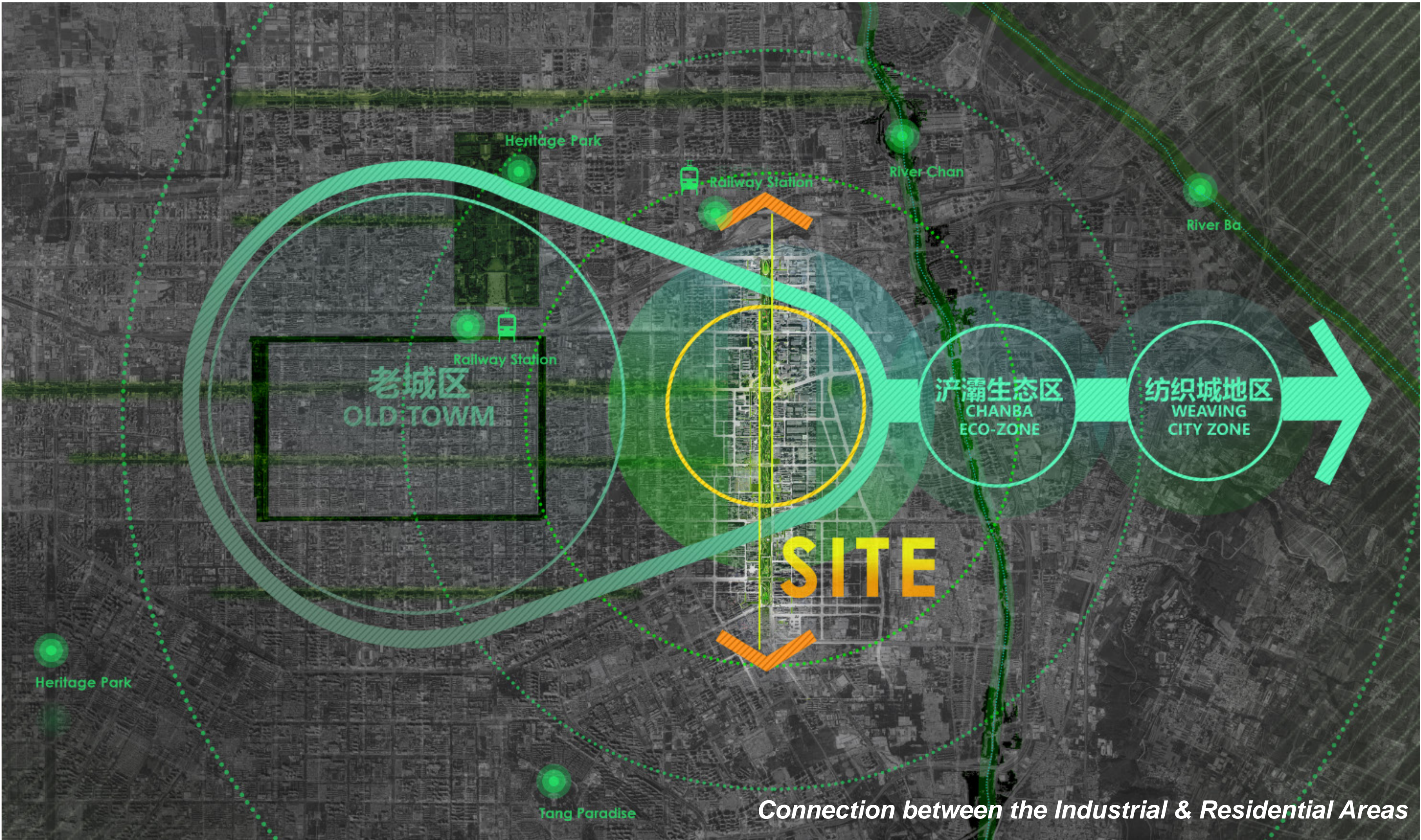


BACKGROUND

FROM A PROTECTIVE BARRIER TO A GREEN INFRASTRUCTURE

Historically, the main function of the Xingfu Forest Belt was to act as a protective barrier between the industrial area (includes 5 munitions factories) to the east and the residential area to the west.

As Xi'an's urban development progressed and the old city merged with the new area on the eastern side of the city, the 140-metre-wide green belt, which was originally planned as a protective barrier between the old industrial area and the residential area, became a vibrant place to connect different economic sectors of the city after the transformation of urban functions. From a traditional infrastructure to an attractive and green infrastructure, the Xingfu Forest Belt will become an extension of the main east-west development axis of Xi'an and a green ecological axis in the core of the eastern part of the city.

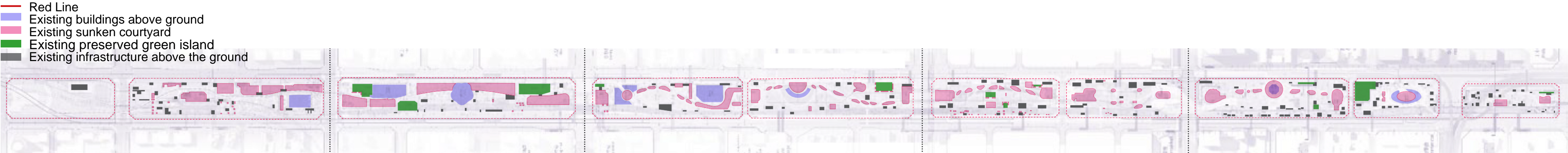


BACKGROUND

INTEGRATED WITH SITE CONDITIONS

The Forest Belt project mainly consists of five elements: above and on-ground green engineering, urban streetscape, underground space, comprehensive pipeline corridor and metro support facilities, and also includes urban road engineering and urban public building construction. Above ground, the primary focus is on green landscape, covering an area of 700,000 square meters with a green coverage rate of 85%, while 12 kilometers of urban roads will be reconstructed; the underground is divided into three levels with a total construction area of 920,000 square metres, the first level is for commercial and public service support with an area of 420,000 square metres, the second level below ground provides parking spaces for 7,600 vehicles, and the third level below ground is for comprehensive pipeline corridor and metro engineering. The entire site of the Forest Belt is planned to have two Class I emergency shelters, equipped with emergency equipment such as water storage pools, helipads, and deep well lights.

Existing Underground Infrastructure



Emergency Shelter Plan



Soil Depth Study



DESIGN VISION

FORMING AN IMAGE OF AN URBAN GREEN VALLEY TO ACTIVATE THE REGION

The urban space on both sides of the site will be considered in an integrated manner to extend the green framework, while opening up the underground space to increase the lighting and extend the green from the roof of the building to the underground, forming an image of an urban green valley from the building to the underground. The greenway connects all activities and cultural nodes, reflecting the profound urban culture, military culture and garden culture of the Xingfu Forest Belt.



Aerial Photo- Plan View

DESIGN STRATEGY- A: ENRICHING FUNCTIONAL LAYOUT

HOLISTICALLY CONSIDERING THE LAND USES

A TOD development model is created with two major metro interchange stations as the core. Business and office spaces are concentrated around the TOD, while educational, residential, and administrative services are distributed along the sides of the Forest Belt between metro stations. Throughout the design process, the landscape architects communicated extensively with the architects and clients and carried out a comprehensive analysis of the existing buildings and structures in order to respond fully to the characteristics and needs of the different types of land use.

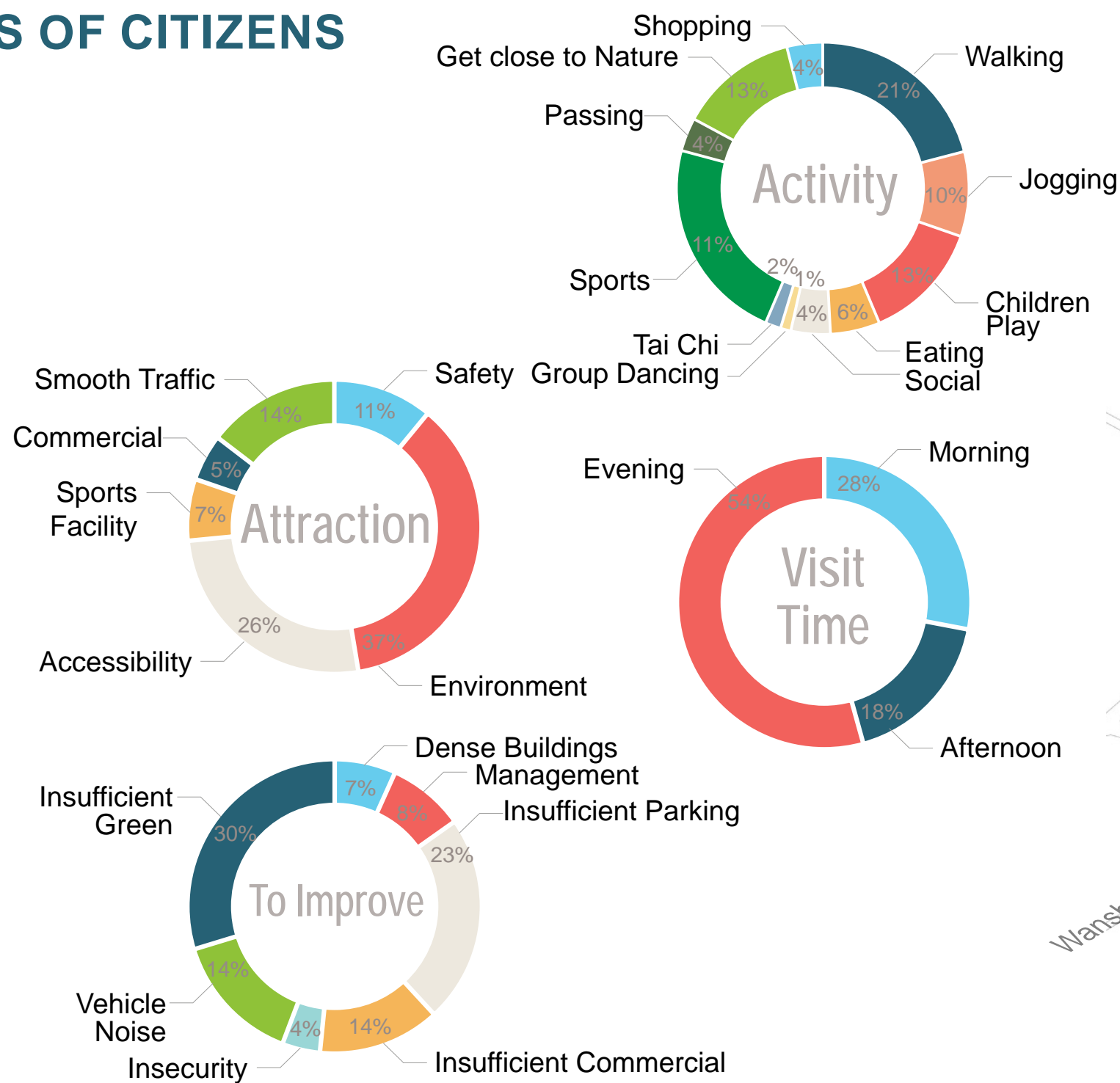
Considering the land uses inside and outside the site, the results of public opinion surveys and the need for emergency shelters, the linear site has been divided into five sectors with three main themes: Sports Valley, Forest Valley, and Art Valley, transforming the monotonous barrier forest into a highly interactive outdoor landscape with various themed activities.

LISTENING TO THE VOICES OF CITIZENS

In addition, the design takes into account local public opinion through surveys and by listening to the voices of citizens. By understanding the needs of the community and increasing functional activity spaces, the design creates a memorable space and uses this important basis to reasonably arrange the park's functional spaces and convenient facilities.

Through the public opinion survey questionnaire and routinely feedback from the local residents, there are high demands and expectations for the Xingfu Forest Belt in four aspects: ecological green space, accessibility, functional activities, and cultural memory. The design therefore incorporates lush planting, adequate lighting, smooth pedestrian circulation and a well-organized signage system.

Landscape Design of Xi'an Xingfu Forest Belt



Results of Opinion Surveys

Surrounding Urban Programs



DESIGN STRATEGY- A: *ENRICHING FUNCTIONAL LAYOUT*

MULTIPLE PROGRAMS



DESIGN STRATEGY- B: THREE-DIMENSIONAL SPATIAL DESIGN

3D DESIGN FOR ACCESSIBILITY, GREENERY AND SPACE

Through the aspects of accessibility, greenery and space, the exterior and interior of the forest belt, above and below ground, are integrated to ensure smooth pedestrian access and better interaction between above and below ground spaces, and to lead pedestrians into the forest belt and underground spaces. This unique feature distinguishes the forest belt from normal parks.

Perspective Section of the Underground Space

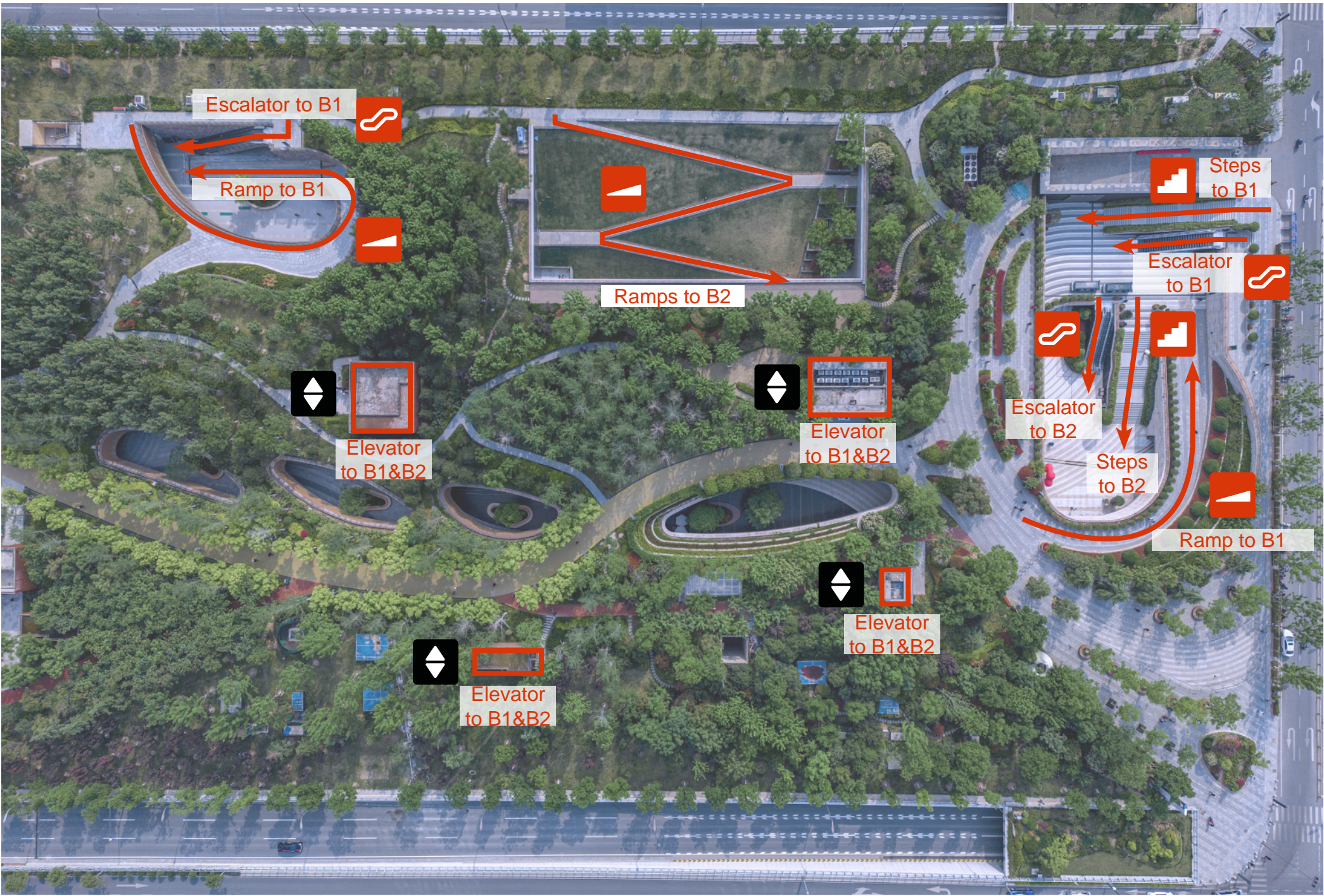


DESIGN STRATEGY- B: THREE-DIMENSIONAL SPATIAL DESIGN

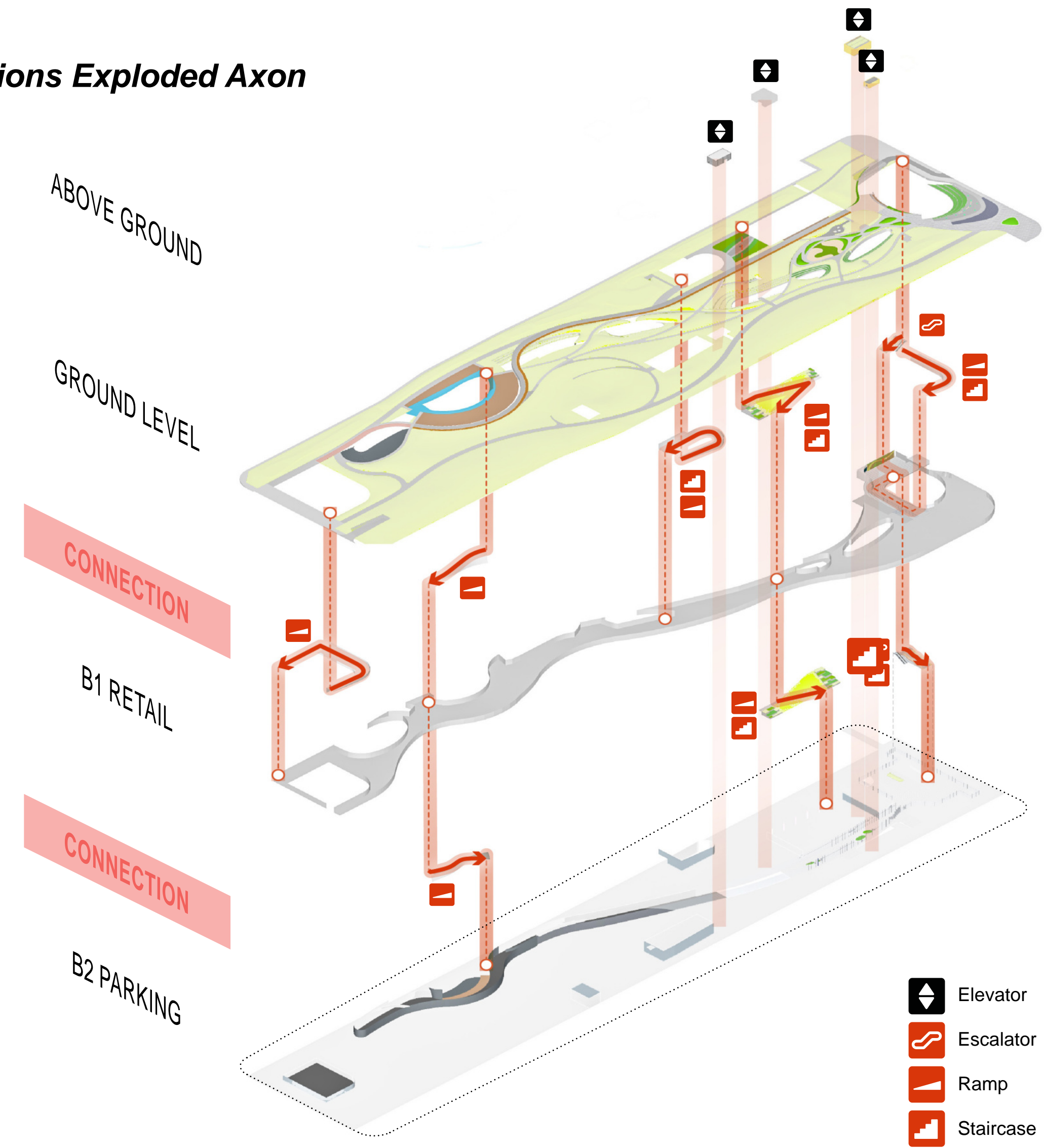
PEDESTRIAN NETWORK WITH HIGH EFFICIENCY

A convenient pedestrian network tightly links the park to the surrounding area. The park's greenway runs through the site, linking several activity nodes and creating a variety of thematic routes. The network of metro stations extends the park's service range to other urban areas, creating a cultural tourism destination and increasing the popularity and value of the park. Sunken plazas are arranged at the main building entrances; pedestrian underpasses are set up at the site's underground intersections with urban streets to facilitate pedestrian movement between blocks; and covered corridors are created in the large sunken plazas to facilitate pedestrians to travel at ground level.

3D Connecting Structures



3D Connections Exploded Axon



DESIGN STRATEGY- B: *THREE-DIMENSIONAL SPATIAL DESIGN*

PEDESTRIAN NETWORK WITH HIGH EFFICIENCY



Aerial View of a Sunken Plaza



Pedestrian Greenway



Sunken Plaza

DESIGN STRATEGY- B: THREE-DIMENSIONAL SPATIAL DESIGN

EXTENDING THE SOFTSCAPE INTO THE UNDERGROUND SPACE



Green softscape are arranged not only on the first floor, but also in areas such as the sunken plaza, which extends into the underground space, making all levels of the forest belt more pleasant and comfortable.



DESIGN STRATEGY- C: SUSTAINABILITY

USING NATIVE SPECIES AND RESUING EXISTING TREES

The selection of plant species takes full account of Xi'an's native species, as well as protected trees that have been transplanted to the site and are being considered for reuse in the programme.

INCREASING GREEN RATIO

Each sub-sector has its own planting list. Taking into account the needs of microclimate, rainwater collection and plant performance, an appropriate ecological topography will be implemented to build up the slope and also effectively digest the site's excess soil, transforming the Forest Belt into a green and open urban park with comprehensive programmes and a high green area ratio of 85%.

ADDING RAIN GARDENS

After consulting with soil and plant experts, the team found out that the soil thickness of the Forest Belt was highly variable, which limited the planting conditions for large trees to a certain extent; only the deep soil is most suitable for planting large trees and provides space for a sustainable urban drainage system to buffer and infiltrate rainwater. In terms of stormwater management, the Forest Belt is in cooperation with the stormwater pipe corridor and storage devices of the city's stormwater management department to design a sensible layout for the rain garden and drainage system.

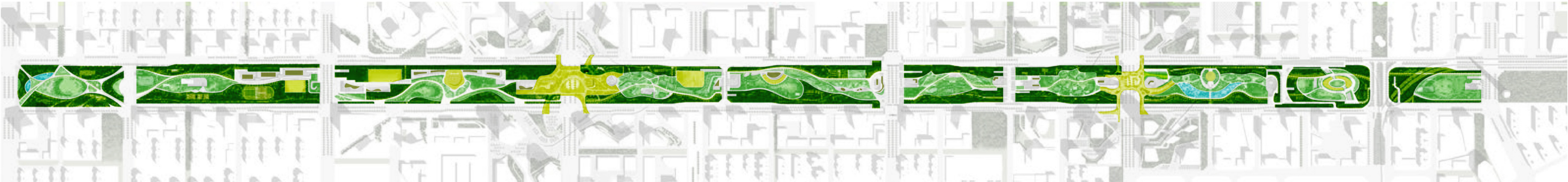


DESIGN STRATEGY- C: SUSTAINABILITY

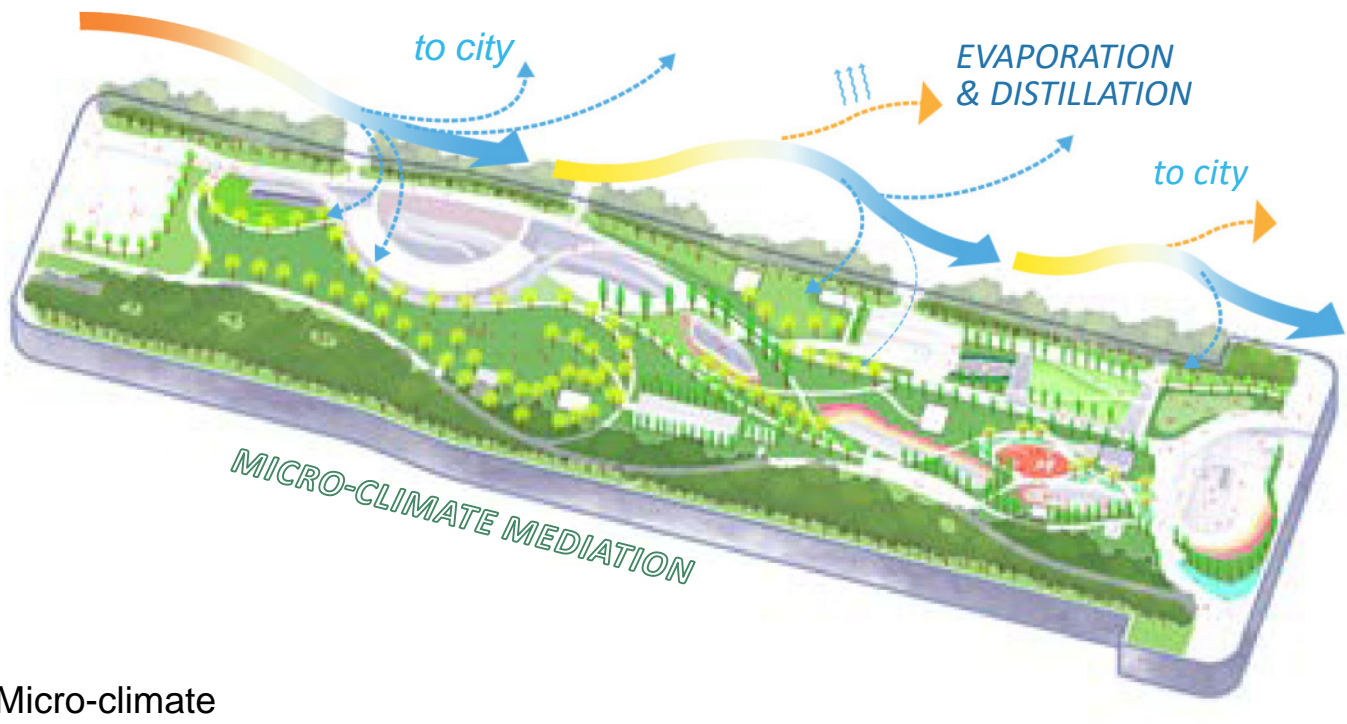
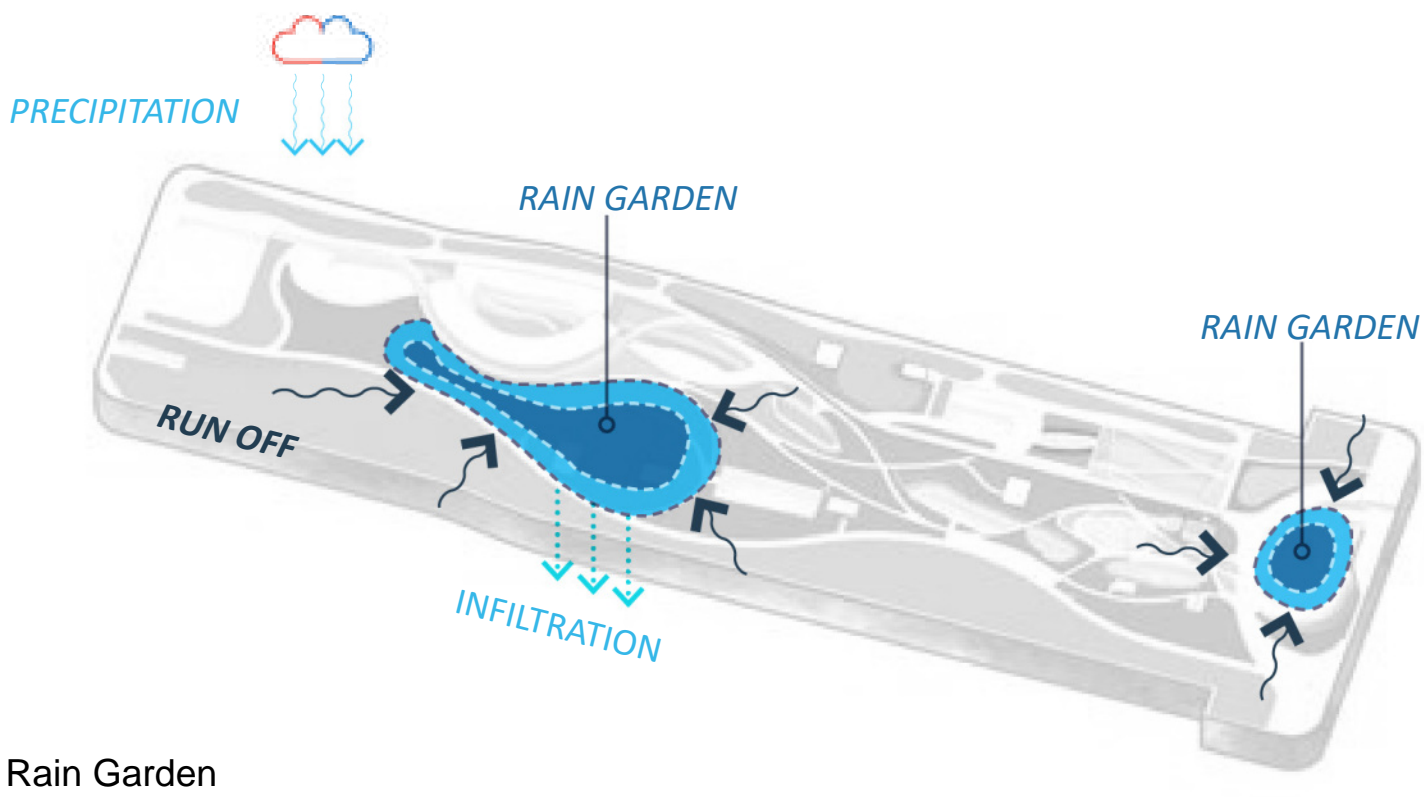
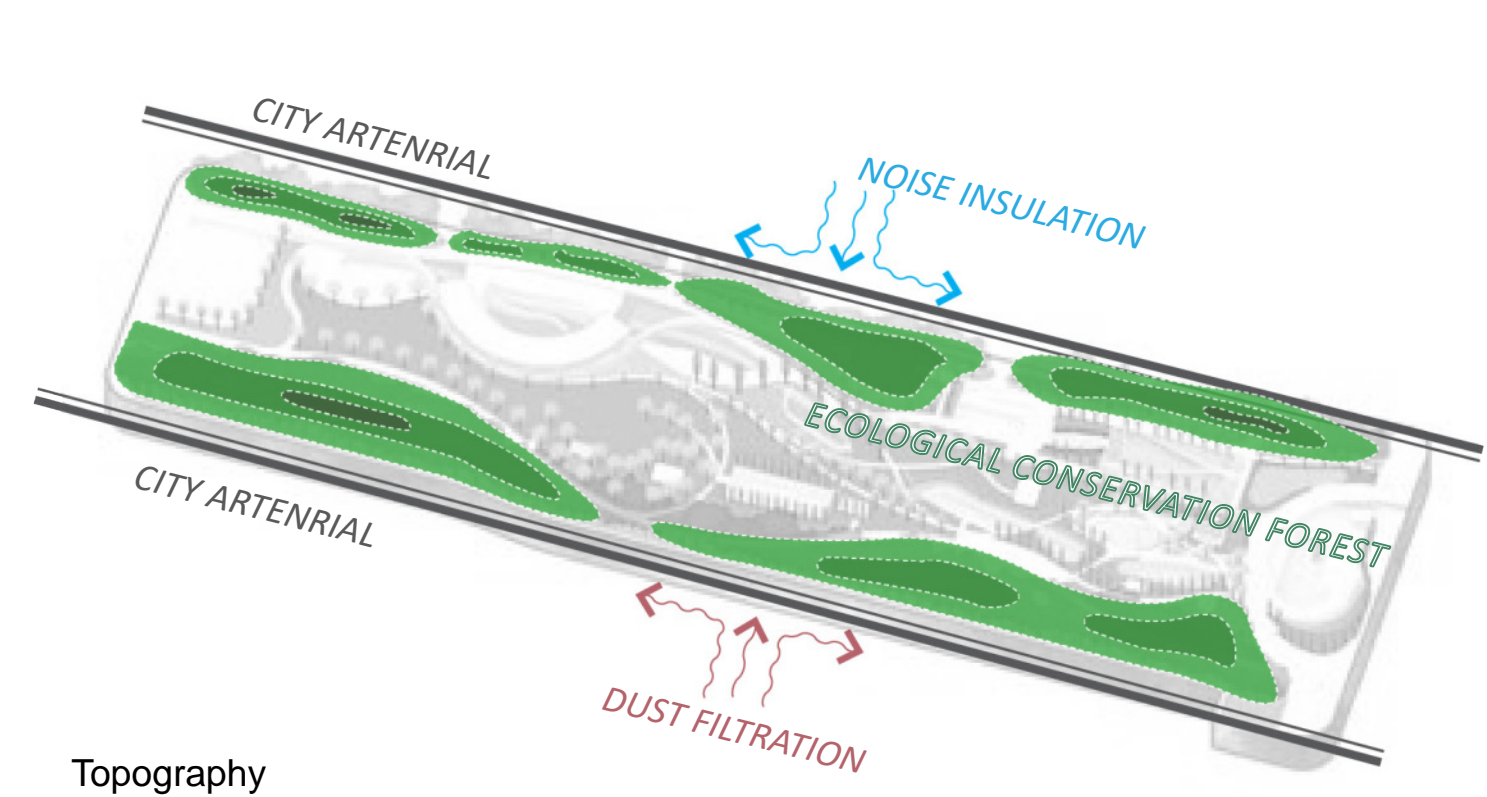
INCREASED GREEN RATE

Original Green Rate: 67%
Current Green Rate≥70% Green Coverage≥85%

- Ecological Conservation Forest
- Internal Planting Zone
- Rain Garden
- Roof and Bridge Green Space
- Sunken Plaza Green Space



ADDING RAIN GARDENS AND INFILTRATING STORMWATER



Sustainable Design Strategies

DESIGN STRATEGY- C: SUSTAINABILITY

INCREASED GREEN RATE



Planting along the Greenway



Multi-layered Planting



Tranquil Path in the Urban Forest

DESIGN STRATEGY- C: SUSTAINABILITY

RAIN GARDENS AND WETLANDS



Wood Walkway in the Forest



Bridge over Wetland



Seating Area



Stepping Stone Pathway



Elevated Walkway

In conclusion, the Xingfu Forest Belt project is a comprehensive and innovative landscape design milestone that combines the characteristics of the surrounding land uses, intergrated with city infrastructure and considers the needs of the local community. It is a catalyst for urban regeneration in the surrounding area.

Through a rich and functional layout and three-dimensional spatial design, it enhances the interaction between above and below ground spaces, providing a seamless and comfortable pedestrian experience. It also creates a unique and memorable landscape that meets the diverse needs and expectations of local residents.

The Xingfu Forest Belt project is an excellent example of sustainable urban development that integrates environmental, social and cultural elements and it forms a “Green TOD” for the city.

