

MINISTRY OF CULTURE AND STRATEGIC COMMUNICATIONS
KHARKIV STATE ACADEMY OF DESIGN AND ARTS
Faculty of « ENVIRONMENTAL DESIGN»

Department of «Environmental Design»

CHEN MINGYU

**TECHNIQUES SHAPING THE ARCHITECTURAL AND LANDSCAPE
DESIGN OF PUBLIC SPACES IN SUSTAINABLE COMMUNITIES
(USING THE EXAMPLE CHINA)**

Qualification work for obtaining the SVO «Master»

in the specialty 022 Design

OPP «Design of the architectural and landscape environment»

The qualification work contains the results of one's own research

The use of ideas, results and texts of other authors must be referenced to the
appropriate source.

_____  数字签名者: Chen Mingyu
日期: 2025.11.17 22:01:55
+08'00'

CHEN MINGYU

Scientific advisor: Olena Sharlai

Candidate of architecture, professor of the Department of «DS»

Kharkiv-2025

CONTENT

INTRODUCTION	1
SECTION I. HISTORIOGRAPHY OF THE ISSUE.STATUS OF RESEARCH ON THE TOPIC	4
1.1. State of research on the topic	4
1.2. Research methods	7
1.3. Research Significance	9
<i>Conclusions to the first chapter</i>	10
SECTION II.Current Design Status and Core Principles of Public Spaces in Sustainable Communities in China	11
2.1 The Core Role of Sustainable Public Spaces in Meeting Diverse Community Needs	11
2.2 In-Depth Research and Commonality Analysis of Domestic Sustainable Community Cases	15
2.3 Construction of a Basic Design Decision-Making Method System for the Chinese Context	20
<i>Conclusions to the second chapter</i>	27
CHAPTER III.DESIGN PRACTICE: SUSTAINABLE PUBLIC SPACE DESIGN STRATEGIES FOR CHANGZHOU HUAYUAN COMMUNITY	29
3.1 Generation of Design Concepts and Integration of Multi-Dimensional Strategies	29
3.2 Expected Effects and Comprehensive Assessment of Sustainability	33
REFERENCES	36
APPENDIX A Visual material for the text	40
APPENDIX B Tables, diagrams	63
APPENDIX C Project proposal	67

INTRODUCTION

Against the backdrop of global urbanization moving towards high-quality development, "sustainable development" has become the core consensus in the field of urban and rural construction. As the basic unit of urban functions, communities' public space quality is directly related to residents' quality of life and urban ecological resilience. With the in-depth advancement of China's new urbanization strategy, the implementation of the "dual carbon" goal, and the continuous promotion of policies such as sponge cities and complete residential communities, the drawbacks of traditional community construction, such as "emphasizing form over function" and "prioritizing buildings over ecology", have become increasingly prominent.^[1] As the core carrier for residents' social interaction and leisure, public spaces generally face practical dilemmas including single function, insufficient ecological benefits, lack of humanistic care, and disconnection from residents' needs. At the same time, residents' escalating demands for a healthy lifestyle, green spaces, and diverse social interactions have jointly promoted the transformation of community public space design from "extensive construction" to "refined and sustainable development".^[2] Under this context, exploring a coordinated architectural and landscape design method for sustainable community public spaces adapted to China's national conditions has become an important issue to respond to the needs of the times and solve practical problems.

This study takes the public spaces of sustainable communities in China (with Changzhou Huayuan New Village as a case study) as the research object. It aims to systematically sort out relevant theories such as sustainable development, landscape urbanism, and ecological architecture, analyze the existing problems and deficiencies in the sustainability of current designs by combining practical cases from different regions in China (such as the renewal of old communities in first-

tier cities and the planning of new communities in second and third-tier cities), and construct a scientific, operable, and regionally adaptable design method system from four dimensions: ecological optimization, functional integration, cultural inheritance, and technological adaptation, thereby providing theoretical support and reference for relevant planning and design practices.^[3]

In terms of theoretical significance, this study deeply integrates sustainable development theory with architectural and landscape design, enriches the theoretical system of sustainable community planning and design, makes up for the shortcomings of existing research such as "pan-internationalization" and insufficient regional pertinence, and provides a new perspective for interdisciplinary community space research. In terms of practical significance, the design method system constructed by this study can directly provide operational guidance for designers and community managers, help solve practical problems in the renewal of old communities and the construction of green spaces in new communities, improve the ecological benefits and humanistic connotation of public spaces, enhance residents' quality of life, strengthen community cohesion, promote the implementation of relevant policies, and provide practical samples for the high-quality development of China's new urbanization.^[4]

Looking back at the research status at home and abroad, foreign research started earlier. Theories such as landscape urbanism and ecological architecture, as well as practices like "pocket parks" and passive energy-saving communities, emphasize public participation, the application of ecological technologies, and functional integration. However, due to differences in urbanization stages, social cultures, and other aspects, they cannot be directly copied. Domestic research began in the early 21st century, focusing on the connotation evaluation of sustainable communities, the design of single-type public spaces, and practical

experience in specific regions. However, most studies focus on a single dimension of architecture or landscape, lacking systematic discussion on their coordinated integration. ^[5]The design methods remain at the level of scattered strategies, with insufficient attention to the differences between different types of communities, resulting in limited pertinence and applicability.

Based on this, this study systematically sorts out theoretical and policy achievements through the literature research method, selects characteristic community cases from around the world using the field research method, collects first-hand data through on-site observation, questionnaires, and interviews, analyzes the experience of typical domestic and foreign projects through the case study method, summarizes core laws and constructs a design method system with the help of the induction and deduction method, and finally verifies the feasibility of the method through the optimized design of typical cases.^[6]

This study follows the logical context of "theoretical combing — current situation analysis — method construction — case verification". Its innovations lie in breaking the limitation of single-dimensional research, exploring the interaction mechanism between architecture and landscape from the perspective of "coordinated integration of architecture and landscape", constructing a systematic design method covering common elements and regional differences, and closely combining theory with China's local practices to provide specific paths for solving practical problems.^[7]

SECTION I. HISTORIOGRAPHY OF THE ISSUE.STATUS OF RESEARCH ON THE TOPIC

1.1. State of research on the topic

This paper, after conducting a comprehensive literature review, studies not only the psychological, cognitive, and physiological development needs of each different age category (3-6-year-old preschoolers, 7-12-year-old children, and over 60-year-old seniors) but also reviews available design principles and cases for community space design within relevant disciplines like landscape architecture, city planning, and social psychology.^[8] The literature review, after synthesizing relevant findings from academic studies, governmental documents, and design guidelines, outlines the crucial factors involved in building sustainable community public spaces. More specifically, it concentrates on how these spaces can meet the specific needs of each stage of human development, with studies on elderly design and ecological sustainability being the theoretical base for this research paper's main paradigm.^[9] The literature review also delves into other design strategies like composite design, among others, and their role in promoting life and inclusiveness within community public spaces.

The design of community public space needs to incorporate multiple functions such as daily leisure activity, resident interaction in neighborhoods, and shelter during emergencies. From previous research studies, there has been growing acceptance about how single-function spaces are no longer sufficient to address the demands of modern communities and how this integration of multiple functions is a primary trend within this design. This design need is more pressing within old communities. Huayuan Old Community, which exists within the Changzhou City context in China, is a typical old community. This old community is confronted with general problems such as old buildings, inadequate public space, and a poor landscape environment. The design of their public space requires this integration to counteract space inadequacies.^[10]

The functionality and safety function within space have long been viewed as being at the forefront within community space design, while other aspects involve such issues as ecologic values, culture, and economy. Nevertheless, there is growing literature to show that within community design, the "inclusiveness" and "participation" function within space have an even more significantly positive effect on the construction of sustainable communities.^[11] Based on comparisons within typical domestic and abroad communities via relevant case studies and personal studies within Huayuan Old Community, this paper will share findings within participatory studies on activity spaces within communities inclusive of all ages. The main themes discovered include "intergenerational interaction," "ecological symbiosis," and "cultural embedding," which denote specific demands within different social strata, such as elderly social demands for resting chairs, children's wishes for play equipment, and disabled social groups' pressing demands within Huayuan Old Community to gain barrier-free access. Based on Huayuan Community's outstanding examples and surveys, this paper confirms that being embedded within a harmonious natural environment with multifaceted interactive equipment and strong cultural connotation is crucial to boosting social cohesion within communities. Spaces balancing functionality, ecology, and humanism are more favorable to obtaining long-term sustainable community development.^[12] (Tabl.B.1.1.1.)

The above studies have dedicated less attention to the specific needs of individuals, including disabled individuals and young people. This paper attempts to make up for this deficiency via literature research and on-site studies. Starting with Huayuan Old Community, this person-environment study on resident-space interaction investigates residents' needs by questionnaire and interviews about residents' usage preferences and demands.^[13] The results show that there are important factors involved in open space design, offering theoretical support

concerning Huayuan Old Community and other old communities with similar renovation demands on their public spaces.

From sustainable community development perspectives, public space is believed to be a crucial and essential element within communities, which possesses a strong capability to promote mutual interaction between residents and improve their life patterns. A high-quality public space has strong capabilities to improve community distinctness, although facts prove that most present community public spaces exist with more disadvantages like homogenous design and low usage efficiency. This can be said to exist within Huayuan Old Community as well. This paper attempts to present solutions to these issues after discussing how these results impact future community public space design. This paper discussively investigates the value of using participatory design practices to generate community public space. This is premised on three overarching assumptions: to begin with, the main stakeholders of public space are members within a community, and their interests should and can be synthesized during design processes—practiced within Huayuan Old Community, whereby design portions focused on implementing ideas generated by its residents to enhance these spaces; second, functional public spaces should ensure the integration of ecological, social, and economic sustainability—practiced within Huayuan Community whereby cheap design implementation and improvements are realized within their landscape design, to name a third assumption whereby design approaches to the public domain can and should incorporate active engagement to make these domains more inclusive.^[14] Digital technology, and modular construction offer innovative approaches to manufacturing and functionalization of various structures. The design approach to community public space at present is led by conventional experience and lacks systematic knowledge. The present thesis targets innovative approaches to digital technology applications within this field. taking into account all-age demands and utilizing

technical equipment holistically—an issue which is more strongly evident in old community renovation. These more complex demands on spatial design should not merely continue to result in the superpositioning of single functions, but rather constitute an organic integration of multi-dimensional demands. This paper provides a methodological tool to design an all-age friendly community public space through a design-centered approach and digital simulation/construction technology. This paper provides an introduction to an all-age demand assessment system and constraints on site ecologies and cost management, available to solve old community design issues when implemented during Huayuan Old Community renovation design. ^[15]The results have shown that this method is available to enhance spatial inclusiveness, functionality, and sustainability to provide a practical option to restore old community public spaces.

1.2. Research methods

The methodology of this research is intended to comprehensively analyze implications of sustainable development ideas on designing community public spaces and to find specific ways to design attractive community public spaces. Since this research is interdisciplinary—encompassing aspects like sociology, psychology, environment design, and architecture—it uses both qualitative and quantitative approaches to gain a holistic understanding of this object. ^[16]

The method of particular importance to this research is the case study method, which can systematically analyze community public spaces according to a combination of their functional element complexity and location characteristics. The research chooses representative examples of both domestic and foreign sustainable community public spaces, but Huayuan Old Community in Changzhou City, China, is selected as the crucial case to analyze comprehensively their present state concerning public space problems and renovation demands. ^[17]

At various points in this research, there is a questionnaire survey involved to acquire information on the demands and attributes of residents across different ages within Huayuan Old Community and other similar communities. This study also uses analogy method applications, more specifically regarding play space design, to present a theoretical and terminological basis within an all-age perspective concerning community public space construction.^[18]

Based on comparative analysis and typology (systemization and classification), on one hand, the paper defines the essential types, features, and benefits of community public spaces, and compares the gaps between Huayuan Old Community and outstanding examples on the other. Visual studies can discover design idea, philosophy, and method in outstanding examples, which can serve as a reference to Huayuan Community's renovation project.^[19] When engaging in specific analysis on community public spaces, approaches including space syntax and behavior mapping could pinpoint crucial factors, such as accessibility and activity behavior among Huayuan Old Community residents, within Huayuan Old Community's public spaces. As an important element within this project, field observation is specifically applied to observe the behaviors of residents of varying ages within Huayuan Old Community and other relevant communities within public space. This helps to analyze relevant factors within space utilization efficiency, including usage of facilities, social interactions with fellow residents, and satisfaction with the spatial environment. Analysis of behavior is applied to identify unique behavior patterns and preferences within demands among residents of varying ages and their developments suited to the spatial environment, offering relevant support to the exact renovation of Huayuan Old Community.^[20]

1.3. Research Significance

This research has both theoretical, practical, and social values. From a theoretical aspect, on the basis of China's community development background, it adopts multiple disciplines' theory to build up a theoretical model on "all-age needs—participatory design—sustainable development". This is because there are disadvantages within single-disciplinary thought, ambiguity about the main features and design parameters of all-age friendly community public spaces, and a lack of theoretical guidance and innovative method perspectives within related studies. From a practical point of view, aiming at homogenous community public spaces and lacking adaptability to all-age groups, this research selects Huayuan Old Community in Changzhou city as a special research object. Still via case studies and investigation, it improves design strategies, technology, and technological routes which can be actually implemented, serving designers with practical examples.^[21]At last, it is a decision-making tool for relevant governmental departments to make planning rules and guidelines to renew decaying urban areas, which can optimize space utilization efficiency and effectiveness. From a social perspective, putting emphasis on both all-age friendly and sustainable development aspects, this research is centered on spatial rights and interests concerning special groups like disabled and elderly, promoting inclusive design thinking to some extent, thus removing social problems like aging and generation disconnection to some extent. Besides, via exploring more about residents' involvement routes, it can encourage residents' sense of ownership and community autonomy, offering grassroots social governance innovations spatial support, which can finally increase residents' life quality and ultimately build up a fair, harmonious, and sustainable city environment.

Conclusions to the first chapter

This introductory chapter provides a basis for the whole thesis. The key contributions of this chapter can be identified by highlighting the following three points.

1. Defined The Research Focus and Goal:

The paper contextualizes these practical issues within Chinese community public spaces within the larger themes of sustainable global development and Chinese policy initiatives. The overarching aim is to formulate an effective design methodology that is contextual to China. This is realized by integrating architectural and landscape design to provide solutions to practical problems, which is demonstrated using a specific example like Garden New Village in Changzhou.

2. Established the Research Approach and Path:

The literature review revealed one crucial limitation: The distinction between studies on architectural design and landscape design. The study being carried out is focused on this required integrated method. The structure follows a necessary sequence: “theoretical review → situation analysis → method development → method validation,” utilizing approaches such as case studies, “person environment study approaches like space syntax and behavior mapping studies.”(Fig.A.2.1.1.)

3. Explained Research Value and Output:

The importance of this research is multifaceted. Theoretical, this research enriches sustainable development theory in a specific Chinese design context. Practical, this informs design work and is a step towards designing age-friendly and renewing cities. Social, this research improves social cohesion and inclusive design. The final product can verify specific design approaches to go beyond theory and encompasses participatory design philosophy and incorporate ideas such as modular construction concerning the fabrication and functional implementation of different architectures.

SECTION II. Current Design Status and Core Principles of Public Spaces in Sustainable Communities in China

The purpose of this chapter is to comprehensively clarify and categorize the present design processes concerning public space design within sustainable communities across China, and on this premise, derive universal design points and principles with comprehensive meaning. Based on representative design examples concerning new construction and renovation within China, this study will endeavor to build a design principle system with strong theoretical implications and practical guidance. ^[22] This shall culminate in forming a strong theoretical foundation and standard to proceed with special design strategies and innovations concerning methodological adaptation within Huayuan Old Community, which is located in Changzhou City.

2.1 The Core Role of Sustainable Public Spaces in Meeting Diverse Community Needs

As the most dynamic "cell nucleus" in the urban fabric, community public spaces serve as the core carrier of residents' daily lives and an incubator for social relations. Their sustainability has gone far beyond mere greening and energy conservation, and is profoundly reflected in their ability to systematically respond to and synergistically meet the composite needs of four dimensions: ecology, function, society, and culture. Against the backdrop of China's new-type urbanization moving towards high-quality development and the comprehensive implementation of the "dual carbon" strategy, sustainable public spaces are transforming from subordinate decorations in traditional planning into key infrastructure that supports community environmental resilience, enhances residents' quality of life, and inherits local cultural context.

2.1.1 Basic Functions of Ecological Maintenance and Environmental Education

The main function of sustainable public spaces is to serve as the “ecological base” and “green lungs” within society. They repair the negative impact produced by high-density construction by using active approaches to ecological interventions with low environmental impact and influence residents’ ecological values in an understated manner.^[24]

Microclimate Regulation and Carbon Sequestration: Using an example of a newly developed community in Pudong, Shanghai, its 40% land allocation to green area and complex vegetation structure including arbor, shrub, and herb layers not only serve as ecologically significant habitats within a city but also successfully clean air-suspended particulates and reduce the effect of the heat island effect. The role of plants in carbon sequestration and oxygenation during photosynthesis directly helps to make a community carbon neutral. Again, incorporating vertical greening and roof gardens wherever possible within an old community redevelopment project in Chengdu helped to improve its microclimate to a great extent.^[25]

Resource Circulation and Demonstration Window: The integration of rainwater harvesting and utilization, and the usage of dispersed solar photovoltaics at the Shanghai community, have turned the very environment into a micro-experimental site and a window display for resource recycling. The harvested rainwater is actually put to use for green landscape irrigation and supplementary landscape water, while solar energy can provide supplementary street lighting. This helps to realize a degree of energy and water autonomy, but more importantly, it gives a very practical environmental message to the community residents about green and low carbon lifestyles.

Biodiversity Conservation and Ecological Resilience: A community centered on ecology in Guangzhou has a primary design theme of building an artificial

wetland system. Not only can this naturally purify rainwater via plant and microbial activity to achieve the ecological cycle of water resources, but it also functions to attract bird and insect life to restore the micro-ecological chain within the area. The method of landscapezing and ecologicalzing metropolitan construction facilities has significantly promoted the ecological resilience and wilderness within this community^[26]

2.1.2 Catalytic Functions of Social Integration and Community Cohesion

Public spaces serve as the physical base for building and amassing social capital within a community. The type and inclusiveness of these spaces directly affect the intensity of social relations within a community and its sense of community identity.

Encouraging All-Age Communication and Interaction between Generations: The community activity centers, community squares, shared kitchens, and community cafes often identified as part of community provision within the above-mentioned cases serve as an important “third space” facilitating communication among community members. Children play in safe and fascinating play grounds, seniors play chess and socialize within designated chess zones, while young parents make acquaintance with each other on “rest-seats” positioned alongside children activity zones. All these informal processes remove age and social-status barriers that exist within modern metropolitan social life and make an important contribution to social integration within the community.

The role of improving local identity and cultural heritage: The reconstruction project in Chengdu involved designing a “culture corridor,” which reflects the history and local culture of that region, while the Guangzhou community design is based on the unique tropical plant communities that exist there, which becomes the

representation of local identity. These approaches to design serve as best practices where nature or culture is appropriately utilized to enrich design. This instills collective memories in the locals to increase their sense of place and pride to make open spaces a spiritual place with a rich sense of culture and unique personality.^[27]

Support to Public Health and Wellness: The fitness trails, basketball grounds, outside fitness equipment, and Tai Chi piles offer support to the physical well-being of residents. More importantly, the serene environment around the wetlands within the Guangzhou community and those around the sunny grasslands within the Chengdu park offer a “therapeutic environment.” They offer residents a refuge to find solace and comfort from the hustle and bustle within an urban setting and enhance their mental wellness within such a setting.

2.1.3 The Indirect Promotional Functions of Economic Viability and Sustainable Operations

A public space which has a rich sound ecology, lively atmosphere, and strong sense of place can offer considerable positive external economic value, thus promoting sustainable activity within the community.

Improving Location Value and Attractiveness: The best livability indicators are high-quality public spaces. They can not only preserve the already residing population but also draw new people to live there. This will increase the value of the surrounding assets automatically, and this will trigger a positive feedback effect.

Minimizing Whole-Life Cycle Maintenance Cost: This is because, although there may be increased construction costs up-front, implementing sustainable design approaches to use more durable materials and water-efficient and energy-efficient facilities can lead to greatly reduced energy and water use within public spaces, and building replacement and maintenance, which will make these more economically sustainable.

Stimulating Community Innovation and Endogenous Economy: A rich source of public activity and a steady pedestrian flow generate a lively environment conducive to small business ventures such as cafes, bookstores, and handicraft markets within a community. The “local economy,” which is led by the vibrancy generated within public spaces, is not only a facilitator but also an opportunity creator within the community economy.^[28] To sum up, sustainable community open spaces are a system that combines natural functions, social meanings, and cultural implications. These open spaces have developed from being merely "supporting facilities" to being proactive instruments to deal with city problems and meet the crucial challenges faced by modern urbanization processes within China to achieve high-quality community development.

2.2 In-Depth Research and Commonality Analysis of Domestic Sustainable Community Cases

To better comprehend the implications, differences, and difficulties involved in designing public space in sustainable communities within China, this paper selected for intensive study three examples representing different types: a new community developed in Shanghai (a technology-integrated-style one), an old community transformed in Chengdu (a restoration-style one), and one with an ecology theme within Guangzhou.^[29] Based on this, systematic problem diagnosis work is performed.

2.2.1 In-Depth Analysis of Representative Cases from a Multi-Dimensional Perspective

Case 1: A Newly Built Community in Shanghai - A Model of Technology Integration and Systematic Planning

This community is a way to achieve sustainable development by integrating advanced technology and planning within a high planning starting point and

relatively relaxed resource constraints. The design of this community's public spaces is very systematic and far-sighted.

Ecological Technology Integration: From the perspective of ecology, it is no longer limited to greening but adopts comprehensive green technologies such as energy-saving doors and windows, exterior wall insulation, solar photovoltaics on roofs, and resource circulation systems including underground storage tanks for rainwater and recycling of treated water, making up a complete system concerning “resource development” and “conservation.”

(Fig.A.2.1.2.-Fig.A.2.1.3.)

Spatial Organization Logic: As far as functional layout is concerned, on the basis of dynamic and static region division and pedestrian-vehicle separation route design, there is an organic integration of functional units such as children’ s play regions, elderly fitness regions, dynamic sport regions, and quiet pleasure regions, which balance activity diversity with functionality and ease of use.

Green Travel Recommendations: The enhanced separate bicycle route system and convenient places to park shared bicycles show that there is a supportive policy environment with respect to green travel at an institutional level and promote low-carb lifestyle habits to residents.

Core Insight: The fact that this case is successful shows that there is an evident advantage to new settlements within encoding concepts about sustainability directly into spatial genes straight from the source. It is very much dependent on collaborative design work and systematic solutions.

Case 2: An Old Community in Chengdu—A Model of Space Activation and Social Weaving

This example perfectly illustrates how to accomplish the restoration of community vibrancy with creative “acupuncture-like” design within very limited spatial resources and against the background of very complex contemporary conditions. The essence is to carefully activate and repurpose available spatial resources, and restore and elevate social capital.

Existing Space Value-Upgrade: The transformation of a corner site which originally stood disused within the community for a long period and was reduced to a parking space into a comprehensive community park incorporating greening, recreation, children's play activity, and fitness is a best practice on the applications of “add green wherever possible” and “functional compounding,” wherein a small amount is spent to greatly enhance value. (Fig.A.2.1.4.-Fig.A.2.1.5.)

Comprehensive Environment Improvement: The energy-saving renovation work on old residential buildings to install energy-saving windows and external wall insulation, and artistic building façade beautification, takes into account both the “interior” and “exterior” aspects of these buildings to achieve comprehensive upgrading and improvement to the environment.^[30]

Reconstruction of Place Spirit: Most importantly, this design successfully strengthened place spirit and triggered a sense of collective memory and identification among residents by successfully incorporating narrative spatial elements like “cultural corridor.” This helped to make the reconstruction of space a success also at the level of incorporating social relations and culture.

Core Insight: The secret to effectively renewing an old community is to make precise interventions and to stir up community consciousness. It shows that with very little capital outlay but with great social insight, very significant overall results can also be achieved. (Fig.A.2.1.5.)

Case 3: A Community in Guangzhou—A Model of Ecological Foundation and Social Interaction Driven

This community is investigating a sustainable development route centered on ecology, which involves intensive engagement between human beings and nature, and human beings themselves. The main aspect highlighted is the construction of ecological infrastructure centered on landscape.

Ecological Facilities Landscape-ization: It successfully transformed the “ecological wetland,” which is a gray infrastructure belonging to city engineering, into the primary part of green infrastructure, having aesthetic value, entertainment function, and educational function. The wetland is a water purifier and is also the most beautiful view and natural classroom within the community.

Biodiversity Creation: The project achieves this by having a 50% green cover ratio and utilizing a wide range of indigenous plants to build and sustain a strong and relatively low-maintenance native environment.

Elaborate Design of Social Spaces: The design takes special care to meet residents’ social demands at a high level, and makes deliberate attempts to provide opportunities for residents to communicate on a profound level by designing "third spaces" like community cafes and kitchens. This goes to show that ecologies and sociality can complement each other rather than being mutually exclusive.

Core Insight: A sustainable community can also incorporate a unique theme, which can also be realized via design. Ecological benefits can shift to social and quality-of-life benefits, which can lead to a unique community competitiveness.

(Fig.A.2.1.6.)

2.2.2 Sorting out Common Problems and Identifying Root Causes through Cross-Case Comparison

Despite the outstanding accomplishments shown above, after comparing these two cases comprehensively and understanding opinions raised by residents’ questionnaires and interviews, we can identify the universal problems which exist

generally within the design of contemporary public spaces within sustainable communities in China:

One-Sided and Fragmented Understanding of “Sustainability”

Connotation: There is a tendency to unconsciously fall into the pitfall of “technological determinism,” which places one-sided emphasis on building up sufficient strength in certain energy-saving and environmental protection technologies, or one-sided identification of sustainability with “green space ratio.” They ignore a comprehensive integration and holistic design incorporating social equity, cultural vibrancy, economic viability, and other aspects with the ecological aspect. For instance, there are spaces that are technologically and sufficiently green but low in usage rate because they are unreasonably organized in space and lack humanistic care, making them merely “green decoration.” [31]

Lack of Refining and Precise Age-Inclusive Designs: While taking into consideration the needs of different ages, there is vast scope for improving the design. The result obtained from questionnaires and interviews indicates that while barrier-free design is being implemented within specifications required by disabled persons, there is no consideration on part of the designer to take into account their needs, there is no provision within activity spaces having some constraints and some required level of privacy desired by teenagers, while child activity spaces are very similar to each other, equipped with standard plastic play equipment, which is inadequate to encourage children to make contacts with nature.

Severe Lack of Post-Operation Maintenance and Community

Governance Mechanisms: The on-site investigation showed that fitness equipment, water features, and lighting facilities in some communities (especially old communities after renovation) are damaged or have long ceased to function because of poor maintenance, resulting in no sustainability mechanism after the design stage. This severely reflects the widespread problem of “prioritizing construction over management.” The question of how to build a mechanism

concerning community governance, fund-raising, and space maintenance commensurate with design is an important issue which should be simultaneously thought about during the early stage of this project but is frequently disregarded.

Formalization of Residents’ Participation in Design Decisions: From interviews, it is observed that there remains a serious inadequacy in residents’ participation and talking rights during early-stage decision-making, halfway-point adjustment, and after-management decisions concerning design on public space. The nature of residents’ participation is generally limited to mere formal declaration announcements and opinion-solicitation processes and may result in a huge gap between design planning and residents’ actual, fluctuating demands and significantly influence residents’ sense of identification, sense of responsibility, and resultant deliberate upkeep behavior on this constructed environment. To trace back to the root causes, these issues come from the prevalent problem called “three deficiencies” in design processes: first, a lack of true collaborative work between architecture, landscape, ecology, social science, and other disciplines being done separately rather than being collaborative; second, there is no long-term intensive investigation into demands after design decisions, which depend on conjectures rather than being supported by evidence; third, there is no comprehensive investigation into whole life-cycle values, which results in being “able to build but unable to maintain.” [32]

2.3 Construction of a Basic Design Decision-Making Method System for the Chinese Context

On the basis of the above-mentioned experience extraction and reflection on typical problems, this paper proposes a system consisting of three supportive sets of design principles to make decisions on design. This is to systematically facilitate

the design of public spaces within sustainable communities, focusing on dealing with the present development within the community in China, particularly on old communities. (Fig.A.2.3.1.)

2.3.1 Functional and Technical Principles: Building a Safe, Inclusive, Efficient, and Resilient Physical Platform

The functional and technical principles serve as the substantive warranty and strict guidelines within which the sustainability of public spaces is ensured. The essence of functional and technical principles is to ensure the elementary functions within the space can and should be realized on a long-term and justifiable basis via universal design, design for durability, and resource use efficiency, and that it is capable of adapting to environmental change.

Essential Objective: Universal Design and Priority to Equity

The key to this section is the principle of universal design, and its purpose is to design a space where every possible social category, such as children, seniors, disabled, and pregnant women, can share equal opportunity to use it with dignity and ease. This necessarily transcends to a higher level than mere specification and implies subtle analyses on the basis of human physiology, cognitive psychology, and behavioral studies. The angle, length, width, and handrail height setting of barrier free routes needs to satisfy the most demanding usage conditions, while designing the allocation, height, and back support of resting benches requires priority attention to long-term resting comforts of seniors, and sign-age design is required to coordinate multiple modes like visual communication (color and graphics) and tactile communication (Braille) to ensure intuitiveness and cognitive understanding.^[33]

Key Strategies and Design Recommendations

Entire Site Barrier-Free and Proactive Safety Measures: No height difference should exist on the whole site, or use slightly sloped ramps with a slope ratio no more than 1:12. The pavement should be flat, strong, and anti-skid to ensure it is safe on rainy days. The function of guardrails, green hedges, and safety warning signs shall both safeguard and adorn those regions on the site which are dangerous (like regions around water bodies, steep slopes, and junctions of routes on which vehicles travel).

Lighting Measures should avoid dark zones during night hours while ensuring there is no light trespass and make a positive impact on night security.

Building and Infrastructure Durable Facilities and Controllable Whole-Life-Cycle Cost: In building material choice, give preference to local, renewable, and weather-resistant materials (like resistant wood with anti-corrosion protection, porous bricks, and concrete with recycled aggregate) to minimize carbon emissions due to transporting those materials. Regarding building structure design, it is necessary to make sure that building structure integrity and connection points are completely reliable to allow for resistance to frequent usage in a public setting. The structure should allow easy inspection and replacement.

Resource Efficiency and Integration of Low-Carbon Circular Technology: Promotion and application on a mass scale of energy-saving LED lights, solar garden lights, and wind and solar hybrid street lights, etc. The comprehensive development and utilization of water-saving irrigation and water-saving devices in public places like sensor faucets and water-saving toilets, etc. Comprehensive planning on site rainwater management needs to be implemented via gray-green integrated rainwater infrastructure including sunken green areas, rain gardens, and underground water modules. The stored and filtered rainwater

should serve purposes like green water supply, landscape water supplement, and flushing roads. The use of recycled materials is to be advocated within architectural design sketches and landscape equipment, and popular science explanations to be established.

2.3.2 Organizational Planning Principles: Creating a Smooth, Harmonious, Vibrant, and Experience-Rich

The principles of organizational planning relate to the macro-arrangement, circulation organization, and form composition of space, which aim to enhance space usage efficiency, comfort, and interest via scientific planning approaches to promote positive and healthy lifestyles.

Core Goal: Maximizing Spatial Performance and Guiding Behavior

A rational plan can coordinate multiple activities effectively, minimize functional conflicts, and design distinct and attractive experiences within space. This is because such planning directly influences how residents perceive, utilize, and navigate within space, ultimately contributing to its effectiveness.

Dynamic-Static Zone Division and Functional Compound Design: On one hand, it is required to distinguish dynamic functional zones (sports grounds, children's play grounds, and square dancing grounds) and static functional zones (reading garden, meditation area, and quiet resting places) on a macro level, and adopt soft partitions like landform, greening, and colonnades to ensure functional independence to avoid disturbance. On the other hand, on a micro level, one should promote functional compounding, which indicates that one functional area can satisfy multiple demands at different occasions. For instance, a social square could work as a walking and resting plaza for locals during weekdays, but be converted into a site for farmers' markets and social gatherings on Saturdays and Sundays to achieve maximum utilization of spatial benefits.

Humanized Circulation Routes and Priority on Accessibility: A convenient and attractive pedestrian and bicycle route system should be implemented to link community public spaces with residential units, rail stations, and other daily service facilities. A humanized circulation route requires prioritizing pedestrian and cyclist access routes and building a convenient and communication-promoting slow traffic environment with reduced turning radii on roads and varied paving materials. Clearly visible route maps should be erected at nodes.^[34]

Building Spatial Hierarchy and Interest in Space: The skillful combination and arrangement of natural factors like landforms, plants (planting density and height), and landscape architecture (colonnades and landscape walls) can meticulously design a spatial hierarchy consisting of “open - semi-open - private.” Green spaces can meet functional demands related to congregation and activity, while sub-forest zones and garden pavilions can provide sheltered areas offering shade, comfort, and opportunities for semi-private communication, while quiet zones with plant partitions can provide opportunities to individuals to be alone and meditate. A hierarchical design like this can greatly promote inclusiveness and interest in exploring that space.

2.3.3 Information, Psychological, and Aesthetic Principles: Endowing Space with Emotion, Identity, Memory, and Aesthetics

This principle emphasizes the spiritual level, meaning, and perception of space. The purpose is to satisfy residents’ higher level psychological needs, build an extremely strong sense of belongingness, and boost aesthetic value and attractability of environment information layout, cultural implantation, and aesthetic design.

Primary Objective: Development of Place Spirit and Promotion of Bodily and Mental Health

“Sense of place” is established via design, which helps residents build up their own sense of identification and feeling of ownership— “I am part of this place.” At the same time, via aesthetic and environmental psychology approaches, it helps to enhance residents’ mental and happiness factors. (**Fig.A.2.3.2.**)

From the Information and Psychological Perspective:

Development of Feelings of Security and Control: Besides feeling safe and sound, it is essential to feel psychologically safe. An open perspective, better illumination, and required electronic surveillance cameras can greatly aid this factor. Clear information about the site, which can easily be comprehended by residents via maps and signage, can limit confusion and nervousness while navigating unknown territory, instilling a sense of control within residents.

Building a Sense of Belonging and Place Identity: Actively incorporate the history, symbolism, and memories of the community into design stories using mediums like sculpture, landscape walls, pavement design, and art installations. This is where designing a “sense of place” is most crucial. The active promotion of participatory design processes, whereby opinions, stories, and even homemade craft work are incorporated into design, can contribute significantly to their sense of ownership and make this space our space.

Meeting Cognitive and Environmental Education Needs: Turn publicly available spaces into open “outdoor classrooms.” Install plant science popularization boards, community collaborative farms, and ecological technology display zones (such as Rain Garden principles sign boards) to cater to the curiosity and desire to know more about nature among residents, particularly children and adolescents. (**Fig.A.2.3.3 - Fig.A.2.3.4.**)

From the Aesthetic Perspective:

Harmony, Unification, and Regional Characteristics Displayed: The style, material, and color of buildings, landscapes, and sketches should coordinate and unify, and correspond to the natural landscape, climate, and temperament of each locality. Oppose “bizarre buildings” and landscapes with “the same appearance across all communities,” but draw upon local traditional homes, gardening, and craftsmanship to display regional style.

People-Oriented Proportion and Scale: The scale of space and facilities shall depend on human perception to generate a warm, comfortable, and pleasant ambiance and avoid any feeling of alienation because of emptiness and grandeur, as well as any feeling of oppression because of crowding and lack of space.

How to generate rhythm, sequence, and visual focus: Using such ideas as repetition, gradation, and contrast, a sense of rhythm and sequence can be achieved. A strong visual interest can also be generated by designing such features as key buildings, typical big trees, and artistic water features to attract visual attention and draw one's line of vision. (**Fig.A.2.3.5-A.2.3.9**)

Conclusions to the second chapter

Establishing a progressive research logic on "function-status-method," this chapter is dedicated to proving the strategic role of sustainable community public spaces during the high-quality development stage of Chinese urbanization. The research begins with explaining its unreplaceable role within a comprehensive carrier to fulfill multiple ecological, social, cultural, and economic demands within a community, and also delves into a comprehensive comparison among three representative cases to summarize not only technology integration, space activation, and ecological themes but also is equipped to point out four prevalent problems currently being experienced, including one-sided characterization of sustainability connotation expression, an unrefined level of age-friendly design, long-term management mechanism, and formalization of resident participation processes.

To address these rooting issues resulting because of a lack of systematicness and coordination, the essence of this chapter is to design a system consisting of three pillars: “Functional and Technical Principles,” “Organizational Planning Principles,” and “Information, Psychological, and Aesthetic Principles,” to summarize and formulate a design decision method system appropriately relevant to this environment. This system focuses on:

Integration and Systematicness: Public space should be treated as a lively and multifaceted system because there is a need to work on an integrated design basis including architecture, landscape, ecology, sociology, economics, and other disciplines to break down barriers.^[35]

Humanity and Inclusiveness: The role of design needs to shift its attention back to caring about “people,” particularly to address special needs, and make age-friendly and inclusive design more than just slogans but something that can be perceived spatially.

Regionality and Adaptability: The approaches to design are not dogmas but an open toolkit which requires a very intensive integration with specific factors like climate, culture, social structure, and level of economy, and should undergo creative transfiguration to reach true sustainability with “localization.”

Processual and Participatory: The best space is not only “designed” but also “nurtured.” The idea is to incorporate residents’ participation and collective construction into the whole process, design, construction, and management to make this space vital and sustainable.

The design principle structure developed within this chapter not only helps to offer a distinct dimension concerning which one can comprehensively analyze and diagnose present issues relating to public spaces within Huayuan Old Community in Changzhou City but also sets up a strong theoretical foundation concerning how distinct localized design approaches shall be developed within the next chapter.^[35](Fig.A.2.3.8.)

CHAPTER III.DESIGN PRACTICE: SUSTAINABLE PUBLIC SPACE DESIGN STRATEGIES FOR CHANGZHOU HUAYUAN COMMUNITY

As the crucial link within the thesis about the transition of theory into practice, this chapter, following the principles developed within Chapter 2—Functional Technology - Organizational Planning - Information, Psychology, and Aesthetics, sets forth specific approaches to sustainable design within Huayuan Community within Changzhou, which is a representative example within old-style residential zones. The surveys have pointed out that there exist several outstanding problems within this community, such as inactive space functionality, degradation within natural functionality, an aged population, and a lack of definite cultural memory. The above-mentioned issues serve to offer a very interesting practical example to test the previously developed design methodology system.^[37]

3.1 Generation of Design Concepts and Integration of Multi-Dimensional Strategies

The essence of design lies within the integration of universal principles with site context to derive a design concept, which can then be decomposed into design strategies. (tabl.B.3.1.1.)

3.1.1 Core Design Concept: Collaborative Framework of “Ecological Weaving and Restoration, Humanistic Coexistence, and Flexible Empowerment

Based on the above analysis, together with the present state of Huayuan Community, this paper outlines a design idea of “Ecological Weaving and Restoration, Humanistic Coexistence, and Flexible Empowerment” to comprehensively solve the problems faced by Huayuan Community.

The Ecological Weaving and Restoration dimension is concerned with repairing the damaged ecological foundation and reconstructing natural metabolism. This can be achieved by implementing an ecological infrastructure that connects both gray and green infrastructure, implementing a micro rainfall management system, improving soil infiltration and water storage functions, boosting biotope vegetation, making up for a lack of horizontal space with vertical greening, to enhance adaptability to climate, utilization efficiency of resources, and biological diversity, thereby forming a healthy ecological environment.

The Humanistic Coexistence dimension seeks to restore social relations and cultural identity. Emphasizing the age-friendliness and inclusiveness of open spaces, this dimension establishes a "third space" that fosters interaction and communication between ages, offering relevant activity spaces for varied groups. On one hand, this dimension delves into the local cultural memories within the community, turning collective memories into visible qualities to enhance a sense of belonging and pride among residents.^[38]

The Flexible Empowerment ensures that there is adaptability to uncertain future developments. Modular and transferable facility design is utilized to reserve "blank" space within which there is self-renewal by residents' active involvement in construction activity and creation of an organism within community spaces to which there is continuous "growth" according to developments within the community.

These three aspects complement each other, thereby forming a complete paradigm of sustainable design.

3.1.2 Systematic Integration of Multi-Dimensional Design

For implementing the design idea, four collaborative approaches are developed on both architectural and landscape scales:

- **Spatial Layout and Circulation Reconstruction Strategy**

To deal with the issues of disintegrated public spaces and connectivity, a spatial structure system called “one core, one ring, and multiple nodes” is developed.

The Core Vitality Space converts a dormant open space at the community center into a multifunctional core square. It is provided with mobile seating, staging, and greening arrangements. These cater to varied demands like everyday recreation and festival assembly. The facilities within public services are gathered there to generate a magnetic core pole.

The slow traffic network optimization ensures that there is an available community health loop, which connects residential clusters, public venues, and functional nodes. The design ensures that green travel is optimized by making right-of-way allocation clearer, adopting comfortable paving, and incorporating landscape guidelines.

The typical node spaces form differentiated nodes on the loop and within clusters according to residents' demands, including reading garden nodes, natural adventure park nodes, and nodes corresponding to different ages' health space demands.

- **Ecological Technology and Material Application Strategy(Fig.A.3.1.1.- Fig.A.3.1.2.)**

The application of sustainable technologies is to attain a win-win scenario pertaining to ecologic and economic aspects.

The sponge system provides a decentralized design for rainwater management. Rainwater harvesting is implemented on roofs, porous pavement is implemented on hard surface areas, while depressed landscape and rain gardens are implemented on grassed surface areas. This helps to reduce pressure on drainage infrastructure while also promoting unique landscapes associated with rainwater.

The energy-saving and low-carbon goals include retro-fitting old buildings by carrying out external wall insulation and energy-saving window and door replacement, installing solar photovoltaic panels on roofs of public buildings, and choosing solar street lights to decrease energy consumption.

The recycling and localization of construction materials gives priority to the use of eco-friendly construction materials like porous bricks and concrete aggregate produced from recycled materials, and processes and uses construction waste within the locality to minimize carbon emissions and landfilling, which gives construction materials site memory value. (tabl.B.3.1.2.)

- Cultural Memory and Place Spirit Shaping Strategy

The purpose of spatial design is to activate the community's cultural genes.

The memory carrier design, developed after interviews within communities and object collection, generates story walls and memory corridors, which convert old well walls, stone mills, and other traces into street art/public furniture and develops themes into sculptures and ground reliefs.

The native plants selected to build this narrative have to show very evident change between seasons. This is achieved via signages erected to present information about these plants and how they change seasons.

The dynamic cultural heritage sets up adaptable spaces such as community farms and open exhibition walls to facilitate citizens to initiate impromptu

activities like folk festivals and handicraft markets, which makes public spaces a dynamic stage for cultural heritage. (tabl.B.3.1.3.)

● **Age-Friendly and Inclusive Facility Configuration Strategy (Fig.A.3.1.3.)**

Adhering to the universal design concept, it is ensured that this space is available to each and every resident equally. The child-friendly spaces involve abandoning equipment such as plastic play equipment and implementing naturalized play environments such as sand and water play, micro topography climbing zones, and sensory gardens to enhance the children's creative and social faculties. (tabl.B.3.1.4.) The elderly-friendly areas provide environments that offer health and wellness gardens with seniors' exercise equipment, resting benches with armrests, and wind and rain sheltered spaces, and ensure flat and non-slip ground and legible signage. The barrier-free design ensures a strict implementation of specifications, including gentle ramps, toilets, and mother and baby rooms, Braille signposts, tactile maps, and visual guidance, which denote humanistic care and equality of participation.^[39]

3.2 Expected Effects and Comprehensive Assessment of Sustainability

This design approach is projected to generate sustainable transformations on multiple dimensions within the community, and these comprehensive benefits include:

Ecological Benefits: The quality of the microclimate will also be greatly elevated by our ecological weaving and restoration plan, which will reduce the effect of the urban heat island. The sponge facilities can accomplish an annual total runoff control rate above 70%, which can greatly raise the utilization efficiency of rainwater resources. The restoration of native vegetation zones can enhance biodiversity, building a rich natural environment.

Social Benefits: The new social space network will serve to enhance inter-generational interaction and combat social isolation. The rich social opportunity structure will enhance neighborliness, promote volunteering, and increase a sense of community.

Health Benefits: The slow traffic loop route and open-air gym equipment will promote residents to take up outdoor activities, which will prevent chronic illnesses. Quality natural environments have the ability to ease mental stress, boost moods, and provide a psychological healing impact.

Economic and Operational Benefits: Despite higher marginal initial costs, green infrastructure and energy-efficient technologies can lead to reduced energy use and lower operating costs over the complete life cycle. The open space design significantly reduces future retrofitting costs.^[40] An attractive environment within the community will enhance property values and desirability, while citizens' sense of pride and ownership can serve as a warranty for low-cost, long-term upkeep.(Fig.A.3.1.4.-Fig.A.3.1.5) (tabl.B.3.2.1.)

GENERAL CONCLUSIONS

To start with, this paper sets up a sustainable community public space design methodological system on the basis of three principles: “Functional Technology - Organizational Planning - Information, Psychology and Aesthetics,” filling in the gaps that exist within present studies about theoretical systematicness and regional adaptability. Going beyond the boundary within which there is only one technical and aesthetic level, this methodological system possesses both theoretical height and applications within the reconstruction of urban community public spaces in China.

Secondly, on the basis of taking Changzhou Huayuan Community as the implementation carrier, theoretical approaches are converted into design strategies on “Ecological Weaving and Restoration, Humanistic Coexistence, and Flexible Empowerment, ” which verifies the practicability and effectiveness of this methodological approach to old residential area revitalization. The strategies put forward to deal with key issues concerning old communities, such as space reconstruction, ecological restoration, cultural revitalization, and adaptation to different ages, are directly related to old community demands and can serve as an example with practical value.

Thirdly, the study clarifies the core value orientation of sustainable community public space design, which shifts from "physical space transformation" to the coordinated development of "humans - environment - society". In the future, further exploration can be conducted on the application of digital technologies in community design and management, as well as the differentiation of design methods for different types of communities (such as newly-built communities and urban villages), to continuously improve the theoretical and practical system of sustainable community public space design with Chinese local characteristics.

REFERENCES

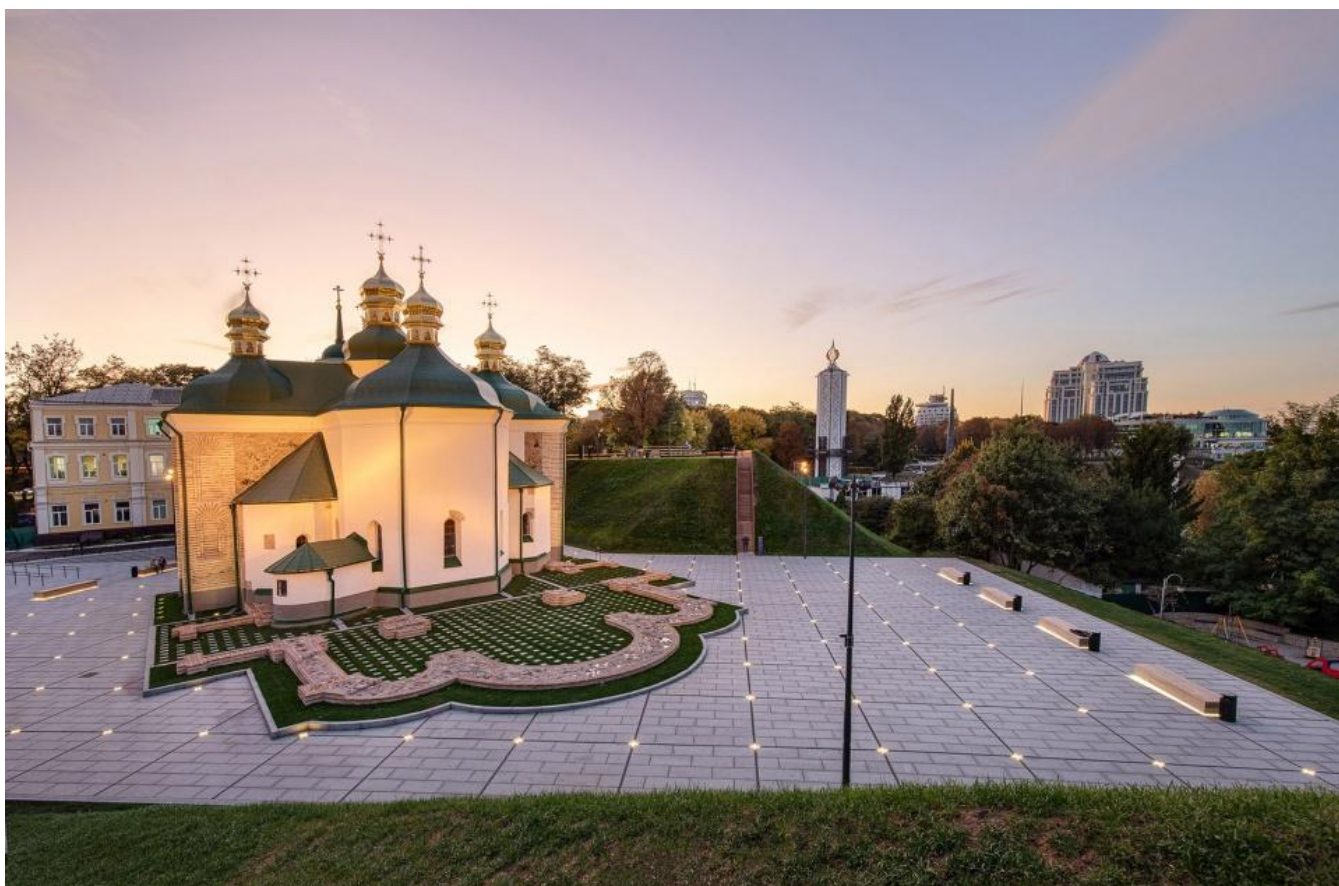
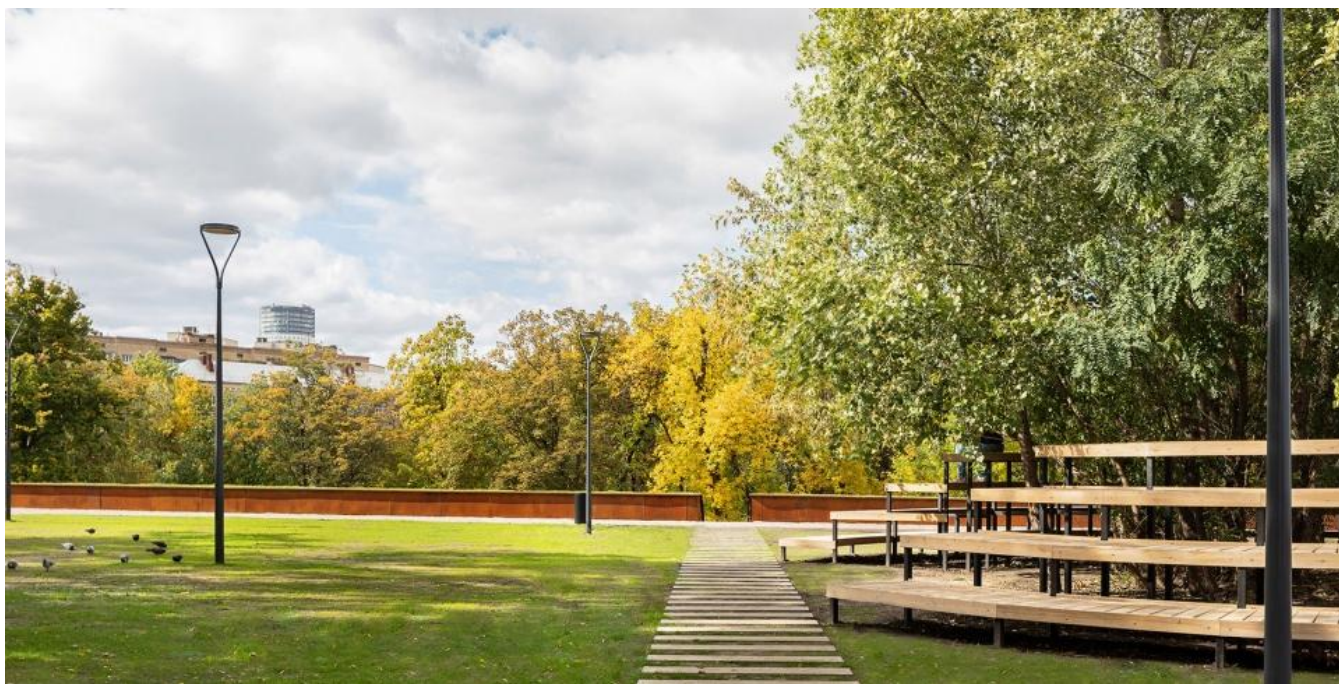
- [1] Cai, Z. (1999). The Ecological Spirit of Chinese Dwellings. *Architectural Journal*, (7), 24-26.
- [2] Wu, L. (2001). Introduction to Sciences of Human Settlements. China Architecture and Building Press.
- [3] Yu, K., and Li, D. (2003). The Road to Urban Landscape: Conversations with Mayors. China Architecture and Building Press.
- [4] Wang, J. (2004). Urban Design. Southeast University Press.
- [5] Peng, Y. (2004). Landscape Analysis of Traditional Villages and Settlements. China Architecture and Building Press.
- [6] Zhang, T. (2005). Research on the Design Concept and Method of Green Community. *Architectural Journal*, (8), 32-34.
- [7] Li, B. (2006). A Study on the Development of Urban Communities in China. East China University of Science and Technology Press.
- [8] Yang, R. (2007). The Theory and Practice of Landscape Urbanism. *City Planning Review*, (4), 45-49.
- [9] Wang, X., and Lin, Q. (2007). The Theory and Practice of Western Modern Landscape Architecture. China Architecture and Building Press.
- [10] Dong, W. (2008). Historic Heritage Conservation in Urban Regeneration. *City Planning Review*, (2), 23-27.
- [11] Han, X. (2009). Study on the Relationship Between Community Public Space and the Health of the Elderly. *Architectural Journal*, (5), 38-41.
- [12] Shen, S. (2009). Theory and Practice of Wetland Park Planning and Design. China Architecture and Building Press.

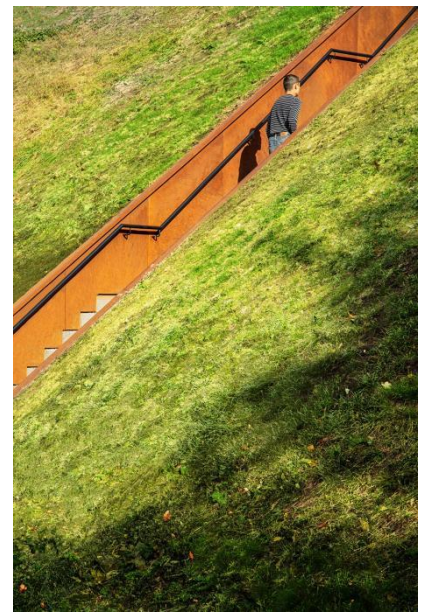
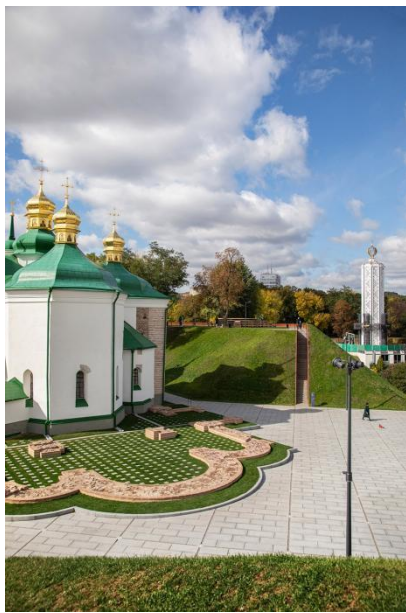
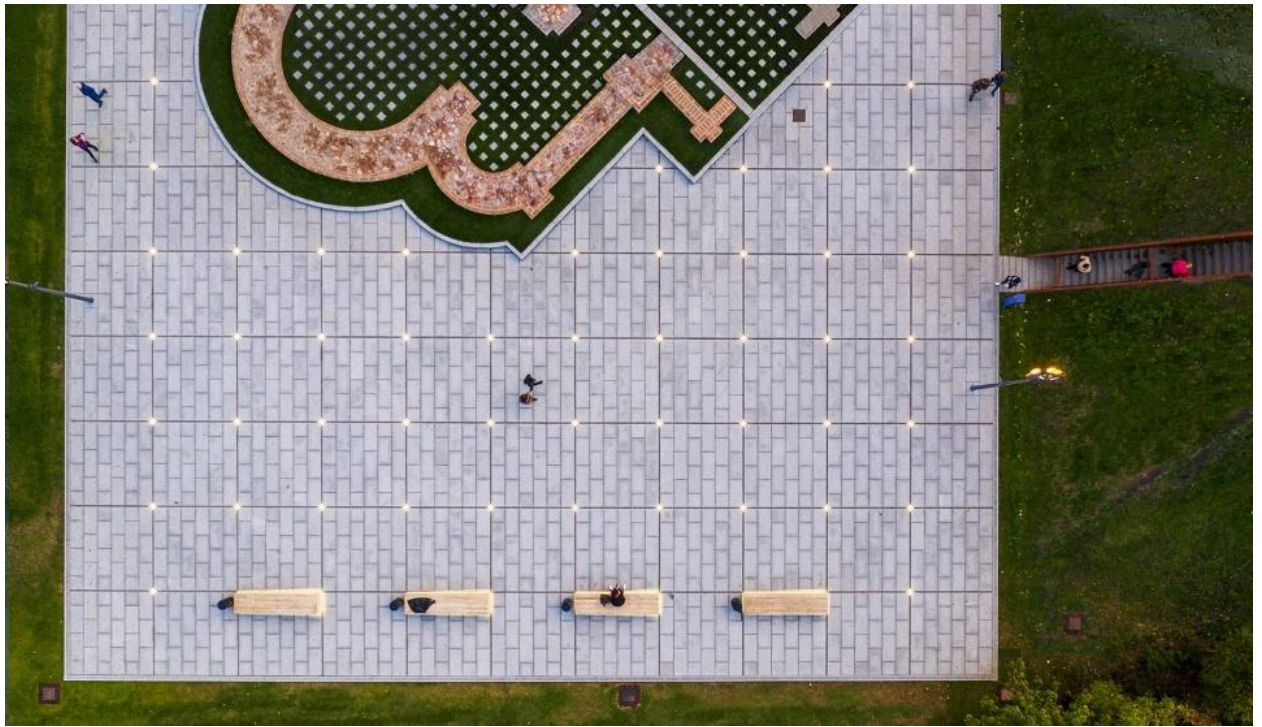
- [13] Wu, Z. (2010). Sustainable Urban Planning. China Architecture and Building Press.
- [14] Liu, B. (2010). Modern Landscape Planning and Design. Southeast University Press.
- [15] Chen, Y. (2011). Principles and Methods of Ecological Architecture Design. China Architecture and Building Press.
- [16] Wang, Y. (2011). Principles of Landscape Ecological Planning. China Architecture and Building Press.
- [17] Li, D., and Yu, K. (2012). "Negative Planning" Theory and Ecological Infrastructure. City Planning Review, (3), 15-19.
- [18] Zhang, M., and Wang, F. (2013). Research on Public Participation Mechanism in the Regeneration of Old Communities. City Planning Review, (6), 45-49.
- [19] Zhao, M., and Sun, S. (2013). Modern Community Planning Theory and Methods. China Architecture and Building Press.
- [20] Yang, P. (2013). The Theory and Methods of Landscape Urbanism. China Architecture and Building Press.
- [21] Chen, T., and Zang, X. (2014). Green Infrastructure and Urban Sustainable Development. City Planning Review, (4), 28-32.
- [22] Li, W., and Ye, X. (2014). Research on the Evaluation System of Urban Community Sustainability. Geographical Research, (5), 927-937.
- [23] Wang, J., and Wen, J. (2015). Research on Vitality Creation of Community Public Space. Architectural Journal, (7), 42-45.
- [24] Zhang, L., and Yuan, J. (2015). Research on the Integrated Design of Architecture and Landscape. Architectural Journal, (9), 36-39.

- [25] Ministry of Housing and Urban-Rural Development. (2016). Code for Planning and Design of Urban Residential Areas. China Architecture and Building Press.
- [26] Li, H., and Xiao, J. (2016). Renewal Design of Urban Historical Space. Southeast University Press.
- [27] Qian, Y., and He, K. (2016). Sponge City: Theory and Practice. China Architecture and Building Press.
- [28] Xu, X. (2016). Urban Road and Traffic Planning. China Architecture and Building Press.
- [29] Zhou, J., and Shen, Y. (2016). Principles of Urban Residential Area Planning. Tongji University Press.
- [30] Zhu, J. (2016). The Inheritance Concept of Garden Waterscape Design. China Architecture and Building Press.
- [31] Farr, D. (2008). Sustainable Urbanism: Urban Design with Nature. John Wiley and Sons.
- [32] Gehl, J. (2010). Cities for People. Island Press.
- [33] Beatley, T. (2000). Green Urbanism: Learning from European Cities. Island Press.
- [34] Carmona, M., Heath, T., Oc, T., and Tiesdell, S. (2010). Public Places - Urban Spaces: The Dimensions of Urban Design. Architectural Press.
- [35] Jacobs, J. (1961). The Death and Life of Great American Cities. Random House.
- [36] Lynch, K. (1981). A Theory of Good City Form. MIT Press.

- [37] Calthorpe, P. (1993). *The Next American Metropolis: Ecology, Community, and the American Dream*. Princeton Architectural Press.
- [38] Mostafavi, M., and Doherty, G. (Eds.). (2010). *Ecological Urbanism*. Lars Müller Publishers.
- [39] Lyle, J. T. (1994). *Regenerative Design for Sustainable Development*. John Wiley and Sons.
- [40] Francis, M. (2003). *Urban Open Space: Designing for User Needs*. Island Press.

APPENDIX A Visual material for the text





(Fig.A.2.1.1.) Renovation of Spassky Fortress and Church Public Square, Kyiv, Ukraine / AER

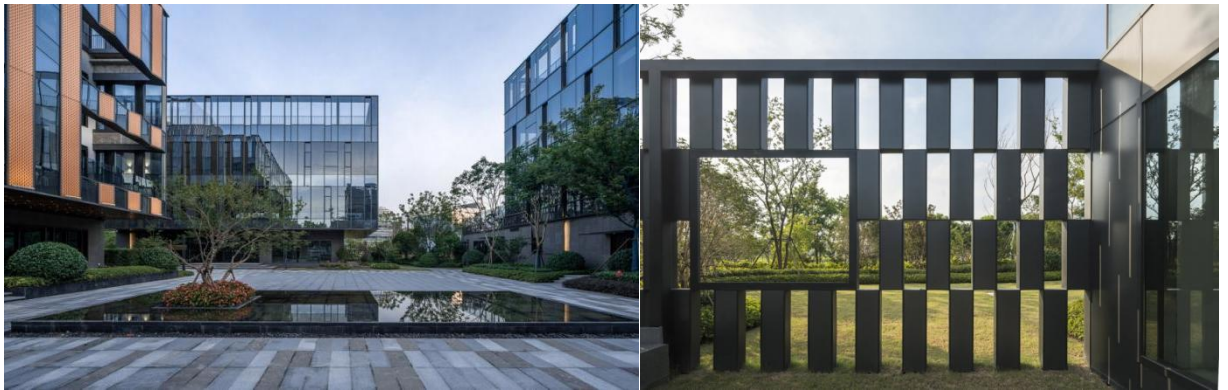
Through landscape design, the historical character has been restored, successfully linking two structures: the Church of the Saviour (c. 12th century) and the adjacent Pechersk Fortress (c. 18th century).

<https://www.gooood.cn/renovation-of-the-spassky-bastion-and-church-public-square-by-aer.htm>



(Fig.A.2.1.2.) Stage — Micro-Renovation of Luoshan Huayuan Community, Shanghai / Yanshuo Design

<https://www.gooood.cn/the-stage-shanghai-luoshan-huayuan-community-micro-renewal-by-studio-ren.htm>



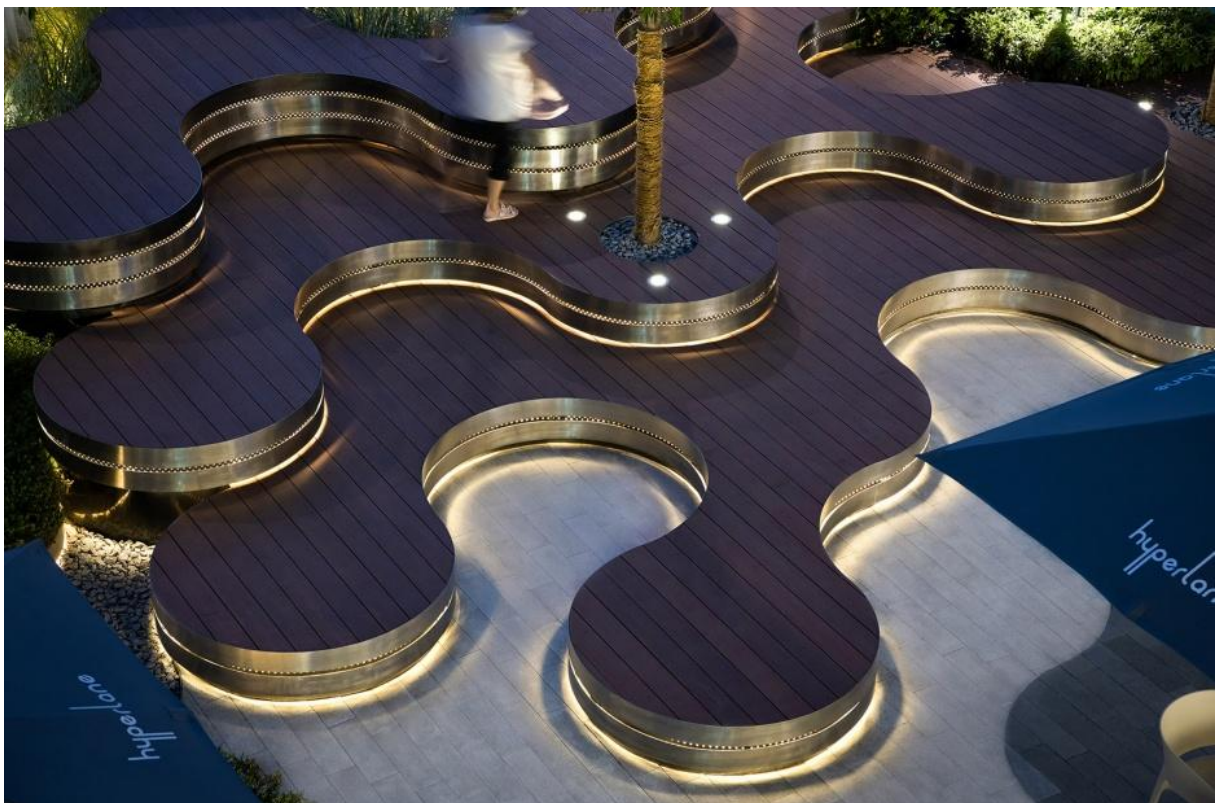
(Fig.A.2.1.3.) Zhangjiang AI Future District, Pudong, Public Space, Shanghai / Dazheng Architects

<https://www.gooood.cn/zhangjiang-ai-future-community-shanghai-by-dplus-studio.htm>



(Fig.A.2.1.4.) Xi'an Vanke Ideal City North District Town Centre · Pool Island / a9a Architects

<https://www.gooood.cn/xi-an-vanke-ideal-city-north-district-town-center-chidao-by-chengdu-90-architectural-design-co-ltd.htm>



The organic integration of park forms, traditional culture and urban spaces presents fresh opportunities for the practice of landscape urbanism.



(Fig.A.2.1.5.) Chengdu Hyperlane Exhibition Area / ASPECT Studios

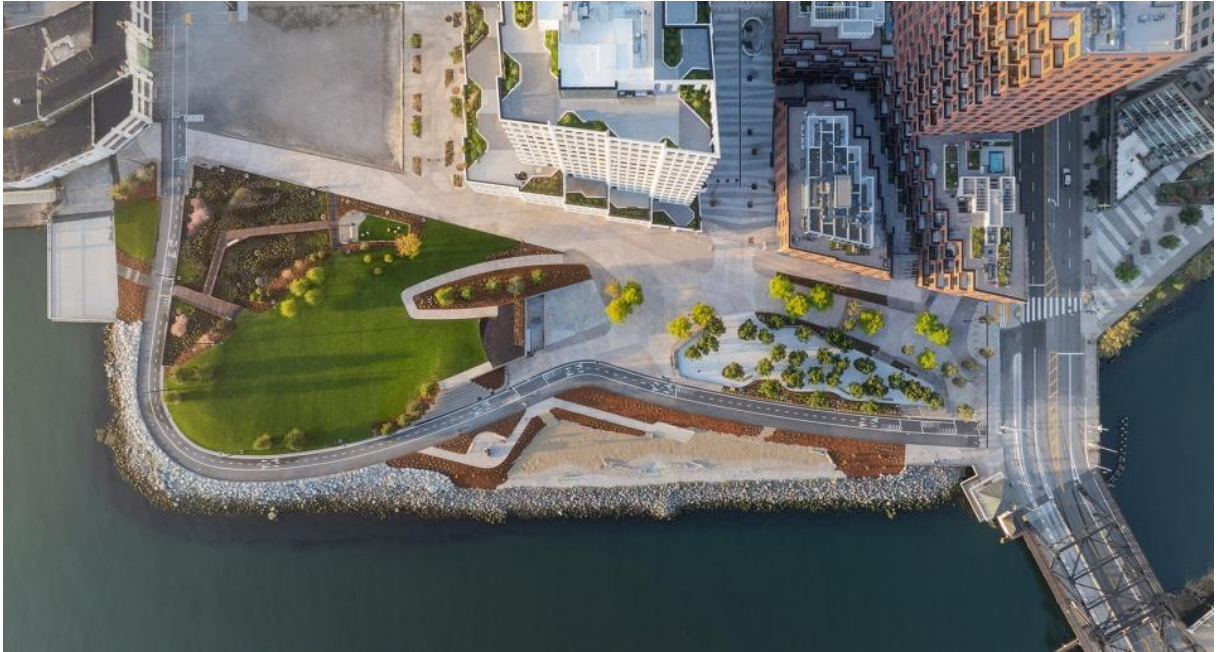
<https://www.gooood.cn/hyperlane-chengdu-china-by-aspect-studios.htm>



(Fig.A.2.1.6.) Red-brick 'Academy Street' + Research Centre, Guangzhou / Very Architecture

<https://www.gooood.cn/langtou-gengxue-education-centre-by-fcjz.htm>

Construct an artificial ecological wetland system. Enable natural purification of rainwater to achieve ecological water circulation.





(Fig.A.2.3.1.) Mission Rock Community Landscape Design, United States /
Min Design

<https://news.znztv.com/bk/140366854.html>



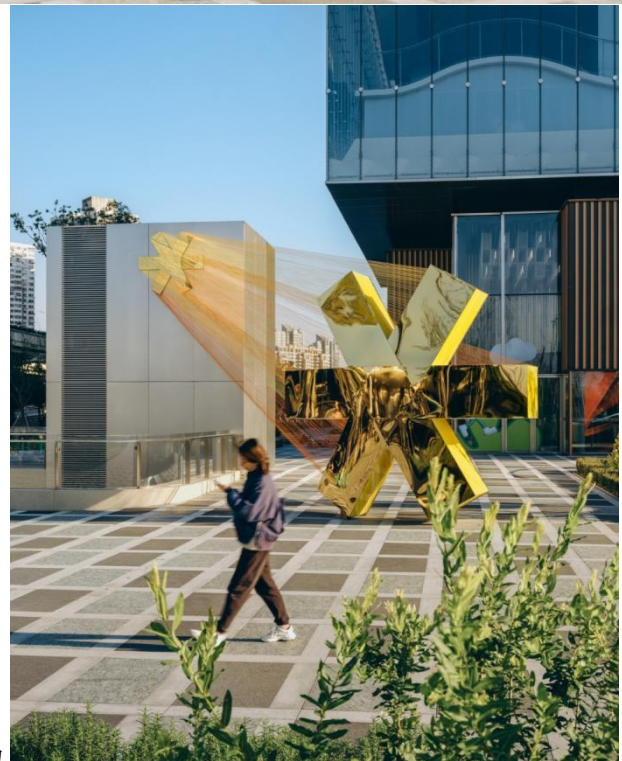
(**Fig.A.2.3.2.**) orizzontale: This project integrates cross-disciplinary skills, participatory practices and innovative methodologies, combining site redevelopment with the collective consciousness-building of public spaces. Through a series of events and activities related to architecture, socio-psychological research, art and communication, it actively engages residents in this urban regeneration initiative.

[Renovation of Old Neighbourhoods: New Models for Urban Regeneration through Landscape and Public Spaces / Italian Horizontal](#)



(Fig.A.2.3.3.) Spiral Membrane Corridor Bridge and Hexagonal Golden Star,
Shanghai / ZHONG Architecture
Light Intervention in Public Spaces

<https://www.gooood.cn/a-gentle-intervention-in-public-space-by-peoples-architecture-office.htm>



(Fig.A.2.3.4.) Hexagonal Gold Star employs two distinct types of gold-mirrored stainless steel, which are bent into form to create two golden stars with a dynamic, leaping quality, further invigorating the public space.

<https://www.goood.cn/a-gentle-intervention-in-public-space-by-peoples-architecture-office.htm>



(Fig.A.2.3.5.) The Village's “New Circle of Friends” — Micro-Landscape Design for Xiaobu Village, Songzhuang Town, Beijing / Crossboundaries
<https://moool.com/songzhuang-micro-community-park-by-crossboundaries.html>



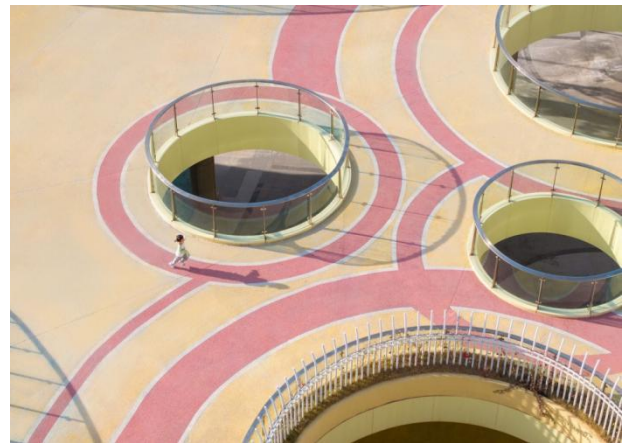
(Fig.A.2.3.6.) HomeRise Project, Mission Bay Community, United States / Leddy Maytum Stacy

Advancing social, economic and environmental resilience, equity, sustainability and integration

<https://www.gooood.cn/homerise-at-mission-bay-by-leddy-maytum-stacy.htm>



(Fig.A.2.3.7.) INFONAVIT Santa Fe Community Renewal, Mexico / AMASA Estudio
Circular Geometry: A Site Narrative
<https://www.gooood.cn/uh-infonavit-santa-fe-by-amasa-estudio.htm>



(**Fig.A.2.3.8.**) Jinwan Neighbourhood Hub Community Centre Renovation, Zhuhai, Guangdong / Shenzhen Yijia Design Co., Ltd.
Employing “park anchor points” and “shared platforms” to achieve low-cost community centre development.
<https://www.goood.cn/king-one-community-center-by-e-plus-design-euv.htm>



(Fig.A.2.3.9) Hudong Pilot: Weaving Community Public Spaces Through Incremental Series Updates, Shanghai / VIA Landscape
Organic Renewal of the Community's Street-Front Interface
<https://www.gooood.cn/hudong-experiment-by-viascape-design.htm>



(Fig.A.3.1.1.) Landscape Design for Alibaba's XiXi Campus Zone C, Hangzhou / ASPECT Studios

Ecologically Regenerative Campus Landscape

<https://www.goood.cn/landscape-design-of-alibaba-xixi-campus-park-c-by-aspect-studios.htm>



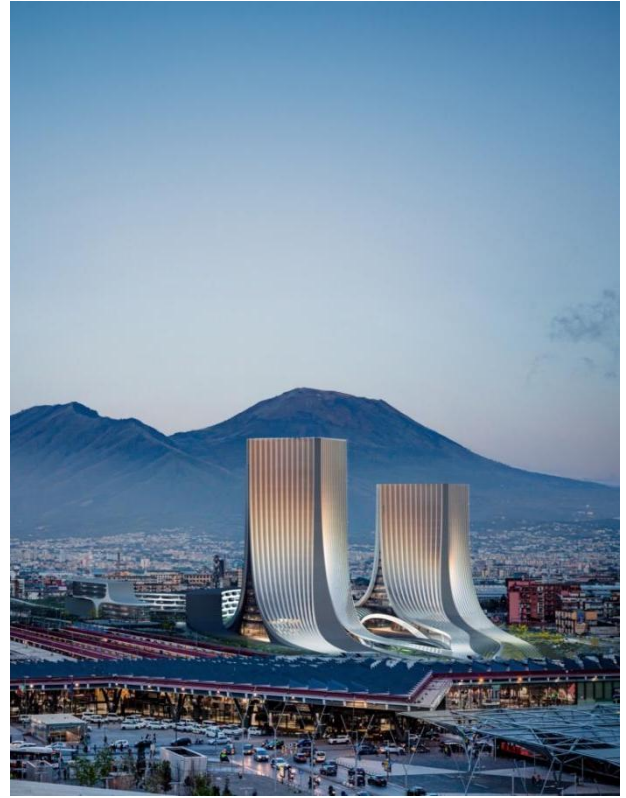
(Fig.A.3.1.2.) Huqiao Youth City Park, Suzhou, Jiangsu / SoBA
<https://www.gooood.cn/cultural-fusion-and-spatial-innovation-in-huachiao-vibrant-sports-park-by-soba.htm>

Youth City Park, Sports Park ,Ecological Strategies and Sustainability.
Community Engagement and All-Age Inclusivity;



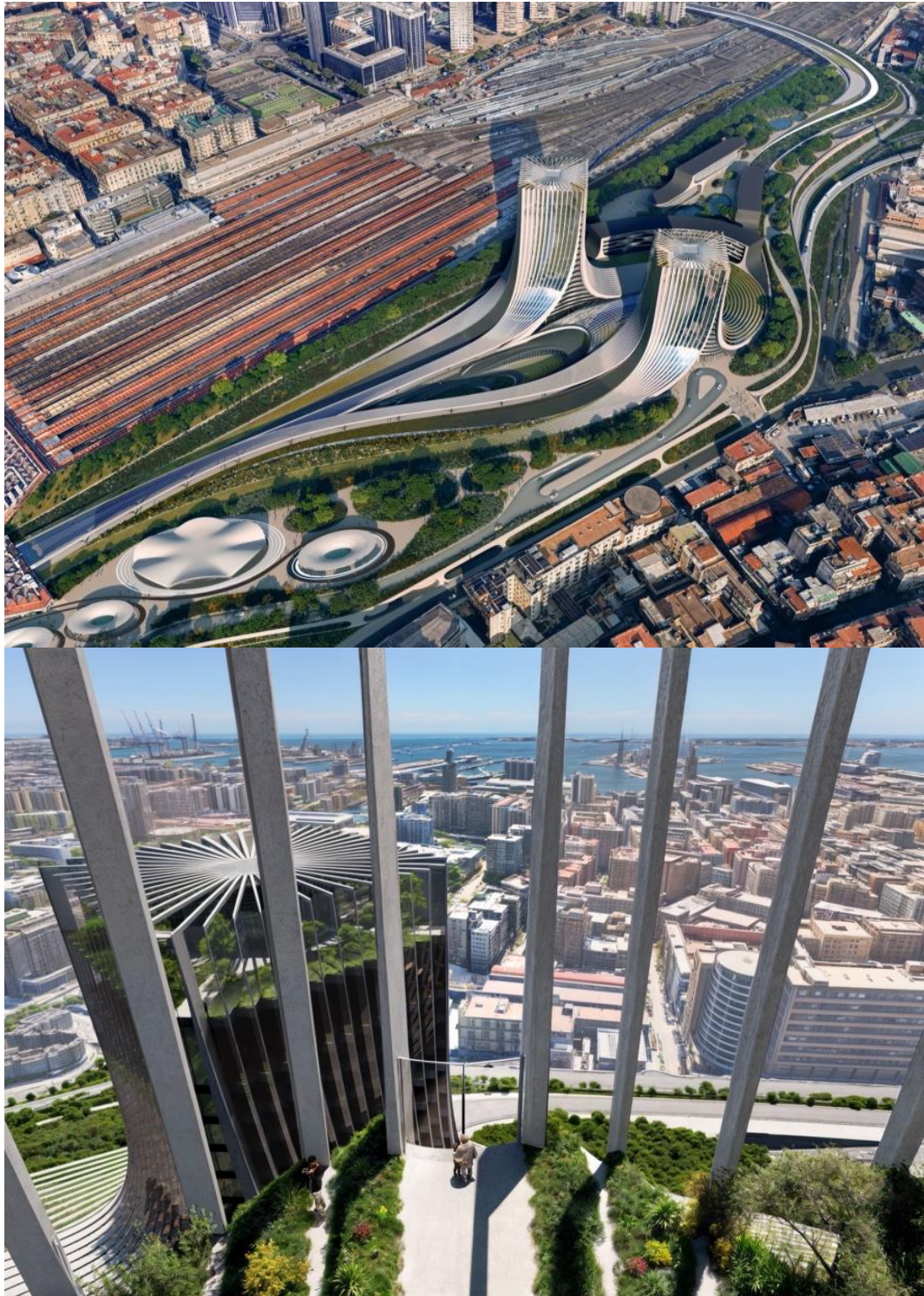
(Fig.A.3.1.3) Child-Friendly Community Renovation in Caohu District II, Xiangcheng District, Suzhou / Pingjie Design + Soochow University

<https://moool.com/child-friendly-community-transformation-in-caohu-second-district-xiangcheng-district-by-parallect-design.html>



(Fig.A.3.1.4) Vegetation irrigation using recycled water reduces tap water consumption by 60%.

Biodiverse landscape: Extensive planting of vegetation to mitigate flood risks.
7,000 square metre photovoltaic system: Installed upon rooftops and sunshade structures to provide renewable energy.



(Fig.A.3.1.5) Masterplan for the 'Eastern Gateway to Naples' / Zaha Hadid Architects, Italy
Crafting a low-carbon future that integrates nature and the city

<https://www.gooood.cn/napoli-porta-est-masterplan-proposal-by-zaha-hadid-architects.htm>

APPENDIX B Tables, diagrams



Tabl.B.1.1.1. Hierarchy of Needs in Sustainable Community Public Space Design



Tabl.B.3.1.1. Sustainable public space design strategies for changzhou huayuan community

Ecological and Resilience Framework

Ecological Restoration	◆ Establish a grey-green integrated rainwater management network to restore soil permeability and enhance natural water retention capacity. ◆ Increase native planting and vertical greening to improve biodiversity and microclimate regulation.		1
Resilience Design	◆ Adopt modular facilities and movable structures to adapt to future functional changes. ◆ Reserve "blank spaces" for community-led renewal, supporting incremental optimization.		2
Resource Circulation	◆ Utilize renewable materials and low-maintenance landscaping to reduce life-cycle costs. ◆ Integrate rainwater harvesting and energy-saving technologies to improve environmental resource efficiency.		3

Tabl.B.3.1.2. Ecological and Resilience Framework

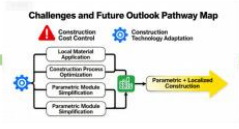
Planting Schedule Analysis

					
斑叶薄荷 Mint	金鱼草 Snapdragon	百子莲 African agapanthus	薰衣草 Lavender	络石 Confederate-Jasmine	芒草 Hay
Spring Planting			Summer Planting		
Autumn Planting			Winter planting		
					
黑种草 Black grass	向日葵 Sunflower	豆角 Vigna unguiculata	南天竹 Bamboo	银叶菊 senecio cineraria	矢车菊 cornflower

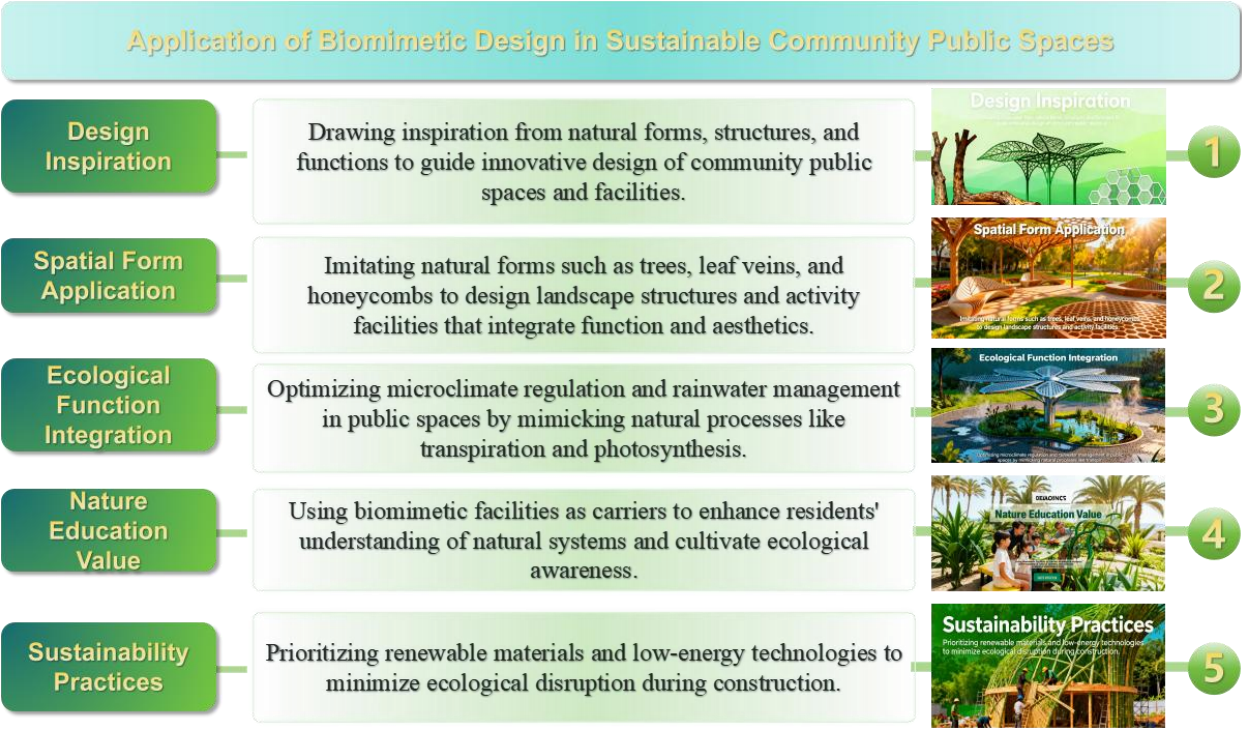
Tabl.B.3.1.3. Planting Schedule Analysis

The Application of Fold-line Design in Sustainable Community Public Spaces		
Design Inspiration and Philosophy	Inspired by architectural deconstruction and topography, this approach uses "folding" to transform scattered community spaces into dynamic, multi-functional public areas, addressing land-use efficiency in dense urban settings.	
Spatial Perception and Exploration	Continuous fold-lines break conventional layouts, creating sequential, flowing spaces that enhance spatial awareness and stimulate exploration.	
Integration with the Environment	The design integrates site topography and ecology, blending landscape structures with the landform to create harmonious, stormwater-resilient landscapes.	
Support for All-Ages Inclusivity	Diverse spatial types support physical, cognitive, and social development for all ages, encouraging autonomous activities and intergenerational interaction.	
Innovation and Sustainability	Its dynamic form adds artistic expression. Using modular construction and local materials enables easy maintenance and future adaptation, reflecting lifecycle sustainability.	

Tabl.B.3.1.4. The Application of Fold-line Design in Sustainable Community Public Spaces

Parametric Design Application		
Design Process and Methodology	Establish parametric models based on site environmental data, generate multiple design options tailored for Changzhou Garden Community, and achieve rapid iteration and performance optimization.	
Technical Advantages and Innovation	Precisely responds to complex site conditions in old communities, efficiently generating landscape structures coordinated with architecture. Data-driven logic ensures spatial performance and construction accuracy.	
Spatial Experience and Interaction	Create dynamic spatial configurations and interactive facilities through algorithmic design, stimulating children's exploratory interest while establishing engaging social nodes for all ages.	
Challenges and Prospects	Need to overcome cost control for special-shaped components and technical adaptation of local construction, exploring feasible approaches to integrate parametric design with localized construction.	

Tabl.B.3.1.4. Parametric Design Application



Tabl.B.3.2.1. Application of Biomimetic Design in Sustainable Community Public Spaces

APPENDIX C Project proposal















