

华南理工大学

South China University of Technology

专业学位硕士学位论文

生态—文化—产业协同视角下广州康乐涌周边城中村空间更新城市设计研究

作　者　姓　名	罗欣琳
学　位　类　别	建筑学硕士
指　导　教　师	导师组
所　在　学　院	建筑学院
论文提交日期	2026 年 4 月

Spatial Regeneration Design of Urban Village Areas around the Kangle Waterway in Guangzhou: An Ecology－Culture－Industry Synergy Perspective

A Dissertation Submitted for the Degree of Master

Candidate：Luo Xinlin

Supervisor：SCUT-POLITO co-supervisors

South China University of Technology

Guangzhou, China

分类号：TU98 **学校代号：10561**

学　号：202321006298

华南理工大学硕士学位论文

生态—文化—产业协同视角下广州康乐涌周边城中村空间更新城市设计研究

作者姓名：罗欣琳　　指导教师姓名、职称：导师组

申请学位级别：建筑学硕士　　学科专业名称：建筑学

研究方向：城市设计

论文提交日期：2026 年 4 月 17 日　　论文答辩日期：2026 年 5 月 21 日

学位授予单位：华南理工大学　　学位授予日期：　　年　　月　　日

答辩委员会成员：

主席：　凌晓红副教授

委员：　刘铮副教授、林正豪副教授、李珏教授级高工、A.Prof. Emanuele Morezzi

华南理工大学
学位论文原创性声明

本人郑重声明：所呈交的论文是本人在导师的指导下独立进行研究所取得的研究成果。除了文中特别加以标注引用的内容外，本论文不包含任何其他个人或集体已经发表或撰写的成果作品。对本文的研究做出重要贡献的个人和集体，均已在文中以明确方式标明。本人完全意识到本声明的法律后果由本人承担。

作者签名：罗依琳　　日期：2026年 5月 22日

学位论文版权使用授权书

本学位论文作者完全了解学校有关保留、使用学位论文的规定，即：研究生在校攻读学位期间论文工作的知识产权单位属华南理工大学。学校有权保存并向国家有关部门或机构送交论文的复印件和电子版，允许学位论文被查阅（除在保密期内的保密论文外）；学校可以公布学位论文的全部或部分内容，可以允许采用影印、缩印或其它复制手段保存、汇编学位论文。本人电子文档的内容和纸质论文的内容相一致。

本学位论文属于：

□保密（校保密委员会审定为涉密学位论文时间：___年__月__日），于___年__月__日解密后适用本授权书。

☑不保密，同意在校园网上发布，供校内师生和与学校有共享协议的单位浏览；同意将本人学位论文编入有关数据库进行检索，传播学位论文的全部或部分内容。

（请在以上相应方框内打“√”）

作者签名：罗依琳　　日期：2026. 5. 22

指导教师签名：　　日期：2026. 5. 22

作者联系电话：18578383148　　电子邮箱：379956040@qq.com

联系地址（含邮编）：广州市天河区五山路381号建筑学院(510640)

摘　　要

在我国城市发展由增量扩张转向存量提质的背景下，城市更新已由单纯的物质空间改造逐步转向兼顾生态修复、历史保护、公共空间提升与产业转型的综合治理。对于广州这类河网密集且城中村分布广泛的超大城市而言，河涌空间不仅是城市生态系统的重要组成部分，也是承载地方记忆、组织公共生活和重构片区空间秩序的重要线性载体。然而，在高密度产业型城中村中，河涌空间长期受到建设挤压、界面封闭、功能侵占与环境退化等多重影响，其生态属性、公共属性与文化联系不断削弱。如何在系统性城市更新背景下重新激活河涌空间，并协调其与历史场所、产业空间及社区生活之间的关系，成为值得关注的研究问题。

本文以广州海珠区康乐涌周边城中村空间为研究对象，聚焦高密度产业型城中村中河涌、历史、产业三重结构叠加所形成的空间矛盾，尝试探索一种以河涌为组织主线、兼顾生态修复、历史保护与公共空间重构的更新设计方法。研究综合采用文献研究、政策梳理、案例分析、场地调研与设计推演等方法，在理论层面引入景观都市主义、水都市主义与生态都市主义的相关观点，在实践层面结合国内外滨水更新案例，总结历史界面修复、生态廊道构建、产业空间转译与公共节点营造等策略经验。通过对康乐涌周边形态结构、河涌界面、历史建筑、民俗设施、产业建筑及流线冲突的系统分析，识别出核心问题。

在此基础上，本文提出以河涌生态骨架重构为总体前提、以场地元素识别与策略对象归纳为中介、以分段策略生成与重点片段设计为路径的更新框架。设计层面将康乐涌沿线分段组织，形成由河涌主线统领、节点系统支撑、分段功能递进展开的整体方案。研究表明，在高密度产业型城中村更新中，河涌空间可被视为统合生态修复、历史保护与公共空间重构的综合性空间骨架，三者通过河涌线性载体形成空间耦合关系。本文可为广州及类似城中村河涌空间的整合更新提供一定参考。

关键词：康乐涌；河涌空间；城中村更新；城市设计

ABSTRACT

Against the background of China's urban development shifting from incremental expansion to stock-oriented quality improvement, urban renewal has gradually moved beyond mere physical reconstruction toward a comprehensive governance approach integrating ecological restoration, heritage conservation, public-space improvement, and industrial transformation. For megacities such as Guangzhou, characterized by dense water networks and extensive urban villages, stream spaces are not only important components of the urban ecological system, but also critical linear carriers of local memory, public life, and spatial restructuring. However, within high-density industrial urban villages, stream spaces have long been constrained by construction encroachment, closed interfaces, functional occupation, and environmental degradation, resulting in the continuous weakening of their ecological, public, and cultural roles. Under the current context of systematic urban renewal, how to reactivate stream spaces and coordinate their relationship with historic places, industrial spaces, and community life has become an important research issue.

This thesis takes the urban village area surrounding Kangle waterway in Haizhu District, Guangzhou, as its research object. Focusing on the spatial conflicts generated by the overlapping structure of stream, history, and industry in high-density industrial urban villages, it explores an urban design approach that uses the stream as the primary spatial organizer while integrating ecological restoration, heritage conservation, and public-space reconstruction. The research adopts a combination of literature review, policy analysis, case study, site investigation, and design speculation. At the theoretical level, it introduces relevant perspectives from Landscape Urbanism, Water Urbanism, and Ecological Urbanism. At the practical level, it draws on domestic and international waterfront regeneration cases to summarize strategic experience in historical interface repair, ecological corridor construction, industrial-space transformation, and public-node making. Through a systematic analysis of the spatial morphology, stream interfaces, historic buildings, folk facilities, industrial buildings, and circulation conflicts around Kangle waterway, the study identifies the key problems of the site.

On this basis, the thesis proposes a renewal framework that takes ecological stream-backbone reconstruction as the overall premise, site-element identification and strategic object classification as the intermediate layer, and sectional strategy generation together with key-fragment design as the implementation path. At the design level, the water corridor of Kangle is organized into differentiated sections, forming an overall scheme

structured by the stream as the main axis, supported by a node system, and developed through progressively differentiated sectional functions. The study argues that, in the renewal of high-density industrial urban villages, the stream should be reinterpreted as a comprehensive spatial backbone that coordinates ecological restoration, heritage conservation, and public-space reconstruction. This research may provide a useful reference for the integrated regeneration of stream spaces in Guangzhou and in similar urban villages.

Keywords： Kangle waterway; Waterway Space; Urban Village Renewal;Urban Design

Table of Contents

CHAPTER 1 INTRODUCTION 1
1.1. Research Background 1
1.1.1. Trends in Urban Regeneration and Waterway Conservation 1
1.1.2. Urban Village Regeneration and Waterway Governance in Guangzhou 2
1.1.3. Morphological Conflicts Between Waterway Spaces and High-Density Industrial Urban Villages 2
1.2. Research Objectives and Significance 4
1.2.1. Research Objectives 4
1.2.2. Research Significance 5
1.3. Literature Review 6
1.3.1. Studies on Waterfront Regeneration and Waterway Governance 7
1.3.2. Studies on the Regeneration and Spatial Reorganization of High-Density Urban Villages 8
1.3.3. Studies on Historical and Cultural Conservation and the Translation of Industrial Heritage 11
1.3.4. Review of the Literature 12
1.4. Definition of Core Concepts and Research Object 13
1.4.1. Definition of Core Concepts 13
1.4.2. Selection of the Research Object 14
1.4.3. Delimitation of the Study Area 17
1.4.4. Research Questions to Be Addressed 19
1.5. Research Content, Methods, and Technical Route 20
1.5.1. Research Content 20
1.5.2. Research Methods 22
1.5.3. Technical Route 24
CHAPTER 2 EXISTING CONDITIONS ANALYSIS OF THE SITES ALONG THE KANGLE WATERWAY 25
2.1. Site Evolution and the Formation Mechanism of Spatial Problems 25
2.1.1. Hydrological Foundation and Settlement Formation 25
2.1.2. The Insertion of Modern Industry and the Alienation of Space 26
2.1.3. Re-identification of Value within the Context of Overall Regeneration 29
2.2. Existing Conditions of the Waterway Space 31

2.2.1. Spatial Morphology of the Waterway 31
2.2.2. Sectional Morphology and Spatial Characteristics of the Waterway 36
2.2.3. Existing Conditions of Traffic Organization and Public Space 41
2.3. Analysis of the Existing Historical and Cultural Elements 43
2.3.1. Existing Conditions of the Historic Building Cluster 44
2.3.2. Existing Conditions of Folk-Memory Spaces 47
2.3.3. Relationship Between Historical and Cultural Elements and the Waterway 49
2.4. Existing Conditions of Industrial Buildings 50
2.4.1. Analysis of the Existing Building Stock on the Site 50
2.4.2. Analysis of Industrial Buildings 52
2.4.3. Selection and Analysis of Buildings for Retention 54
2.5. Identification of Site Problems 56
CHAPTER 3 THEORETICAL FOUNDATIONS AND CASE STUDIES 59
3.1. Theoretical Review 59
3.1.1. Landscape Urbanism 59
3.1.2. Water Urbanism 61
3.1.3. Ecological Urbanism 63
3.1.4. Theoretical Synthesis 64
3.2. Ecology-Dominant Synergy Cases 67
3.2.1. The Catharijnesingel Canal Restoration Project, Utrecht 68
3.2.2. Dasha River Ecological Corridor in Shenzhen 70
3.2.3. The Saw Mill River Daylighting Project, Yonkers 72
3.3. Culture-Dominant Synergy Cases 74
3.3.1. Water-Town Environment Regeneration in Beijiao, Shunde 75
3.3.2. Regeneration of the Lizhiwan Waterway in Guangzhou 76
3.3.3. The Cultural Waterfront Node of the Liede Waterway in Guangzhou 78
3.4. Industry-Dominant Synergy Cases 80
3.4.1. Regeneration of the Navigli Water System in Milan 80
3.4.2. The Integrated Waterfront Renewal of Suzhou Creek in Shanghai 82
3.5. Summary of Case Studies and Strategy Translation 84
CHAPTER 4 REGENERATION STRATEGIES FOR THE URBAN VILLAGE SPACES AROUND THE KANGLE WATERWAY 88
4.1. Strategy Generation Logic and Overall Framework 88
4.1.1. Correspondence Between Site Problems and Case-Based Experience 88

4.1.2. Overall Strategic Framework and Translational Path 90
4.2. Reconstruction of the Ecological Backbone of the Waterway 91
4.3. Identification of Site Elements and Categorization of Strategic Objects 95
4.4. Strategy Formation 100
4.4.1. Sectional Organization and Formation of the Overall Functional Structure 100
4.4.2. Strategy Formation for the Historical and Cultural Section 103
4.4.3. Strategy Formation for the Ecological Section 107
4.4.4. Strategy Formation for the Industrial Memory Section 109
4.5. Chapter Summary 114
CHAPTER 5 DESIGN PROPOSAL AND PRESENTATION 115
5.1. Design Objectives and Strategies 115
5.1.1. Design Objectives 115
5.1.2. Design Strategies 115
5.2. Overall Design Proposal 116
5.2.1. Overall Spatial Structure 116
5.2.2. Overall Plan Layout 118
5.3. The Waterway Backbone and Public Interfaces 122
5.3.1. Construction of the Waterway Backbone 122
5.3.2. Public Nodes and the Organization of Spatial Sequence 124
5.4. Design of the Historical and Cultural Section 126
5.4.1. Spatial Structure and Connections 126
5.4.2. Sectional Relationship of the Waterway 128
5.4.3. Node Design 129
5.5. Design of the Ecological Conservation and Demonstration Section 134
5.5.1. Spatial Structure and Connections 135
5.5.2. Sectional Relationship of the Waterway 136
5.5.3. Node Design 137
5.6. Design of the Industrial Memory Section 140
5.6.1. Spatial Structure and Connections 140
5.6.2. Sectional Relationship of the Waterway 142
5.6.3. Node Design 143
5.7. Chapter Summary 146
CONCLUSION 147
REFERENCES 149

List of Figures

Figure 1-1 Temporal Distribution and Hybrid Urban Village Redevelopment in Guangzhou .15
Figure 1-2 Zonal Implementation Strategy for Urban Regeneration in Guangzhou 15
Figure 1-3 Schematic Diagramand the Study Area 16
Figure 1-4 Study Area 18
Figure 1-5 Research Technical Route 24
Figure 2-1 Land Use of Kangle Village in 1990 28
Figure 2-2 Land Use of Kangle Village in 2000 28
Figure 2-3 Land Use of Kangle Village in 2010 28
Figure 2-4 Headwater Section within the Kangle Waterway Study Area 32
Figure 2-5 Middle Section within the Kangle Waterway Study Area 32
Figure 2-6 Analysis of Existing Spatial Nodes in Plan within the Study Area 33
Figure 2-7 Headwater Section of the Waterway Covered by Buildings 34
Figure 2-8 Pronounced Asymmetry Between the Two Banks of the Waterway 34
Figure 2-9 Riverside Buildings Compressing the Waterway Space 34
Figure 2-10 Eutrophication on the Water Surface of the Waterway 35
Figure 2-11 Exposed Sediment at the Bottom of the Waterway 35
Figure 2-12 Manual Dredging Operations within the Waterway 35
Figure 2-13 Distribution of Cross-Section Locations along the Waterway 37
Figure 2-14 Sample Analysis of H/W Values for Typical Cross-Sections 37
Figure 2-15 Culverted Cross-Section of of the Waterway (A–A) 38
Figure 2-16 Cross-Section at the Longchuan'ao Node of the Waterway (B–B) 39
Figure 2-17 Cross-Section of the Factory Segment of the Waterway (C–C) 40
Figure 2-18 Analysis of Traffic Organization, Freight Flows, and Conflict Points 42
Figure 2-19 Existing Mixed Circulation of Freight and Pedestrians in Internal Lanes 43
Figure 2-20 Existing Temporary Clutter and Spatial Compression in Internal Lanes 43
Figure 2-21 Existing Commercial Frontages and Parking Encroachment 43
Figure 2-22 Existing Truck Stopping and Freight Distribution 43
Figure 2-23 Historic Buildings Embedded within a High-Density Built Environment 45
Figure 2-24 Surrounding Interfaces of the Historic Buildings 45
Figure 2-25 Everyday Condition of the Forecourt of the Historic Buildings 46
Figure 2-26 Activities Organized in the Forecourt of the Historic Buildings 46
Figure 2-27 Existing Interior Condition of the Luo Clan Ancestral Hall 46

Figure 2-28 Relationship among the Historic Buildings, the Trees, and Longchuan'ao 48
Figure 2-29 Spatial Relationship between the Old Tree and Longchuan'ao 48
Figure 2-30 Existing Condition of the Preserved Old Trees 49
Figure 2-31 Existing Condition of Longchuan'ao within the Waterway 49
Figure 2-32 Distribution of Building Spacing 52
Figure 2-33 Analysis of Building-Spacing Characteristics 52
Figure 2-34 Retainable Factory Building 54
Figure 2-35 Street-front Commercial and Storage Space 54
Figure 2-36 Ordinary Productive Space 54
Figure 2-37 Selected Retained Industrial Buildings 54
Figure 3-1 Progressive Theoretical Framework of the Three Theories 65
Figure 3-2 Before-and-After Comparison of Catharijnesingel, Utrechts 69
Figure 3-3 Overall Spatial Pattern after the Restoration 70
Figure 3-4 Current Condition of the Public Interface for Walking along the Canal 70
Figure 3-5 Waterfront Interface of the Dasha River Ecological Corridor 71
Figure 3-6 Before-and-After Comparison of the Daylighting of the Saw Mill River 73
Figure 3-7 Daylighted Channel and Integrated Public Space of the Saw Mill River 74
Figure 3-8 Sanfeng River in Huanglong 76
Figure 3-9 Painted Footpath and Waterside Platform 76
Figure 3-10 Aerial View of the Lizhiwan Waterway 78
Figure 3-11 Restored Historical Scene along the Lizhiwan Waterway 78
Figure 3-12 Cultural Waterfront Nodes along the Liede Waterway 79
Figure 3-13 Festival Scene of the "Dragon Boat View" at the Liede Waterway 79
Figure 3-14 Existing Condition of the Navigli Waterway in Milan 81
Figure 3-15 Overall Renewal Structure of the Suzhou Creek Corridor 82
Figure 3-16 Schematic Diagram of the Waterfront Public Space at M50 Creative Park 83
Figure 4-1 Diagram of the Logic of Strategy Generation and the Overall Framework 91
Figure 4-2 Diagram of Strategic Units for the Repair of the Kangle Waterway 93
Figure 4-3 Diagram of Site Sectionalization 100
Figure 4-4 Strategies for Key Elements at the Headwater Section of the Site 103
Figure 4-5 Functional Structure Diagram of the Historical and Cultural Section 104
Figure 4-6 Lingnan Spatial Prototypes and Their Design Reinterpretation 105
Figure 4-7 Node Diagram of the Historical and Cultural Section 106
Figure 4-8 Functional Structure Diagram of the Ecological Section 108

Figure 4-9 Node Diagram of the Ecological Section 109
Figure 4-10 Functional Structure Diagram of the Industrial Memory Section 110
Figure 4-11 Industrial Space Continuity and Reinterpretation Diagram 112
Figure 4-12 Node Diagram of the Industrial Memory Section 113
Figure 5-1 Overall Functional Structure Diagram of the Kangle Waterway Corridor 117
Figure 5-2 Diagram of the Overall Spatial Structure and Sectional Linkage 117
Figure 5-3 Overall Plan 119
Figure 5-4 Before-and-After Comparison 121
Figure 5-5 Analysis of the Waterway Backbone 123
Figure 5-6 Diagram of the Hierarchy of Nodes and the Relationship 125
Figure 5-7 Diagram of the Nodal Sequence and Bridge-Linkage System 125
Figure 5-8 Diagram of the Cluster Structure of the Historical and Cultural Section 127
Figure 5-9 Diagram of Spatial Organization and Visual Connections 127
Figure 5-10 Sectional Relationship Diagram of the Historical and Cultural Section 129
Figure 5-11 Spatial Reinterpretation and Material Expression in the Cultural Section 131
Figure 5-12 Before-and-After Rendering of the Historical and Cultural Section 132
Figure 5-13 Perspective Rendering of the Waterside Platform 133
Figure 5-14 Relationship between the Covered Bridge and the Historic Buildings 133
Figure 5-15 Everyday Use Scenario of the Dragon Boat Plaza 134
Figure 5-16 Festive-Event Scenario of the Dragon Boat Plaza 134
Figure 5-17 Diagram of the Cluster Structure of the Ecological Section 136
Figure 5-18 Diagram of Spatial Connections in the Ecological Section 136
Figure 5-19 Sectional Relationship Diagram of the Ecological Section 137
Figure 5-20 Perspective Rendering of the Ring-Shaped Ecological Corridor 138
Figure 5-21 Diagram of Spatial Design and Material in the Ecological Section 139
Figure 5-22 Diagram of the Cluster Structure of the Industrial Memory Section 141
Figure 5-23 Diagram of Spatial Connections in the Industrial Memory Section 141
Figure 5-24 Sectional Relationship Diagram of the Industrial Memory Section 142
Figure 5-25 Before-and-After Perspective Rendering of the Waterfront Space 144
Figure 5-26 Diagram of Spatial and Material in the Industrial Memory Section 145

List of Tables

Table 2-1 Summary of Major Site Problems Identified 58
Table 3-1 Site Relevance of Landscape Urbanism 60
Table 3-2 Site Relevance of Water Urbanism 62
Table 3-3 Site Relevance of Ecological Urbanism 64
Table 3-4 Correspondence of the Three Theories from the Perspective of Synergy 66
Table 3-5 Translation of Case-Based Experience into Strategies 86
Table 3-6 Translation of Case-Based Experience into Strategies 87
Table 4-1 Correspondence Between Site Problems and Case-Based Experience 89
Table 4-2 Correspondence Between Site Problems and Case-Based Experience 90
Table 4-3 Extracted Implementation Paths for Repairing the Public Backbone 94
Table 4-4 Identification of Site Elements and Extraction of Strategic Guidelines 98
Table 4-5 Identification of Site Elements and Extraction of Strategic Guidelines 99
Table 4-6 Extracted Implementation Paths for the Sectional Organization 102
Table 5-1 Correspondence Between Design Strategies and Design Responses 116
Table 5-2 Land-Use Indicators 120

Chapter 1 Introduction

1.1. Research Background

1.1.1. Trends in Urban Regeneration and Waterway Conservation

Against the backdrop of China's urban development transition from incremental expansion to the quality enhancement of existing urban stock, the objectives of urban regeneration are no longer confined to localized physical interventions. Instead, they increasingly address multiple intertwined issues, including ecological restoration, public space improvement, historic and cultural preservation, and coordinated social governance. In 2017, the Ministry of Housing and Urban-Rural Development issued the Guiding Opinions on Strengthening Ecological Restoration and Urban Betterment, which explicitly proposed improving the urban ecological environment, remedying deficiencies in public space and infrastructure, and promoting a shift in urban development from extensive outward expansion to intensive and connotative enhancement through ecological restoration and urban repair [1]. From this policy perspective, urban regeneration has evolved from a single construction-related issue into a comprehensive question of spatial governance, within which ecosystems, open spaces, and existing socio-cultural structures should all be incorporated into the regeneration framework.

Within this transformation, the importance of water-related spaces has become increasingly prominent. Urban rivers, waterways, and associated blue-green spaces are not only crucial components of the urban ecological system, but also key carriers connecting ecological processes, public activities, and residents' well-being. Compared with conventional approaches that treat water bodies merely as infrastructure for drainage, flood control, or scenic backdrop, contemporary urban regeneration places greater emphasis on the composite value of water spaces in ecological restoration, climate regulation, open-space organization, and place-making. However, in practice, many urban waterway improvement projects still privilege engineering-oriented interventions, often reducing waterfront spaces to simplified green belts or visual landscape edges while neglecting their relational connections with surrounding land uses, historic sites, and community life. This in turn may result in monotonous spatial functions, insufficient publicness, and a lack of place vitality [2]. Therefore, how to reinterpret the ecological, cultural, and public dimensions of water-related spaces within the context of urban regeneration has become a significant issue in contemporary urban design and existing-stock regeneration research.

1.1.2. Urban Village Regeneration and Waterway Governance in Guangzhou

As a megacity and a national central city, Guangzhou has entered a stage of development centered on the reuse and optimization of existing urban resources. Urban regeneration and the transformation of urban villages have thus become important instruments for improving spatial quality, optimizing industrial structure, and enhancing living environments. In 2024, within the implementation framework of the "Hundreds of Counties, Thousands of Towns, and Myriads of Villages High-Quality Development Project", Guangzhou explicitly advanced a series of policy documents related to urban regeneration, including the Regulations on the Redevelopment of Urban Villages in Guangzhou, the Special Plan for Urban Regeneration in Guangzhou (2021–2035), and the Special Plan for the Redevelopment of Urban Villages in Guangzhou (2021–2035), while prioritizing the redevelopment of four major areas, including the Guangzhou New Central Axis (Haizhu)[3]. Among these, the Regulations on the Redevelopment of Urban Villages in Guangzhou further clarify that urban village redevelopment should simultaneously achieve multiple goals, including the improvement of living conditions and ecological environments, the strengthening of historical and cultural preservation, and the promotion of industrial transformation and upgrading [3]. This indicates that current urban village regeneration in Guangzhou has moved beyond a singular logic of demolition and reconstruction toward a more systematic governance framework that balances public interest, ecological restoration, cultural continuity, and industrial upgrading.

Guangzhou's long-established river network constitutes not only an essential ecological foundation of Lingnan urban morphology, but also an important linear carrier for organizing historic neighborhoods, traditional settlements, and everyday life. At the same time, the high-intensity development of the megacity and the long-term spontaneous evolution of urban villages have caused some waterways and their waterfront interfaces to suffer from spatial compression, enclosed edges, ecological decline, and fractured public connections. Consequently, within the broader context of systematic urban village regeneration in Guangzhou, how to transform waterway spaces from passive objects of into active public spaces that structure and organize site regeneration has become a research direction of clear practical significance.

1.1.3. Morphological Conflicts Between Waterway Spaces and High-Density Industrial Urban Villages

The Kanglu area, in which Kangle Village is located, is one of the key urban village redevelopment zones within the Guangzhou New Central Axis (Haizhu). According to the

Detailed Plan for the Urban Regeneration Unit of Fenghe (Kangle Village and Lujiang Village), Haizhu District, the Kanglu area covers a total land area of approximately 110.17 hectares. Its regeneration will proceed under the overarching strategy of combining "demolition, improvement, and revitalization," with the goal of establishing the area as an "international fashion and innovation district." The plan also proposes to advance industrial transformation and upgrading, spatial quality enhancement, and historical and cultural preservation in parallel. At the same time, it clearly stipulates the in-situ conservation of heritage buildings such as Hongsheng Ancient Temple, the Luo Clan Ancestral Hall, and the Weichang Luo Ancestral Hall, while emphasizing the reorganization of the district's public-space structure through large open spaces, linear corridors, and cultural corridors [5].

The particularity of Kangle Village lies in the superimposition of three highly conflicting spatial elements. The first is the waterway system represented by the Kangle Waterway and its historical-natural spatial pattern. The second is the clan-based and religious space represented by the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple. The third is the long-embedded industrial activity within the district, including garment manufacturing, accessories trading, and logistics transfer. Precisely because of this, the area possesses both a pronounced historical character and strong place memory, while simultaneously exhibiting the common problems of high-density industrial urban villages, such as mixed interfaces, spatial compression, and functional conflicts. Field investigation further reveals that the space along the waterway has long been encroached upon by logistics transport, electric bicycles, handcarts, and temporary storage activities. Portions of the water interface have become heavily hardened and visually obstructed, while the original visual and physical connections between the waterway and historic spaces such as ancestral halls and temples have been weakened. Although religious and clan-related spaces still retain their festive and ritual functions, their everyday public role remains limited and they have not been effectively transformed into contemporary community spaces. Meanwhile, fragmented property rights, complicated spatial ownership, and intertwined stakeholder interests further increase the difficulty of implementing systematic regeneration.

Based on the above context, this study selects the space surrounding the Kangle Waterway in Guangzhou as a representative case, with the aim of exploring a spatial regeneration design approach centered on water that can effectively mend urban ruptures and stimulate community vitality.

1.2. Research Objectives and Significance

1.2.1. Research Objectives

Within the context of urban regeneration focused on existing urban stock, the transformation of waterway spaces inside urban villages can no longer be understood merely as conventional hydraulic engineering, environmental improvement, or landscape enhancement. Rather, it has gradually evolved into a complex design issue involving ecological restoration, the reorganization of public space, the continuation of historical context, and the reconstruction of place identity. This is especially true in the high-density industrial urban villages of the Pearl River Delta, where waterway spaces, under conditions of long-term informal construction, functional hybridity, and high-intensity development, have progressively lost their original role as public organizers of space and instead become residual spaces compressed by buildings, occupied by logistical activities, and marginalized by everyday production. At the same time, the settlement fabric, historic buildings, folk activities, and local industrial memory that developed in relation to these waterways are increasingly threatened by fractured spatial relationships and the gradual disappearance of historical layers in the course of continuous regeneration[4]. It is therefore evident that the regeneration of waterway-based urban village spaces is not simply a matter of repairing an individual object or improving a localized environment; rather, it requires the overall identification and reorganization of existing spatial relations, local culture, and site structure.

Against this background, this study takes the waterway spaces within Guangzhou's high-density industrial urban villages as its research object. Focusing on issues such as the decline of publicness, the rupture of historical relationships, and the weakening of site memory under the context of urban regeneration, it seeks to explore a spatial regeneration approach for high-density and mixed-use sites from an interdisciplinary perspective bridging architecture and urban design. The core of the research responds to the following questions. First, how can compressed and marginalized waterway spaces be re-established as the public backbone that organizes the site? Second, how can spatial restructuring restore the relationships between historical elements, waterways, streets and lanes, and citizens' everyday life? Third, how can the cultural history and place-specific character of local spaces be sustained within the broader process of regeneration, so as to avoid homogenized and abstract renewal outcomes?

Accordingly, the objectives of this research are reflected in three main aspects. First, by systematically identifying the site's historical evolution, current spatial conditions, and

principal contradictions, the study seeks to reveal the mechanisms through which waterway spaces in high-density industrial urban villages have become dysfunctional, and to clarify the key issues that regeneration must address. Second, by introducing and selecting relevant theories and cases from both domestic and international contexts, the study aims to extract spatial organization principles and design methods that can respond to the local context, and to establish a logical chain from problem identification to strategy generation. Third, grounded in empirical investigation of a specific site, the study translates these extracted regeneration strategies into spatial design practice in order to test their feasibility in organizing public interfaces, repairing historical relationships, and reinterpreting site memory, thereby providing a targeted research pathway and design approach for the regeneration of similar waterway-based urban villages.

1.2.2. Research Significance

From a theoretical perspective, although current studies on waterway regeneration, urban village redevelopment, and the conservation of historic spaces are already relatively abundant, these discussions are often conducted separately within relatively independent fields such as ecological governance, spatial remediation, individual-building conservation, or industrial transformation. Comprehensive research on the composite spaces of high-density industrial urban villages remains insufficient. In such sites, waterways are not merely components of the water environment or municipal infrastructure, nor are they only objects of landscape-oriented transformation. Rather, they are important media that have long participated in settlement formation, spatial organization, and the construction of local life. Likewise, the associated historic buildings, folk-activity spaces, and industrial remnants are not isolated static objects, but multiple carriers that collectively constitute local identity and spatial memory. By incorporating waterway spaces, historical anchors, and site memory into a unified analytical and design framework, and by approaching the topic from the perspective of repairing and reconstructing relationships, this study helps supplement existing theoretical perspectives on the regeneration of complex existing-stock spaces and enriches the discussion of urban village regeneration within the fields of architecture and urban design.

From a methodological perspective, design-oriented research often faces the problem that while design proposals may be strongly expressed, the chain of argumentation remains relatively weak, leading to a tendency to leap directly from experiential judgment to design conclusions. This thesis attempts to establish a relatively clear deductive logic through a research pathway consisting of problem identification, theoretical reference, case translation,

strategy construction, and design verification, so that design conclusions can form a more complete argumentative loop grounded in site analysis and method construction. For a master's thesis in architecture, this mode of research not only emphasizes the importance of design as the core output, but also underlines that the design process itself should possess academic qualities of analyzability, interpretability, and verifiability. In this sense, the methodological significance of this study lies not only in proposing a number of specific spatial strategies, but also in exploring a design-research framework applicable to complex existing urban sites.

From a practical perspective, Guangzhou is currently in a phase in which the systematic regeneration of urban villages and the improvement of urban spatial quality are being advanced simultaneously. As important nodes connecting ecological networks, public life, and local historical context, waterways and their regeneration are of practical significance for improving environmental quality, reconstructing public activity systems, and sustaining urban memory. However, under conditions of rapid redevelopment, sites often face the risk of being overwritten by large-scale restructuring and standardized construction, which may weaken original spatial layers, place characteristics, and local identity. By taking waterway spaces within Guangzhou's high-density industrial urban villages as the entry point, this study attempts to propose a regeneration approach that balances publicness, respect for historicity, and responsiveness to contemporary needs. In doing so, it may not only provide a reference for the design practice of the specific site, but also offer some lessons for the transformation of similar waterway-based urban village spaces in Guangzhou and the broader Pearl River Delta region.

1.3. Literature Review

The regeneration of the Kangle Waterway and the surrounding urban village areas in Guangzhou is not merely a matter of physical spatial transformation in a single dimension; rather, it is a complex issue interwoven with a high-density built environment, informal social relations, and a fragile hydrological-ecological system. In the specific context of a highly integrated production–urban environment and severely alienated waterfront spaces, neither purely hydraulic engineering approaches nor purely architectural-aesthetic improvements are sufficient to address its deeper governance dilemmas. Therefore, in order to formulate a systematic regeneration strategy, this study must move beyond disciplinary boundaries and seek theoretical grounding from multiple perspectives. Based on the present condition of the Kangle Waterway—where space has been compressed, right-of-way has been encroached

upon, and functions have been distorted—this study reviews the literature from three interrelated dimensions: morphology, socio-political economy, and ecological engineering methods. In doing so, it aims to clarify the gap between leading international theories and the practical constraints encountered in China, thereby establishing both a solid theoretical basis and a clear point of entry for the strategies proposed in this research.

1.3.1. Studies on Waterfront Regeneration and Waterway Governance

Waterfront regeneration has long been an important topic in urban design, landscape planning, and urban governance research. Earlier studies mainly focused on the revitalization of ports, industrial shorelines, and urban waterfronts, emphasizing the possibility of transforming waterfront areas from spaces of production into spaces of public use under conditions of industrial restructuring. In The New Waterfront, Breen and Rigby, through a comparative review of multiple international cases, argue that the core of waterfront regeneration lies not simply in improving the shoreline landscape, but in reintegrating previously industrial- and traffic-dominated waterfronts into the system of urban public life through spatial opening-up, functional reorganization, and improved public accessibility[6]. This suggests that the study of waterfront space has, from the outset, contained the fundamental proposition of transforming the waterfront from a “backstage” condition into a “frontstage” of urban life, which provides an important foundation for understanding contemporary waterway regeneration.

With the further development of urban regeneration research, discussions of waterfront space have shifted from simple landscape beautification toward a more comprehensive restructuring of spatial systems. Represented by Charles Waldheim, landscape urbanism argues that landscape should not be understood as a residual interface subordinate to architecture and urban form; rather, it should be seen as an important medium for organizing urban space, infrastructure, and open systems. In The Landscape Urbanism Reader, this position is explicitly translated into a renewed understanding of the “organizational capacity of the site” within complex urban environments[7]. In a similar vein, Water and Urban Development Paradigms, edited by Jan Feyen, Kelly Shannon, and Matthew Neville, further advances the study of the relationship between water and the city from a framework of engineering management toward an integrated perspective of engineering, design, and governance, emphasizing that water is not merely an environmental issue but also a key factor shaping urban structure, public space, and development paradigms[8]. These studies demonstrate that the core concern of contemporary waterfront regeneration has shifted from

isolated channel remediation to complex spatial restructuring mediated by water.

In recent years, Chinese studies on waterways and waterfront spaces have also gradually expanded from water-environment governance to issues of spatial ecological revitalization and cultural reinterpretation. As a representative Lingnan water-network city, Guangzhou's waterways not only perform functions of drainage, flood control, and ecological regulation, but also deeply participate in the formation of local settlements, the organization of everyday life, and the construction of urban memory. Research by Wang Min, Zhao Meiting, and Zhu Hong on Guangzhou's waterways points out that waterways are not only part of the city's natural resources, but also important material carriers of social construction and urban memory; their meanings are continuously reconfigured along with changes in urban functions, social practices, and cultural representations [4]. This suggests that, in the Guangzhou context, discussions of waterway regeneration cannot treat waterways merely as objects of technical governance, but must also address their attributes as public space and carriers of local memory.

Most existing studies on waterfront regeneration have been developed in contexts where shoreline boundaries are relatively clear, setback conditions are comparatively generous, and implementation factor are more clearly defined. By contrast, waterways within high-density urban villages often face multiple problems simultaneously, including building encroachment, the "back-of-house" condition of spatial interfaces, broken circulation, and fractured historical relationships. Their complexity is therefore significantly greater than that of conventional urban waterfront sites. In other words, while existing research provides theoretical inspiration for the proposition that water should once again become the public backbone of urban space, more detailed discussion is still needed on how waterways within high-density industrial urban villages can undertake the dual task of structural reorganization and memory linkage under extremely limited spatial conditions.

1.3.2. Studies on the Regeneration and Spatial Reorganization of High-Density Urban Villages

Research on urban villages provides an important basis for understanding the formation, evolution, and governance logic of informal spaces in the course of China's rapid urbanization. Chinese scholars pointed out early on that urban villages constitute a distinctive type of urban space shaped by the combined effects of the urban–rural dual system, collective land ownership, market demand, and grassroots social structures. Taking Haizhu District in Guangzhou as an example, Ma Xueguang revealed, from the perspective of the social production of space, the multi-actor negotiations underlying the formation and evolution of

urban village space, arguing that both the spatial structure and governance mechanisms of urban villages display pronounced institutional and social characteristics[11]. Building on this, Zhang Jingxiang, Hu Yi, and Sun Dongqi, from the perspective of the production of space, analyzed the physical transformation and social transition of Jiangdong Village in Nanjing, further demonstrating that urban village space is not a passive material outcome, but rather the product of the continual reorganization of social relations, benefit distribution, and spatial order [12]. The importance of such studies lies in their shift of urban village research from the level of problem identification to the level of spatial mechanisms, while also indicating that architectural and urban design research should not understand urban village regeneration simply as demolition and reconstruction, but should instead begin with a more careful reading of the logic underlying its existing spatial formation.

A substantial body of domestic research has also emerged around the institutional background and implementation pathways of urban village regeneration in Guangzhou. Starting from Guangzhou's urban and rural renewal under the "Three Olds Redevelopment" policy, Tian Li and Guo Xu point out that urban village regeneration in Guangzhou is not only a process of spatial redevelopment, but also a process in which governance models, interest relations, and development logics are continuously adjusted [14]. Correspondingly, taking the regeneration of Liede Village as a case, Tan Xiaohong, Yuan Qifeng, and Lü Bin specifically analyzed mechanisms of villagers' participation, demonstrating that urban village regeneration in Guangzhou is not a purely technical issue, but a complex process involving multi-stakeholder negotiation, grassroots mobilization, and coordination of implementation mechanisms [15]. These studies are of great value for understanding the practical pathways of urban village regeneration in Guangzhou, and they also show that such research cannot be conducted in isolation from local governance frameworks, property relations, and implementation mechanisms. Particularly in a city like Guangzhou, where regeneration practice is highly active, spatial reorganization often unfolds in parallel with policy instruments, benefit coordination, and village governance methods; its outcomes therefore involve not only changes in the physical environment, but also the reconstruction of social relations, patterns of use, and spatial meanings.

In recent years, as research on urban villages has shifted from macro-institutional analysis toward micro-spatial practices, scholarly attention has increasingly focused on informal governance mechanisms and everyday spatial operations. Existing studies indicate that the governance of high-density industrial urban villages does not rely entirely on formal

administrative systems; instead, complex informal rules and self-organizing networks have emerged in migrant population management, rental relationship coordination, and industrial spatial organization. Fu Junyao and Xiao Fei, taking Kang Le Village in Guangzhou as an example, reveal the coexistence of "territorial construction" and self-governance failure in urban village governance, suggesting that spatial order is often maintained through informal social relations rather than institutional arrangements [17]. Liang Xiaowei and Yuan Qifeng further argue, from a territorialization perspective, that the transformation dilemma of commercial urban villages stems not only from property rights and policy constraints but also from stable expectations formed by multiple stakeholders through informal spatial use [16]. International scholarship also emphasizes that the regeneration of informal urban spaces must move beyond a "formalization" mindset and recognize the positive role of informal practices in spatial production [18][19]. These studies suggest that urban village renewal design must fully account for the deep constraints imposed by informal governance structures on spatial use, avoiding the disruption of existing socio-ecological balances through singular physical interventions.

In terms of social participation, existing research has gradually shifted from an early emphasis on "villager participation" toward discussions of multi-stakeholder collaboration and spatial justice. On the one hand, scholars have noted that stakeholders in urban village renewal have expanded from original villagers and local governments to include tenants, small and micro enterprises, and social organizations, whose participation demands and spatial use logics differ significantly [20]. On the other hand, concepts such as collaborative creation and community building have been introduced into urban village renewal practice, emphasizing the establishment of positive linkages between spatial transformation and social identity through participatory planning [21]. Relevant studies indicate that the renewal of industrial urban villages requires particular attention to the spatial rights of migrant populations and small and micro enterprises, while the mediating role of professional forces and grassroots social organizations in the renewal process has also received increasing attention [22]. These frontier developments provide important supplements for understanding urban village spatial governance; however, how to translate informal governance logics and social participation mechanisms into concrete spatial design strategies remains to be further explored.

However, existing studies as a whole still focus primarily on macro-level issues such as institutional arrangements, redevelopment models, benefit coordination, and villagers' participation, while structural research on specific spatial types within urban villages remains

insufficient. In high-density industrial urban villages in particular, the waterway is not merely an ordinary marginal space; rather, it is often a composite interface simultaneously subjected to production-related pressure, traffic conflict, the absence of public activities, and the rupture of cultural relationships. If approached only from the general perspective of urban village redevelopment, the waterway is easily reduced to a subsidiary object of environmental improvement or landscape enhancement, while its leading role in restructuring the spatial framework of the site is overlooked. Therefore, regeneration research oriented toward waterway-based urban villages needs to move beyond the existing body of urban village studies and deepen the discussion from general governance and redevelopment issues to systematic identification and spatial reorganization. It is precisely within this research gap that the present study is situated, attempting to propose a more targeted research path for the regeneration of waterway spaces in high-density industrial urban villages from the perspective of spatial organization and design translation.

1.3.3. Studies on Historical and Cultural Conservation and the Translation of Industrial Heritage

In the field of historic environment conservation, recent discussions have gradually shifted from the preservation of individual monuments toward a more integrated concern with place memory, social life, and spatial relationships. In The Power of Place, Dolores Hayden emphasizes that urban memory is not attached only to a small number of monumental buildings institutionally recognized as heritage, but is closely related to everyday spaces, labor history, the experiences of social groups, and the structure of the urban landscape. Her perspective of “place memory” provides important inspiration for understanding the value of ordinary historic environments and local spaces [9]. For this study, this line of research indicates that historical elements within the site should not be regarded merely as isolated objects, but rather as media of memory embedded within everyday spatial relationships.

Parallel to research on historic environment conservation, studies on industrial heritage and adaptive reuse have further expanded the meaning of “preservation.” The Dublin Principles, adopted jointly by ICOMOS and TICCIH in 2011, clearly state that industrial heritage includes not only buildings, structures, and sites, but also the technological, labor, social, and cultural values they embody, and that the overall environment and historical significance of such heritage should be respected in processes of conservation and transformation [24]. The literature review by Plevoets and Van Cleempoel further shows that adaptive reuse has developed multiple approaches, ranging from typological and technical strategies to architectural strategies, whose aim is not passive preservation but the

continuation of cultural value under new conditions of use[25]. In this sense, approaches to industrial heritage are not limited to complete preservation, but may also include more flexible methods such as partial retention, spatial translation, and interface reuse.

Within Chinese architectural scholarship, discussions on the conservation and reuse of industrial heritage have also gradually developed. In an article published in Architectural Journal, Wang Jianguo and Jiang Nan argue that the conservation-oriented transformation and reuse of industrial historic buildings and sites is one of the urgent issues facing Chinese cities in the post-industrial era; the focus of research should not remain only at the level of value judgment, but should move toward operable dimensions such as design methods, evaluation principles, and technical standards [27]. Returning to the present study, under conditions of rapid regeneration, some buildings that may not possess strict heritage status but nonetheless have strong place-recognition value and industrial memory significance may also become important objects worthy of identification and translation within the design process.

However, most existing studies on historical conservation and the reuse of industrial heritage are conducted in situations where object boundaries are relatively clear, site integrity is comparatively high, or redevelopment intensity remains relatively controllable. By comparison, historical elements in urban villages often exhibit characteristics of multi-type overlap, fragmented distribution, and complex interrelationships. Traditional ancestral halls, temples, folk spaces, and modern industrial buildings coexist and jointly constitute multiple historical layers of the site. For such sites, the real issue is how elements formed in different historical periods can enter a new spatial structure together while maintaining local recognizability and continuity in the process of regeneration. In this respect, while existing studies provide important insights in terms of value judgment and methodological inspiration, they still lack integrated design discussions oriented toward such complex sites.

1.3.4. Review of the Literature

In summary, existing studies have provided an important foundation for this research from the respective perspectives of waterfront regeneration, urban village transformation, and the conservation of historical memory. Waterfront studies suggest that water should not be understood merely as engineering infrastructure or as a landscape boundary, but should instead be reintegrated into the system of urban public space. Urban village studies reveal the profound impact of density, informality, and institutional complexity on spatial form. Research on historical conservation and industrial heritage further shows that the continuation of local memory depends not on the isolated preservation of objects, but on the reconstruction

of place meaning through the repair of spatial relationships and the translation of use.

However, when these strands of research are brought together in relation to the waterways within Guangzhou's high-density industrial urban villages, important gaps remain. First, existing waterfront regeneration studies offer insufficient discussion of how waterway spaces can reconstruct a public backbone under conditions of high density and strong enclosure. Second, although urban village studies reveal spatial hybridity and institutional complexity, they seldom analyze the issue of site restructuring from the perspective of waterways as a specific natural-spatial medium. Third, although studies on historical conservation and industrial heritage have proposed directions such as "relational repair" and "adaptive reuse," they still lack refined strategies for coordinating the translation of traditional cultural elements, folk spaces, and industrial memory within the same site. Therefore, it is necessary for this study to integrate site problem identification, theoretical reference, case selection, and spatial strategy construction in the subsequent chapters, so as to form a research path oriented toward the complex spaces of waterway-based urban villages.

1.4. Definition of Core Concepts and Research Object

1.4.1. Definition of Core Concepts

The "waterway-based urban village space" addressed in this study refers to a composite existing urban space formed through the long-term superimposition of waterway systems, extremely high-density building fabric, historic buildings, everyday life, and industrial activities in the course of rapid urbanization. To begin with, the urban village itself is a distinctive spatial type produced under the conditions of China's rapid urbanization, characterized by high-density built form, complex property relations, the coexistence of informal rental arrangements, and self-organized modes of operation[4]. Furthermore, in a water-network city such as Guangzhou, waterways are not merely drainage infrastructure, but spatial media closely intertwined with settlement formation, local life, and urban memory. Accordingly, waterway-based urban village space should be understood as a composite site type simultaneously embedded in natural hydrological processes, social structures, and the built environment, rather than being reduced either to an object of channel remediation or to underperforming land awaiting demolition and reconstruction. The focus of this research therefore lies not in any single element in isolation, but in the spatial relationships that have long developed and continuously evolved among water, streets and lanes, buildings, and local everyday life.

Based on this understanding, the study further adopts the concept of urban memory space

to define the value dimension at the center of its concern. Urban memory is not attached solely to individual heritage buildings or monumental architecture; rather, it is preserved, renewed, and reproduced through the combined operation of spatial form, everyday activities, social interaction, and historical narratives. Hayden argues that urban memory should be understood as a spatial experience embedded in the everyday urban landscape and public history, rather than something monopolized by a small number of iconic objects[9]. In the case of the Kangle Waterway site, elements such as ancestral halls, ancient temples, dragon boat activity spaces, water edges, and certain industrial remnants are significant precisely because together they constitute the spatial media through which local identity can be recognized and sustained. For this reason, the study emphasizes the regeneration of urban memory spaces, seeking to reinsert local memory into contemporary public life through the reorganization of spatial relationships.

In addition, this study employs the concept of selective retention and translation to define its approach to historical elements and industrial remnants. Here, “retention” does not imply preserving the site in an unchanged state, nor does it mean perpetuating existing modes of production. Its core lies in identifying representative carriers of memory and, within the broader framework of overall regeneration, retaining a limited number of spatial elements with place recognizability, structural reusability, and narrative value. Through functional reinsertion, interface reorganization, and spatial re-narration, these retained elements are then translated into new components that serve the contemporary spatial structure of the site. Plevoets and Van Cleempoel’s review of adaptive reuse demonstrates that heritage conservation is not limited to complete preservation, but may instead adopt multiple strategies of transformation at architectural, technical, and typological levels according to the condition of the object [25]. Applied to the present site, this understanding provides a clearer theoretical basis for design decisions regarding the retention of a limited number of valuable buildings and components: the purpose of retention is not to perpetuate inefficient production, but to sustain the historical layering of the site and its local recognizability.

1.4.2. Selection of the Research Object

The determination of the research object in this study was gradually developed through multiple layers of selection, including the broader urban regeneration framework, the planning background of the district, and the spatial characteristics of the site itself. The logic of selection can be summarized into three levels: the overall urban regeneration framework, the district-level regeneration window, and the site’s conformity with value-based identification.

At the first level, from the perspective of Guangzhou's overall urban regeneration framework, the redevelopment of urban villages has already been incorporated into the city's special planning system toward 2035. The Special Plan for the Redevelopment of Urban Villages in Guangzhou (2021–2035) has been officially approved and implemented by the municipal government. It explicitly proposes that, according to the goals and timetable defined in the plan, as shown in Figure 1-1, urban regeneration and urban village redevelopment should be advanced actively and steadily through district-based guidance and classified strategies. Within this context, the central area of Haizhu District, shown in Figure 1-2, particularly the areas related to the southern section of the Guangzhou New Central Axis, has become an important territory for urban structural adjustment and spatial quality enhancement [3]. Among these areas, Fenghe Village (Kangle and Lujiang) has been included in the list of key comprehensive redevelopment projects to be advanced during the period from 2021 to 2025. In locational terms, it belongs to the Sun Yat-sen University International Innovation Ecological Valley Area, and its project type is defined as a key platform-oriented project. This indicates that the area has become an important component of Guangzhou's current priority regeneration zones, and that its redevelopment is supported by a clear institutional basis and a concrete implementation window.

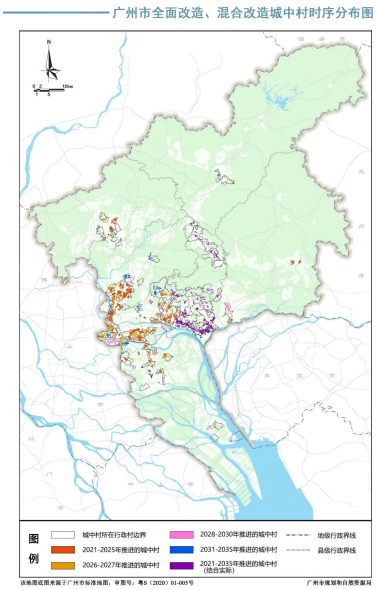


Figure 1-1 Temporal Distribution of Comprehensive and Hybrid Urban Village Redevelopment in Guangzhou

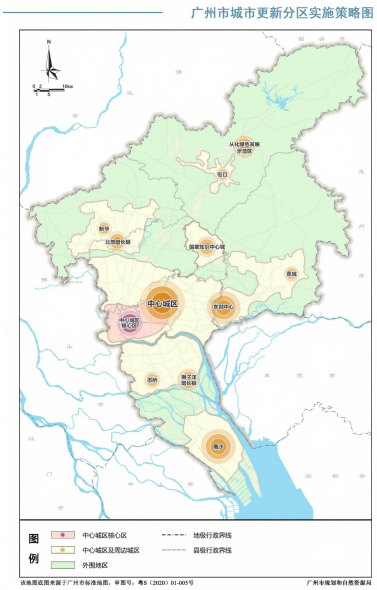


Figure 1-2 Zonal Implementation Strategy for Urban Regeneration in Guangzhou

(Source:: Adapted from the references[3])

At the second level, from the perspective of regeneration at the district scale, the Detailed Plan for the Urban Regeneration Unit of Fenghe (Kangle Village and Lujiang

Village), Haizhu District was reviewed and approved in 2023 and was officially promulgated and implemented in 2024, with Figure 1-3 illustrating the district plan. According to officially released information, the Kanglu area is located in central Haizhu District, bounded by Xingang West Road to the north, Xinjiao West Road to the south, Guangzhou Avenue South to the east, and Ruikang Road to the west. The redevelopment area covers approximately 110.17 hectares. It is positioned as an "International Fashion and Innovation Vitality District," with regeneration to be advanced around three major functions: urban intelligent textiles, inner-city technological innovation, and vibrant consumption. The plan also aims to reconstruct the overall district environment through the enhancement of public services, the optimization of the road system, and the supplementation of blue-green spaces. This indicates that the Kanglu area possesses clearer planning conditions and more concrete regeneration constraints in practice, making it an appropriate empirical case for studying regeneration issues in high-density urban villages[5]. However, given the large overall scale of the regeneration area and the complexity of its functional composition, taking the entire regeneration unit directly as the research object would risk losing analytical focus and would be less conducive to an in-depth examination of key spatial problems and the testing of corresponding strategies. Therefore, this study further narrows the scope within the district through a problem-oriented selection process.

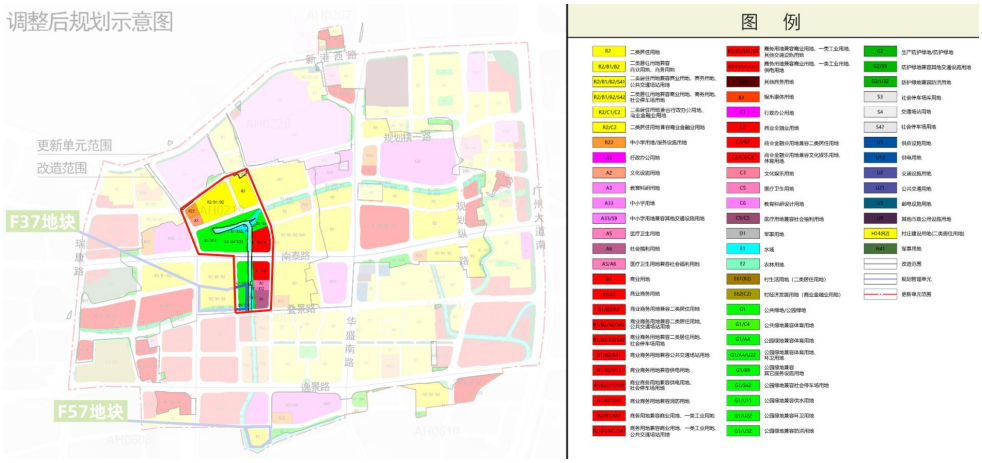


Figure 1-3 Schematic Diagram of the Kangle–Lujiang Regeneration Unit and the Study Area

(Source:: Adapted from the references[5])

At the third level, from the perspective of the site conditions within the Kanglu area, the corridor along the Kangle Waterway exhibits the most prominent composite characteristics within the district, where multiple representative elements are concentrated and superimposed. On the one hand, the waterway itself constitutes the clearest and most stable spatial clue on the site, serving as an important backbone that connects public space, ecological interfaces, and everyday activities. On the other hand, the historic buildings, folk-activity spaces, and a

limited number of former factory interfaces with mnemonic value distributed along the corridor enable this area to simultaneously carry multiple layers of local history, social life, and industrial transformation. According to the list of preliminarily protected historical and cultural heritage objects published by Haizhu District, the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple in Kangle Village have all been explicitly included, further demonstrating the distinctive cultural value of this area[28]. In other words, this part of the district is characterized by a threefold relational structure of water, history, and memory.

Based on the above step-by-step selection process, the final study area is defined as a linear research corridor organized along the Kangle Waterway, with several key nodal plots selected along its banks. On the one hand, this allows the study to preserve the continuity of the waterway space and the integrity of the research questions; on the other hand, it avoids overextending the scope to the entire regeneration unit, thereby enabling the study to concentrate on the site's most critical spatial contradictions within a manageable scale. Accordingly, the research object of this thesis is a composite linear spatial system within the regeneration unit, organized around the waterway and anchored by a series of key nodes.

1.4.3. Delimitation of the Study Area

The delimitation of the study area provides the basis for establishing the research questions, organizing the analytical framework, and carrying out design verification. The area defined in this study was gradually delineated within the overall regulatory planning framework of the Kanglu area, centering on the Kangle Waterway and its key associated spaces. The delimitation process follows a progressive logic, so that the study area not only has a clear implementation background, but can also accurately respond to the core spatial issues addressed in this research.

The headwater section of the Kangle Waterway was identified as the core area of the study. This section is not only the starting segment of the waterway space, but also the area where the relationship between the waterway and the surrounding built environment is most direct and where spatial problems are most concentrated. It thus typifies the core contradictions found in high-density urban villages, including the compression of waterway space, the transformation of interfaces into back-of-house conditions, and the failure of the public spatial backbone. For this reason, it was established as the foundational part of the study area.

Following the principle of preserving the integrity of historical anchors, the study area

was then extended northward on the basis of the headwater core section so as to incorporate historic buildings and their surrounding spaces into a unified research scope. The purpose of this extension is to preserve the spatial integrity of the relationship between the Kangle Waterway and cultural anchors such as the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple, while also reserving the necessary setback and improvement space around these protected buildings. Through this extension, the study area expands from the waterway itself to a more integrated discussion of the relationship between water and history.

Following the principle of identifying carriers of industrial memory, the study area was further extended southward, given that the southern section of the site still retains a certain number of buildings and interfaces associated with garment production and possesses strong place recognizability and characteristics of industrial memory. The inclusion of this part provides the necessary spatial support for the subsequent translation of industrial memory, the sectional organization of space, and the continuation of site narrative. Through this southward extension, the study area broadens from the relationship between water and history to a more comprehensive discussion of the relationship between water, history, and memory.

Based on the above three-step selection process, the final study area, shown in Figure 1-4, is defined as a linear composite study area organized around the Kangle Waterway as its principal axis.



Figure 1-4 Study Area ***(Source: Drawn by the author)***

1.4.4. Research Questions to Be Addressed

Based on the above logic for selecting the research object and the principles used to delimit the study area, and in conjunction with the overall regeneration direction already defined in the regulatory planning of the Kanglu area, this study is structured around one overarching question and three sub-questions. At the district scale, the regeneration plan has already established broad objectives including the enhancement of public space, the optimization of the blue-green system, the continuation of historical context, and the upgrading and transformation of industry. The focus of this study, however, is how to translate these policy-level objectives into implementable spatial design questions through the specific entry point of the sites along the Kangle Waterway.

The overarching question of this study is as follows: within the context of the overall regeneration of the Kanglu area, how can the Kangle Waterway be re-established as the primary spatial backbone to reorganize the order of riverside space under the dual consideration of publicness and ecological performance, while also activating historical anchors and translating industrial memory so as to form a site regeneration pathway with strong local identity and future development potential?

To address this overarching question, the study further develops the following three sub-questions.

First, how can the historical anchors within the site be identified and integrated, so that through spatial reorganization and adaptive activation they may re-enter public perception and everyday public life? Within the study area, the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, Hongsheng Ancient Temple, and related folk-activity spaces are not merely objects to be preserved, but key nodes that constitute the historical recognizability of the site. At present, these areas generally suffer from problems such as crowded interfaces, insufficient forecourt space, and weak connections with the waterway. It is therefore necessary to restore their relationship with the waterway and with public life through spatial clearance, interface reconstruction, and the reconnection of paths.

Second, how can the site’s industrial memory be sustained within the broader context of regeneration and transformed from static retention into a spatial carrier for future fashion-industry incubation, industrial upgrading, exhibition, and public exchange? The southern section of the Kangle Waterway still retains a certain number of buildings and spatial interfaces associated with garment production. Although these elements are no longer suitable to continue serving as the basis of the original production order, they nevertheless remain important carriers of memory from the site’s modern development process. This study

therefore examines how, through identification, selective retention, and translation, these elements may continue to participate in site regeneration within a new functional framework, while also sustaining the site's connection to the garment industry and providing spatial support for future exhibition, incubation, and exchange related to the fashion industry.

Third, how can the reconstruction of the waterway backbone, the activation of historical anchors, and the translation of industrial memory be integrated into a continuous waterfront spatial system and translated into operable sectional design and nodal strategies? Since the study area exhibits a linear configuration extending along the waterway and embedded with distinct nodes, the key design issue does not lie in the isolated treatment of individual objects, but rather in establishing a continuous spatial framework capable of organically organizing nodes and functions of different natures. Accordingly, the study ultimately investigates how to construct a sectional design pathway structured around the waterway as the main axis, with a cultural section, an ecological section, and an industrial-memory translation section as its principal components.

In summary, the problems addressed in this study do not seek to comprehensively cover all aspects of the overall regeneration of the Kanglu area. Rather, within a linear composite study area organized around the Kangle Waterway and linking cultural nodes with memory-related nodes, the study concentrates on the spatial relationships among the reconstruction of the waterfront public backbone, the repair of historical relationships, and the continuation of industrial memory. On this basis, it establishes the logical foundation for the subsequent stages of existing-condition analysis, strategy formulation, and design proposal development.

1.5. Research Content, Methods, and Technical Route

1.5.1. Research Content

This study focuses on the spatial restructuring of the sites along the Kangle Waterway within the broader context of the overall regeneration of the Kanglu area. It places particular emphasis on the interrelationship among the reconstruction of the waterway's public backbone, the activation of historical anchors, and the translation of industrial memory, and on this basis develops a design response for the specific site. In accordance with the research objectives and the overall argumentative logic, the study is structured into the following five chapters.

Chapter 1, Introduction, establishes the research background, research questions, and research object. This part mainly clarifies the background against which the study is proposed,

its objectives and significance, and reviews relevant domestic and international research. On this basis, it further defines the logic for selecting the research object, the principles for delimiting the study area, and the key questions to be addressed. Through this chapter, the study establishes a research foundation that moves from the broader context of urban regeneration to the specific site, thus providing the necessary premise for the subsequent analysis and design.

Chapter 2, A Study of the Spatial Conditions of the Kangle Waterway, focuses on site diagnosis and problem identification. Based on the study area along the Kangle Waterway, this chapter analyzes the site from the perspectives of spatial evolution, current spatial conditions, interface relationships, the distribution of historical elements, and the identification of carriers of memory. It specifically identifies the core issues of compressed and back-of-house waterway space, enclosed historical anchors and fractured relationships, and the gradual disappearance of site memory. The task of this chapter is not to provide a general background description of the site, but rather to clarify the objects and directions of design intervention through systematic diagnosis, thereby establishing the problem basis for subsequent strategy construction.

Chapter 3, Theoretical Foundations and Case Studies, addresses the relevant theoretical and case-based research. Centered on the key issues of this study, this chapter reviews the theoretical foundations related to waterway spatial restructuring, the organization of public waterfront interfaces, the activation of historical spaces, and the translation of industrial memory, and combines these with an analysis of representative case studies. The focus is not on general introductions to the cases, but on extracting transferable mechanisms in terms of spatial release, interface reconstruction, nodal organization, and memory translation, while assessing their applicability to the Kangle Waterway site. Through this chapter, the study accomplishes an initial translation from general theory and external experience to the specific problems of the local site.

Chapter 4, Spatial Regeneration Strategies for the Urban Village Areas around the Kangle Waterway, develops the regeneration strategy framework. Based on the preceding problem identification and case translation, this chapter further formulates a system of strategies oriented toward the sites along the Kangle Waterway. It focuses on how to organize continuous riverside space with the waterway as the backbone, how to restore the relationship between water and history through the integration of historical anchors, and how to sustain the industrial layers of the site through the identification and translation of a limited number of memory carriers. In terms of research structure, this chapter serves as the bridge from

analysis to design, and constitutes the key stage in which the study shifts from problem diagnosis to spatial operation.

Chapter 5, Design Proposal and Presentation, provides verification through design. Based on the regeneration strategies, this chapter translates the proposed ideas into a concrete design proposal through overall plan organization, spatial zoning, nodal articulation, interface reconstruction, and sectional design. The proposal is organized around a cultural section, an ecological section, and an industrial-memory translation section, with the continuous waterway space as the principal axis through which different types of nodes and interfaces are integrated into an operable riverside spatial system. Through this chapter, the study not only produces a design outcome for the specific site, but also tests the validity of the previously established research path and strategy framework.

Overall, the research content of this study seeks to establish a complete logical chain consisting of problem formulation, problem identification, theoretical reference, strategy generation, and design verification, so that the final design conclusions may be grounded in a clear and coherent research basis.

1.5.2. Research Methods

In response to the complex regeneration issues faced by the sites along the Kangle Waterway, this study adopts a combination of methods, including literature review, site investigation, diagrammatic analysis, case comparison, strategy translation, and design verification, in order to construct a systematic research path from problem identification to design generation.

1.5.2.1 Literature Review

By reviewing relevant domestic and international research on waterfront regeneration, waterway governance, spatial reorganization in urban villages, historical and cultural conservation, and the translation of industrial remnants, this method establishes the theoretical foundation and academic background of the study. The primary purpose of the literature review is to clarify the major insights already developed in existing scholarship, identify their limitations, and thereby define the entry point and key focus of this study.

1.5.2.2 Site Investigation and Diagrammatic Analysis

This method involves field investigation, on-site observation, and the compilation of drawings and records concerning the waterway spaces, building interfaces, historical elements, public spaces, and carriers of industrial memory within the study area. Combined with regulatory planning base maps, existing-condition surveys, and diagrammatic representations

of spatial relationships, it supports a systematic analysis of the site's current conditions. The emphasis of this method lies in identifying problems through drawings and spatial relationships rather than remaining at the level of descriptive observation, thereby establishing a clear problem basis for the subsequent formulation of design strategies.

1.5.2.3 Case Comparison and Mechanism Extraction

Focusing on issues such as the restructuring of waterway space, the shaping of public waterfront interfaces, the integration of historical anchors, and the translation of industrial memory, this method selects representative domestic and international cases for analysis. The purpose of case study here is not to simply enumerate precedents, but to extract spatial methods that may inform this research by examining pre-regeneration contradictions, core intervention mechanisms, spatial outcomes, and limits of applicability, and by establishing correspondences between case-based experience and the site-specific problems of the Kangle Waterway.

1.5.2.4 Strategy Translation

Strategy translation does not mean directly applying external cases or theoretical principles to the site of this study. Rather, under the specific conditions of the spatial characteristics, regeneration background, and real constraints of the Kangle Waterway corridor, it refers to transforming existing experience into design strategies that are specifically tailored to the site. This method emphasizes a problem-oriented process of filtering, reorganizing, and localizing theories and cases, so as to generate spatial operational principles capable of responding to the specific research object of this study.

1.5.2.5 Design Verification

As an essential component of research in architecture and urban design, design in this study is not treated as a secondary outcome, but as the core means of testing the validity of the research judgments and strategy framework. Through overall plan organization, functional zoning, nodal design, interface articulation, and sectional control, this method translates the preceding research into a concrete design proposal, and uses the spatial logic of the proposal to verify whether the research questions, strategies, and pathway proposed by the study are valid.

1.5.3. Technical Route

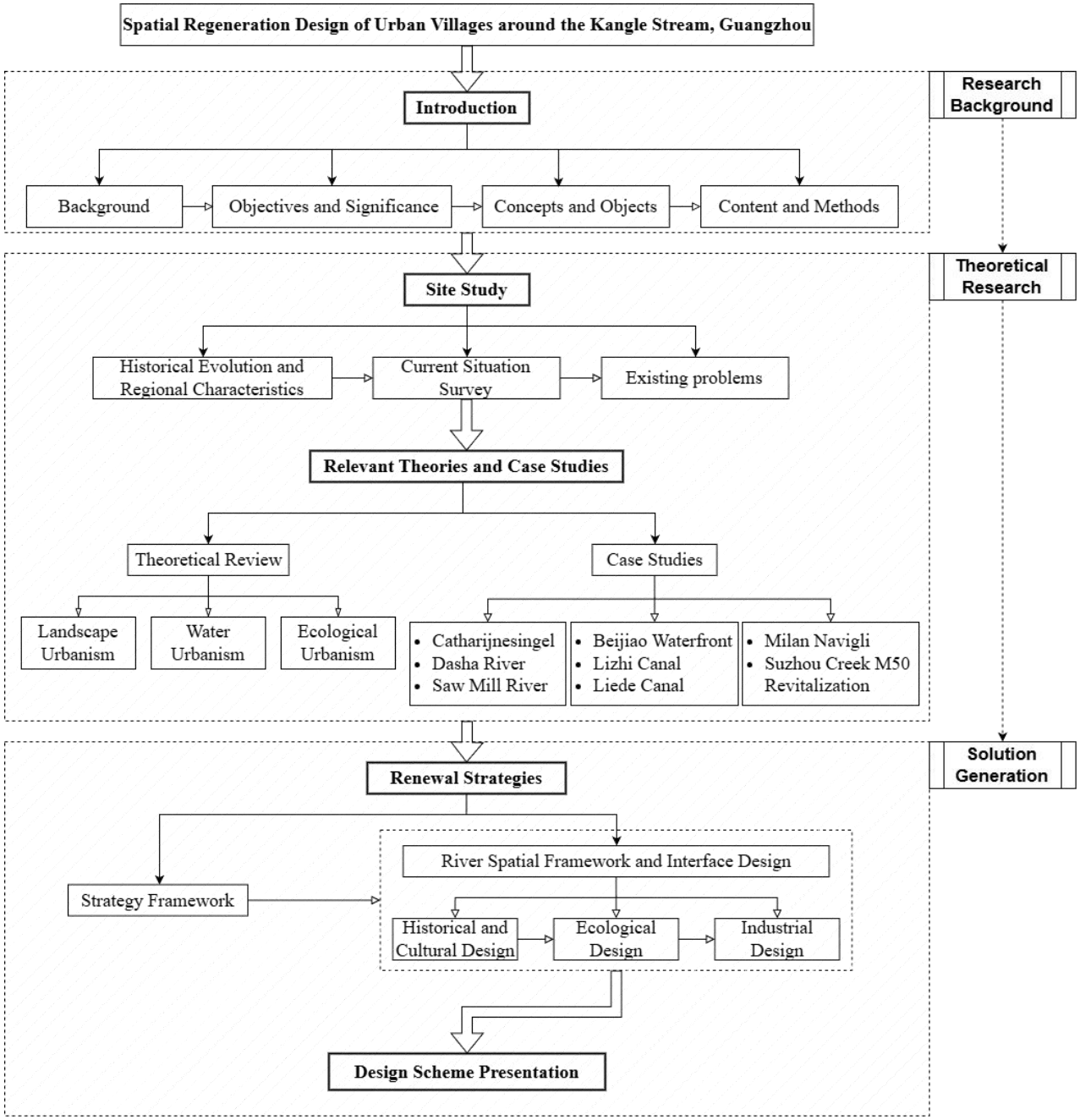


Figure 1-5 Research Technical Route ***(Source: Drawn by the author)***

Chapter 2 Existing Conditions Analysis of the Sites along the Kangle Waterway

2.1. Site Evolution and the Formation Mechanism of Spatial Problems

2.1.1. Hydrological Foundation and Settlement Formation

Guangzhou is located in the Pearl River Delta, where a dense natural river network has long shaped the city's territorial structure. Since the early period of urban formation, Guangzhou developed a drainage and irrigation system centered on the Six-Meridian Canal System, giving rise to an early urban fabric in which waterways and streets ran in parallel and together formed the distinctive landscape pattern described as "all six waterways connecting to the sea, with green hills partially entering the city." Studies on the historical water-management structure of ancient Guangzhou have shown that water systems in Lingnan cities and settlements not only served the practical functions of drainage, transportation, and irrigation, but also played a profound role in organizing spatial form and everyday order. The Haizhu area, long shaped by the front and rear channels of the Pearl River together with its dense waterway network, developed settlement patterns, agricultural production, and daily life in close relation to water. In this context, water was not merely a natural geographical condition, but also an essential medium for organizing settlement space. Against this background, before the large-scale industrial transformation of the modern era, Kangle Village retained the typical characteristics of a water-network agricultural village, in which waterways, fishponds, farmland, and low-rise dwellings together constituted its basic spatial structure [32].

From the perspective of settlement formation, the Kangle Waterway functioned as an important medium shaping early village siting and spatial expansion. Influenced by the tidal system of the Pearl River and the low-lying terrain, early settlements were generally established on relatively stable terraces and slightly elevated grounds along both sides of the waterway, forming a basic spatial pattern of dwelling by the water and extending along the canal[31]. On the one hand, the waterway supported agricultural irrigation, domestic water use, and drainage; on the other hand, it also provided an important route for early movement and the transport of goods and materials. With the development of polder agriculture in the Pearl River Delta, the area around the Kangle Waterway gradually evolved into a water-town landscape in which farmland, ponds, and village housing were interwoven, and the waterway thereby became the principal backbone linking productive space and the internal life of the settlement.

The Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple, which still survive on the northern side of the Kangle Waterway, indicate that a relatively stable clan-based and religious spatial structure had already taken shape in this area during the traditional period. These three historic buildings were included in the list of preliminarily protected historical and cultural heritage objects published by Haizhu District in 2026. Judging from their spatial relationships, these historical anchors likely functioned together with the waterway, lanes, and forecourts as important nodes of village public life. The internal street-and-lane system of the traditional settlement also tended to maintain strong connections with the waterway, forming a relational network in which main lanes and side lanes led toward the waterfront space, allowing the water body to simultaneously serve multiple functions, including drainage, circulation, social interaction, and ritual activity. Therefore, what the Kangle Waterway embodied in the traditional period was not simply the role of hydraulic infrastructure, but rather that of a composite space combining productive, everyday, and public functions.

Overall, before the large-scale insertion of modern industry, the sites along the Kangle Waterway presented a traditional water-town settlement structure in which the waterway acted as the spatial backbone, ancestral halls and temples served as public nodes, and streets, lanes, and forecourts functioned as connective media. In other words, the Kangle Waterway originally operated as an important spatial medium for organizing settlement formation, public life, and local identity. The spatial problems observed today emerged precisely through the gradual compression, fragmentation, and rewriting of this original structure.

2.1.2. The Insertion of Modern Industry and the Alienation of Space

From the late 1980s to the 1990s, with the continuous southward expansion of Guangzhou’s urban territory and the rapid rise of the textile and garment trade in Haizhu District, Kangle Village underwent a process of structural alienation. It gradually transformed from a traditional rural settlement into a textile-based industrial area, and eventually into an industrial urban village highly coupled with the Zhongda textile trading district. This was not merely a change in economic function, but a profound process of spatial reorganization that fundamentally altered the structure and use of the site.

The agglomeration of garment manufacturing in Kangle Village originated in the formation and expansion of the Zhongda textile trading district from the 1990s onward, which thoroughly reshaped the functions of the site. Research by Xia Lili and others on the spatial agglomeration of manufacturing in Kangle Village shows that the development of

manufacturing enterprises within the village was primarily supported by the Zhongda textile trading district's convenient channels for raw material procurement, dense information networks, and demand for low-cost processing[33]. At the same time, Kangle Village's proximity to core market nodes such as the Guangzhou International Textile City, together with its relatively low rental costs, flexible spatial supply, and comparatively loose management conditions, provided a practical basis for the large-scale entry of workshop-style garment-processing enterprises. In this sense, the concentration of manufacturing enterprises within Kangle Village was gradually formed through the combined effects of market proximity, industrial linkages, spatial supply, and informal modes of governance.

More importantly, the insertion of the garment industry not only altered the functions of the site, but also profoundly reshaped its spatial form. According to field investigations by Xia Lili and others, by 2010 a large number of garment manufacturing enterprises had already clustered within the approximately 0.4 km² area of Kangle Village[33]. Their spatial distribution was clearly influenced by the internal road system of the village and displayed characteristics such as the relative concentration of similar industries, the mutual dependence of industrial and residential spaces, and the vertical mixed use of multi-story buildings. In other words, production, storage, rental housing, and everyday services were not spatially separated, but were instead layered one upon another within limited land resources and high-intensity building environments, forming a highly composite and distinctly informal spatial structure. Along the Kangle Waterway, this pattern of roadside agglomeration and vertical mixed use further intensified the productive and logistical occupation of ground-floor interfaces, causing spaces that might once have supported public activity, waterfront connections, and neighborhood interaction to be gradually transformed into composite interfaces dominated by processing, material storage, loading and unloading, circulation, and temporary commercial activities.

From a longer temporal perspective, the work of Liang Xiaowei and Yuan Qifeng on changes in land use and building height in Kangle Village provides more direct evidence of this process of spatial alienation. Their study shows that, as illustrated in Figure 2-1, prior to the mid-1990s agricultural activity still constituted an important means of livelihood in Kangle Village. Agricultural land accounted for 70.39% of the total village land, buildings were predominantly one- to two-story traditional dwellings, and the village still retained relatively intact non-built land, water surfaces, and a low-intensity built environment. However, with the acceleration of urbanization and the development of the Zhongda cloth market, Kangle Village gradually transformed from a traditional agricultural village into an

industrial urban village after the mid-1990s. By 2000, as shown in Figure 2-2, agricultural land had declined to only 6.77% of the total village area, the original ponds had been largely filled in, and built-up land had expanded significantly. After 2001, with the rapid expansion of the Zhongda cloth market and the continuing growth in demand for processing and manufacturing, the village underwent further large-scale extension and vertical addition, with building heights continuing to rise and garment production as well as related supporting activities penetrating more deeply into the village fabric. After 2005, projects such as the Guangzhou International Textile City, Changjiang International Textile City, and Zhujiang International Textile City were completed one after another, gradually placing Kangle Village within an encirclement of large-scale integrated markets and transforming it from a general industrial urban village into a garment-industry community. By 2010, as shown in Figure 2-3, the area of commercial land within Kangle Village had increased by 6.41 hectares compared with 2000, indicating that Kangle Village had gradually evolved into an industrial community in which production and service functions coexisted[16].

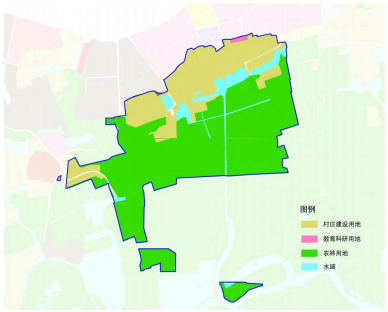


Figure 2-1 Land Use of Kangle Village in 1990

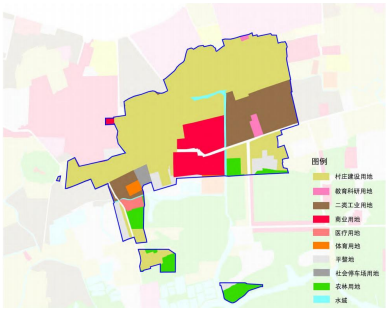


Figure 2-2 Land Use of Kangle Village in 2000

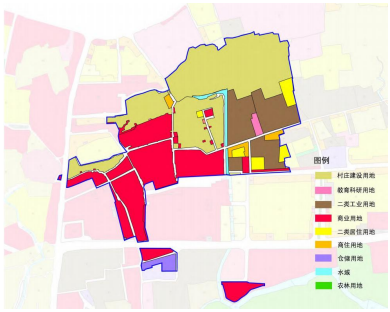


Figure 2-3 Land Use of Kangle Village in 2010

(Source:: Adapted from the references[16])

From the perspective of changes in the order of governance, Fu Junyao and Xiao Fei point out that since the 1990s Kangle Village has undergone multiple phases of institutional reform, economic restructuring, and social self-governance. In particular, the rectification of the Zhongda cloth market, the construction of surrounding specialized markets, and the continuous outward spillover of the textile and garment industrial chain objectively pushed more production, storage, and service functions into the village [17]. As a result, the original relationship of water–settlement–everyday life within Kangle Village was gradually replaced by a new relationship of market–processing–logistics, and the spaces along the waterway continuously lost their former function as organizers of public life.

In summary, the insertion of the garment industry since the modern period did not simply bring about changes in land use or economic structure in Kangle Village; rather, it constituted

a continuous rewriting of the site's spatial order. Along the Kangle Waterway, building density steadily increased, and the waterway was gradually compressed into a narrow gap squeezed between high-intensity built environments. Ground-floor interfaces were occupied by production and freight-related activities, while spaces that might once have been transformed into places for public life and waterfront interaction were continuously logisticalized. At the same time, the original relationships between the waterway and ancestral halls, temples, and related folk spaces were progressively weakened. Therefore, the spatial alienation of the Kangle Waterway corridor should not be understood simply as a matter of environmental deterioration, but rather as the result of the long-term embedding of the industrial chain, through which the waterway lost its function as the site's spatial backbone and was rewritten into a high-intensity service interface.

2.1.3. Re-identification of Value within the Context of Overall Regeneration

Since the beginning of the twenty-first century, with the continuous advancement of ecological civilization and the deepening emphasis in Guangzhou on protecting the overall spatial pattern of "cloud-capped mountains and Pearl River waters", the focus of urban waterway has gradually shifted from an earlier, single-track engineering approach centered on sewage interception, flood control, and drainage provision toward a more composite regeneration path that integrates ecological restoration, shared slow-mobility systems, landscape improvement, and public accessibility. The Overall Plan for Blueway Development in Guangzhou explicitly proposes that, relying on composite spatial resources such as waterways, roads, and green spaces, the city should construct a waterfront spatial system integrating safety, ecology, recreation, culture, and vitality, and incorporate blueway development into Guangzhou's overall territorial pattern of mountains, rivers, forests, farmland, lakes, and sea [34]. This indicates that, in the contemporary context of urban regeneration in Guangzhou, waterways are no longer understood merely as drainage channels or objects of pollution control, but are being reintegrated into the ecological network and the system of urban public space.

At the district level in Haizhu, this governance shift is particularly evident. Haizhu Lake and its surrounding water network have been explicitly described as a composite hydrological structure of "one lake, six veins, and six waterways encircling the lake," and related practices emphasize the reconstruction of relationships among waterways, wetlands, green spaces, and urban life through natural ecological restoration, hydrological connectivity, environmental improvement, and public sharing[36]. In terms of implementation, Haizhu District has also

continuously incorporated river and lake ecological restoration, water-system connectivity, and the construction and repair of drainage infrastructure into its water-management responsibilities and fiscal budget arrangements. This demonstrates that waterway governance in the district has moved beyond a merely conceptual planning direction and has entered a stage of long-term, project-based, and systematic implementation. Therefore, current waterway governance in Haizhu no longer treats water bodies simply as units of environmental remediation, but increasingly emphasizes their organizing role within the regional ecological backbone and the public-space system.

However, the governance of the Kangle Waterway reveals the particular complexity of waterways located within high-density urban villages. A special supervisory bulletin issued by the Haizhu District Water Affairs Bureau on sewage governance in the Kangle Waterway basin points out that, in order to advance basin governance, Fengyang Subdistrict must continue to rectify dispersed and polluting activities along the corridor, while simultaneously promoting pipe-network dredging and unclogging, manhole rectification, sewage interception and connection, and environmental cleaning. The bulletin also specifically emphasizes the practical problems of high population density in Fenghe Village, large sewage volumes, and heavy pressure on the operation and maintenance of the drainage system. This indicates that the problems faced by the Kangle Waterway are not merely issues of water quality, but rather the result of the superimposition of the waterway with a high-density built environment, a complex drainage system, mixed productive and everyday uses, and pressures of grassroots governance.

It is precisely under the overlapping conditions of industrial alienation, governance intervention, and regenerative transition that the values of the sites along the Kangle Waterway have begun to be re-identified. On the one hand, the waterway is being re-understood as an important backbone for organizing riverside public space, ecological connections, and slow-mobility systems. On the other hand, the historical anchors on the northern side and the carriers of industrial memory on the southern side are no longer seen merely as objects of passive preservation, but as potential elements to be reorganized within the broader framework of regeneration. Accordingly, the problems faced by the sites along the Kangle Waterway can no longer be reduced simply to the question of how to control or remediate the water; rather, they should be reformulated as the question of how, within an overall regeneration framework, the spatial relationships among water, history, and memory can be reorganized through the waterway as a structuring thread. This also constitutes the practical basis for this study’s engagement with the site.

Based on the evolutionary process outlined above, the area surrounding the Kangle Waterway has developed into a complex site characterized by the superimposition of waterway space, historical and cultural elements, and the existing stock of industrial buildings. The following sections examine the current conditions from these three aspects—waterway space, historical and cultural elements, and industrial building stock—and, on this basis, identify the principal problems of the site.

2.2. Existing Conditions of the Waterway Space

The Kangle Waterway is the most continuous linear spatial element within the study area. It also has the potential to serve as the spatial backbone linking the historic anchors in the north, the carriers of industrial memory in the south, and the organization of public space along the waterfront. However, in its current condition, the channel form, waterfront interfaces, and hydrological operation of the waterway have all significantly diverged from the openness and public character traditionally associated with waterways in historic settlements. Instead, they exhibit characteristics of engineering-oriented transformation, back-of-house marginalization, and spatial fragmentation under the prolonged pressure of a high-density built environment. Accordingly, this section analyzes the current condition of the Kangle Waterway from two aspects—planar morphology and waterfront interface, and sectional form and spatial characteristics—in order to identify how the waterway, as the dominant spatial clue of the site, has failed to function effectively within the overall spatial structure.

2.2.1. Spatial Morphology of the Waterway

From the perspective of plan morphology, the Kangle Waterway still retains a relatively clear linear spatial framework and remains the most stable identifying feature within the study area. However, under the prolonged compression of the high-density built environment, this linear framework has come to display obvious characteristics of narrowing, angular distortion, and fragmentation. Based on field investigation and drone imagery, as shown in Figure 2-4 and Figure 2-5, the Kangle Waterway maintains only a limited overall width within the study area. Buildings along both sides are closely aligned with the channel, with insufficient setback distances, while streets and lanes along the corridor lack the necessary buffer space in relation to the waterway. As a result, in plan, the Kangle Waterway appears less as an open space with a clear boundary and active interface, and more as an infrastructural corridor squeezed through the gaps of the built environment.



Figure 2-4 Headwater Section within the Kangle Waterway Study Area

(Source: Photographed by the author)



Figure 2-5 Middle Section within the Kangle Waterway Study Area

(Source: Photographed by the author)

A further examination of the nodal distribution and the overall spatial relationships, as shown in Figure 2-6, indicates that although several key nodes with potential public value exist along the Kangle Waterway, they remain insufficiently integrated into a coherent system. First, near the headwater area, there are an old tree, a small open space, and facilities related to dragon boat storage, which should have formed an initial node closely associated with local memory. In the current condition, however, this area is occupied by temporary clutter, enclosures, and scattered facilities, resulting in weak spatial legibility. Second, although pedestrian bridges connect the two banks at several points, these bridges function primarily as circulation infrastructure; they lack spaces for staying, viewing, and barrier-free access, and therefore fail to become public nodes with meaningful spatial transition value. Third, engineering facilities such as pumping stations are located at turning points along the channel. While these installations ensure drainage performance, they also further reinforce the perception of the waterway as a maintained engineering object rather than an accessible public space. Therefore, although the Kangle Waterway occupies a central position in the plan structure, it has not truly become the dominant axis for organizing the surrounding public spaces and the relationships among the various nodes.

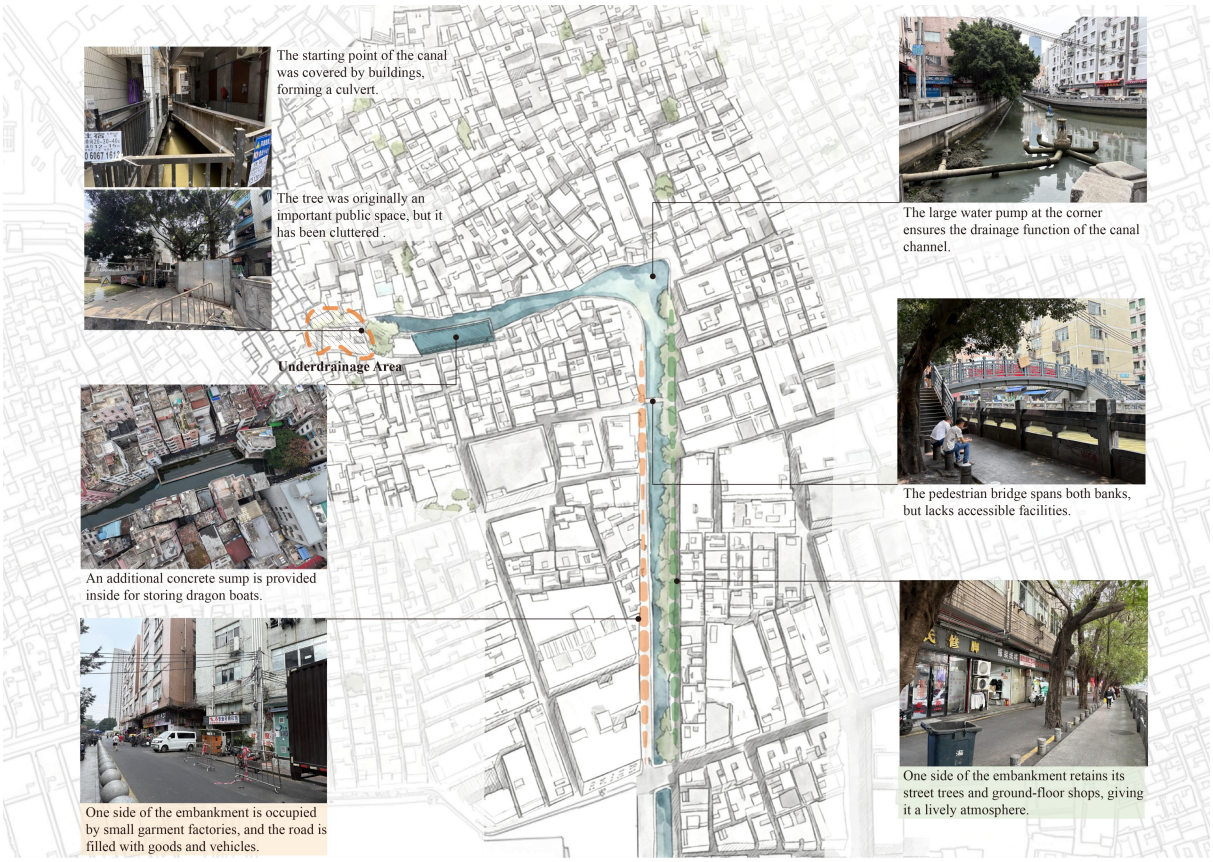


Figure 2-6 Analysis of Existing Spatial Nodes in Plan within the Study Area

(Source: Drawn by the author)

Beginning from the headwater section, the plan continuity of the Kangle Waterway is already subject to evident disruption. As shown in Figure 2-7, the initial segment of the waterway has in part been covered by buildings, resulting in a culverted condition. The watercourse, as the starting point of an open spatial system, is concealed within the built environment and therefore cannot form a clearly legible source in terms of urban perception. On the one hand, this weakens the integrity of the waterway as a linear spatial system; on the other hand, it causes the source node—which should possess a certain degree of spatial significance—to deteriorate into a residual marginal area lacking visibility and accessibility. In plan, the Kangle Waterway thus exhibits the condition of "the water is present, yet its origin is concealed," meaning that its continuity is already compromised at the point of departure.

A further observation of the riverside interfaces, as shown in Figure 2-8, indicates that the two sides of the Kangle Waterway do not form a homogeneous waterfront edge, but instead display clear asymmetry and functional difference. On one side, there remains a continuous row of trees, localized pedestrian space, and ground-floor commercial frontage, giving the corridor a certain degree of street vitality and visual openness. On the other side,

however, the bank is more extensively occupied by small-scale garment-production buildings, material storage areas, temporary parking, and logistical activities, and the interface as a whole demonstrates a marked tendency toward production-oriented and back-of-house use. In certain sections, the riverside road accommodates a composite set of functions, including street circulation, temporary loading and unloading, and daily service activities. Most of the side lanes perpendicular to the waterway do not effectively guide movement toward the waterfront space; instead, they produce a condition in which the lanes terminate at the river edge without spatially opening toward it, thereby preventing the waterway from being actively accessed and shared by the surrounding urban fabric. As a consequence, the two banks do not jointly constitute a continuous and integrated public waterfront interface; rather, they form an imbalanced structure characterized by relative openness on one side and strong enclosure on the other. This interface condition directly weakens the public character of the waterway, making it difficult to understand it as a public space shared by both banks and causing it instead to function more like a utilitarian boundary attached to a partial street system.

As shown in Figure 2-9, the riverside space is generally bounded by hard embankments, guardrails, pipe infrastructure, and dense built interfaces, producing a clear separation between the waterway and the surrounding everyday spaces. As a result, in spatial perception the Kangle Waterway appears closer to a controlled infrastructural corridor than to a public waterfront interface that can be entered, occupied, and recognized. Therefore, although the Kangle Waterway still retains a continuous linear framework within the site, its integrated functions in ecological, interface, and public-space terms have all been weakened, and it has not yet truly assumed the organizational role of a riverside spatial backbone.



Figure 2-7 Headwater Section of the Waterway Covered by Buildings

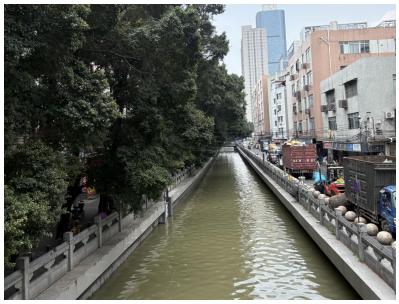


Figure 2-8 Pronounced Asymmetry Between the Two Banks of the Waterway



Figure 2-9 Riverside Buildings Compressing the Waterway Space

(Source: Photographed by the author)

In addition, the spatial problems manifested in the plan morphology of the waterway are closely related to its hydrological operating conditions. The Kangle Waterway is located

within a terminal tributary and is strongly influenced by tidal conditions and artificial regulation. As shown in Figure 2-10and Figure 2-11, portions of the water surface exhibit signs of eutrophication and sediment stagnation, while in some sections the riverbed is exposed during low-water periods. Furthermore, as shown in Figure 2-12, its daily operation depends on pumping-station regulation and manual debris removal. This indicates that the Kangle Waterway is no longer an open water body with strong natural self-renewal capacity, but rather an engineered channel that requires continuous maintenance under conditions of high-density built surroundings and complex patterns of use. The limited capacity for water exchange and the weakening of ecological vitality further intensify the negative character of the riverside interfaces and reinforce its status as an object of ongoing management and control.



Figure 2-10 Eutrophication on the Water Surface of the Waterway

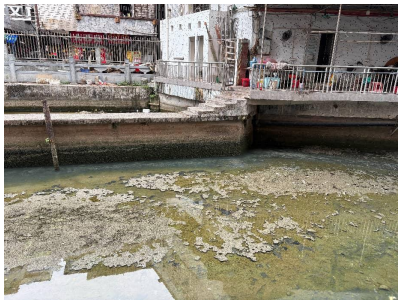


Figure 2-11 Exposed Sediment at the Bottom of the Waterway



Figure 2-12 Manual Dredging Operations within the Waterway

(Source: Photographed by the author)

In summary, although the Kangle Waterway still retains a continuous linear structure in plan, significant problems remain in terms of source legibility, interface organization, nodal linkage, and its relationship with the surrounding street-and-lane system. First, the culverted condition at the headwater section weakens the spatial legibility of the waterway's point of origin. Second, the riverside interfaces are asymmetrical and marked by a strong back-of-house tendency, resulting in insufficient public openness. Third, although several key nodes have begun to emerge, they lack overall organization and hierarchical articulation. Finally, the connection between the waterway and the surrounding street-and-lane network remains weak, failing to form a complete public spatial network along the river corridor. Therefore, from the perspective of plan structure, the Kangle Waterway has not yet acquired the spatial organizational capacity required to function as the dominant backbone of the site. Its linear presence remains largely at the physical level and has not been translated into an effective spatial order or public structure.

2.2.2. Sectional Morphology and Spatial Characteristics of the Waterway

A further examination from the perspective of sectional relationships shows that the main problems of the spaces along the Kangle Waterway are not limited to insufficient continuity in plan. More fundamentally, they also involve an overall sectional sense of compression produced by the long-term imbalance among channel width, the height of riverside buildings, embankment form, and the space available for waterfront activities. For linear open spaces embedded within high-density built environments, the proportional relationship between interface height and open width directly affects the sense of enclosure, conditions of ventilation and daylight, and the perceptible scale experienced by users. Based on this understanding, this study introduces the H/W index—defined as the average interface height divided by the effective open width between the two banks—to compare the degree of enclosure in representative cross-sections along the Kangle Waterway[37]. It should be noted that, in this thesis, H/W is used primarily as an auxiliary tool for assessing sectional compactness, differences in openness, and the sense of spatial pressure, rather than as a direct basis for deriving conclusions regarding microclimatic performance or pollution diffusion. Accordingly, the evaluation of each section in this study is undertaken in combination with additional factors, including embankment form, building setback, the character of riverside interfaces, and accessibility.

According to the survey and statistical analysis of ten typical cross-sections along the Kangle Waterway, as shown in Figure 2-13, the H/W values range between 0.65 and 2.18, indicating an overall sectional condition characterized by relatively high enclosure and, in some locations, extreme spatial compression. When the H/W values are read together with the results of field investigation, the existing sections of the Kangle Waterway can be broadly categorized into two types: high-density compressed sections and constrained transitional sections. Only a few segments exhibit an extremely compressed condition, while most sections, although not reaching the highest degree of enclosure, still remain in a transitional state marked by insufficient openness and restricted interface conditions.

The first type is the high-density compressed section, represented primarily by Section 3, as shown in Figure 2-14. The H/W value of this section reaches 2.18, which is significantly higher than that of the other segments, indicating a pronounced imbalance between channel width and building height on both sides. Field observation further shows that buildings in this segment are aligned very closely to the edge, leaving extremely limited space for riverside activity. The road along the waterway is narrow and accommodates mixed pedestrian and vehicular movement, causing the channel to be perceived as heavily squeezed by the

surrounding high-density built environment. People are separated from the water by embankments, changes in level, and the narrow circulation corridor, making the sense of spatial pressure particularly intense. This type of section therefore represents the most typical and concentrated form of sectional imbalance along the Kangle Waterway.

The second type is the constrained transitional section, which includes most of the remaining segments, as shown in Figure 2-14. The H/W values of this type are generally distributed between 0.65 and 1.08. Although these sections do not exhibit the same extreme compression as Section 3, they still lack the sectional conditions necessary to form a complete public waterfront space. More specifically, these segments generally retain a relatively intact channel form, but their embankments are mostly vertical hard retaining walls, building setbacks remain limited, and the riverside roads simultaneously accommodate multiple functions such as circulation, parking, loading and unloading, and everyday commercial activity. As a result, although the water remains visible, it is difficult to truly approach or use. Therefore, while this type of section possesses a certain potential for transformation, it essentially remains in a constrained state of transition from an engineered drainage interface toward a public waterfront interface, without having fully completed that transformation.

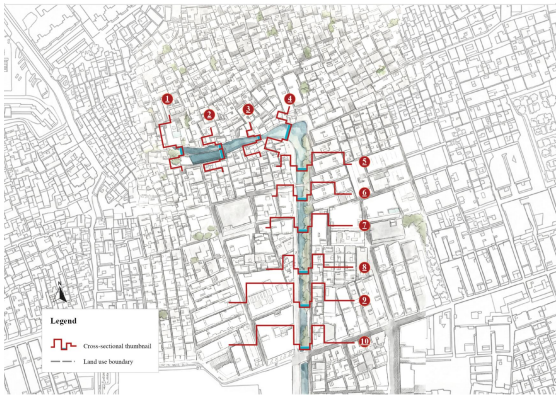


Figure 2-13 Distribution of Ten Typical Cross-Section Locations along the Waterway

(Source: Drawn by the author)

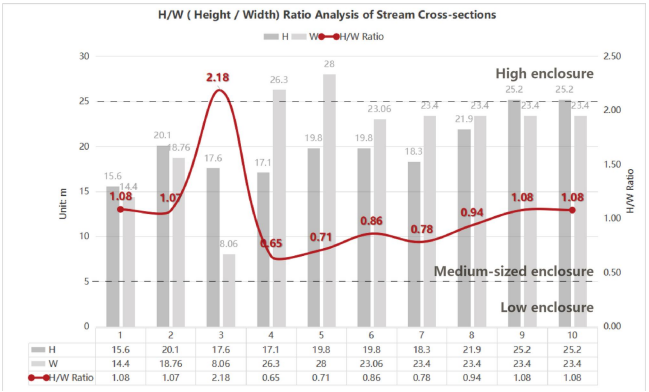


Figure 2-14 Sample Analysis of H/W Values for Typical Cross-Sections

(Source: Drawn by the author)

A further examination of the representative cross-sections shows that the spatial pressure along different segments of the Kangle Waterway is not homogeneous, but rather manifests itself through different forms of imbalance. In order to explain these sectional problems more specifically, this study selects three typical samples for detailed analysis: Section A–A at the culverted headwater segment, Section B–B at the dragon boat node, and Section C–C at the factory-frontage segment.

Figure 2-15 corresponds to the headwater segment of the waterway, whose most prominent characteristic is the coexistence of culverting and the degradation of a public node.

In this segment, the initial part of the channel has been covered by surrounding buildings, causing the water body to shift into a semi-enclosed or even invisible spatial condition. Both sides of the section are lined with high-density urban-village housing, while the road scale is extremely narrow and public space is encroached upon by temporary parking, garbage accumulation, and fencing facilities. Even the old-tree node, which originally had the potential to serve as a public village space, is now enclosed and temporarily blocked off, failing to establish an effective open relationship with the water. Therefore, the problem reflected in Figure 2-15 is not merely that the channel has been covered, but that, at the sectional level, the source of the waterway has deteriorated from a potentially public point of origin into a residual infrastructural space compressed by multiple ancillary functions.

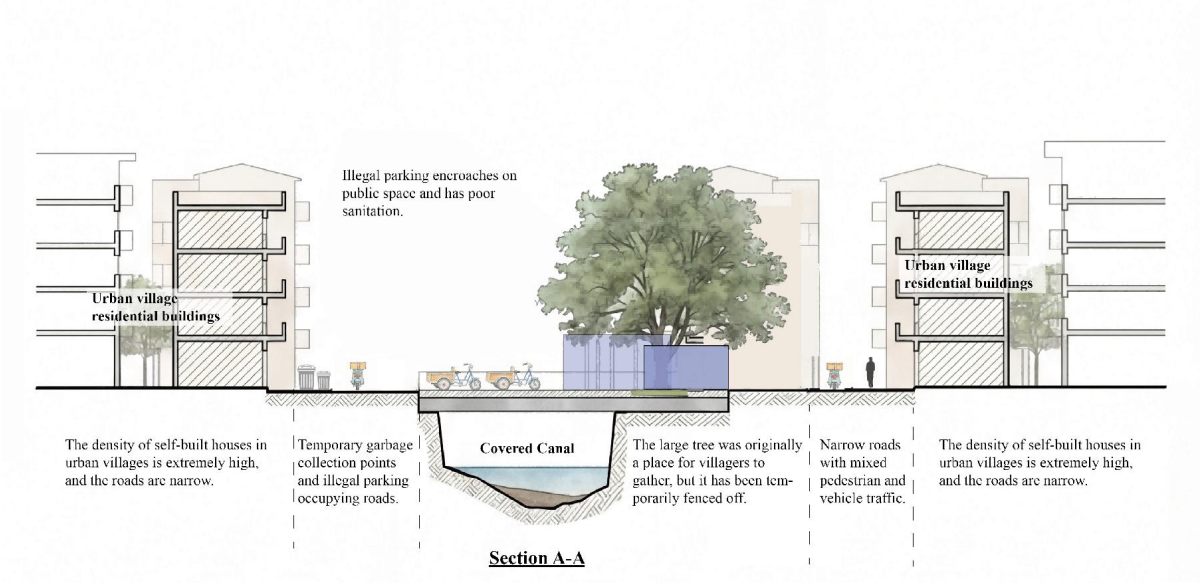


Figure 2-15 Culverted Cross-Section of the Headwater Segment of the Waterway (A–A)

(Source: Drawn by the author)

Figure 2-16 corresponds to the segment where Longchuan'ao (a submerged dragon boat storage basin) is located, and its main problem lies in the coexistence of channel compression and the alienation of a cultural node. In this segment, building setbacks on both banks are insufficient, the riverside road is narrow, and pedestrian and vehicular activities overlap intensely, resulting in the absence of an independent waterfront activity zone along either side of the channel. Most notably, a submerged dragon boat storage basin used for preserving dragon boats in the riverbed has been inserted into the section, further fragmenting what should otherwise remain a continuous channel profile and interfering with both the water flow line and the integrity of the section. Although Longchuan'ao ought to function as an important cultural node carrying local folk memory, the current sectional condition shows that its cultural meaning has not been translated into spatial openness. Instead, under the combined

pressure of a high-density built environment, narrow roads, and ancillary facilities, it is characterized by clear functional compression. Thus, the key issue revealed in Figure 2-16 is that, although the carrier of cultural memory still exists, it lacks the spatial support necessary to sustain a meaningful relationship with both the waterway and public activity.

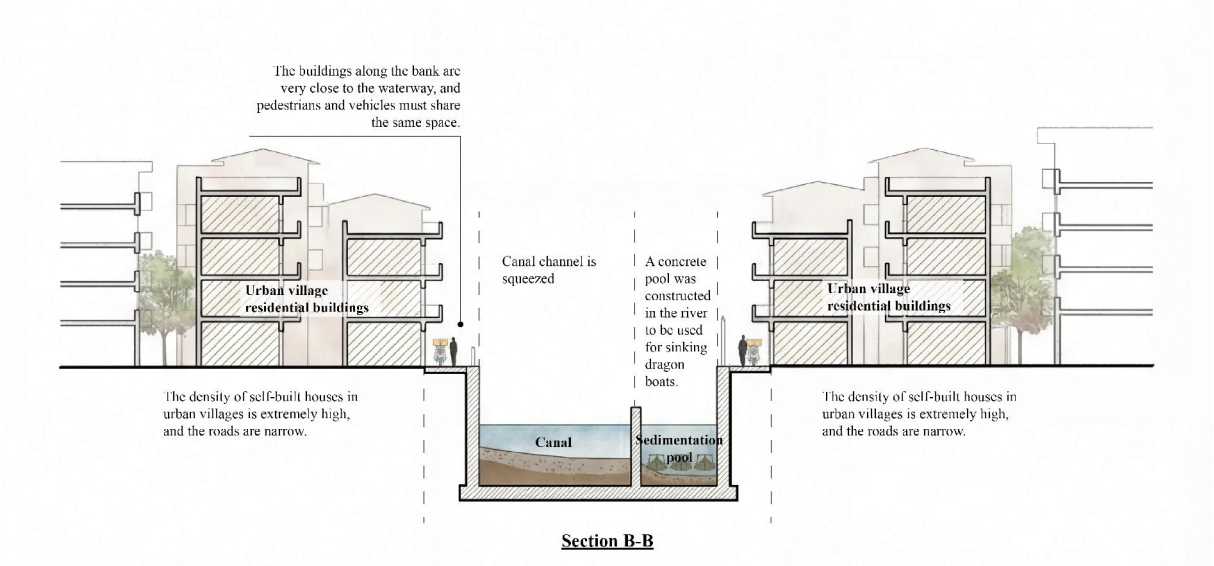


Figure 2-16 Cross-Section at the Longchuan'ao Node of the Waterway (B–B)

(Source: Drawn by the author)

Figure 2-17 corresponds to the southern factory-frontage segment, whose principal feature is an asymmetrical relationship between the two banks and the dominance of productive interfaces. Compared with the previous two section types, the channel itself is relatively intact in this segment, yet the spatial relationship between the two sides is clearly unbalanced: one side consists of urban-village housing and a roadside corridor, while the other is occupied by buildings associated with garment production, forming an overtly production-oriented interface. The road accommodates multiple functions, including two-way circulation, temporary parking, and freight loading and unloading, while no transitional zone or stopping space exists between the water body and adjacent bank activities. Overall, the waterway remains subordinate to the organization of production and circulation along its edges. Therefore, the issue reflected in Figure 2-17 is that the potential of the channel as public waterfront space continues to be suppressed by the logic of productive use, making it difficult for the riverside interface to be transformed into a genuinely open, accessible, and occupiable public place.

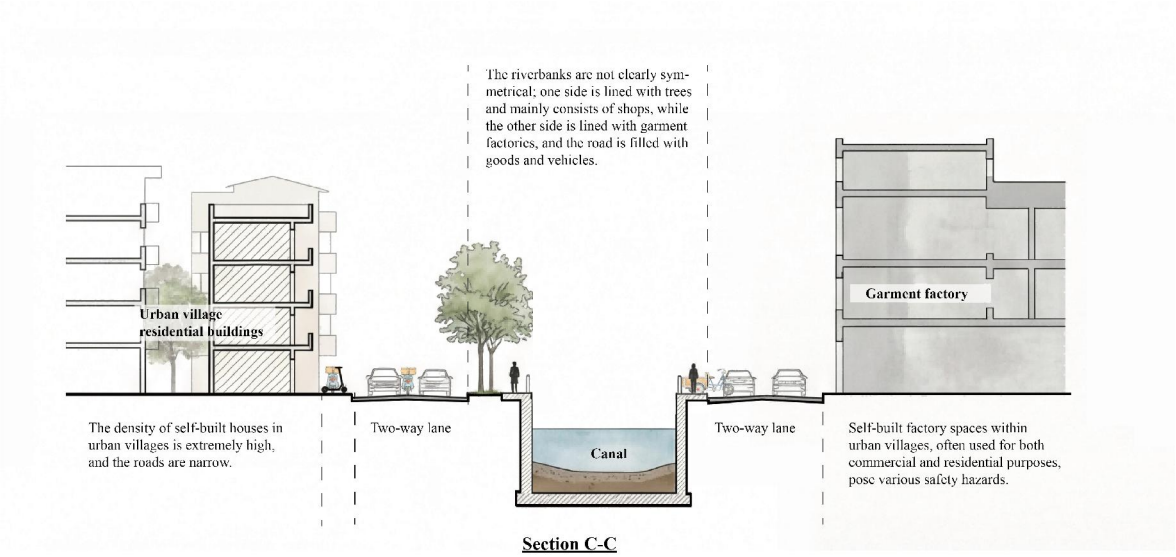


Figure 2-17 Cross-Section of the Factory Segment of the Waterway (C–C)

(Source: Drawn by the author)

Taken together, the H/W enclosure analysis and the spatial characteristics of the three representative sections indicate that the existing condition along the Kangle Waterway remains generally within a state of high-density compression and constrained transition. On the one hand, the culverted treatment of the headwater segment weakens the spatial legibility of the origin of the waterway, causing what should be a publicly meaningful starting point to deteriorate into an infrastructural space compressed by ancillary facilities and dense built form. On the other hand, the dragon boat node and the factory-frontage section reveal, respectively, a lack of effective spatial support for carriers of cultural memory and the continued suppression of waterfront openness by production-oriented interfaces. This further demonstrates that, although there are local variations among the sections, most of them share common problems, including the imbalance between building height on both sides and channel width, the hardening of embankments, the excessive functional burden placed on riverside roads, and the lack of transitional zones between the water body and adjacent bank activities. Therefore, the core contradiction at the sectional level of the Kangle Waterway lies not simply in the small scale of the channel itself, but in the overall imbalance produced by the long-term superimposition of sectional geometry, interface attributes, and patterns of use. Although the waterway still exists as a continuous physical entity, it has not yet formed a waterfront spatial structure that is accessible, occupiable, and legible, nor does it yet possess the composite sectional conditions required to support ecological buffering, public activity, and the expression of site memory.

2.2.3. Existing Conditions of Traffic Organization and Public Space

From the perspective of the overall operational mechanism of the site, the corridor along the Kangle Waterway has long functioned as a high-density mixed-use environment embedded within the peripheral production and circulation system of the Zhongda textile trading district. As shown in Figure 2-18, the site maintains close external connections with the Zhongda cloth market and the wider commercial area through Ruikang Road, Nantai Road, and the surrounding primary and secondary roads. Internally, however, a large number of narrow lanes with limited sectional capacity are required to accommodate multiple functions, including freight penetration, everyday circulation, and pedestrian movement. The traffic system along the Kangle Waterway should therefore be understood as a composite operational system in which industrial logistics, daily life, and the use of public space are deeply intertwined.

In terms of road hierarchy, the municipal roads surrounding the site primarily serve as the main connectors linking the area to the external commercial district, the broader urban road system, and the regeneration zone. Once movement enters the interior, however, circulation rapidly shifts into an informal network structured by narrow lanes. As shown in Figure 2-18, freight flows do not stop at the peripheral roads, but continuously penetrate inward through multiple internal lanes toward the waterway corridor and the ground-floor interfaces of buildings, forming a layered transport path that extends from external main roads to internal branch lanes and finally to street-level frontages. This network is characterized by a high degree of informality and permeability. Its operation relies on flexible modes such as electric scooters, small trucks, handcarts, and manual carrying, and therefore does not conform to the conventional logic of hierarchical urban road management. As a result, although the internal lanes are spatially limited, they have long been required to bear a logistical burden exceeding their actual carrying capacity.

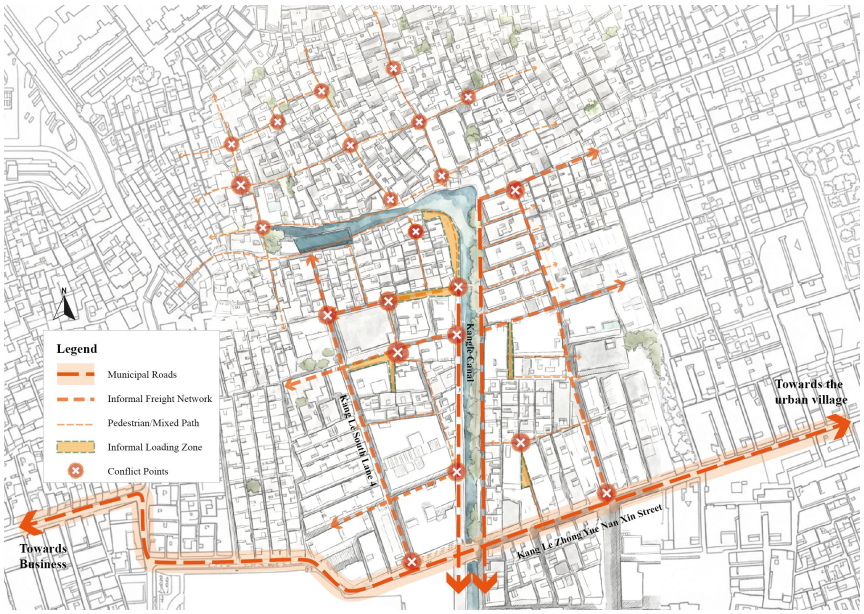


Figure 2-18 Analysis of Traffic Organization, Freight Flows, and Conflict Points along the Kangle Waterway Corridor *(Source: Drawn by the author)*

Observation of the interior lanes further shows that freight movement and pedestrian activity have become highly overlapped in a shared circulation condition. Field photographs in Figure 2-19 and Figure 2-20 show that narrow lanes simultaneously accommodate electric scooters in motion, temporary parking, cargo stacking, piles of everyday miscellaneous items, and pedestrian movement. In some locations, overhead wires, ground-floor extensions, and building canopies further compress the effective section of the space. Although these lanes formally still serve circulation, their effective pedestrian interfaces have been repeatedly encroached upon, forcing pedestrians and freight vehicles to share the same narrow path. Thus, the internal roads of the site have effectively become mixed-traffic corridors that are passively surrendered to the competing pressures of logistics, on-street parking, and production-oriented ground-floor use.

The operational conflicts along the riverside roads are even more complex. Field photographs in Figure 2-21 and Figure 2-22 indicate that the roads along the Kangle Waterway must simultaneously serve, on the one hand, as outward-facing interfaces for street-level shops, production buildings, and daily services, and on the other hand, as corridors continuously subjected to the pressures of motor-vehicle circulation, non-motorized parking, short-term loading and unloading, and freight distribution. In some segments, one side of the road directly borders the waterway, while the other side is lined with continuous productive or commercial ground-floor frontages. Parking, loading and unloading, entrance activities, and street-level business operations are all superimposed within a limited road width, with the result that interfaces that might otherwise become waterfront pedestrian

spaces are persistently occupied by traffic operation and logistical use. In particular, in segments where trucks stop and goods are intensively loaded or unloaded, the road function is clearly skewed toward that of a logistics corridor, and pedestrians are forced to move through the gaps between vehicles and cargo. Under such conditions, the riverside space is unable to form a continuous, comfortable, and safe public walking interface.



Figure 2-19 Existing Mixed Circulation of Freight and Pedestrians in Internal Lanes



Figure 2-20 Existing Temporary Clutter and Spatial Compression in Internal Lanes



Figure 2-21 Existing Commercial Frontages and Parking Encroachment along the Riverside Road



Figure 2-22 Existing Truck Stopping and Freight Distribution along the Riverside Road

(Source: Photographed by the author)

In summary, the existing traffic system along the Kangle Waterway exhibits three prominent characteristics. First, a strong logistics-penetration relationship exists between the peripheral municipal roads and the internal lane network, causing the interior roads to bear excessive transport pressure. Second, freight movement, residents' daily travel, and pedestrian activity have long been mixed together, without clear spatial separation or hierarchical organization. Third, traffic operation is highly superimposed upon ground-floor interfaces, the waterway edge, and the use of public space, resulting in conflict points being distributed and continually accumulated along the corridor. Therefore, the traffic problem of the site should not be understood simply as road congestion or parking disorder, but rather as an expression of a broader imbalance among freight flows, the pedestrian system, and public space.

2.3. Analysis of the Existing Historical and Cultural Elements

In addition to the waterway space itself, several cultural remains and memory-bearing elements with clear local significance are still preserved in the areas surrounding the Kangle Waterway. These include the three protected historic buildings—the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple—as well as the old tree at the headwater area and Longchuan'ao (a submerged dragon boat storage basin) used for

dragon boat storage. These elements not only carry the memory of clan organization, religious practice, and local folk customs within the village, but also constitute the most representative historical anchors of spatial identity in Kangle Village. Therefore, identifying and analyzing their current conditions as a distinct category is necessary not only for the purpose of historical conservation, but also as a prerequisite for subsequent spatial restructuring and memory translation.

2.3.1. Existing Conditions of the Historic Building Cluster

Within the study area, several historic buildings of conservation value remain as important material carriers of the traditional settlement structure and local cultural memory of Kangle Village. Among them, the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple are relatively concentrated in spatial terms, forming the most recognizable historic building cluster in the northern part of the site. For this reason, they are analyzed here as the principal historical anchors.

At the scale of the overall site, the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple, together with the headwater section of the Kangle Waterway, the surrounding lanes, and several localized forecourt spaces, form the most historically legible spatial core in the northern part of Kangle Village. Their location near the source area of the waterway suggests that this group of historic buildings did not exist independently from the water during the process of settlement formation, but rather maintained relatively close relationships with the waterway, the lane network, and everyday public activities. According to the spatial logic of traditional settlements, ancestral halls and temples often organized ritual, social, and gathering activities in conjunction with forecourts, side lanes, and waterfront interfaces. Their value therefore lies not only in the architectural objects themselves, but also in the relational network they form with the surrounding open spaces and the waterway. Under present conditions, however, this relational network has been significantly weakened. There is no clearly legible open transitional space between the waterway and the historic buildings. Although the lane system still links the three buildings together in plan, these connections are narrow, fragmented, and lack continuous public character, failing to form a complete spatial sequence of forecourt–lane–waterway.

The three buildings remain relatively close to one another in plan and together constitute the historic core cluster within the current site. As shown in the drone imagery in Figure 2-23, they exist as embedded elements within the high-density urban-village fabric. Although they remain adjacent to one another, they are now surrounded by a large number of later-added

village houses and self-built structures. As a result, the current spatial condition is not one in which the historic buildings actively organize the surrounding site, but rather one in which they are preserved in a compressed state within the existing urban fabric. Thus, while the cluster still retains a certain degree of spatial concentration, it lacks a corresponding external open interface and has not yet been transformed into a historic spatial field that can be clearly recognized, accessed, and perceived.

A further analysis of the surrounding interfaces and visibility in Figure 2-24 shows that the three buildings are presently in a condition where the objects remain, but the sense of place has weakened. On the one hand, their traditional roof forms, courtyard layouts, and building volumes still give them a degree of legibility within the surrounding dense and heterogeneous environment. On the other hand, the forecourts around them are generally too limited in scale, and the development of views is constrained. The spaces leading toward the building entrances and toward the waterway are fragmented by narrow alleys, temporary installations, and tightly aligned residential structures, so that although the historic buildings remain locally visible, they are unable to establish clear visual recognition or spatial guidance on a broader scale. In particular, with regard to their relationship to the waterway, while the imagery still faintly suggests the proximity of the cluster to the water, the spatial link between them has been almost entirely blocked by intervening buildings. The waterway does not function as an open boundary for the historic building cluster; instead, it is severed from it by dense village housing and later-built interfaces. Between the historic buildings and the water, there are no clear visual corridors, pedestrian links, or occupiable open spaces.



Figure 2-23 Historic Buildings Embedded within a High-Density Built Environment

(Source: Photographed by the author)



Figure 2-24 Surrounding Interfaces of the Historic Buildings

(Source: Photographed by the author)

In terms of architectural attributes, the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple correspond respectively to different types of

traditional spatial carriers, including clan ritual, branch-line ancestral continuity, and local religious practice. In traditional settlements, these spaces not only served ceremonial and devotional functions, but also often acted as important nodes for discussion, gathering, and festive events[29]. Field photographs in Figure 2-25 show that the buildings themselves still preserve relatively complete Lingnan ancestral-hall typologies. Their grey-brick walls, pitched roofs, eaves, and courtyard configurations remain clearly legible, while the facades and interior courtyards still retain strong traditional character. At the same time, Figure 2-26 shows that the forecourt of the ancestral hall still accommodates festive and gathering functions in contemporary use: traces of firecrackers on the ground, temporarily assembled groups of people, and the relatively open entrance space indicate that it has not been completely detached from everyday local life, but still serves, at particular moments, as a setting for community activity and ritual events. As shown in Figure 2-27, the interior space of the Luo Clan Ancestral Hall has not entirely lost its use either; the courtyard and main hall still retain a certain degree of integrity and spatial order, suggesting that such historic buildings continue to possess strong continuity at the level of the architectural object itself. For this reason, this study defines them as historical anchors, because they continue to play a role in organizing public life and sustaining local identity within the settlement structure. Although the buildings themselves still retain a certain cultural and public function, the historic spatial field that should originally have been formed through the combined relationship of forecourts, lanes, and waterfront interfaces can no longer be fully perceived or effectively organized.



Figure 2-25 Everyday Condition of the Forecourt of the Historic Buildings



Figure 2-26 Activities Organized in the Forecourt of the Historic Buildings



Figure 2-27 Existing Interior Condition of the Luo Clan Ancestral Hall

(Source: Photographed by the author)

In summary, the current condition of the historic building cluster on the northern side of the Kangle Waterway is one in which the historic objects remain concentrated and the rudimentary cluster structure still survives, but the relationships among the buildings, the lane system, the forecourt spaces, and the waterway have been significantly weakened by

high-density village housing and later-built surroundings. As a result, the cluster currently appears more as a collection of historic remnants that are enclosed and compressed, rather than as a historic spatial core capable of clearly responding to the water, organizing public activity, and reshaping the perception of the site. Therefore, the focus of subsequent design should not remain limited to the conservation of individual buildings, but should instead emphasize the re-establishment of the spatial relationships among the three buildings and between them and the Kangle Waterway.

2.3.2. Existing Conditions of Folk-Memory Spaces

In addition to the historic building cluster on the northern side, the preserved old tree and Longchuan'ao (a submerged dragon boat storage basin) near the headwater section of the Kangle Waterway together constitute another important category of place-based historical anchors within the site. Unlike ancestral halls and temples, whose historical value is carried primarily by the architectural object itself, this type of anchor is more closely manifested as a spatial node of memory formed through the long-term superimposition of local everyday life, the waterway environment, and folk activities. As shown in the locational relationships in Figure 2-28, the old tree, Longchuan'ao, and historic buildings such as the Luo Clan Ancestral Hall maintain close spatial proximity and are jointly distributed within the headwater area of the Kangle Waterway, indicating that this was a composite space where historical village activities were concentrated along the water's edge.

In terms of their overall relationship, the preserved old tree and Longchuan'ao are located at the source area of the waterway and constitute one of the few visual pause points and spatial reference points within the high-density built environment. As shown in Figure 2-29, Longchuan'ao is embedded at the edge of the channel, while the preserved old tree stands nearby; together they form the core elements of the headwater node. From the perspective of spatial potential, this location originally possessed the basis for generating a composite scene of lingering beneath the tree, waterfront activity, and folk-memory expression.



Figure 2-28 Relationship among the Historic Building Cluster, the Old Tree, and Longchuan'ao

(Source: Photographed by the author)



Figure 2-29 Spatial Relationship between the Old Tree and Longchuan'ao

(Source: Photographed by the author)

The preserved old tree has a strong degree of place legibility within the site. Compared with the surrounding self-built housing and later-added buildings, which are highly dense and morphologically repetitive, the tree forms a distinct vertical marker at the headwater node and provides one of the few experiences of openness and spatial pause within the site. In traditional settlements, moreover, a large tree is not only a natural element, but also often an important support for neighborhood gathering, everyday social interaction, and local spatial recognition. However, as shown in Figure 2-30, the space around the tree is now fragmented by enclosures, auxiliary structures, waste-collection functions, and disorderly vehicle parking, making it difficult for the space beneath the tree to continue serving as an open public space. Therefore, although the preserved old tree remains the most recognizable place-based element at this node, its public character and spatial organizing capacity have been significantly weakened.

Longchuan'ao, by contrast, reflects the continuing practical connection between the site and local dragon boat customs. The tradition of dragon boat racing in Guangzhou is still mainly preserved in traditional water-network areas such as Haizhu, Liwan, Panyu, and Huangpu. Its ritual sequence includes activities such as raising the dragon boat, plucking auspicious greens, ceremonial visits, racing, communal dragon-boat feasting, and sending off the dragon, demonstrating that dragon boat culture is not merely a festive performance, but a water-town folk tradition closely associated with local water bodies, community organization, and annual ritual cycles[39]. In relation to the present study site, the significance of Longchuan'ao does not lie in the facility as an isolated object, but in the fact that, as a space associated with dragon boat storage, it preserves a relational trace between the Kangle

Waterway and local festive practices. However, in terms of its present form, Longchuan'ao already displays marked characteristics of engineeringization and functionalization. Field photographs in Figure 2-31 show that the existing Longchuan'ao takes the form of a hard concrete basin embedded into the edge of the channel, with rigid boundaries and explicit construction, lacking any soft transition between the basin, the natural riverbed, and the adjacent bank space. While this treatment preserves the basic function of dragon boat storage, it weakens the original spatial expression of the dragon boat basin as a folk-cultural setting and a waterfront node, making it closer to a retained functional facility than to a cultural place that can be perceived and engaged by the public [41].



Figure 2-30 Existing Condition of the Preserved Old Trees

(Source: Photographed by the author)

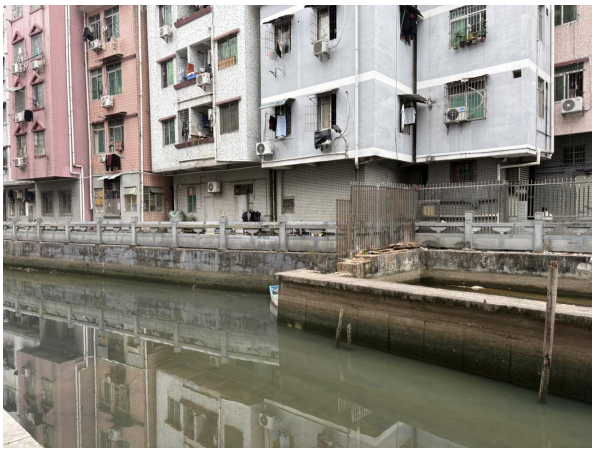


Figure 2-31 Existing Condition of Longchuan'ao within the Waterway

(Source: Photographed by the author)

2.3.3. Relationship Between Historical and Cultural Elements and the Waterway

The foregoing analysis shows that the existing historical and cultural elements surrounding the Kangle Waterway—including clusters of historic buildings, old trees, and the dragon-boat dock—originally formed a composite place-based system organized around the waterway as a linear spatial medium. Within the spatial logic of the traditional settlement, the waterway not only served as a natural water body and supported everyday use, but also worked together with forecourts, alleys, and ritual spaces to structure clan activities, folk customs, and grassroots public life.

Under current conditions, the relationship between the waterway and these historical and cultural elements has been weakened in three main respects. First, spatial accessibility has declined. Historical nodes that were once connected through alleys, forecourts, and waterfront interfaces have become increasingly dispersed due to the compression of the surrounding built environment and constrained circulation conditions. As a result, the waterway has failed to function effectively as the primary public-space axis linking these historical nodes. Second,

visual legibility has also diminished. Although the historic buildings, old trees, and dragon-boat dock remain highly identifiable elements, there is a lack of clear and continuous visual organization between them and the waterway. In some areas, obstructed interfaces, insufficient forecourt space, and environmental disorder further prevent these historical and cultural elements from forming a coherent sequence of spatial recognition within the site as a whole. Third, the relationship at the level of lived scene and activity has also weakened. Although festivals, rituals, and local folk practices still continue in certain areas, their interaction with the waterway space has clearly diminished. Historical and cultural elements are therefore more often presented as passively preserved objects, rather than functioning as organizing nodes within contemporary public life.

In summary, the core problem of the historical and cultural elements surrounding the Kangle Waterway lies in the continuing erosion of their original structural relationship with the waterway, the alley network, and everyday public life. Overall, the site is characterized by a condition in which “the objects remain, but the relationships are severed and the scenes have degraded.” Subsequent design intervention should therefore focus less on the isolated preservation of individual elements and more on re-integrating historic buildings, folk-cultural facilities, and natural places into a continuous riverside public-space sequence through the reorganization of waterway space, the linking of nodal systems, and the improvement of surrounding interfaces.

2.4. Existing Conditions of Industrial Buildings

Field investigation indicates that the southern part of the study area still retains a certain concentration of productive building clusters. Their functions are primarily related to garment manufacturing, warehousing, processing, and associated business activities, leaving clearly visible traces of industrial use along street frontages, within internal alleys, and in semi-interior spaces. Through their long-term development, these buildings have participated in shaping the spatial structure of the site and have also carried important memories of the stage in which village life and industrial production coexisted in Kangle Village.

2.4.1. Analysis of the Existing Building Stock on the Site

From the perspective of the overall built environment, the existing building stock along the Kangle Waterway is dominated by high-density self-built housing and mixed-use buildings, forming an urban-village fabric characterized by extremely high intensity, widespread edge-to-edge construction, and severe spatial compression. These buildings

constitute the overwhelming majority of the site. Although they vary considerably in number of stories, massing, facade quality, and ground-floor use, they share a series of common problems, including insufficient building spacing, restricted ventilation and daylight, weak fire-safety and evacuation conditions, and the absence of effective public interfaces. Accordingly, the existing building stock can be understood as a background built environment marked by high density, narrow spacing, and low openness.

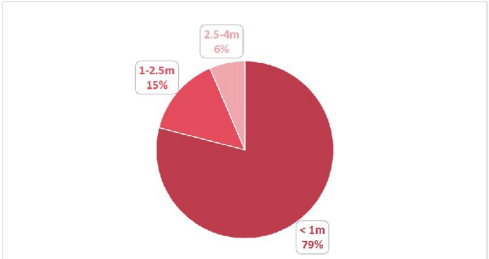
A further examination of the distribution of building spacing, as shown in Figure 2-32, indicates that the overwhelming majority of buildings on the site are already in a highly compressed condition. Statistical results show that approximately 79% of buildings have edge-to-edge distances of less than 1 meter, around 15% fall between 1 and 2.5 meters, and only 6% reach a spacing of 2.5 to 4 meters. These results demonstrate that the existing buildings generally lack the necessary setbacks and buffer interfaces. As a consequence, many of them can no longer meet acceptable conditions for daylight, ventilation, and safe evacuation, nor can they provide sufficient spatial reserve for the insertion of future public space, interface integration, or environmental improvement.

From the perspective of spatial safety, the combination of high building density and mixed-use functions further intensifies the operational pressure of the site. A large number of buildings simultaneously accommodate commercial activities, storage, processing, living functions, and logistical support on their ground floors. As a result, the problems associated with the building stock are no longer limited to the physical quality of individual buildings, but instead become more complex spatial risks produced through their superimposition with surrounding lanes, traffic flows, and the waterway interface[42]. Therefore, within the broader context of overall regeneration, the existing building stock should not be treated in a generalized way as something either to be preserved wholesale or comprehensively transformed. Rather, it is necessary to distinguish between ordinary background buildings and a limited number of candidate objects possessing special value.



Figure 2-32 Distribution of Building Spacing

(Source: Drawn by the author)



Analysis of Building Spacing & Fire Safety		
Minimum Edge-to-edge Distance	Footprint Area (m²)	Percentage
< 1m	53807.81	79%
1-2.5m	9917.12	15%
2.5-4m	4381.53	6%
Total Area	68106.46	100%

Figure 2-33 Analysis of Building-Spacing Characteristics

(Source: Drawn by the author)

Accordingly, this study understands the existing building stock as being, on the whole, in relatively poor condition and generally lacking a direct basis for adaptive reuse. This judgment provides the background reference for the subsequent identification of a limited number of representative objects with potential for translation. Precisely because most of the existing buildings are simply the result of high-density expansion, it becomes all the more necessary to identify those few objects that possess typological characteristics, industrial relevance, and interface value.

2.4.2. Analysis of Industrial Buildings

In order to further clarify the objects and direction of subsequent regeneration design, the existing industrial spaces in the southern section of the Kangle Waterway are classified and analyzed in the next step. Based on field investigation and graphic documentation, the industrial spaces within the study area can generally be grouped into the following three categories.

The first category, shown in Figure 2-34, consists of representative factory-type spaces suitable for retention and adaptive reinterpretation. Buildings of this type usually retain a relatively complete volume, are in comparatively good structural condition, and possess a strong degree of industrial or productive interface recognizability, thereby clearly reflecting the spatial characteristics of the development stage of Kangle Village's garment industry. Their advantages lie in their relatively generous spatial scale and strong potential for transformation. They are capable not only of retaining their material characteristics as carriers of the site's industrial memory, but also of being reinterpreted into spaces for exhibition, communication, light entrepreneurship, or public services. Therefore, this category is more

suitable to serve as a key object for retention and reinterpretation in the subsequent design.

The second category, shown in Figure 2-35, includes street-front commercial and storage interface spaces. These spaces are mostly distributed along roads or waterfront edges and are typically closely associated with activities such as business operations, storage, loading and unloading, and short-term stopping. Their main characteristic lies in their close relationship with everyday street use and the waterway space. However, the overall environment is relatively disorderly, while the integrity and structural value of the buildings themselves are comparatively ordinary. The significance of this category does not lie in preserving each building as a complete architectural entity, but rather in the fact that its interface characteristics, patterns of use, and traces of industrial activity constitute an important layer of the site's modern industrial memory. In subsequent regeneration, such spaces are therefore more appropriately addressed through interface improvement, ground-floor opening, functional replacement, and spatial reorganization, rather than being preserved in their original state in full.

The third category, shown in Figure 2-36, consists of ordinary productive buildings and temporary extension spaces. This type accounts for a relatively large proportion of the site. Such spaces are generally of average construction quality, exhibit evident spatial compression, and create considerable interference with the public interface of the waterway, road circulation, and the historic environment. At the same time, they lack strong place recognizability and sustainable reuse value. From the perspective of regeneration, this category is more suitable for demolition, clearance, or comprehensive rectification, so as to release the necessary space for riverside public areas, the forecourts of historic nodes, and the slow-mobility system.

This classification indicates that the industrial spaces on the site should not be uniformly regarded as negative existing stock. Instead, they should be evaluated hierarchically according to their integrity, recognizability, and transformation potential, so as to support the formulation of subsequent strategies of demolition, adaptation, and retention.



Figure 2-34 Retainable Factory Building



Figure 2-35 Street-front Commercial and Storage Space



Figure 2-36 Ordinary Productive Space

(Source: Photographed by the author)

2.4.3. Selection and Analysis of Buildings for Retention

On the basis of the classification of industrial space types, and in consideration of the existing site conditions, spatial location, building morphology, and potential for subsequent adaptive reinterpretation, three representative buildings in the southern part of the study area are preliminarily identified as retention objects, as shown in Figure 2-37. They are labeled Retained Building A, Retained Building B, and Retained Building C, respectively. All three are located within the area where industrial buildings are relatively concentrated along the southern section of the Kangle Waterway, and together they clearly reflect the existing characteristics and spatial attributes of different types of industrial buildings on the site. Among them, Building A belongs to the category of representative factory-type spaces suitable for retention and reinterpretation, while Building B and Building C are key examples within the category of mixed-use spaces combining street-front business, storage, and production. The identification of these three buildings helps to clarify the specific physical carriers through which industrial memory may be preserved and reactivated in the subsequent regeneration design.



Figure 2-37 Selected Retained Industrial Buildings ***(Source: Photographed by the author)***

Retained Building A is the most representative industrial building selected in this study. It has a relatively large volume, a high degree of overall integrity, and is located at the cross-shaped interface formed by the intersection of the waterway and the north–south arterial road. Owing to its visibility from both the waterfront and the street, it is one of the most spatially legible buildings in the southern part of the study area. In terms of functional composition, the ground floor is primarily occupied by street-front shops, while the upper floors combine commercial and productive functions, forming a typical pattern of "commercial–productive mixed use." This hybridity makes it particularly representative of the composite spatial character developed by Kangle Village's garment industry within the context of a high-density urban village. At the same time, its location directly relates to the waterway, the road network, and the surrounding building clusters, making it one of the few key nodes on the site capable of simultaneously responding to waterfront display, industrial reinterpretation, and the restructuring of the public interface. Therefore, this building not only possesses strong representational value as a carrier of industrial memory, but also demonstrates considerable potential for spatial reinterpretation. In subsequent design, it may serve as the core carrier for the reinterpretation of industrial memory in the southern section, and be transformed into a composite public-industrial node oriented toward both the waterway and the street through ground-floor opening, façade improvement, and functional replacement.

Retained Building B embodies the mixed-use characteristics typical of Kangle Village's garment workshops. Although its scale is relatively moderate, its spatial organization is comparatively clear. The ground floor mainly accommodates storage functions, while a relatively ample freight forecourt is preserved around the building, capable of meeting practical needs such as loading and unloading, short-term stopping, and logistics turnover. The upper floors are primarily used for garment production, with part of the space also serving as workers' dormitories, thus forming a vertically stacked pattern of "storage, production, and living." This composite relationship closely reflects the everyday operational mode of Kangle Village's garment industry and reveals the reality of the high degree of interweaving between industrial space and living space within the urban village. The value of Building B lies in the fact that it preserves, to a relatively complete extent, the functional structure and use logic of a typical garment workshop, making it an important sample for identifying the everyday operating mechanism of Kangle Village's industrial spaces. In subsequent design, this building may function as a supporting node for industrial display and spatial reinterpretation. On the basis of retaining part of its productive spatial characteristics,

its freight forecourt, ground-floor interface, and internal circulation may be reorganized so that it can be transformed from an enclosed production unit into a composite space accommodating display, communication, and light-use activities.

Retained Building C, in its current condition, is a dormitory building within the factory cluster. Its functional attribute does not directly represent the production process itself, but rather reflects the residential support function that accompanied the industrial system. Morphologically, Building C differs markedly from the more homogeneous ordinary factory buildings surrounding it, demonstrating stronger recognizability and typological distinctiveness. It therefore has a certain degree of spatial legibility within the overall factory cluster. Although it is not a typical production building, its presence reveals the tightly coupled spatial relationship between production and living that developed through the long-term evolution of Kangle Village's garment industry, and thus constitutes an indispensable part of the site's industrial memory. Compared with Building A and Building B, Building C is more suitable as a supplementary retention object at the typological level. In subsequent regeneration, it may accommodate functions such as the display of everyday industrial life, the insertion of supporting services, or the transformation into small-scale mixed-use programs. In this way, together with the former two buildings, it may contribute to a multi-layered reinterpretation system in the southern section, extending from "productive space" to "spaces of industrial memory."

Taken together, these three retained buildings represent three different emphases within the existing stock of industrial buildings in the southern part of the study area. Collectively, they constitute the basic objects for the identification and regenerative reinterpretation of industrial memory in this area, and they also provide a realistic foundation for shifting the southern section from a singular "back-of-house production area" toward a composite waterfront space that incorporates display, communication, service, and public activity.

2.5. Identification of Site Problems

The foregoing diagnosis reveals that problems along the Kangle Waterway stem from a compound imbalance between the high-density urban-village environment, industrial insertion, and the current regeneration context. The surrounding social structure is equally composite: migrant garment workers, original villagers, sub-lessors, and small enterprise owners form complex rental networks, while daily activities mix production logistics, loading/unloading, worker rest, and clan festivals. The stream's encroachment by freight and temporary storage reflects the deep tension between ecological/cultural aspirations and real social operations.

Renewal strategies must therefore reintegrate the stream into this social fabric—releasing public interfaces while retaining necessary industrial corridors and activity flexibility for diverse populations.

At the core of this imbalance is the fact that the spatial relationships that might once have been formed among the waterway, the lane network, historical anchors, and industrial memory have been continuously weakened, resulting in the absence of a clear spatial backbone and a legible spatial order. Taken together, the current conditions of the site can be summarized into the following four major problems, as further presented in Table 2-1.

First, the failure of the waterway as a public spatial backbone. Although the Kangle Waterway remains the clearest linear spatial element within the site, in its current state it functions more as an infrastructural corridor confined by the high-density built environment and controlled by engineering facilities, rather than as an organizing backbone of public space. The covering of the headwater section, the enclosure of the riverside edges, sectional compression, and insufficient public accessibility collectively prevent the effective release of the waterway's public and ecological potential.

Second, the rupture of the relationship between historical anchors and the waterway. Important anchors such as the historic building cluster, the preserved old tree, and Longchuan'ao are still retained in the northern part of the site, indicating that the site continues to possess a strong material basis for historical legibility. The problem, however, is that the spatial relationships between these elements and the waterway, the lane network, and everyday public life have been significantly weakened, producing an overall condition in which the objects remain, but the relationships are broken and the spatial scenes have deteriorated.

Third, the gradual disappearance of the site's memory layers. Since the modern period, Kangle Village has developed spatial traces associated with garment production, storage, processing, and circulation, some of which still remain in portions of the street-facing interfaces and in a limited number of productive buildings. Without further identification and translation, however, these modern industrial memories are easily replaced in the course of comprehensive regeneration by generalized new construction, thereby causing the site to lose the distinct historical layering of village–industry coexistence.

Fourth, the lack of overall organization within the riverside spatial system. The most fundamental contradiction of the site does not lie merely in the insufficiency of any single spatial element, but rather in the absence of a clear structural relationship among the waterway, traffic, historical nodes, and memory carriers. As a result, the site currently presents a

condition in which the waterway exists but does not form a system, the nodes exist but do not form a sequence, and the memories exist but do not form a scene. What is lacking is an overall framework capable of coordinating the relationships among the waterway, history, memory, and public space.

Table 2-1 Summary of Major Site Problems Identified ***（Source: compiled by the author）***

Problem Type	Main Manifestations	Implications for Design
1. Failure of the waterway as a public spatial backbone	Covered headwater section, enclosed riverside edges, sectional compression, and insufficient public accessibility.	Priority should be given to re-establishing the waterway as the organizing main axis of riverside public space.
2. Isolation of historical anchors	The historic building cluster is enclosed, forecourts are insufficient, connections with the waterway are weakened, and folk-memory nodes have deteriorated.	The spatial relationships among historical nodes, the waterway, the lane network, and public activity need to be reconstructed.
3. Gradual disappearance of the site's memory layers	Ordinary high-density background buildings dominate, while the limited productive buildings and interfaces have not yet been adequately identified or translated.	Representative carriers of industrial memory need to be identified and translated.
4. Lack of organization within the riverside spatial system	The waterway, traffic, historical nodes, and memory carriers are fragmented from one another, lacking a continuous spatial sequence.	An overall framework that coordinates the waterway, history, memory, and public space needs to be established.

This chapter has analyzed the existing spatial elements along the Kangle Waterway and identified four core problems: the failure of the waterway as a public spatial backbone, the rupture of the relationship between historical anchors and the waterway, the gradual disappearance of the site's memory layers, and the lack of overall organization within the riverside spatial system. These findings indicate that the key to site regeneration lies not in the repair of isolated elements, but in the reorganization of the relationships among the waterway, history, memory, and public space through a systematic spatial approach. On this basis, the next chapter will further examine relevant theories and representative case studies in order to explore spatial regeneration paths capable of responding to the above problems.

Chapter 3 Theoretical Foundations and Case Studies

3.1. Theoretical Review

The diagnosis presented in Chapter 2 shows that the core problems currently faced by the sites along the Kangle Waterway lie in the simultaneous weakening of the waterway's public backbone, the system of historical anchors, and the layers of industrial memory under conditions of high-density regeneration. In response, the subsequent research must introduce theoretical perspectives capable of addressing, in an integrated manner, the organization of linear space, the structuring role of water, and the coordinated regeneration of ecological, social, and cultural dimensions. Accordingly, this study adopts Landscape Urbanism, Water Urbanism, and Ecological Urbanism as its integrated analytical framework. These three theoretical approaches correspond respectively to the core needs of the site at the levels of spatial restructuring, water-led spatial logic, and the comprehensive performance of regeneration, and therefore demonstrate a high degree of theoretical relevance to the study area.

3.1.1. Landscape Urbanism

Landscape Urbanism emerged in North American academic discourse in the 1990s, with representative figures including James Corner and Charles Waldheim. The theory developed out of a critical reflection on traditional architecture-centered approaches to urban design. Its fundamental proposition is to regard landscape, rather than architecture, as the primary medium for organizing urban space, and to incorporate open space, infrastructure, topography, and ecological processes into a unified structural framework. As represented by The Landscape Urbanism Reader, edited by Charles Waldheim, this theoretical direction emphasizes that landscape should no longer be understood merely as a supplementary beautification element added after urban construction, but rather as a form of operative infrastructure capable of organizing urban morphological transformation, integrating infrastructure, and accommodating uncertainty[7].

In terms of theoretical content, the core of Landscape Urbanism does not lie in the simple addition of green space or landscape elements, but in the reorganization of urban spatial structure through open-space networks. It places greater emphasis on the processual, temporal, and structural dimensions of the site, arguing that urban space should establish an adaptive and extensible framework capable of accommodating future environmental change, social use, and functional transformation [45]. In this sense, landscape is understood as a

foundational organizational system capable of coordinating ecology, water management, traffic, and public activity, with its primary value lying in the reconstruction of the spatial backbone.

At the level of spatial method, Landscape Urbanism typically forms a structural pattern combining corridors, nodes, and districts through strategies such as green-network construction, the integration of linear open spaces, the organization of nodal systems, and the linkage of pocket spaces, thereby repairing the ruptures in urban fabric caused by high-density construction or rapid expansion [45]. Its methodological emphasis lies in establishing a structure of order led by open space, so that originally scattered and fragmented spatial pieces can be reincorporated into a coherent overall framework.

Returning to the present study site, as summarized in Table 3-1, the significance of introducing Landscape Urbanism lies primarily in its ability to respond to the two problems identified in Chapter 2: the failure of the waterway as a public spatial backbone and the lack of overall organization within the riverside spatial system. Although the Kangle Waterway remains the clearest linear element within the site, it is not currently recognized as a true public backbone. Instead, its structural role has been weakened by the compression of the high-density built environment, the fragmentation of the lane network, and the lack of continuous organization in riverside space. Within this context, Landscape Urbanism allows the Kangle Waterway to be reinterpreted as a foundational landscape structure through which the district's public-space system can be reorganized. By integrating the waterway, water lanes, ancestral-hall forecourts, and scattered pocket spaces into a continuous open-space network, a spatial method of linear corridor–nodal space–district stitching can be formed, enabling the waterway to be transformed from a passive boundary into a structural medium for urban regeneration.

Table 3-1 **Site Relevance of Landscape Urbanism**
(Source: compiled by the author)

Item	**Content**
Corresponding level	Overall spatial structure
Core concern	Landscape as the foundational medium for organizing urban space
Corresponding problems	Failure of the waterway as a public spatial backbone; lack of overall organization within the riverside spatial system
Implications for the site	Integrating the Kangle Waterway, water lanes, ancestral-hall forecourts, and pocket spaces into a continuous linear public-space system

Accordingly, within the theoretical framework of this study, landscape urbanism primarily addresses issues at the level of spatial structure—that is, how the public backbone and overall spatial order along the Kangle Waterway can be re-established through the integrative capacity of landscape infrastructure. What landscape urbanism provides for the regeneration of the Kangle Waterway is, above all, a methodological foundation for reconstructing the overall spatial order of the site through linear open space. Through the systematic integration of the waterway, nodes, and interfaces, it brings ecological restoration, the linkage of historical and cultural elements, and the reinterpretation of industrial space into a unified spatial logic, thereby laying the structural foundation for the coordinated regeneration of ecology, culture, and industry.

3.1.2. Water Urbanism

Water Urbanism refers to a body of theoretical perspectives that has gradually emerged since the twenty-first century around the reconfiguration of the relationship between water and the city. Research represented by Kelly Shannon emphasizes that water should not be understood merely as an object of drainage, flood control, or environmental management, but rather as an important medium for shaping urban spatial structure, land-use patterns, and ecological connections. In Water Urbanisms and related studies, water is repositioned at the center of urban spatial organization. Its significance lies in promoting a shift in urban form from rigid, engineering-oriented control toward an integrated system in which ecological processes, spatial organization, and social use are mutually coupled[8].

In terms of theoretical content, compared with Landscape Urbanism, the emphasis of Water Urbanism lies not in the reorganization of open-space networks in a general sense, but in establishing water itself as the principal axis of spatial structure. In other words, while Landscape Urbanism is more concerned with how landscape reorganizes urban structure, Water Urbanism is more concerned with how water becomes the dominant medium for organizing urban form and public relationships[46]. Within this theoretical framework, rivers, waterways, lakes, and artificial water systems are no longer regarded merely as objects to be managed and controlled, but as important resources capable of guiding pedestrian systems, public interfaces, land functions, and ecological linkages.

At the methodological level, Water Urbanism emphasizes the integration of water-management functions—such as drainage, flood control, detention, and water-quality improvement—with waterfront public space, slow-mobility networks, and nodal organization, thereby establishing a spatial framework in which the water system, shoreline interface,

pedestrian network, and public nodes are mutually connected. Its core lies in transforming the water-management system into a spatial system, so that urban water bodies may regain a structural role within the city [46].Water Urbanism is therefore particularly suitable for regeneration contexts in which the water body still exists, but its spatial role has been compressed by infrastructural logic.

This point is especially critical for the present study site. As the analysis in Chapter 2 has shown, the problem of the Kangle Waterway is not merely one of insufficient water-environment governance, but rather that it has long been treated as a drainage corridor and an engineering boundary, without being allowed to perform its structural role of linking historical nodes, public spaces, and everyday activities. As summarized in Table 3-2, Water Urbanism provides a more targeted logic for this study: the Kangle Waterway should not be regarded merely as a landscape object within future redevelopment, but should instead become the principal axis for organizing riverside space, connecting historical anchors, and reconstructing public relationships. In other words, the regeneration of the Kangle Waterway should not only address water quality, water safety, and shoreline environmental conditions, but also re-establish the relationship between waterfront spaces and historical nodes through the waterway as a structuring thread, thereby transforming water from an object of governance into a spatial medium.

Table 3-2 Site Relevance of Water Urbanism

(Source: compiled by the author)

Item	**Content**
Corresponding level	Medium and system level
Core concern	Water as a structural element for organizing urban space and ecological connections
Corresponding problems	Failure of the waterway as a public spatial backbone; rupture of the relationship between historical anchors and the waterway
Implications for the site	Transforming the waterway from an object of governance into a spatial structuring medium that integrates waterfront interfaces and public nodes

Accordingly, within the theoretical framework of this study, water urbanism primarily addresses issues at the level of medium and system—that is, how the waterway can be transformed from a mere object of management into an active structuring element of spatial organization, and re-established as the dominant medium through which spatial relationships across the site are organized. In this way, historical and cultural elements can be linked along

the water, while industrial spaces can reorganize their interfaces and functions around the waterbody. Water urbanism therefore provides a key theoretical basis for promoting the systematic coordination of ecology, culture, and industry in waterfront regeneration, and serves as the crucial point of connection between the ecological dimension and the public-space dimension.

3.1.3. Ecological Urbanism

Ecological Urbanism is a comprehensive theoretical framework that emerged in the context of advancing global sustainable development, resilient cities, and interdisciplinary urban design. Represented by Ecological Urbanism, edited by Mohsen Mostafavi, this approach emphasizes that urban design should not focus solely on formal organization, but should incorporate ecological processes, resource cycles, infrastructural performance, and socio-cultural dimensions into design thinking. Its core lies in bringing environmental performance, social use, and spatial regeneration into the same logical system through cross-scalar and interdisciplinary methods[48].

In terms of theoretical content, the significance of Ecological Urbanism lies in its provision of an integrated regeneration framework capable of coordinating multiple objectives. If Landscape Urbanism emphasizes the restructuring of space through open-space systems, and Water Urbanism emphasizes the reconstruction of system logic through water, then Ecological Urbanism further asks how ecological restoration, public use, social organization, and cultural continuity may be made to operate in coordination rather than in isolation during the process of regeneration. Its importance does not lie in replacing the previous two frameworks, but in subsuming them within a broader logic concerned with both ecological performance and the composite value of socio-cultural dimensions[49].

At the methodological level, Ecological Urbanism stresses the translation of goals such as water-quality improvement, stormwater detention, thermal-environment optimization, resource circulation, and public-space restructuring into operable indicators within spatial design, while also paying attention to the continued role of community participation, everyday social use, and local cultural networks in the regeneration process[50]. In other words, this theory focuses on whether regenerated spaces can achieve long-term coordination among environmental performance, everyday use, and social identity.

Returning to the present study site, relying solely on the restructuring of landscape systems or the reinforcement of the waterway as a main spatial axis is still insufficient to respond to all of the issues involved. The regeneration of the site simultaneously concerns

ecological restoration, thermal-environment improvement, the organization of pedestrian space, the recovery of community publicness, and the continuation of historical and industrial memory. As summarized in Table 3-3, the value of Ecological Urbanism lies precisely in the fact that it provides an integrative framework for issues that would otherwise belong to different disciplinary domains. Within this framework, the regeneration of the waterway is not only a matter of restoring ecological processes, but also of renewing public space; the historic building cluster and Longchuan'ao are not only cultural objects to be preserved, but can also become nodes for reorganizing community cognition and public activity; and the translation of industrial memory should not be limited to formal retention, but must also be considered in relation to future modes of use, social participation, and environmental performance.

Table 3-3 Site Relevance of Ecological Urbanism

(Source: compiled by the author)

Item	Content
Corresponding level	Comprehensive regeneration level
Core concern	Coordination among ecological restoration, public-space restructuring, and socio-cultural dimensions
Corresponding problems	Gradual disappearance of the site's memory layers; lack of overall organization within the riverside spatial system
Implications for the site	Incorporating ecological restoration, public use, and the continuation of historical memory into a unified regeneration framework

Accordingly, within the theoretical division of this study, ecological urbanism primarily corresponds to issues at the level of integrated regeneration—that is, how ecological restoration, cultural continuity, and industrial reinterpretation can be incorporated into the process of site restructuring under the broader context of comprehensive urban regeneration. It emphasizes the interrelationship among these three dimensions in terms of public space, everyday use, and functional transformation, thereby providing comprehensive theoretical support for the regeneration of the area surrounding the Kangle Waterway. The significance of ecological urbanism lies in its provision of an integrated framework capable of coordinating ecological restoration, cultural continuity, and industrial renewal, so that the former two theories are no longer treated as separate in practical design.

3.1.4. Theoretical Synthesis

Taken together, landscape urbanism, water urbanism, and ecological urbanism are not simply juxtaposed in this study; rather, they constitute a progressive theoretical framework

developed in response to the specific problems of the site along the Kangle Waterway. As shown in Figure 3-1, landscape urbanism, at the level of spatial structure, emphasizes landscape as the foundational medium for organizing urban space, and is therefore applicable to reconstructing the linear backbone of the Kangle Waterway and its associated public spaces. Water urbanism, at the level of systemic medium, stresses the role of water in organizing urban space and public connections, and is thus relevant to transforming the Kangle Waterway from a mere object of management into a structural axis linking historical nodes, pedestrian networks, and waterfront spaces. Ecological urbanism, at the level of integrated performance, incorporates ecological restoration, public-space restructuring, and cultural continuity into a unified framework, thereby providing an overall logic for site regeneration that addresses both environmental performance and social value. When combined, these three theories form a progressive framework advancing from overall spatial organization, to waterside systemic linkage, to integrated regenerative coordination, and thus provide methodological support for the coordinated regeneration of ecology, culture, and industry within the same site.

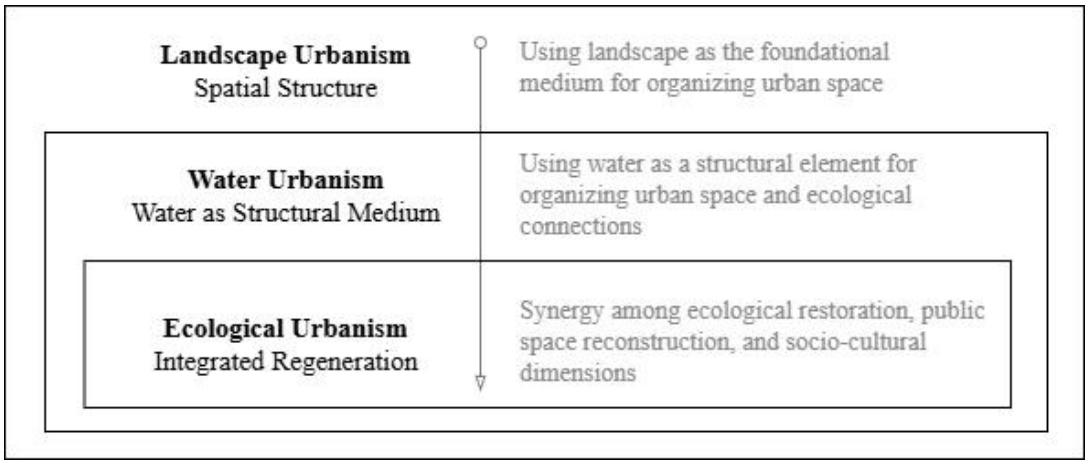


Figure 3-1 Progressive Theoretical Framework of the Three Theories

(Source: Drawn by the author)

In relation to the core problems identified in Chapter 2, Landscape Urbanism primarily responds to the failure of the waterway as a public spatial backbone and the lack of overall organization within the riverside spatial system, emphasizing the reconstruction of spatial order through linear open spaces, nodal networks, and district stitching. Water Urbanism primarily responds to the failure of the waterway as a public spatial backbone and the rupture of the relationship between historical anchors and the waterway, emphasizing the role of water as a structural medium for organizing riverside activities, public interfaces, and historical nodes. Ecological Urbanism, in turn, primarily responds to the gradual disappearance of the site's memory layers and the lack of overall organization within the riverside spatial system, emphasizing the coordination of public use, community governance,

and the translation of historical memory on the basis of ecological restoration, so as to avoid reducing regeneration to mere landscape beautification or superficial cultural display.

Based on the theoretical synthesis outlined above, this study further translates the three theories into a collaborative framework of ecology, culture, and industry for the regeneration of the spaces surrounding the Kangle Waterway. As summarized in Table 3-4, this framework understands ecology, culture, and industry as three core elements embedded within the riverside spatial system. At the ecological level, it corresponds to the restoration and reconstruction of the waterway itself, the waterfront interface, and the open-space backbone. At the cultural level, it concerns the activation and continuation of the relationships among historic buildings, folk-cultural facilities, natural places, and local memory. At the industrial level, it addresses the identification and reinterpretation of representative retained buildings, street-front productive interfaces, and the memory embedded in industrial spaces. These three dimensions do not operate as a simple superimposition; rather, they are coordinated through urban design methods in terms of spatial structure, functional layout, and interface organization.

Table 3-4 Correspondence of the Three Theories from the Perspective of Ecological, Cultural, and Industrial Synergy *(Source: Compiled by the author)*

Theory	Ecological Dimension	Cultural Dimension	Industrial Dimension
Landscape Urbanism	Reconstructs the waterway and open-space backbone	Connects historical nodes and forecourt spaces	Coordinates retained buildings and waterfront interfaces
Water Urbanism	Reinforces the waterway as an ecological axis	Restores the relationship between water, folk customs, and historical elements	Promotes the transformation of industrial interfaces from back-facing to water-oriented
Ecological Urbanism	Integrates ecological restoration and environmental performance	Emphasizes the integration of cultural continuity with public life	Guides industrial reinterpretation and community coordination

When further translated into the level of subsequent strategies, this collaborative framework can be summarized into three mutually supportive lines of reinterpretation. First, the reconstruction of the ecological backbone of the waterway responds to the problem of the failure of the site's public spatial backbone. Through sectional optimization, interface opening, slow-mobility connections, and node release, it seeks to rebuild the overall spatial order along the waterway. Second, the activation of historical and cultural nodes responds to the rupture in the relationship between historical elements and the waterway. Through the spatial integration

of ancestral halls, historic temples, old trees, dragon-boat docks, and other nodes, cultural resources are reintroduced into the system of everyday public space. Third, the reinterpretation of spaces of industrial memory responds to the gradual disappearance of industrial space in the southern section. Through the selection, improvement, and functional restructuring of representative retained buildings and street-front productive interfaces, these spaces are transformed from their former status as back-of-house production areas into composite carriers participating in the reorganization of waterfront public space. In this way, ecology, culture, and industry no longer appear as three parallel modules in the subsequent design, but are instead jointly organized within an overall framework composed of the waterway as the main axis, the nodal system, and interface reinterpretation.

In summary, the key to the regeneration of the spaces surrounding the Kangle Waterway lies in establishing, through urban design methods, a collaborative framework of ecological, cultural, and industrial regeneration, with the waterway as the main spatial axis, historical and cultural elements as identifying nodes, and representative industrial buildings as carriers of reinterpretation. This framework is not only a localized translation of the three theories discussed above, but also the theoretical foundation for the subsequent development of case study references, strategy generation, and design proposals.

3.2. Ecology-Dominant Synergy Cases

For the site surrounding the Kangle Waterway, ecological problems are manifested in the decline of the waterway's capacity to function as a linear open-space organizer. On the one hand, parts of the channel have been obscured or compressed, resulting in insufficient spatial continuity along the waterway. On the other hand, waterfront public spaces and slow-mobility connections are highly fragmented, making it difficult to form an integrated open-space backbone. At the same time, some areas lack waterfront nodes that support staying, viewing the water, and social interaction, which prevents the waterway from re-entering everyday public perception. Therefore, ecologically oriented case studies should focus on how the channel can, through restoration, once again become an ecological corridor that organizes the spatial order of the site, and how waterfront spaces can enhance the public accessibility and sense of place of the waterway through node creation. Based on this understanding, the lessons drawn from ecologically oriented case studies in this thesis are summarized under two aspects: channel restoration and the reconstruction of the spatial backbone, and waterfront open space and node creation.

3.2.1. The Catharijnesingel Canal Restoration Project, Utrecht

The Catharijnesingel Canal Restoration Project in Utrecht, the Netherlands, is a representative example in contemporary European urban regeneration of the shift from transport-infrastructure priority to public space and ecological quality priority. The outer canal system in which Catharijnesingel is located can be traced back to the medieval period following Utrecht's acquisition of city rights, and for a long time it formed a ring-shaped water structure surrounding the historic urban core. However, in the second half of the twentieth century, urban regeneration was dominated by planning concepts centered on motor-vehicle traffic. In 1969, part of the canal was filled in and used for the construction of the city's road system for automobiles. As a result, the continuity of the original water system was interrupted, and a road-dominated physical and psychological barrier gradually emerged between the historic center and the surrounding districts. It was not until the twenty-first century, with the comprehensive redevelopment of the station-city area and a broader shift toward urban sustainability, that Utrecht relaunched the canal restoration project, ultimately enabling the historic city center to once again be encircled by continuous water and greenery by 2020. The project subsequently received a major European public-space award in 2022, indicating that it has come to be regarded as a demonstrative case in the contemporary transformation of urban public space[52].

From the perspective of spatial structure, the most important significance of this project lies in its reappropriation of a core linear urban space through de-trafficization. The project first reorganized the motor-vehicle traffic system that had long occupied the original canal section, returning road space previously dedicated to rapid vehicular movement to water, green space, and pedestrian interfaces[53]. According to the project documentation shown in Figure 3-7, the restored Catharijnesingel has once again become a key structural element in the regeneration of Utrecht's station-city district. Together, the linear canal and the riverside park form a blue-green backbone through the city center, spatially reconnecting the historic urban core with the surrounding newly developed areas. In this way, water is no longer merely a formal return of a historical remnant, but regains a structural role in organizing urban space, improving pedestrian accessibility, and reshaping public perception.



Figure 3-2 Before-and-After Comparison of the Renewal of Catharijnesingel, Utrechts

(Source: Adapted from the references[53])

In terms of interface organization, the regeneration of Catharijnesingel integrates ecology, slow mobility, and public activity into a single system through the redesign of its riverside spaces. According to publicly available materials shown in Figure 3-3, the restored canal is lined with a continuous linear park, while traffic has been reorganized to prioritize pedestrians and cyclists. The riverside edges adopt more ecologically adaptive sloped banks and naturalized forelands, enabling the waterfront to simultaneously support recreation, movement, landscape experience, and habitat functions[53]. The new Catharijnesingel reopens the public interfaces on both sides of the water, allowing the riverside spaces to be perceived, entered, and occupied, thereby completing the transformation from a traffic corridor into a livable public waterfront space.

In its treatment of riverside structures and historical layers, the project restores the water system while simultaneously incorporating the contemporary urban structure into a new spatial narrative. According to the publicly available materials shown in Figure 3-4, the restored canal reconnects with the area around the Hoog Catharijne commercial complex, allowing boats once again to circulate continuously around the city center[53]. This demonstrates that, while retaining the contemporary functional pattern of the city, the project recalibrates the previously automobile-dominated spatial logic through the return of water. The key to this approach lies in the selective removal of intrusive structures, the reorganization of traffic, and the reshaping of public interfaces, so that the renewed canal space can both support contemporary urban life and rearticulate the continuity of the historic water structure.



Figure 3-3 Overall Spatial Pattern after the Restoration



Figure 3-4 Current Condition of the Public Interface for Walking along the Canal

(Source: Adapted from the references[53])

Returning to the present study, the implications of the Utrecht Catharijnesingel project can be summarized in three main respects. The project achieves cultural continuity and industrial activation under an ecology-dominant framework by restoring the stream while reshaping historical interfaces and integrating public functions along the waterfront. First, it demonstrates that, within a highly built-up urban core, the revival of water space can re-establish a compressed water structure as an urban public backbone through the reorganization of traffic systems and the redistribution of linear space. Second, the case shows that the key to canal restoration lies in whether continuous public interfaces and slow-mobility connections can be established simultaneously, so that the linear water body may truly be transformed into the organizing axis of a public-space system. Third, in dealing with a high-density site such as the Kangle Waterway, waterway regeneration should be understood as a structural reorganization centered on linear open space, rather than as a simple project of embankment repair or landscape beautification. Although the Kangle Waterway differs from Utrecht in scale, sectional conditions, and historical context, the fundamental logic embodied by Catharijnesingel—removing encroaching traffic structures, releasing water space, and reconstructing a linear public backbone—still provides an important methodological reference for this study.

3.2.2. Dasha River Ecological Corridor in Shenzhen

The Dasha River Ecological Corridor in Shenzhen represents a practice path more closely aligned with the integration of channel restoration and public space in the context of China's high-density urban environment. According to publicly available sources, the Dasha River Ecological Corridor was completed and opened in 2019. It extends for approximately 13.7 km, covers a total area of about 950,000 m², stretches from Changlingpi Reservoir to the estuary at Shenzhen Bay, and connects with major open-space systems such as the Shenzhen

Bay Coastal Leisure Belt and Talent Park. On the basis of ecological restoration, the project integrates channel improvement, slow-mobility systems, landscape activity spaces, and the urban open-space network, thereby forming a continuous waterfront public corridor[59].

From the perspective of spatial structure, the most important characteristic of the Dasha River Ecological Corridor lies in its use of a continuous linear waterfront space to reorganize previously dispersed urban open-space resources in the surrounding area. Its structural value is reflected in the way the river corridor, as the main axis, reconnects different urban districts and public destinations, forming an overall spatial sequence from the northern upstream area to the southern estuary. As shown in Figure 3-5, official Shenzhen sources clearly indicate that the Dasha River Ecological Corridor runs through the entire Nanshan District and is connected with spatial systems such as the Shenzhen Bay Coastal Leisure Belt and Talent Park. It has also been described in related promotional materials as an important waterfront slow-mobility system and a “green ribbon” of the city[59]. This suggests that the project’s real spatial significance lies in constructing a continuous ecological and public-space backbone for the city, with the river corridor as its foundation.

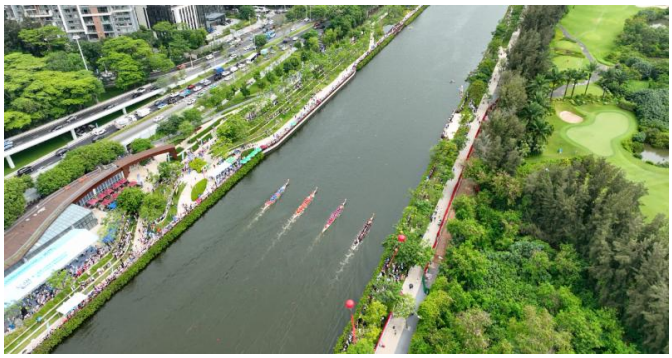


Figure 3-5 Waterfront Interface of the Dasha River Ecological Corridor

(Source: Adapted from the references[59])

In terms of interface organization, the key lesson of the Dasha River Ecological Corridor lies in transforming the originally engineering-oriented and functionally singular boundaries along both sides of the channel into a public interface system that is accessible, inhabitable, and perceptible. Official materials indicate that the project involved not only the upgrading of riverside greening, existing walkways, and railings on both banks, but also the landscape treatment of existing structures and facilities, as well as the continuous connection of bicycle lanes and pedestrian paths along both sides. This shows that the emphasis of the regeneration lay in the overall reorganization of the riverbank boundary, pedestrian interfaces, and facility systems, enabling both sides to shift from a condition characterized by enclosure, defensiveness, and circulation priority toward an open, continuous, and people-oriented waterfront interface. In particular, when the demonstration section was opened, leisure

benches, book bars, drinking fountains, and nursing rooms had already been installed along the route, while pathways and activity spaces further enhanced the potential for public staying and participation.

Compared with Utrecht, the experience of the Dasha River more clearly demonstrates that, within the Chinese urban context, the restoration of ecological corridors must not only serve ecological recovery, but also respond simultaneously to flood-control safety, continuity of slow-mobility systems, and the everyday needs of citizens.The case forms a cultural-industrial composite upon an ecological base by constructing an ecological corridor while preserving historical memory and embedding innovation industry nodes. This case indicates that river-channel regeneration can move beyond the conventional single-track approach of hydraulic engineering treatment and shift toward a comprehensive spatial regeneration that balances ecological restoration, the quality of open space, and public use. For the Kangle Waterway, the significance of the Dasha River case lies in its integration of ecology, slow mobility, and public space with the channel as the main axis, thereby transforming originally fragmented waterfront edges into a linear system that can be continuously perceived, traversed, and inhabited. Since the Kangle Waterway is situated within a smaller-scale site and a denser built environment, its subsequent reinterpretation should place greater emphasis on localized interface opening, the supplementation of slow-mobility connections, and the release of key nodes, rather than pursuing large-scale waterfront beautification.

3.2.3. The Saw Mill River Daylighting Project, Yonkers

The Saw Mill River Daylighting Project in Yonkers, New York, is a representative North American case in which a long-buried urban river was brought back to the surface through daylighting and integrated with the renewal of public space in a small-scale downtown area [55]. According to publicly available information, approximately 2,000 feet of the downstream reach of the Saw Mill River was gradually incorporated into an underground concrete diversion system in the early twentieth century, leaving the river buried beneath the surface of the city center for decades and effectively erasing its visibility and public presence in urban space. It was not until the twenty-first century that the City of Yonkers, Groundwork Hudson Valley, and other partner organizations gradually advanced the river’s re-emergence and incorporated the project into a broader framework of downtown revitalization and environmental restoration. In 2011, water first flowed again through the newly created surface riverbed, and in 2012 the first phase of the daylighting park at Larkin Plaza was completed,

becoming the starting point for a subsequent multi-phase regeneration process [56].

From the perspective of spatial structure, and as shown in Figure 3-6 the Saw Mill River project re-established the buried river as the core of public space by restructuring a local downtown site that had previously functioned as a parking lot. Project materials from Groundwork Hudson Valley clearly indicate that the daylighted site was named Van der Donck Park, with the former parking area replaced by an open surface channel, ecological habitats, and publicly accessible open space[57].

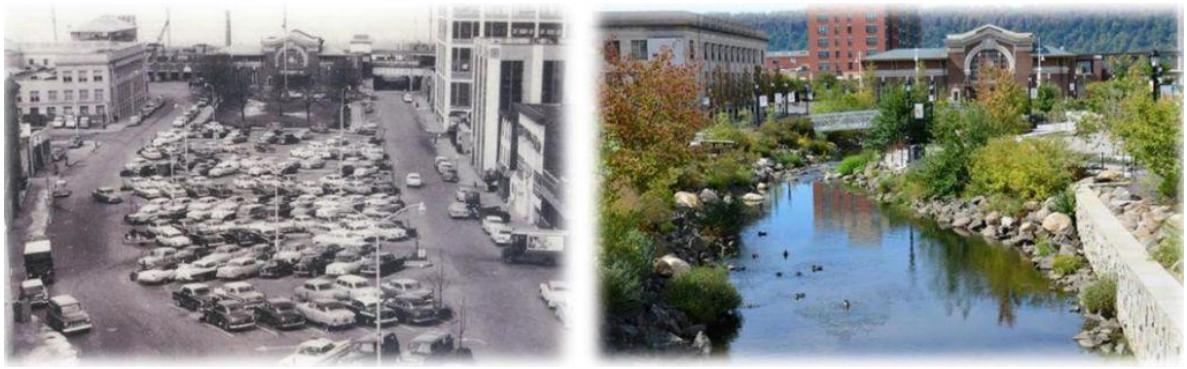


Figure 3-6 Before-and-After Comparison of the Daylighting of the Saw Mill River

(Source: Adapted from the references[57])

In terms of the integration of ecology and public space, the Saw Mill River project is characterized by a strongly nodal and repair-oriented approach. Unlike the Catharijnesingel project in Utrecht, which reconstructs the urban backbone through the restoration of a long continuous water corridor, the first phase of the Saw Mill River daylighting project can be understood more as the opening of a window of water within a dense urban center, using the reappearance of a local river segment to stimulate the renewal of surrounding public space and urban perception. As shown in the project materials in Figure 3-7, the daylighted river space includes riverbank restoration, freshwater pools, tidal pools, habitats for fish and birds, and pedestrian interfaces for public stopping and observation. Rather than functioning as a purely scenic water feature, the project explicitly emphasizes the integration of environmental restoration, ecological education, and downtown public activity[57]. In other words, the Saw Mill River project treats river restoration as a composite spatial node that simultaneously carries ecological functions and public use. This method of expressing ecological processes within a compressed, small-scale urban site offers important inspiration for the renewal of local river segments in dense existing urban environments.



Figure 3-7 Daylighted Channel and Integrated Public Space of the Saw Mill River

(Source: Adapted from the references[57])

Returning to the present study, the value of the Saw Mill River project lies primarily in demonstrating how a concealed and compressed water body can be brought back into urban perception through localized daylighting and nodal spatial repair.The case demonstrates the coupling of ecological engineering with cultural and public values through daylighting the river while reconstructing urban public interfaces and continuing industrial memory. As Chapter 2 has shown, the headwater section of the Kangle Waterway currently suffers from culverting, covered interfaces, and insufficient legibility as a public point of origin. The site therefore also requires consideration of how its most symbolically important source node can once again be seen, entered, and understood. The experience of the Saw Mill River project suggests that localized daylighting and the public activation of nodes can themselves become the starting point for a broader process of riverside regeneration, creating a place of public significance within a limited site through ecological restoration, staying space, and slow-mobility connections. At the same time, however, there are clear differences between this case and the present study site. Accordingly, the translation of this case in the present research should focus less on literal replication and more on its methodological logic of localized exposure, nodal activation, and the use of small-scale spatial repair to reconstruct broader spatial perception. For the Kangle Waterway, this logic is particularly useful in thinking about how to restore the spatial legibility of the waterway's origin in the headwater section and how to re-establish the relationship among water, history, and public activity through nodal design.

3.3. Culture-Dominant Synergy Cases

Culturally oriented case studies place greater emphasis on how the regeneration of waterways can work together with local culture, historical memory, and scenes of public life to form places with a strong sense of identity. For the Kangle Waterway, the core cultural

problem lies in the fact that the relationships between existing cultural carriers—such as ancestral halls, historic temples, dragon-boat docks, and old trees—and the waterway, alleyways, and everyday activities have been weakened by the high-density built environment. As a result, the site as a whole presents a condition in which the objects remain, but the relationships have weakened and the associated scenes have deteriorated. Therefore, the focus of culturally oriented case studies lies in examining how waterway space can sustain the continuity of local cultural scenes, and how historical and cultural nodes can be reintroduced into contemporary systems of public life through regeneration. Based on this understanding, this study summarizes culturally oriented case studies under two aspects: the continuity of local cultural scenes and the activation of historical and cultural nodes.

3.3.1. Water-Town Environment Regeneration in Beijiao, Shunde

Relevant practices in Beijiao, Shunde, may be regarded as a representative example of the continuity of local cultural scenes within the context of Lingnan water towns. Beijiao has, in recent years, gradually developed a regeneration approach in which waterways, villages, and public life together constitute an integrated scene, through coordinated efforts in water-environment governance, village environmental improvement, and the revitalization of water-town culture. Public reports indicate that Beijiao has invested more than RMB 3 billion in recent years in projects related to sewage treatment, river dredging, industrial rectification, ecological restoration, and environmental improvement. The town has completed and put into operation more than 200 km of sewage pipeline network, and has explicitly proposed the reshaping of the Lingnan water-town landscape through systematic water governance[60]. At the same time, typical villages under Beijiao's jurisdiction, such as Huanglong and Bijiang, have also shown a gradual recovery of the water-town spatial texture characterized by the experience of "opening the door to the river and opening the window to the landscape."

From the perspective of spatial organization, the value of Beijiao lies first in the way it incorporates waterways, village alleys, public activity spaces, and everyday life into the regeneration process as a whole. Taking Huanglong Village as an example, public reports note, as shown in Figure 3-8 and Figure 3-9, that the village improved both banks of the Sanfeng River through actions described as "cleaning the banks, regulating the water, and beautifying the waterfront," thereby creating waterside platforms, stone-paved walkways, and small leisure squares. In this way, living spaces that had treated the river merely as a background were transformed once again into public scenes oriented toward villagers' everyday use[61]. Meanwhile, communities such as Bijiang have also, through environmental improvement and

the upgrading of public space, enabled the traditional open waterfront pattern of water-town villages to re-emerge. This approach demonstrates that the continuity of local cultural scenes depends on the integrated restoration of water, paths, squares, tree shade, and waterfront interfaces, so that local culture can once again be perceived through spatial experience.



Figure 3-8 Sanfeng River in Huanglong



Figure 3-9 Painted Footpath and Waterside Platform

(Source: Adapted from the references[61])

In terms of cultural carrying mechanisms, Beijiao's regeneration experience is also reflected in the continuous activation of local activities and cultural brands. Relevant reports indicate that Beijiao has continued to promote local cultural-brand activities such as the Dragon Boat Festival, the Lintou Water-Town Ancient Village Cultural Fair, and other place-based events, while also integrating cultural activities with grassroots public spaces, village environmental improvement, and the construction of public-service facilities through the system of New Era Civilization Practice Stations. This suggests that, in Beijiao's practice, water-town culture can re-enter residents' everyday lives through dragon-boat traditions, fairs, village history, folk performance arts, and routine community activities. For the Kangle Waterway, the lesson of this case lies in the fact that the continuity of local cultural scenes should not be limited to the preservation of static objects such as ancestral halls and historic temples. Rather, culture should be reorganized into a spatial scene that can be used in everyday life and collectively recognized, through the coordinated structuring of the waterway, forecourts, old trees, and spaces for folk-cultural activities.The project creates a multi-dimensional synergy led by culture by restoring the waterscape character while simultaneously softening ecological shorelines and implanting waterfront cultural-tourism industries.

3.3.2. Regeneration of the Lizhiwan Waterway in Guangzhou

If Beijiao provides an example of the continuity of the overall scene of a Lingnan water town, then the Lizhiwan Waterway more typically demonstrates a path in which a historic water system, old-city life, and cultural memory are restored together. According to materials

from the Guangzhou Municipal Bureau of Ecology and Environment, as shown in Figure 3-10 and Figure 3-11, the Lizhiwan Waterway is located in the Xiguan area of Guangzhou, has a catchment area of approximately 3.85 km², and includes an open-channel section of about 2.7 km. Owing to its long history, rich culture, and attractive scenery, it has been listed as one of the Eight Scenic Spots of Guangzhou. Official descriptions further indicate that the regeneration of the Lizhiwan Waterway was not limited to channel improvement alone; rather, it involved a comprehensive set of interventions, including uncovering and restoring the waterway, shoreline improvement, the separation of sewage and stormwater, the upgrading of the wastewater system, the enhancement of flood-control and drainage capacity, and the revitalization and adaptive use of historic cultural districts. Through these integrated measures, both the aquatic environment and the historic scene were restored in parallel, and in 2024 the project was selected as an Outstanding Case of Beautiful Rivers and Lakes in Guangzhou[63] .

From the perspective of the continuity of spatial scenes, the most important lesson of the Lizhiwan Waterway lies in the fact that it did not interpret history and culture simply as the insertion of a series of “pseudo-historic elements” along the water. Rather, by restoring the relationship between the water body itself and the everyday living interfaces along its banks, it reconstructed the daily waterfront scene of the old city. Official materials emphasize that, through spatial optimization and small-scale interventions such as embankment repair, functional lighting, greening and beautification, and cultural signage, the regenerated Lizhiwan Waterway has enabled residents once again to experience the Lingnan old-city waterscape described as “a bay of green water, with red lychees on both banks”[64] . Compared with the Kangle Waterway, the Lizhiwan Waterway is situated within a mature historic district with a stronger emphasis on tourism and cultural display. However, its relevance for this study lies in showing that the recovery of cultural scenes does not depend on large-scale reconstruction; rather, historical memory can be re-embedded into contemporary living space through the reopening of the channel, shoreline repair, interface improvement, and path organization.



Figure 3-10 Aerial View of the Lizhiwan Waterway

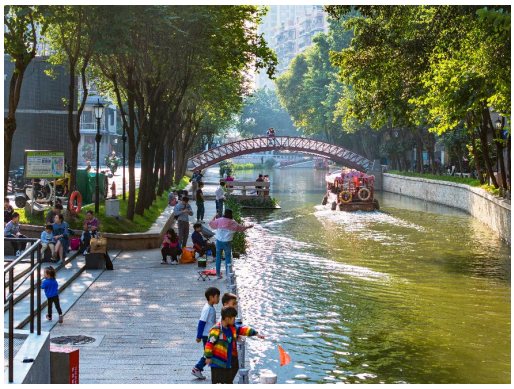


Figure 3-11 Restored Historical Scene along the Lizhiwan Waterway

(Source: Adapted from the references[63])

At the level of public activity and cultural life, the significance of the Lizhiwan Waterway lies in the fact that its cultural scene is not presented as a static display, but instead forms a living cultural space together with the Pantan Dragon Boat Festival during the Dragon Boat Festival, Mid-Autumn Festival activities in Yongqing Fang, and the everyday leisure life of the Xiguan neighborhood. Official materials explicitly note that the Lizhiwan Waterway has witnessed a series of festive and recreational activities with strong local characteristics of Guangzhou, ranging from dragon-boat races in Pantang to sightseeing around Moon Bridge. This indicates that its cultural value is expressed not only at the level of visual landscape, but also in its sustained capacity to accommodate public activities[63].The case achieves a win-win between ecology and industry under a culture-dominant framework by restoring historical scenes through water ecological governance and enhancing commercial vitality along the banks. For the Kangle Waterway, the lesson of this case is that the shaping of local cultural scenes should be realized through the coordinated organization of waterway space, the forecourts of historic buildings, folk-cultural facilities, and the routes of festival activities, rather than reducing culture to decorative waterfront landscape elements.

3.3.3. The Cultural Waterfront Node of the Liede Waterway in Guangzhou

The Liede Waterway Greenway in Guangzhou is a representative case of the activation of historical and cultural nodes. According to a special report by Dayoo.com on the construction of Guangzhou's greenways, the Liede Waterway Greenway was not developed solely from the perspective of channel improvement. Rather, it incorporated both the tangible and intangible cultural heritage of Liede Village into the making of the waterfront space, including bluestone pavements, covered bridges, culturally themed embankment railings, landscaped flowerbeds, and dragon-boat cultural elements such as the Liede dragon boats and Liede drums, ultimately forming the Eight Charms of Liede, a series of eight landmark scenic

nodes. The report also notes that the waterside platforms on both banks have become important places for watching dragon-boat races, while the space beneath the bridges spanning the waterway has been adapted for the storage of dragon boats during ordinary times[65].

The spatial value of this case lies in its nodal spatial organization, through which dragon-boat culture is materially embedded within waterfront spaces of different scales. As shown in Figure 3-12 and Figure 3-13, the under-bridge space is directly associated with the local folk practice of dragon-boat storage, while the waterside platforms not only serve as viewing spaces but also become public interfaces for watching and participating in dragon-boat activities during festivals. Elements such as bluestone pavements, covered bridges, railings, and flowerbeds further reinforce the relationship between Lingnan locality and waterfront life[65]. The experience of the Liede Waterway therefore suggests that the key to activating historical and cultural nodes lies in whether cultural carriers, spatial forms, and activity mechanisms can be integrated into a composite relationship within the same node.



Figure 3-12 Cultural Waterfront Nodes along the Liede Waterway



Figure 3-13 Festival Scene of the "Dragon Boat View" at the Liede Waterway

(Source: Adapted from the references[65])

For the Kangle Waterway, the relevance of the Liede Waterway case is mainly reflected in two respects. First, historical and cultural nodes do not necessarily have to take the form of large, independent public spaces; they may also be localized fragments such as bridgeheads, river bends, spaces beneath old trees, or areas associated with folk-cultural facilities. Second, node activation should not remain at the level of visual expression alone, but should be combined with local activity mechanisms, so that nodes are not only legible but also endowed with practical use value. The case illustrates the interweaving of culture, ecology, and industry within the same waterfront space by creating cultural nodes while restoring ecological shorelines and operating festival industries.The forecourts of ancestral halls, the spaces around old trees, and the dragon-boat dock in the northern section of the Kangle Waterway

already possess similar nodal potential. In subsequent design, the experience of the Liede Waterway may be drawn upon to transform these spaces from passively preserved cultural fragments into important anchors linking historical memory and contemporary public life, through interface improvement, the provision of activity platforms, and the incorporation of dragon-boat cultural elements.

3.4. Industry-Dominant Synergy Cases

The core issue addressed by industry-oriented case studies lies in how waterway regeneration can further promote the coordinated upgrading of surrounding functions, and how industrial remains along the water can be retained and reinterpreted within a new public-space system. For the Kangle Waterway, this dimension is particularly critical. In the southern part of the study area, the existing productive buildings, street-front commercial interfaces, and dormitory-type buildings are not only part of the current spatial fabric, but also important spatial traces of the development stage of Kangle Village's garment industry. Therefore, the key focus of industry-oriented case studies is to examine how waterway regeneration can interact with the reorganization of surrounding functions, and how representative industrial buildings can be transformed from former back-of-house production spaces into composite carriers oriented toward public life.

3.4.1. Regeneration of the Navigli Water System in Milan

The regeneration of the Navigli water system in Milan may be regarded as a representative case of waterway regeneration and the coordinated upgrading of surrounding functions. According to the City of Milan's public documentation on the Navigli reopening project, as shown in Figure 3-14, the project is not understood merely as the restoration of a historic waterscape, but rather as an urban regeneration initiative. On the one hand, the project proposes to re-expose parts of the historic canal system and to improve the livability of the area through waterside promenades, new tree planting, and slow-mobility spaces. On the other hand, the relevant plans explicitly incorporate commercial and service activities into the spatial organization along the canal, while reconstructing the order of public space along the water through the separation of cycling, walking, and motor traffic. Official project materials from the City of Milan further indicate that the first phase aims to re-expose approximately 2 km of the more than 7 km of historic alignments, and, through hydraulic reconnection with the Darsena, to restore the role of the Navigli system as a structural element of the city[66] . At the same time, the project's cost-benefit analysis summarizes its objective as the "restoration

and multidimensional use of water resources," placing it within the broader framework of urban regeneration and public-space renewal.



Figure 3-14 Existing Condition of the Navigli Waterway in Milan

(Source: YesMilano)

From the perspective of spatial regeneration logic, the key lesson of the Milan case lies in demonstrating that waterway regeneration can serve as a catalyst for the coordinated upgrading of surrounding functions. In other words, the restoration of the waterway not only improves the landscape environment, but also reorganizes pedestrian interfaces, commercial and service activities, and patterns of public life along the route, thereby transforming waterfront areas formerly dominated by traffic infrastructure into attractive urban public spaces [67]. This logic—whereby waterway regeneration drives interface improvement and functional upgrading—is highly instructive for the Kangle Waterway. The problem in the southern section of the Kangle Waterway is not simply the dense concentration of productive buildings, but more fundamentally the long-standing dominance of logistics, storage, and traffic over the relationship between the waterway and its surrounding interfaces. If regeneration is limited to water-environment improvement alone, it will still be difficult to alter the area's spatial character as a "back-of-house production zone." This case suggests that only when waterway regeneration is considered together with the reorganization of the pedestrian system, public interfaces, service functions, and everyday activities can the waterway truly become a catalyst for the coordinated upgrading of the district's functions.

In summary, the principal lesson offered by the Milan waterway regeneration case lies in showing how waterway regeneration can go beyond simple environmental improvement and further drive the reorganization of surrounding interfaces, the optimization of slow-mobility connections, and the integration of commercial and service functions. The case demonstrates the coupling of industrial memory translation with ecological and public values by revitalizing industrial heritage while reconstructing water-based public spaces and restoring ecological shorelines. For the Kangle Waterway, the relevance of this experience lies in the

fact that regeneration in the southern section should not be understood as an isolated "waterfront landscape renovation," but should instead be advanced together with the opening of the interfaces of retained buildings, the adjustment of ground-floor functions, and the organization of riverside activities, so that the waterway may truly become the main axis driving the reorganization of spatial structure and functional relationships.

3.4.2. The Integrated Waterfront Renewal of Suzhou Creek in Shanghai

Regeneration of Suzhou Creek in Shanghai represents a process of continuous waterfront-space restructuring advanced within the broader framework of integrated riverfront connectivity. In 2025, the Shanghai Municipal People's Government approved the Special Plan for the Overall Character and Open-Space Enhancement of the Suzhou Creek Waterfront Area (2025–2035), which was subsequently formally issued by the Shanghai Municipal Bureau of Planning and Natural Resources, as shown in Figure 3-15. This indicates that regeneration along Suzhou Creek has entered a stage of systematic implementation oriented toward overall character improvement, open-space enhancement, and functional upgrading. Official materials further show that by 2020, basic public accessibility had been achieved along 42 kilometers of the Suzhou Creek waterfront, and the creek had been transformed from a single object of river management into a continuous waterfront spatial system capable of supporting public activity, ecological improvement, and urban regeneration[68].



Figure 3-15 Overall Renewal Structure of the Suzhou Creek Corridor

(Source: Adapted from the references[69])

From the perspective of spatial organization, the key to the integrated renewal of Suzhou Creek lies in first establishing a continuous and open public framework along the waterfront, and then gradually improving the overall system through the connection of discontinuities, landscape enhancement, and cross-river linkages. Taking the Putuo section of Shanghai as an example, publicly released district-government information indicates that by 2020, 19 discontinuity points had basically been connected, landscape-improvement works—including those involving M50 Creative Park—had been completed, and new bridges such as M50

Bridge had been advanced so as to strengthen slow-mobility connections across the river[69]. This demonstrates that the renewal of Suzhou Creek has reorganized riverside space into a continuous public system through the combined processes of connection, enhancement, and linkage.

Within this larger framework, M50 Creative Park illustrates the specific value of localized memory translation within the broader regeneration of Suzhou Creek. Official Shanghai materials make clear that M50 Creative Park was transformed from a former textile factory complex and remains one of the most intact groups of national textile industrial buildings preserved along Suzhou Creek. It retains approximately 43,000 square meters of industrial buildings dating from the 1930s to the 1990s, including factory buildings, warehouses, a boiler house, and a canteen. In other words, the significance of M50 lies in its preservation of a relatively complete industrial spatial layering, enabling it to serve as a material witness to the modern industrial development of the Suzhou Creek corridor.

Moreover, M50 Creative Park is being re-incorporated into the overall connectivity system. Public design documents issued by the Shanghai Municipal Bureau of Planning and Natural Resources regarding Baihe Bridge, shown in Figure 3-16, explicitly indicate that the bridge extends westward to the waterfront public space of M50 Creative Park in Putuo District and eastward to Hengfeng Road. This suggests that the waterfront space and cross-river connections of M50 have already been incorporated into the overall public-space network of Suzhou Creek [69]. The implication of M50 therefore lies in demonstrating that industrial heritage can, under the broader condition of integrated riverside connectivity, re-enter the framework of urban public space, transforming from a relatively enclosed fragment of former production space into an open and legible waterfront memory interface[70].



Figure 3-16 Schematic Diagram of the Waterfront Public Space and Cross-River Linkages at M50 Creative Park ***(Source: Adapted from the references[69])***

Returning to the present study, the case of the integrated renewal of Suzhou Creek and M50 Creative Park provides inspiration at two levels. First, at the systemic level, riverside

regeneration should prioritize the establishment of a continuous public-space framework, reconstructing overall organizational capacity through the connection of discontinuities, interface enhancement, and bridge linkages. Second, at the local level, representative productive buildings and waterside interfaces may, under the logic of overall connectivity, be further identified, retained, and translated into new public cultural spaces. The case forms an ecological-cultural composite under an industry-dominant framework by transforming industrial spaces through connecting ecological corridors and implanting cultural exhibition functions.For the Kangle Waterway, what is truly instructive in this case is its regeneration method of systemic connectivity, localized activation, and memory translation: on the one hand, it reconstructs the overall continuity of riverside space; on the other hand, it enables a limited number of representative productive buildings to continue carrying site memory within a newly established public-space system.

3.5. Summary of Case Studies and Strategy Translation

In existing research, ecology, culture, and industry are often discussed as independent dimensions, with case studies categorized into three isolated groups. This thesis breaks away from this convention by proposing a "Dominant-Goal Synergy" framework for case analysis: each case takes one dimension as the primary spatial operation, but is compulsorily examined for its adaptation mechanisms and coupling paths with the other two dimensions. Therefore, the following case groupings do not imply that the three goals can be treated in isolation; on the contrary, the core value of each group lies in revealing how multi-objective synergy is achieved through spatial design under a clearly defined dominant goal, thereby providing transferable composite experience for the Kangle Stream renewal.

The foregoing analysis of ecologically oriented, culturally oriented, and industry-oriented cases shows that, although these cases differ significantly in site scale, historical background, and regeneration objectives, their relevance to the regeneration of the spaces surrounding the Kangle Waterway does not lie in formal imitation, but in the methodological logic they offer for the regeneration of waterway spaces in high-density urban villages. In other words, these cases respond, from different perspectives, to the current problems faced by the Kangle Waterway—namely, the failure of the waterway’s public spatial backbone, the weakening of relationships between historical and cultural elements and the waterway, the gradual disappearance of spaces of industrial memory, and the lack of overall organization within the riverside spatial system—through strategies related to channel restoration, scene continuity, node activation, functional coordination, and the reinterpretation

of existing remains.

The core lesson of ecologically oriented cases lies first in understanding channel restoration as the reconstruction of an overall spatial backbone, rather than as a singular act of environmental improvement. Whether in Utrecht, where the restoration of the canal and the linear park along its banks reconstructed the order of urban public space, or in the Dasha River case, where a continuous slow-mobility system and waterfront open spaces were integrated to form a linear ecological corridor, the common feature is the re-establishment of connections among ecological processes, public activities, and urban interfaces with the waterway as the principal spatial axis. At the same time, the daylighting experience of the Saw Mill River further demonstrates that, in a high-density built environment, the release of localized nodes can also serve as an important starting point for reintroducing the waterway into public perception and everyday life. The ecological lesson, therefore, is that channel restoration should be used to reconstruct the overall spatial structure, while key nodes should be employed to enhance the accessibility and public character of waterfront space. For the Kangle Waterway, this means that the primary task of regeneration should be to rebuild a continuous open-space backbone along the waterway and, by taking the source area, bridgeheads, and key interfaces as nodal breakthroughs, gradually restore its dual ecological and public attributes.

The experience offered by culturally oriented cases lies mainly in showing that local cultural scenes are sustained through the integrated organization of waterways, alleys, forecourts, activity spaces, and interfaces of public life. The examples of Beijiao in Shunde and the Lizhiwan Waterway demonstrate that the recovery of local cultural scenes depends on reconnecting waterway space with traditional patterns of everyday life, so that the imagery of the Lingnan water town and historic scenes can re-enter public space in perceptible and participatory ways. The Liede Waterway case further shows that, in a high-density built environment, cultural continuity can also be activated through a series of key nodes, allowing dragon-boat culture, bridgehead spaces, riverside platforms, and everyday lingering spaces to form spatial anchors of local identity. The cultural lesson, therefore, is that cultural conservation should not remain limited to the object-based preservation of ancestral halls, historic temples, and similar elements, but should instead place greater emphasis on repairing their relationships with the waterway, old trees, dragon-boat docks, forecourts, and festival routes, so that local culture may shift from being a “displayed relic” to a “used public scene.”

The core lesson of industry-oriented cases lies in demonstrating that waterway regeneration can further promote the coordinated upgrading of functions along the route and

create conditions for the adaptive reuse of industrial remains. The Milan case shows that the restoration of a waterway can become an important catalyst for improving surrounding interfaces, optimizing slow-mobility systems, and reorganizing commercial and service functions, thereby transforming waterfront spaces from singular traffic or logistics edges into attractive urban public interfaces. The experience of Suzhou Creek and M50 more directly demonstrates that the retention and reinterpretation of representative industrial buildings should be considered within the overall riverside public-space system. Through interface opening, functional replacement, and the insertion of pathways, former productive buildings can be transformed from back-of-house spaces into composite nodes with capacities for display, communication, and public activity. Accordingly, regeneration in the southern section of the Kangle Waterway should treat this area as an important support point linking waterway public space, industrial memory, and new service functions, so that waterway regeneration and the coordinated upgrading of functions may proceed simultaneously.

Taken together, the three categories of cases summarized in Table 3-5 indicate that the key to regenerating the spaces surrounding the Kangle Waterway lies in bringing ecology, culture, and industry into a unified riverside spatial system through urban design methods. Accordingly, the case studies discussed above may ultimately be translated into three mutually supportive strategic lines: the reconstruction of the ecological backbone of the waterway, the repair of historical and cultural relationships, and the reinterpretation of spaces of industrial memory. These three lines jointly serve the structural objective of the overall regeneration of the spaces surrounding the Kangle Waterway: namely, within the context of a high-density industrial urban village, to use the waterway as the principal spatial axis for coordinating ecological restoration, cultural continuity, and functional renewal, and thereby reconstruct a riverside spatial order that possesses both local identity and practical feasibility.

Table 3-5 Translation of Case-Based Experience into Strategies for the Kangle Waterway

(Source: compiled by the author)

Content	Ecology	Culture	Industry
Representative cases	Utrecht Catharijnesingel, Dasha River, Saw Mill River	Beijiao in Shunde, Lizhiwan Waterway, Liede Waterway	Milan, Suzhou Creek M50
Key focus	Channel restoration, reconstruction of the spatial backbone, creation of waterfront nodes	Continuity of local cultural scenes, activation of historical and cultural nodes	Functional coordination driven by waterway regeneration, retention of industrial remains, and spatial reinterpretation

Table 3-6(Continued) Translation of Case-Based Experience into Strategies for the Kangle Waterway

(Source: compiled by the author)

Content	Ecology	Culture	Industry
Key lessons	Reconstruct a continuous open-space system with the waterway as the main axis; enhance public accessibility and spatial vitality through the release of localized nodes	Sustain local cultural scenes through the integrated organization of waterways, alleys, forecourts, and folk activities; use key nodes to accommodate cultural display and public activities	Use waterway regeneration to improve surrounding interfaces and upgrade functions; reinterpret industrial memory through the retention of representative buildings and the restructuring of interfaces
Corresponding problems of the Kangle Waterway	Failure of the waterway's public spatial backbone; lack of overall organization in the riverside spatial system	Weakened relationship between historical and cultural elements and the waterway; insufficient sense of local scene	Gradual disappearance of spaces of industrial memory; back-of-house condition of riverside interfaces; insufficient functional coordination
Direction of reinterpretation	Reconstruct the ecological backbone of the waterway, supplement slow-mobility connections, and release key waterfront nodes	Repair the spatial relationships among ancestral halls, historic temples, old trees, dragon-boat docks, and the waterway, and form a sequence of cultural nodes	Retain and reinterpret representative industrial buildings, and promote interface opening, functional replacement, and the coordinated regeneration of riverside public space

Chapter 4 Regeneration Strategies for the Urban Village Spaces around the Kangle Waterway

4.1. Strategy Generation Logic and Overall Framework

The research presented in Chapter 2 shows that the site surrounding the Kangle Waterway currently faces several major problems, including the failure of the waterway's public spatial backbone, the weakening of the relationship between historical and cultural elements and the waterway, the gradual disappearance of spaces of industrial memory, and the lack of overall organization within the riverside spatial system. Chapter 3, in turn, conducted a categorized study of relevant cases from the perspectives of ecology, culture, and industry, and extracted a range of experiences, including channel restoration and the reconstruction of the spatial backbone, the continuity of local cultural scenes and the activation of historical nodes, the coordinated upgrading of functions driven by waterway regeneration, and the retention and reinterpretation of industrial remains. Compared with the previous approach of analyzing cases in parallel according to project names, the current case-study system corresponds more directly to the Kangle Waterway's composite demands in terms of ecological restoration, cultural continuity, and industrial renewal, and is therefore more conducive to extracting transferable methodological logic from the cases.

4.1.1. Correspondence Between Site Problems and Case-Based Experience

The strategies developed in this chapter are built upon a logical chain of problem, experience, and transformation. In other words, the process first takes the problem identification in Chapter 2 as its practical foundation, clarifying the key spatial contradictions that must be addressed in the regeneration of the Kangle Waterway. It then selects, from the case studies in Chapter 3, those methodological points that are most compatible with the site scale, interface conditions, and regeneration objectives of the project. Finally, these lessons are translated into regeneration strategies applicable to the spaces surrounding the Kangle Waterway, forming a strategic system composed of the reconstruction of the ecological backbone of the waterway, the repair of historical and cultural relationships, and the reinterpretation of spaces of industrial memory. The aim is to identify the structural logic and methodological pathways in these cases that possess broader applicability, and to adapt them through localized reinterpretation within the context of the high-density urban village surrounding the Kangle Waterway.

The principal lesson offered by ecologically oriented cases lies in reconstructing a linear

open-space system through channel restoration, while enhancing the public accessibility and spatial vitality of the waterbody through the creation of waterfront nodes. The principal lesson offered by culturally oriented cases lies in sustaining local cultural scenes through the integrated organization of waterways, alleys, forecourts, and folk-cultural activities, while activating local identity through a series of key nodes. The principal lesson offered by industry-oriented cases lies in combining waterway regeneration with the coordinated upgrading of surrounding functions, and in achieving the reinterpretation of industrial memory through the retention of representative industrial buildings, the restructuring of interface relationships, and the insertion of new functions. On this basis, the strategy generation for the spaces surrounding the Kangle Waterway no longer treats ecology, culture, and industry as three separate modules. Instead, they are regarded as three core elements jointly embedded within the riverside spatial system and are comprehensively organized under the unified framework of the waterway as the principal spatial axis.

The correspondence between site problems and case-based lessons may be summarized in Table 4-1. Ecological lessons primarily address the failure of the waterway's public spatial backbone and the lack of continuity in riverside open space. Cultural lessons primarily respond to the weakening of relationships among historical and cultural elements and the decline of local scene identity. Industrial lessons primarily address the disappearance of spaces of industrial memory and the back-of-house condition of riverside interfaces. These three categories of lessons are not placed side by side as parallel components in the subsequent strategy generation; rather, they jointly serve the reconstruction of the overall spatial order of the Kangle Waterway and are ultimately translated into specific pathways, including the reconstruction of the ecological backbone of the waterway, the strategy generation for the historical and cultural section, the strategy generation for the ecological conservation demonstration section, and the strategy generation for the industrial memory section.

Table 4-1 Correspondence Between Site Problems and Case-Based Experience

(Source: compiled by the author)

Site Problem	Case-Based Experience	Strategic Translation
Failure of the waterway as a public spatial backbone	Channel restoration can reconstruct a continuous open-space system and enhance waterfront accessibility through key nodes.	Rebuild the riverside spatial backbone, restore continuous pedestrian space, and release key waterfront nodes.

Table 4-2(Continued) Correspondence Between Site Problems and Case-Based Experience

(Source: compiled by the author)

Site Problem	Case-Based Experience	Strategic Translation
Rupture of the relationship between historical anchors and the waterway	Local cultural scenes can be sustained through the integrated organization of waterways, streets, forecourts, and cultural activities.	Reconnect historic buildings, old trees, the dragon-boat dock, and the waterway, and form a sequence of cultural nodes.
Gradual disappearance of the site's memory layers	Waterway regeneration can promote functional upgrading and support the retention and reinterpretation of industrial remains.	Retain representative industrial buildings, open interfaces, and reinterpret industrial memory through functional transformation.
Lack of overall organization within the riverside spatial system	Ecology, culture, and industry should be coordinated within one unified riverside spatial system.	Build an overall spatial framework with the waterway as the main axis, coordinating nodes, memory, and public space.

4.1.2. Overall Strategic Framework and Translational Path

Once the correspondence between problem identification and case-based experience has been clarified, the subsequent strategies need to be further organized into an overall framework with internal hierarchy and structure. Taken together, the research in Chapters 2 and 3 indicates that an appropriate strategic path for this study should first reconstruct the basic structure of the riverside space as a whole, clarifying the relationships among the waterway as the principal axis, public nodes, historical anchors, and memory carriers. On this basis, more specific strategies can then be developed in relation to the repair of the waterway backbone, the reorganization of historical nodes, and the translation of industrial memory. Finally, through sectional guidance and spatial integration, these strategies may be made to serve the broader regeneration objectives of the Kangle Waterway corridor as a unified whole.

From the perspective of translational pathways, as shown in Figure 4-1, the strategy system of Chapter 4 may be summarized into three progressive levels. The first level is the reconstruction of the overall spatial structure, with the key task being to re-establish the waterway as the principal organizing axis of the site and, through sectional guidance, clarify the role of different segments within the overall framework. The second level is the repair of public and historical relationships, focusing on restoring the spatial connections between the waterway and historical anchors through revealing the headwater section, ensuring continuity

of riverside pedestrian movement, reorganizing the forecourts of historic buildings, and activating place-based nodes. The third level is the translation of industrial memory, focusing on identifying a limited number of representative productive buildings and street-facing interfaces from the existing stock so that, within the context of comprehensive regeneration, they may continue to carry the expression of site memory and support new public functions.

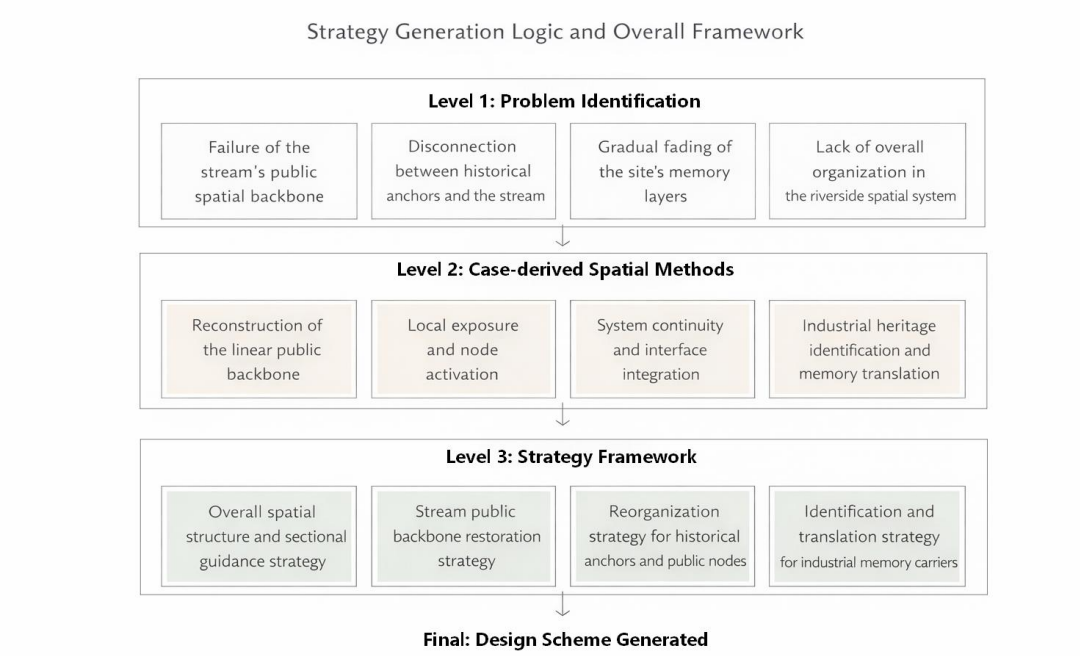


Figure 4-1 Diagram of the Logic of Strategy Generation and the Overall Framework

(Source: Drawn by the author)

4.2. Reconstruction of the Ecological Backbone of the Waterway

The reconstruction of the ecological backbone of the waterway constitutes the core overarching strategy proposed by this study for the site. Its purpose is to re-establish the organizing role of the Kangle Waterway in site regeneration by restoring the continuity, ecological capacity, and publicness of the waterway as the principal spatial axis. As the analysis in Chapter 2 has shown, the most prominent current problem of the Kangle Waterway lies in the fact that, under the long-term effects of high-density construction, interface encroachment, headwater concealment, sectional constraint, and traffic interference, it has gradually lost its structural role as both the main axis of public space and an ecological medium. At the theoretical level discussed in Chapter 3, this strategy primarily responds to the proposition of Landscape Urbanism that urban structure should be reorganized through open space, while also drawing on the systemic logic of Water Urbanism, which regards water as a spatial organizing medium. At the case-study level, this section mainly draws upon the experience of linear public-backbone reconstruction embodied in the Catharijnesingel Canal

Restoration Project in Utrecht, as well as the logic of localized exposure and discontinuity repair demonstrated in the Saw Mill River Daylighting Project in Yonkers. It further incorporates local practices from waterway regeneration in Guangzhou and its surrounding region in terms of shoreline repair, waterside pedestrian access, and the improvement of public interfaces, thereby forming a backbone-reconstruction strategy suited to the narrow sections and strong enclosure of the Kangle Waterway site. In this sense, the reconstruction of the ecological backbone of the waterway is a process of rebuilding the overall spatial order along the corridor with the waterway as its core. This section is developed through two dimensions: the repair of the public backbone and sectional guidance of the backbone. The former emphasizes the repair typologies of the waterway itself and its riverside interfaces, while the latter focuses on the organization of different segments along the entire backbone and the strategic priorities assigned to each.

The key task of repairing the public backbone is to directly respond to the problem of the failure of the waterway as a public spatial backbone, that is, to restore the structural role of the Kangle Waterway as a continuous public axis through targeted interventions on the channel itself and its riverside interfaces. Based on the analysis in Chapter 2 of the headwater section, representative cross-sections, and riverside interfaces, and in conjunction with the strategy diagram shown in Figure 4-2, this study summarizes the repair of the public backbone into three basic strategic units: riverside setback bands, discontinuity-repair nodes, and headwater opening units. These three units correspond respectively to three key dimensions of the problem: the establishment of the waterway as a main spatial axis, the restoration of continuity, and the legibility of its point of origin.

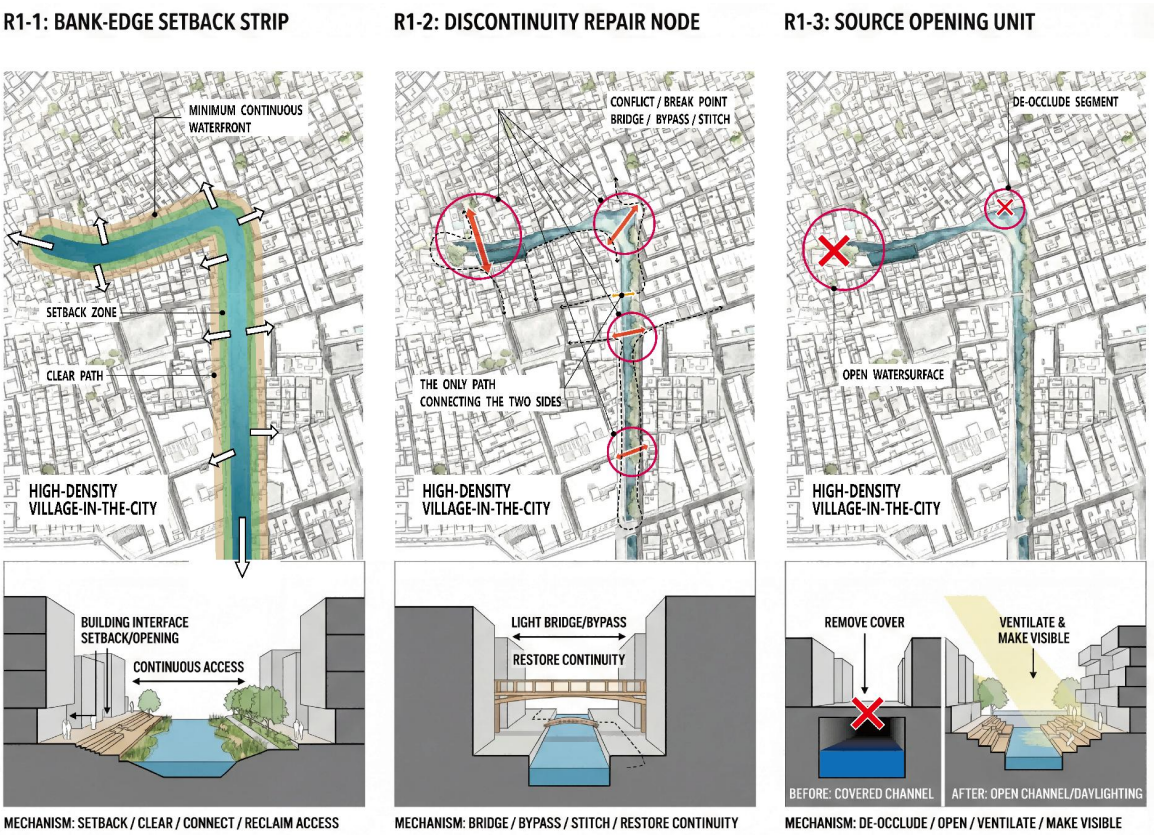


Figure 4-2 Diagram of Strategic Units for the Repair of the Public Backbone of the Kangle Waterway

(Source: Drawn by the author)

First, the riverside setback band is the most fundamental unit of backbone repair. Along the Kangle Waterway, buildings are generally built immediately adjacent to the channel, continuous setbacks are lacking along the water's edge, and pedestrian interfaces remain incomplete. As a result, although the waterway still exists physically, it is unable to form even the most basic condition of public accessibility. The primary purpose of the riverside setback band is therefore to establish a minimum continuous waterfront strip. Through interface clearance, localized setbacks, and path connection, it seeks to restore riverside pedestrian accessibility and basic conditions for staying, so that the waterway may once again possess the qualities of a main axis that can be entered and perceived.

Second, the discontinuity-repair node corresponds to key locations where the continuity of the main spatial axis has been locally interrupted. In current conditions, bridge positions, conflict points with side lanes, localized obstacles, and encroachment by high-density buildings often create breaks or weakened continuity at particular points along the waterway. Unless these interruptions are repaired, the waterway cannot truly function as a coherent system. The focus of discontinuity-repair nodes lies in re-establishing continuity along the interrupted riverside axis through lightweight bridging, detours, stitching, and localized interface adjustment, while simultaneously strengthening the transitional relationship between

lateral lanes and the riverside system.

Finally, the headwater opening unit corresponds to the long-standing problems of concealment and culverting at the headwater section of the Kangle Waterway. The headwater is crucial not only to the spatial establishment of the entire waterway axis, but also to the relationship between the water and the key northern nodes, including the historic building cluster, Longchuan'ao, and the preserved old tree. The purpose of the headwater opening unit is not merely to uncover the channel, but to render the headwater visible, legible, and accessible again through de-concealment, localized opening, improved ventilation and daylight, and interface reorganization, so that it may become both the cultural and ecological point of origin of the entire backbone.

Table 4-3 Extracted Implementation Paths for Repairing the Public Backbone of the Waterway

(Source: compiled by the author)

Strategy Type	Implementation Path
Riverside setback band	1. Under conditions of high-density interfaces, priority should be given to securing the formation of a minimum continuous waterfront setback band. 2. The post-setback riverside space should simultaneously accommodate pedestrian interfaces, ecological buffering, and environmental repair functions. 3. The objective of the setback is not to create large-scale vacant land, but to establish continuous accessibility and basic conditions for staying. 4. The setback band should not be allowed to be reoccupied by parking, storage, or logistical activities.
Discontinuity-repair node	1. Priority should be given to identifying and repairing conflict points, breaks, and weak continuity segments within the riverside system. 2. The continuity of the main axis should be restored through lightweight bridging, detours, or stitching, rather than through large-scale demolition and reconstruction. 3. Repair nodes should simultaneously address the transitional relationship between lateral lanes and the riverside main axis. 4. Interventions should avoid focusing solely on point-based circulation while neglecting the broader organizational significance of the node within the overall backbone.
Headwater opening unit	1. The headwater section should first be revealed from its culverted and concealed condition, so as to re-establish the public legibility of the waterway's origin. 2. Once opened, the headwater space should form direct relationships with the historic buildings, Longchuan'ao, and the preserved old tree. 3. The headwater unit should possess the qualities of ventilation, daylight, visibility, and accessibility, so that the public can perceive the origin of the waterway. 4. The headwater space should not again be weakened in its public and symbolic significance by enclosure, ancillary facilities, or restrictive management.

As shown through the above typological summary and the extracted implementation paths in Table 4-3, the repair of the public backbone constitutes a layered repair system

unfolding from the legibility of the point of origin, to the restoration of continuity, and finally to the opening of interfaces. Its core objective is not to restore the Kangle Waterway as an idealized natural river, but rather to establish, within a high-density existing urban environment, a gradually implementable mechanism of main-axis repair through which the waterway may genuinely recover its role as the spatial backbone of regeneration along the corridor.

4.3. Identification of Site Elements and Categorization of Strategic Objects

Once the reconstruction of the ecological backbone of the waterway has established the overall spatial axis, the key issue of regeneration shifts to how the various site elements along the corridor may be reincorporated into the backbone system. In other words, the establishment of the backbone is only the precondition for regeneration; what truly determines the direction of subsequent spatial generation is which elements along the corridor are worthy of retention, integration, translation, and activation, and what roles these elements should assume within the broader process of regeneration. On this basis, this section proceeds from the site as a whole to identify and categorize the core elements that may serve as strategic objects in the subsequent design process, thereby clarifying the object basis for the strategy generation developed later in Chapter 4.

In their current condition, the site elements along the Kangle Waterway that can be incorporated into subsequent regeneration strategies may be broadly grouped into four categories. The first consists of historical architectural elements, represented by the Luo Clan Ancestral Hall, the Weichang Luo Ancestral Hall, and Hongsheng Ancient Temple. The second consists of folk-cultural facility elements, centered on Longchuan’ao. The third consists of natural place-based elements, represented by the preserved old tree and supplemented by continuing public functions such as village-history display, dragon boat culture display, and grassroots service provision. The fourth consists of industrial elements, represented by former garment-production spaces within the original site, mainly distributed in the southern section, including representative factory buildings, storage-related interfaces, street-facing business spaces, and the industrial traces they retain. These elements are spatial witnesses to the modern insertion of the garment industry into the site and constitute the principal objects for subsequent memory translation. These retained elements are summarized in Table 4-4. Their common characteristic is that the objects themselves still remain, while the relationships among them and between them and the waterway have been significantly

weakened.

For the historical architectural elements, the current problems are mainly concentrated in three aspects. First, informal surrounding buildings closely press against their boundaries, while miscellaneous storage and temporary parking encroach upon the necessary conservation buffer, leaving an insufficient margin of open space around them. Second, the forecourts of the historic buildings are often blocked by surrounding structures, lacking visual corridors toward the waterway and clear site entrances. Third, although the buildings themselves remain relatively well preserved, in actual use they are mostly retained in a passive manner and no longer effectively participate in contemporary public life. In response to these issues, the implementation path proposed in this study is to first clear away informal spaces immediately adjacent to the historic buildings and to restore the required protection buffer. In addition, those building volumes that obstruct the forecourts should be removed so as to reopen visual and pedestrian links from the forecourts toward the waterway. While maintaining the integrity of the historic buildings themselves, their original functions—such as ritual use, deliberation, and display—should be continued, while village-history archives, exhibition functions, and grassroots governance services may be moderately introduced as supplementary uses, enabling them to once again serve as the core anchors of the headwater section.

For Longchuan’ao as a folk-cultural element, its value lies in the fact that it still supports the storage, maintenance, folk-cultural use, and gathering activities associated with dragon boats, making it the most distinctive waterside folk-cultural interface in the district. The current problems mainly lie in the cramped space around the basin, the hard-edged boundary treatment, and its close adjacency to the dense village fabric, all of which make it difficult to support both festive operation and everyday display. At the same time, although its physical relationship with the waterway still exists, it lacks a clear and usable transitional edge in spatial terms. In response, the strategic orientation should first reserve sufficient space for dragon boat storage and maintenance, so as not to weaken its basic folk-cultural function. Second, a directly perceptible and practically usable waterside relationship should be maintained between the basin and the main waterway, preserving the shallow water and muddy riverbed conditions suitable for the docking and launching of dragon boats. Finally, Longchuan’ao should be integrated with viewing, exhibition, and staying functions to form a comprehensive public waterside place that can serve not only festive occasions, but also everyday use.

For the preserved old tree, the problem lies in the fact that its potential as an everyday

public node has not yet been released. Under present conditions, the tree lacks an effective relationship with the waterway, is enclosed by hard boundaries, and the space beneath it lacks the conditions for staying, while the surrounding area is also affected by disorderly parking, random storage, and temporary waste occupation. Accordingly, the strategic focus should be placed on removing unnecessary enclosures, establishing a permeable tree pit and a circular staying space around the trunk, and linking the tree to pedestrian paths and the waterfront interface. In this way, the tree may be transformed from an isolated natural object into an under-tree park node that can support staying, gathering, and viewing.

As for the industrial elements, although they do not possess the conservation status of traditional historic buildings, their overall structure, spatial scale, and traces of use directly reflect the modes of production and everyday life that emerged after the modern insertion of the garment industry into Kangle Village, and thus constitute the most immediate material carriers of the site's industrial memory. At present, these industrial elements generally exhibit three major problems. First, their overall interfaces are highly disordered, especially in lanes where loading, unloading, storage, and temporary stopping have long dominated, resulting in a weak sense of spatial order. Second, their internal functions are highly mixed, often combining commerce and living, or production and living, within the same building. Third, their facades are generally rather closed, particularly on the side facing the waterway, where open relationships are rarely formed, making it difficult for these industrial elements to be genuinely incorporated into the riverside public-space system. As a result, the spatial value of these objects has not yet been translated into a public resource of memory.

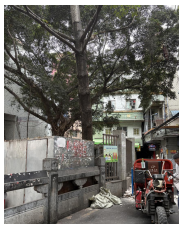
Table 4-4 Identification of Site Elements and Extraction of Strategic Guidelines

(Source: compiled by the author)

Object	Functional Value	Existing Problems	Strategic Positioning
Historical buildings			
 Luo Clan Ancestral Hall	Core carrier of clan memory within the village; well-preserved architectural condition with high conservation value; strong place legibility	1. Weak locational legibility and narrow access routes, preventing effective integration into public life; 2. Poor surrounding environment, with limited forecourt space easily occupied by disorderly parking and storage; 3. Cramped forecourt and disordered surrounding interfaces, with unclear boundaries between festive use and everyday use; 4. Weak architectural autonomy, surrounded by dense village fabric; 5. Forecourt and waterway relationship severed by surrounding self-built structures, lacking visual corridors	1. Clear away surrounding informal spaces and restore the required conservation setback; 2. Open the entrance interface and visual corridor, restoring visual and accessible links to the waterway; 3. Maintain the architectural integrity and continue original functions such as ritual, deliberation, and display; 4. Strengthen its role as a space for folk-cultural display and public gathering through forecourt integration and interpretive guidance; 5. Introduce village-history archives, display functions, and grassroots governance services according to site needs
 Weichang Luo Ancestral Hall	Branch-line ancestral hall, supplementing the internal hierarchy of the cluster and local memory		
 Hongsheng Ancient Temple	Folk-cultural and religious node, with symbolic significance for local culture		
Folk-cultural facility			
 Longchuan'ao	Core carrier of dragon boat culture, supporting gathering, storage, and launching activities	1. Cramped space, with embankments pressed closely against the village fabric; 2. Hardened concrete boundaries and abrupt form, used mainly during festivals and detached from everyday public space; 3. Insufficient space for dragon boat storage, maintenance, and festive operations	1. Reserve sufficient space for dragon boat storage and maintenance; 2. Ensure direct connection between the basin and the waterway, preserving shallow water and muddy-bottom conditions suitable for docking and launching; 3. Reconstruct a waterfront edge that supports gathering, viewing, and staying, and combine it with dragon boat cultural display to form a composite public node

Table 4-5(Continued) Identification of Site Elements and Extraction of Strategic Guidelines

(Source: compiled by the author)

Object	Functional Value	Existing Problems	Strategic Positioning
Natural element			
 Preserved old trees	Carrier of everyday local memory, shaded staying place, and spatial reference point	1. Lacks effective connection with the waterway; 2. Enclosed by rigid boundaries, with insufficient public accessibility and staying quality; 3. Surrounded by excessive hard paving, which is unfavorable to tree growth; 4. Disordered surroundings, including random storage, disorderly parking, and temporary waste occupation	1. Remove unnecessary enclosures and create a permeable tree pit and circular staying space; 2. Strengthen its relationship with pedestrian paths, Longchuan'ao, and the waterfront interface; 3. Form an under-tree pocket park for gathering, viewing, and resting, restoring its role as an everyday public node
Industrial element			
 Accessories retail / materials sales spaces	Relatively intact structural preservation; overall framework capable of representing the site's modern garment-industry memory; maintains a certain setback distance from the waterway; large building volume and relatively open interior space provide the basis for later functional translation and public reuse	1. Overall interfaces are disordered, especially in lanes where spatial order is weak; 2. Internal functions are mixed, often combining commerce and residence or production and residence, resulting in weak recognizability; 3. Facades are relatively closed, especially toward the waterway, with insufficient spatial connection	1. Open the ground floor or selected interfaces to strengthen the relationship between the building and the waterway, while enhancing the capacity for mixed reuse; 2. Retain the overall structure and some representative productive spaces and equipment for display, education, or public activities; 3. Improve the facade and ground-floor interface to create an open public edge facing the waterway
 Garment factory buildings			
 Factory Dormitory			

In summary, the site elements identified above are strategic objects with different potential roles on the basis of the ecological backbone of the waterway. Through this process of identification, the object foundation for the subsequent strategy generation in Chapter 4 can be further clarified: namely, to reorganize the relationships among the identified historical, ecological, and industrial elements on the one hand, and the waterway, public space, and everyday activity on the other. It is precisely on this basis that the following section will proceed from the overall functional structure, sectional organization, and key-node scenarios in order to transform these strategic objects into a regeneration strategy system with concrete spatial form and implementation direction.

4.4. Strategy Formation

4.4.1. Sectional Organization and Formation of the Overall Functional Structure

After completing the identification of site elements, it is necessary to further introduce sectional guidance on the basis of the continuous main axis, according to the characteristics of the retained elements within the site, so as to form a differentiated organization within a unified framework. The purpose of sectional guidance is to clarify, at the strategic level, the main problems, core resources, and regeneration priorities of different segments, enabling the entire waterway backbone to maintain continuity while also carrying different layers of historical, ecological, and mnemonic value. At the same time, drawing on the site analysis in Chapter 2 and the case-study research in Chapter 3, this study classifies the backbone along the Kangle Waterway into the three key segments shown in Figure 4-3: the historical and cultural section, the ecological conservation and public education demonstration section, and the industrial memory section.

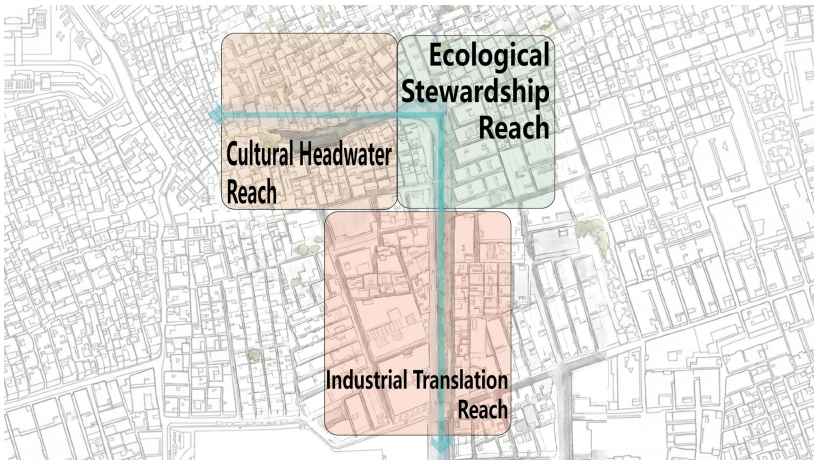


Figure 4-3 Diagram of Site Sectionalization

(Source: Drawn by the author)

The first section is the historical and cultural section, corresponding to the headwater

area of the Kangle Waterway and the northern historic building cluster. This section contains the most concentrated historical and cultural resources and possesses the greatest potential for place legibility. Its regeneration priority lies in re-establishing the spatial relationships among the ancestral halls, the ancient temple, Longchuan'ao, the preserved old tree, and the waterway through the revealing of the headwater, the integration of forecourts, the opening of nodes, and the reconstruction of spatial scenes, thereby enabling it to become the cultural-identification core within the riverside system. In other words, this section is responsible for the dual tasks of reconstructing the point of origin and repairing historical relationships.

The second section is the ecological conservation and public education demonstration section, corresponding to the bend in the waterway. Compared with other parts of the Kangle Waterway, this area is relatively more open in spatial terms, but within the overall riverside system it plays an intermediary role in maintaining the continuity of the main axis, carrying ecological restoration, and providing a space of public demonstration. Its current problems are mainly manifested in constrained sections, pronounced hard-edged interfaces, discontinuous pedestrian connections, and the inadequate expression of the ecological qualities of the waterway. Accordingly, the regeneration priority of this section should focus on sectional optimization, interface setback, the continuity of riverside pedestrian movement, and the insertion of ecological education space, so that it may become a demonstrative site for the ecological restoration and environmental education value of urban waterways. In other words, this section spatially connects the northern and southern segments while also carrying the functions of ecological conservation, public perception, and public demonstration.

The third section is the industrial memory section, corresponding to the southern area where productive buildings, street-facing business interfaces, and traces of modern industrial activity are relatively concentrated. The regeneration priority here should be based on the identification of memory carriers and, through the recognition, retention, and translation of a limited number of representative productive buildings and street-facing interfaces, enable them to continue carrying the expression of site memory and new public functions within the renewed riverside public-space system. Compared with the previous two sections, this segment places greater emphasis on extension and translation. Its significance lies in extending the regeneration of the Kangle Waterway corridor beyond the level of traditional water-town history toward that of modern industrial memory, thereby allowing the overall proposal to form a more complete site narrative.

Table 4-6 Extracted Implementation Paths for the Sectional Organization of the Kangle Waterway Corridor *(Source: compiled by the author)*

Section	Implementation Path
Historical and cultural section	1. Priority should be given to restoring the spatial legibility of the headwater section, so that it can once again enter public perception. 2. The forecourts of historic buildings should establish direct relationships with the riverside open space, rather than continuing to be enclosed by surrounding interfaces. 3. Place-based nodes such as Longchuan'ao and the preserved old tree should be incorporated into the overall nodal system, reconstructing their relationships with the waterway and public activity. 4. Enclosure, logistical occupation, and restrictive management should not be allowed to further sever the relationship between historical nodes and the water.
Ecological conservation and public education demonstration section	1. The middle section should serve as the key area for riverside ecological restoration, with priority given to the optimization of constrained sections and hard-edged shoreline interfaces. 2. On the premise of maintaining the continuity of the main axis, moderate ecological buffering, stormwater detention, and native habitat restoration measures should be inserted. 3. The riverside space should combine continuous pedestrian movement with public education and display functions, so that the process of ecological restoration can be perceived and understood. 4. This section should not be treated merely as a general circulation corridor or a simple landscape green belt, but should instead reinforce its role as an ecological demonstration area.
Industrial memory section	1. A limited number of representative productive buildings, structures, and interfaces should be identified from the existing stock as objects of memory translation. 2. Representative spatial objects should not simply be removed in their entirety, but should be partially retained and structurally adjusted within the overall regeneration framework. 3. Productive residual spaces should be transformed from logistical interfaces into memory interfaces that can participate in the riverside public narrative. 4. Generalized new construction should not be allowed to erase the traces of modern industrial activity.

As can be seen from the summary in Table 4-5, the above three section types correspond to different strategic priorities along the riverside main axis. Together, they constitute a riverside system that unfolds progressively through historical identification, ecological demonstration, and mnemonic extension. The significance of sectionalization lies in enhancing the hierarchy and operability of the overall system through differentiated guidance. Accordingly, sectional guidance must always be grounded in the continuity of the overall main axis. The different sections are not isolated from one another, but are mutually linked and collectively serve the reconstruction of the overall spatial order, thereby providing a clear spatial typology and set of guidelines for the subsequent development of more specific strategies.

4.4.2. Strategy Formation for the Historical and Cultural Section

After the identification of site elements and the extraction of implementation paths, the regeneration of the historical and cultural section is further developed into a clustered structure with clear hierarchy and functional coupling. Based on the existing resource conditions, this study defines the northern section as a cultural headwater cluster centered on the protected historic buildings and composed of Longchuan'ao, the preserved old tree, village-history display, dragon boat culture display, grassroots service functions, and riverside public space. The spatial objective of this cluster is twofold: on the one hand, to establish this section as the cultural point of origin of the entire waterway corridor; on the other hand, to enable history, folk culture, ecology, and everyday use to interact within a single integrated cluster.

In order to further clarify the spatial problems and basic responses associated with the different elements, the study diagrammatically represents the three typical object types described above. As shown in Figure 4-4, the diagram on the left explains how the historic building cluster can rebuild its relationship with the water through the restoration of conservation setbacks, the opening of forecourts, and the recovery of visual corridors. The middle diagram shows how Longchuan'ao may recover its folk-cultural function through spatial reservation, boundary adjustment, and the restoration of its direct relationship with the main waterway. The diagram on the right shows how the preserved old tree may be transformed into an everyday public node through the removal of enclosing boundaries, the creation of a tree-pit staying space, and the strengthening of its connection with the waterfront interface. Through the juxtaposition of tables and diagrams, the identification of site elements is thus developed beyond a simple inventory of resources and translated into operable spatial guidelines, providing the object basis for the subsequent restructuring of the cluster.

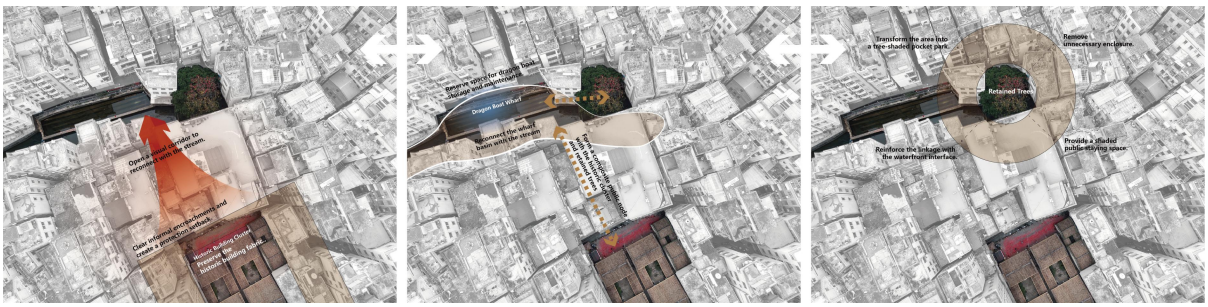


Figure 4-4 Strategies for Key Elements at the Headwater Section of the Site

(Source: Drawn by the author)

As shown in the spatial-organization diagram in Figure 4-5, the protected historic buildings occupy the core layer and function as the central anchors of the entire cultural

headwater cluster. Longchuan'ao and the surrounding dragon boat plaza form the most important folk-cultural interface along the water, supporting festival gathering, dragon boat display, and waterside activities. The preserved old tree and the surrounding green space together constitute a natural public node for everyday rest, meeting, and staying. Functions such as the village-history museum, the dragon boat culture museum, and the village committee office are embedded along the outer edge of the cluster as supporting uses, supplementing local memory display, folk-cultural interpretation, and grassroots governance services. Through this clustered organization, the historic buildings are no longer merely isolated objects to be viewed, Longchuan'ao is no longer just a functional facility, and the preserved old tree is no longer simply an enclosed natural remnant. Instead, they together form a composite cultural place organized around the core historic buildings and linked with plazas, water, green space, and exhibition functions.

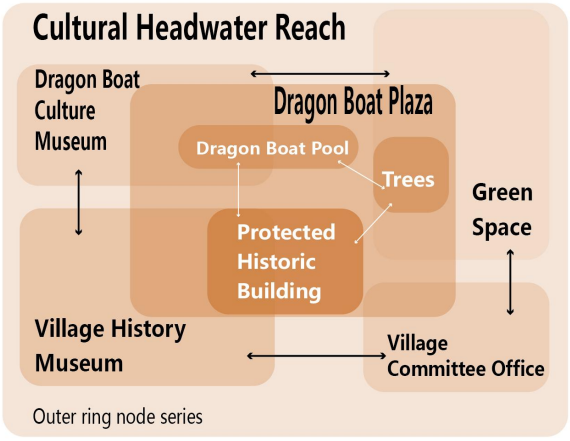


Figure 4-5 Functional Structure Diagram of the Historical and Cultural Section

(Source: Drawn by the author)

The strategy generation for the cultural memory section does not stop at the static preservation of historic buildings such as ancestral halls and temples. Rather, it further extracts spatial elements from traditional Lingnan prototypes that possess both place identity and everyday usability, and reinterprets them into a contemporary spatial language suited to the Kangle Waterway site. As shown in the upper part of Figure 4-6, these correspond to the most representative spatial prototypes of Lingnan settlements: the forecourt order centered on ancestral halls and temples; the waterfront connections mediated by water alleys and bridgeheads; the everyday public life grounded in tree shade and courtyards; the shaded transitional interfaces characterized by grey space; and the festive folk scenes represented by dragon-boat activities. Together, these elements constitute the fundamental cultural characteristics of Lingnan water-town space and provide the prototypical basis for the design reinterpretation of the northern section of the Kangle Waterway.

First, through the integration of forecourts and the opening of visual corridors, the ancestral halls, historic temples, and their surrounding fragmented spaces are reorganized into a continuous cultural forecourt system, so that these historic buildings no longer exist as isolated objects but are re-established as core nodes within the riverside public-space system. Second, through the opening of bridgehead nodes and the reorganization of pedestrian interfaces along the waterway, the relationship among the waterway, alleyways, and historic buildings is restored, allowing the water body to once again participate in the organization of cultural scenes. Third, through the provision of platforms beneath trees and waterfront promenades, the traditional Lingnan spatial qualities of shaded lingering and grey space are transformed into public staying interfaces suited to contemporary use. Fourth, through the insertion of a dragon-boat plaza, the original memory of local folk customs is reinterpreted as a public place that accommodates both everyday activities and festive display. Therefore, the regeneration of the cultural memory section is not a simple imitation of traditional forms; rather, through the systematic reconstruction of forecourts, nodes, promenades, and activity scenes, it transforms Lingnan culture from something merely preserved at the level of historic remains into something perceived at the level of spatial experience and sustained at the level of public life.

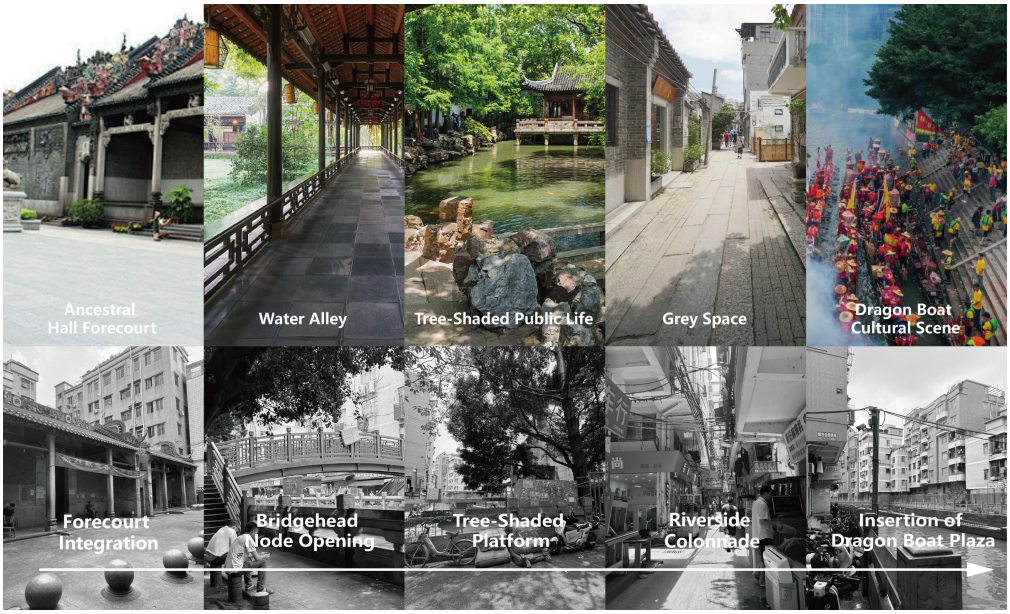


Figure 4-6 Lingnan Spatial Prototypes and Their Design Reinterpretation

(Source: Drawn by the author)

On the basis of this functional structure, the interior of the cluster is further supported by several outer-ring public nodes, which translate the relationships within the cluster into specific places. According to the current nodal proposal and Figure 4-7, these may be developed into four concrete node types. The first is an ecological park organized around the

preserved old tree. Centered on the tree, this node uses the tree-pit boundary, permeable paving, small-scale green space, and circular staying space to form an under-tree park with shade, gathering, and resting functions, thereby turning the natural element into the everyday public core of the cluster. The second is a waterside activity platform along the ecological embankment. Located on the waterfront interface, this node enhances waterside contact and staying quality through a platform aligned with the form of the embankment, while together with the ecological embankment forming an open waterside platform. The third is a dragon boat park. This node embeds dragon boat display into the park's green-space system and, through lawns, exhibition interfaces, and viewing paths, ensures that dragon boat culture is not only present during festive occasions, but can also be read and experienced in everyday conditions. The fourth is a sloped-roof covered corridor bridge spanning the water. This node combines crossing, staying, and viewing functions, serving not only as a waterside circulation structure, but also as a highly legible node linking the historic building cluster with green space and the park, thereby giving stronger spatial continuity to the relationships within and beyond the cluster.

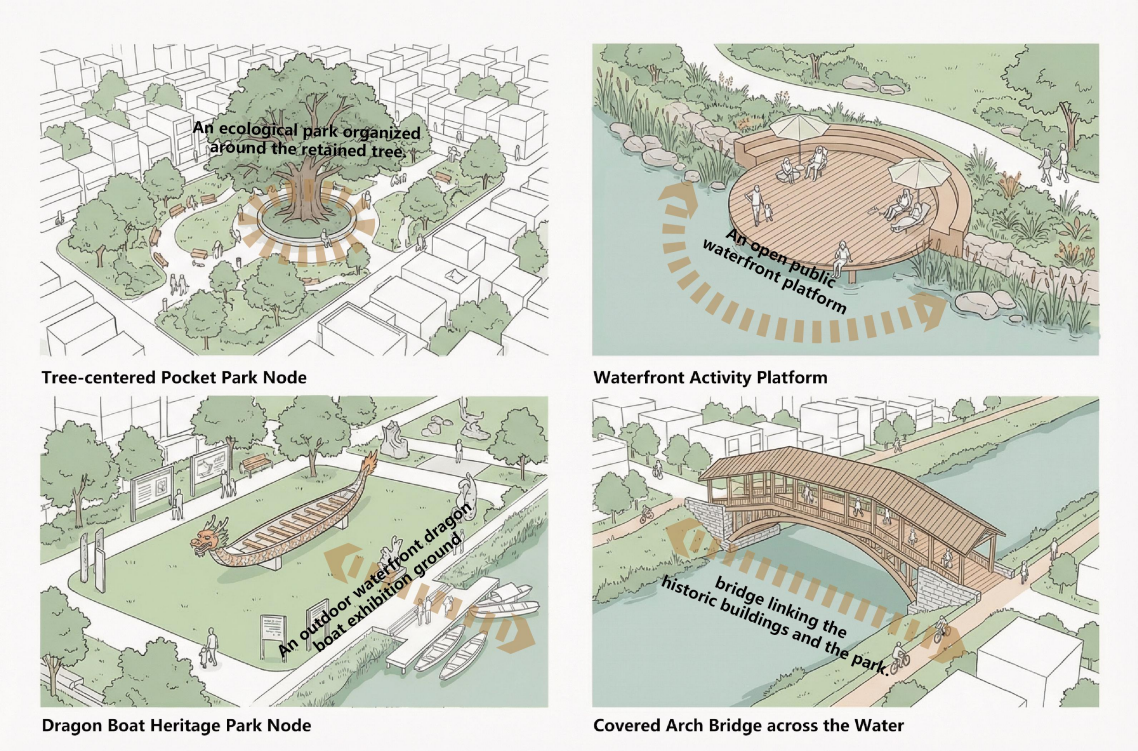


Figure 4-7 Node Diagram of the Historical and Cultural Section

(Source: Drawn by the author)

Accordingly, on the basis of object identification, this section is further developed into a cultural headwater cluster with a clear hierarchy of core anchors, waterfront interfaces, natural nodes, and outer-ring public nodes. Through this process, the authenticity of the original

historical and folk-cultural elements is preserved, while a clear basis is established for the placement of nodes, the generation of spatial form, and the insertion of functions in the subsequent design stage.

4.4.3. Strategy Formation for the Ecological Conservation and Demonstration Section

The ecological conservation and demonstration section is located in the middle reach of the Kangle Waterway. Building on the prior establishment of the ecological backbone of the waterway and the identification of site elements, this section focuses on the coordinated organization of the open site and the waterway itself in the middle segment. The principal task of this section is to transform the riverside space—previously dominated by circulation and hard-edged boundaries—into a composite conservation zone that integrates ecological restoration, public perception, and demonstration-based education, relying on the waterway and the cleared site conditions. The core of its strategy is to take the waterway as the ecological main axis and the cleared site as the carrying surface for restoration, and to form a demonstrative spatial system through the combination of ecological embankments, ecological corridors, public platforms, and interpretive facilities. In doing so, it seeks both to repair the relationship between water and land edges and to create a space in which ecological processes can be understood and experienced by the public.

As shown in the spatial-organization diagram in Figure 4-8Figure 4-8, the ecological conservation and demonstration section is composed of three layers—the waterway ecological conservation zone, the urban waterway conservation base, and waterside platforms—all organized around the Kangle Waterway as the core ecological corridor. First, the waterway itself and the buffer zones along both banks form the waterway ecological conservation zone. Its primary task is to restore the ecological boundary condition of the channel through the softening of embankments, the creation of water–land transitional zones, and vegetation planting, so that the waterway is no longer treated as a single hard-edged drainage section, but instead becomes a linear ecological interface with a certain capacity for habitat restoration. Second, the urban waterway conservation base is established on the cleared site. Its role is to provide a more complete spatial support surface for ecological restoration while embedding ecological education, observation, display, and public activities, thereby transforming the middle section from a generic open site into a demonstrative place of urban waterway ecological conservation. Third, a series of waterside platforms and slow-mobility staying interfaces are arranged between the waterway edge and the site, serving as interfaces through which the public can approach, observe, and experience the ecological processes of the

waterway. In this way, a perceivable transitional relationship is established between ecological restoration and public openness.

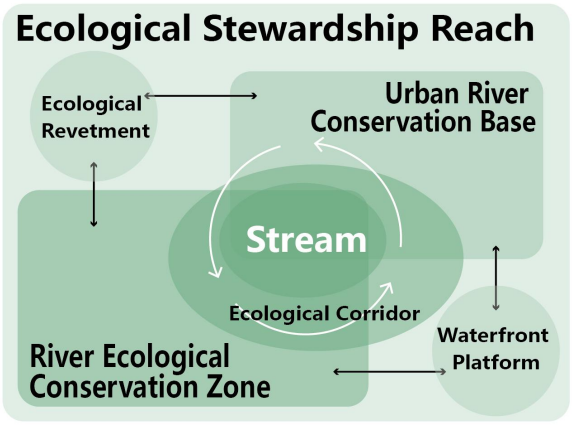


Figure 4-8 Functional Structure Diagram of the Ecological Conservation and Demonstration Section

(Source: Drawn by the author)

From the perspective of functional structure, the strategy for this section may be further understood as consisting of one ecological main axis, two types of conservation interfaces, and four node prototypes. The one ecological main axis refers to the waterway itself and the ecological corridor formed along both sides, which constitutes the most fundamental organizing structure of the entire section. The two types of conservation interfaces refer respectively to the ecological buffer shoreline along the river and the waterside staying interface oriented toward the public: the former emphasizes the repair of the water–land boundary, while the latter emphasizes the visibility and accessibility of ecological processes. The four node prototypes are the concrete spatial expressions of this functional structure, as shown in Figure 4-9, and they respectively carry the functions of slow-mobility recreation, short-stay rest, observation and display, and stormwater detention.

The first node prototype is the ecological buffer shoreline with a slow-mobility walkway. Arranged along one side of the waterway, this node takes ecological embankments and continuous pedestrian movement as its core components, forming a riverside slow-mobility interface through the combined use of sloped banks, planting belts, permeable walkways, and low-intervention shoreline treatment. The second node prototype is the waterside resting platform. Unlike the continuous walkway, the waterside platform places greater emphasis on creating interfaces at key locations for short-term staying, viewing the water, resting, and small-scale activity. The third node prototype is a gallery-like observation structure spanning the water. Characterized by ring-shaped or elevated structures crossing the channel, its primary purpose is not conventional bridge circulation, but rather the creation of a core facility within the urban waterway conservation base from which the ecological restoration

process of the Kangle Waterway may be observed comprehensively from a higher vantage point. The fourth node prototype is the rain garden and stepped waterside interface. This node is developed more within the cleared site area itself, combining micro-topography, rain gardens, vegetated depressions, and stepped water edges to form a sponge-based ecological unit.

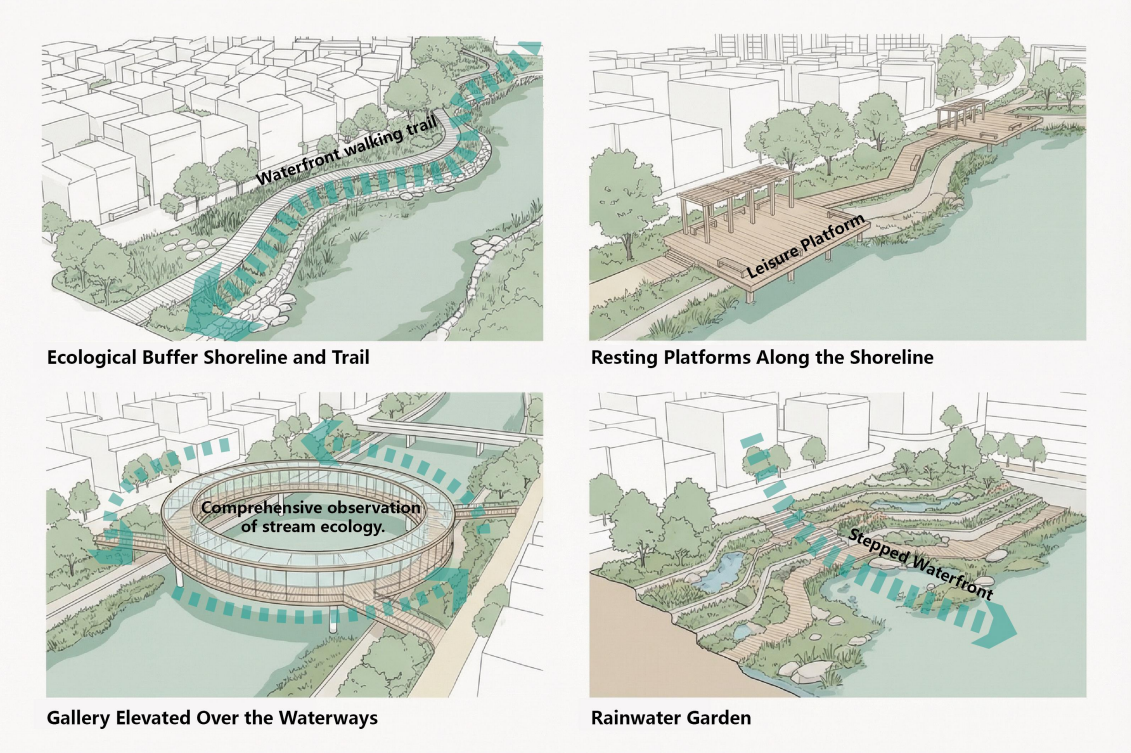


Figure 4-9 Node Diagram of the Ecological Conservation and Demonstration Section

(Source: Drawn by the author)

Accordingly, the strategy formation of the ecological conservation and demonstration section is, in essence, a process of further translating the basic relationship between waterway and site into an implementable functional structure and a series of node prototypes. The waterway assumes the functions of ecological main axis and corridor; the site assumes the functions of conservation base and educational interface; and the node prototypes are responsible for converting ecological processes into perceptible public-space experiences. Through this process, the middle section can be transformed from a riverside space formerly dominated by circulation and lacking legibility into an urban waterway ecological conservation section with restorative capacity, educational significance, and demonstrative value, thereby providing a clear basis for the subsequent placement of nodes, interface design, and spatial.

4.4.4. Strategy Formation for the Industrial Memory Section

The industrial memory section is located in the southern reach of the Kangle Waterway.

Building on the prior establishment of the ecological backbone of the waterway and the completion of site-element identification, this section serves as a key area for the reorganization of existing productive buildings, street-facing business interfaces, and waterfront open spaces. Its principal task is to translate the traces of productive space, building frameworks, and everyday commercial interfaces formed through the modern insertion of the garment industry into the site into a new system of public memory. In other words, the regeneration goal of this section is to ensure that the original industrial spatial structure retains its recognizability in the process of opening toward the waterway through the combined operations of retention, opening, embedding, and translation.

As shown in the spatial-organization diagram in Figure 4-10, the industrial memory section is primarily structured around two interrelated functional clusters. One is an upgrading cluster centered on the upgrading of the garment industry.The former emphasizes the adaptive renewal of existing productive buildings and spatial frameworks so that they may accommodate functions related to industrial upgrading, such as design studios, shared offices, training and education spaces, and retail spaces. The latter emphasizes the retention of structural frameworks, selected productive spaces, and memory-display content from the industrial remnants, enabling them to support functions such as industrial archives, industrial exhibition, and the narration of local production history. These two clusters are interwoven through commercial support and open interfaces: the upgrading cluster injects contemporary uses capable of sustaining long-term occupation into the site, the memory cluster preserves historical layers that remain readable, and the commercial and public facilities establish the mechanisms of everyday operation and public access between them.

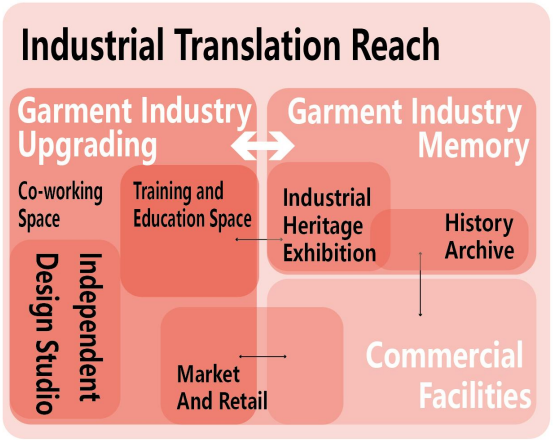


Figure 4-10 Functional Structure Diagram of the Industrial Memory Section

(Source: Drawn by the author)

To address the gradual disappearance of spaces of industrial memory in the southern section, the back-of-house condition of the riverside interface, and the lack of functional

coordination, the strategy generation for the industrial memory section seeks to re-identify the existing industrial chain and its spatial carriers, and to promote their transformation from a single processing-oriented system into a composite system of display, incubation, exchange, and service. As shown in the lower part of Figure 4-11, the diagram summarizes the remaining spatial basis of the garment industry in the southern section of the Kangle Waterway, where production, display, trade, and street-front services are still intertwined within the high-density urban village environment, yet remain generally low in hierarchy and relatively closed in interface condition. On this basis, the design does not sever the site's original industrial attributes; rather, while retaining its garment-industry DNA, it upgrades and reinterprets its functional structure.

More specifically, the upper part of the diagram illustrates the intended direction of regeneration for the industrial memory section. First, spaces originally dominated by processing and storage are reinterpreted as composite spaces that combine light production, training, and exchange, allowing certain productive activities to be retained while enhancing their display value and openness. Second, relying on representative retained buildings and the riverside interface, formerly fragmented and enclosed business activities are upgraded into public interfaces integrating display, product release, and creative retail, thereby transforming industrial space from a back-of-house production area into an urban front-of-house. Third, based on existing dormitories, supporting facilities, and street-front service spaces, functions such as community support, public services, and industrial support programs are introduced, so that industrial regeneration no longer serves only external consumption and display needs, but also responds to the everyday use of local workers and residents. Therefore, the regeneration strategy for the industrial memory section does not aim to erase the traces of the original industry; rather, by means of functional reorganization and interface opening, it seeks to preserve the garment-industry memory of the site while promoting its transformation into a waterfront industrial space with greater visibility, communicative capacity, and public character.

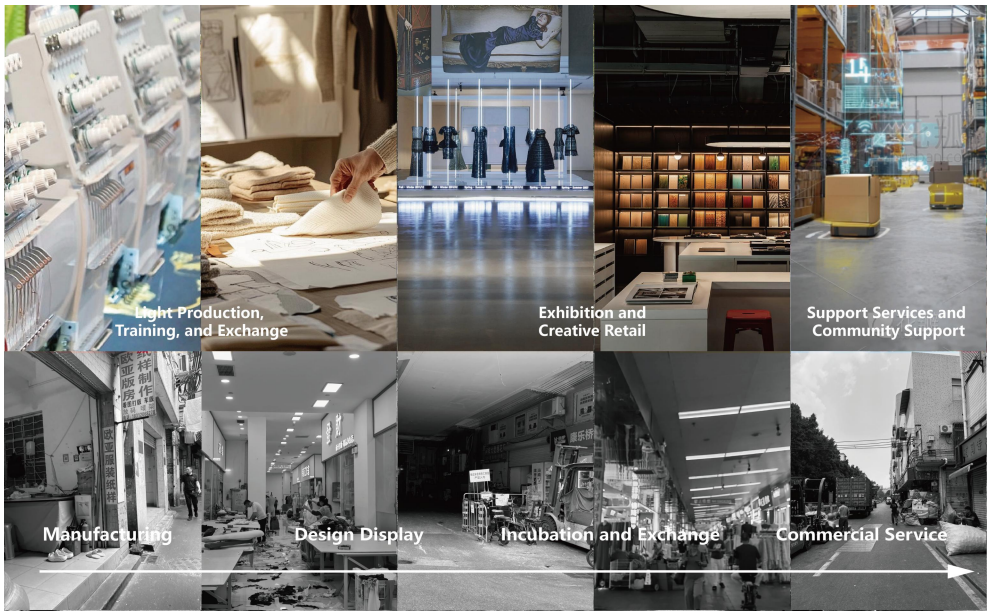


Figure 4-11 Industrial Space Continuity and Reinterpretation Diagram

(Source: Drawn by the author)

From the perspective of functional structure, the strategy for this section may be further summarized as consisting of one waterway promenade axis, two functional clusters, and four node prototypes. The waterway promenade axis refers to the continuous waterfront walkway and open interface established along the edge of the southern section, through which production-oriented interfaces that were once enclosed and relegated to back-of-house conditions are reincorporated into the public system of the waterway. The two functional clusters are the garment-industry upgrading cluster and the garment-industry memory cluster. The four node prototypes are the specific spatial expressions of this functional structure along the waterway edge and within the retained buildings, as shown in Figure 4-12, and correspond respectively to four types of public behavior: promenading, trading, viewing, and arrival.

The first node prototype is the waterway promenade walkway. This node is arranged along the edge of the waterway and is characterized by a continuous and meandering waterside path. By transforming what was originally a simple linear circulation edge into a more meandering waterfront route with greater possibilities for strolling and staying, the public is able to continuously perceive the relationships among industrial buildings, green space, and the waterway while moving along the corridor. The second node prototype is the temporary market. Functionally, the temporary market is a flexible public interface formed through the adaptive reuse of the ground floor or stilted ground-level spaces of retained buildings. On the one hand, it continues the original commercial character of the southern section, ensuring that the industrial logic of production and trade is not completely severed. On the other hand, through the opening of the ground floor and its linkage with the waterfront

interface, commercial activity is transformed into an everyday scene with public character. The third node prototype is the dragon boat viewing platform. Although dragon boat culture is spatially more closely associated with the northern section, in the southern section this node is retranslated into a large-scale public waterfront viewing interface. The fourth node prototype is the boat landing pier. This node is organized around the core functions of passenger gathering, docking, and embarkation/disembarkation, and its significance lies in establishing a clearer external arrival interface for the industrial memory section in the south.

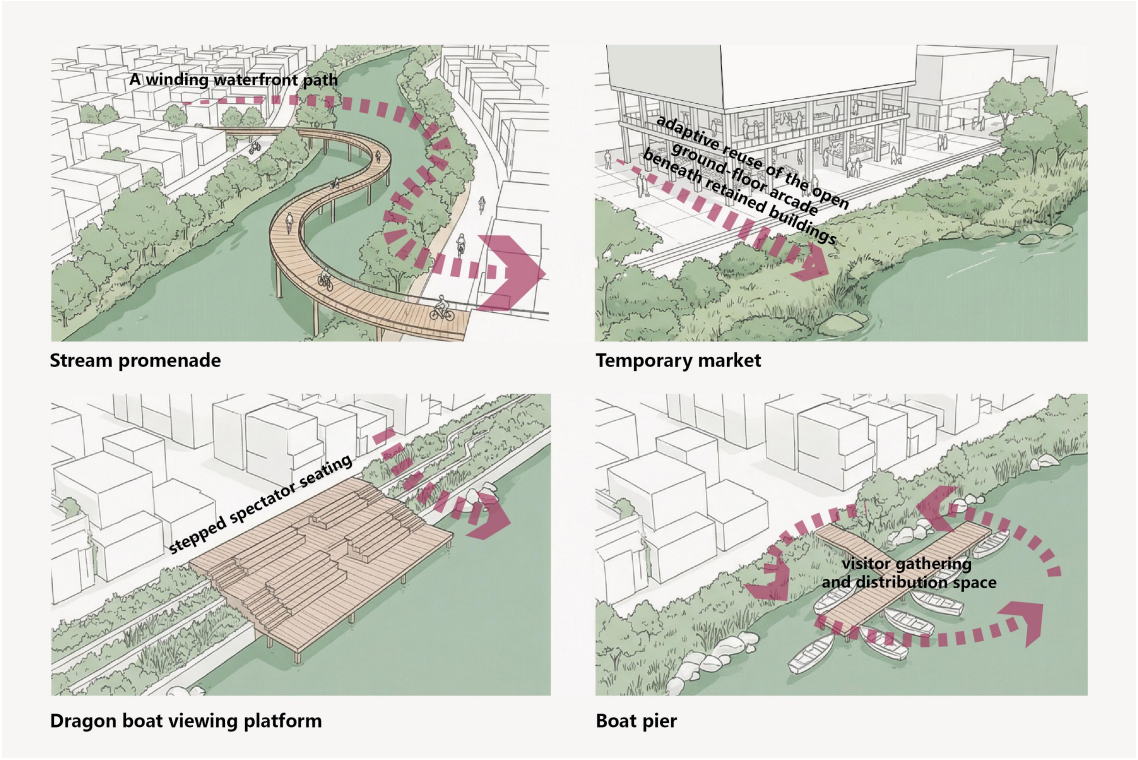


Figure 4-12 Node Diagram of the Industrial Memory Section

(Source: Drawn by the author)

Accordingly, the strategy formation of the industrial memory section is, in essence, a process of further translating the identified productive buildings and street-facing interfaces into a functional structure and nodal system organized toward the waterway. The upgrading cluster responds to contemporary demands for industrial development, the memory cluster preserves the site's modern productive traces, commercial and public facilities provide support for everyday use, and the four node prototypes concretize these contents into spatial experiences. Through this process, the southern section becomes the extension of the riverside regeneration framework that most clearly embodies the logic of translating productive memory into public interface, thereby providing a clear basis for the subsequent design of the overall site plan, node placement, and functional expression.

4.5. Chapter Summary

Building on the problem identification in Chapter 2 and case translation in Chapter 3, this chapter constructs the site strategy system by transforming the principal contradictions along the waterway into operable spatial strategies.

First, reconstructing the ecological backbone clarifies the Kangle Waterway's fundamental role: it serves not merely as an object of ecological restoration, but as the primary axis organizing spatial relationships and public interfaces along the corridor. Second, operable site elements—including historic buildings, Longchuan’ao, preserved trees, cleared sites, productive buildings, and street interfaces—are identified and categorized to clarify their roles in the regeneration process. Finally, the corridor is organized into three sections—the historical and cultural section, the ecological conservation demonstration section, and the industrial memory section—each with corresponding functional structures and node prototypes.

These sectional strategies do not fragment ecology, culture, and industry. Rather, they adopt differentiated emphases within a unified stream-space carrier in response to each segment's core contradictions. Every section embeds a synergistic relationship among the three objectives: the ecological backbone as the foundation, cultural anchors as the soul, and industrial memory as the pulse. By coupling these dimensions through the linear stream space, this chapter integrates heterogeneous site resources into a unified spatial logic and translates abstract regeneration objectives into concrete strategic principles. The next chapter will elaborate the overall design proposal and key spatial fragments based on this backbone-section-node framework.

Chapter 5 Design Proposal and Presentation

5.1. Design Objectives and Strategies

5.1.1. Design Objectives

The design proposal presented in this chapter is a further implementation of the preceding stages of problem identification, case-based translation, and strategy formation. Its core task is to answer the question of how the previously established strategies can be translated into an implementable site design through spatial design. Accordingly, the proposal takes as its central concern how the waterway can once again organize the site, reintegrating historical, ecological, and industrial elements into a unified spatial system. The overall design objectives of the proposal may be summarized at three levels. First, it seeks to reconstruct the ecological-backbone role of the waterway as the principal axis of the site. Second, it aims to form a composite place structure that unfolds progressively from north to south. Third, it aspires to create a public environment that accommodates everyday use while sustaining place memory. Through the opening of forecourts, the restructuring of clusters, the creation of waterfront nodes, and the formation of open interfaces, the proposal seeks to bring historic buildings, folk activities, ecological processes, and industrial traces into contemporary public life.

At the level of overall conception, the corridor along the Kangle Waterway is understood as a composite regeneration corridor structured by the waterway as the main axis and developed progressively through different thematic sections. The waterway establishes the overall spatial order; the historical and cultural section, the ecological conservation and demonstration section, and the industrial memory section constitute the three key zones; and public nodes, clustered structures, and pedestrian connections at different scales integrate these three sections into a continuous spatial experience. The following overall design proposal and sectional fragment designs are all developed on the basis of this conception, so as to translate the functional structures, spatial forms, and key-node organization of each section into design form.

5.1.2. Design Strategies

This section further establishes the correspondence between the regeneration strategies proposed in Chapter 4 and the design responses developed in this chapter. More specifically, it demonstrates how, on the basis of the reconstruction of the ecological backbone of the waterway, the identification of site elements, and the generation of strategies, each strategy is

translated into spatial, functional, and nodal design terms.

Table 5-1 Correspondence Between Design Strategies and Design Responses

(Source: compiled by the author)

Site Strategy	Design Response	Spatial Expression
Reconstruction of the ecological backbone of the waterway	Establish a continuous riverside public-space system with the waterway as the main axis, strengthening its organizing role within the overall regeneration framework	Waterway promenade walkway, ecological embankments, waterside platforms, discontinuity-repair nodes, headwater opening interface
Identification of site elements and categorization of strategic objects	Incorporate historical, ecological, and industrial elements along the corridor into the overall layout, clarifying the role and position of different objects within the proposal	Historic building cluster, Longchuan'ao, preserved old tree, cleared sites, retained factory buildings, street-facing business interfaces
Strategy formation for the historical and cultural section	Take the historic buildings, Longchuan'ao, and the preserved old tree as the core elements in constructing a cultural point of origin and a sequence of public nodes	Historic-building forecourt plaza, dragon boat park, tree-pit parkland, open waterside platform, covered corridor bridge
Strategy formation for the ecological conservation and demonstration section	Use the waterway itself and the cleared site as the basis for constructing a demonstration area that integrates ecological restoration, public education, and waterfront experience	Ecological buffer shoreline, conservation base, waterside resting platform, over-water observation structure, rain garden
Strategy formation for the industrial memory section	Rely on retained productive buildings and street-facing interfaces to promote industrial upgrading, memory display, and the translation of open space	Waterway promenade walkway, temporary market, dragon boat viewing platform, boat landing pier, exhibition-oriented factory buildings and open ground-floor interfaces

As can be seen from the correspondence summarized in Table 5-1Table 5-1, this hierarchical logic is further translated into spatial form, functional structure, and interfaces for public activity. It is precisely on this basis that the subsequent overall design and key-fragment design can both maintain a unified logic centered on the waterway as the main axis and at the same time generate differentiated spatial responses for different sections.

5.2. Overall Design Proposal

5.2.1. Overall Spatial Structure

As shown in Figure 5-1, the overall spatial structure of this proposal is organized around

the waterway as the core main axis, and on this basis forms an overall configuration characterized by three sections, two interacting axes, and multiple supporting nodes. In this study, the Kangle Waterway is re-established as the most stable and continuous linear organizing element within the site, enabling it to function as the primary spatial backbone that structures the functional layout, open spaces, and public activities along the corridor.

As further shown in Figure 5-2, at the level of spatial organization, the waterway main axis constitutes the ecological principal axis of the site and forms the most fundamental longitudinal backbone of the overall spatial structure. Around this axis, the proposal further establishes a transverse axis of historical and recreational connection, linking the inner lane fabric on the western side with the open spaces, cultural nodes, and public-activity interfaces on the eastern side. In this way, it breaks the previous condition in which the waterway existed within the dense built environment but remained disconnected from everyday life on both sides. These two axes intersect in the middle section to form a composite convergence zone. Here, the waterway axis integrates the functions of ecological display, public staying, and cross-sectional linkage, while the transverse recreational axis enables transition and access between different sections. In other words, the middle section is not only the intermediary zone among the three spatial sections, but also the point at which the overall spatial relationships along the entire Kangle Waterway corridor are most intensely concentrated.

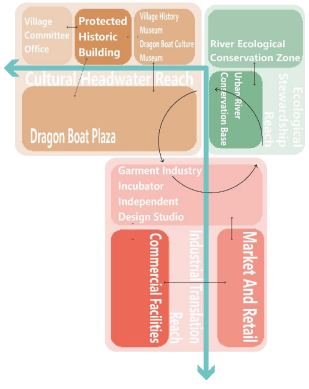


Figure 5-1 Overall Functional Structure Diagram of the Kangle Waterway Corridor

(Source: Drawn by the author)

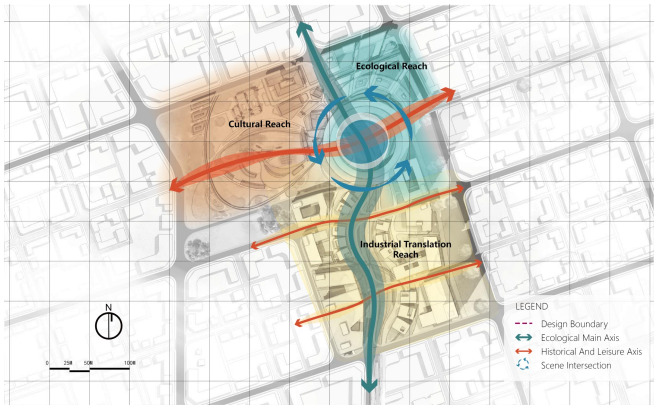


Figure 5-2 Diagram of the Overall Spatial Structure and Sectional Linkage along the Kangle Waterway Corridor

(Source: Drawn by the author)

From the perspective of spatial relationships, the proposal gradually establishes open interfaces on both banks oriented toward the waterway through the superimposition of the waterway principal axis and the transverse connection axis. The open spaces on both sides therefore develop differentiated interface types according to the dominant tasks of different

sections, while ultimately serving the overall continuity of the waterway principal axis. In terms of sectional linkage, the three spatial sections are all organized around the same ecological principal axis of the waterway, forming an overall system that unfolds progressively from north to south. Through this organizational logic, the entire Kangle Waterway corridor establishes an overall spatial sequence of cultural origin, ecological mediation, and industrial extension, while maintaining continuity and unity under the structuring role of the waterway principal axis.

In summary, the overall spatial structure of this proposal re-establishes the overall order of the site under the guidance of the ecological principal axis of the waterway, through the sectional organization of the cultural headwater section, the ecological conservation section, and the industrial translation section, together with the transverse intervention of the historical and recreational connection axis. It is precisely on the basis of this structure that the subsequent overall plan layout, key-fragment design, and node placement are able to form a unified and coherent spatial logic.

5.2.2. Overall Plan Layout

After clarifying the overall spatial structure, the proposal further translates the waterway main axis, sectional functional organization, and key nodes into the concrete site through the overall plan layout. As shown in Figure 5-3, the overall plan is organized longitudinally by the waterway and links the cultural headwater section in the north, the ecological conservation section in the middle, and the industrial memory section in the south into a continuous riverside regeneration system. At the same time, in response to the existing road network, cleared sites, and retained buildings, public functions, open spaces, and slow-mobility connections are arranged on both banks, enabling the waterway to shift from its former role as a drainage boundary to the core axis organizing the overall spatial order.

From the perspective of overall circulation and spatial relationships, the plan layout creates a continuous spatial experience through the combined organization of the waterway main axis, transverse connections, and a sequence of nodes. The cultural point of origin in the northern section transitions toward the ecological core of the middle section through plazas, paths, and waterfront spaces; the middle section in turn connects with the industrial-translation space in the southern section through cross-river links and riverside walkways. The major functional clusters are mutually permeable under the joint organization of the waterway principal axis and several transverse routes. In particular, the ecological core formed in the middle section not only receives cultural connections from the north, but also

provides the continuation of open space and the slow-mobility system toward the south, thereby ensuring that the three sections operate, at the level of the overall plan, as a unified whole rather than as three separate design fragments. Through this arrangement, the spaces on both sides of the waterway are no longer merely scattered residual spaces behind buildings, but are integrated into a continuous public system that is accessible and occupiable. The functional zones shown in the overall plan are thus organized into a coherent environmental whole through the joint structure of the waterway, water surface, green space, and paths.



Figure 5-3 Overall Plan ***(Source: Drawn by the author)***

In order to further clarify the main land-use composition and spatial control relationships on the basis of the overall layout, a summarized statistical description is provided. Table 5-2 serves as a control-oriented explanation for urban design representation, mainly reflecting the functional proportions, open-space organization, and relationships between retention and renewal among the three types of spaces in the overall scheme: the historical and cultural section, the ecological conservation demonstration section, and the industrial memory section. Its purpose is to further demonstrate that this proposal is not merely a morphological design, but rather the result of integrating the cultural headwater section, the ecological conservation section, and the industrial memory section into a continuous riverside spatial system under the guidance of the waterway as the principal axis.

Table 5-2 Land-Use Indicators *(Source: compiled by the author)*

Building Type / Object	Site Area (m²)	Gross Floor Area (m²)	Number of floors
Fully Retained Buildings			
Protected historic building cluster	809	809	1
Retained and Adaptively Reused Buildings			
Garment accessories commercial building	4101	28707	7
Mixed-use garment workshop with residential function	1374	8244	6
Factory dormitory building	1108	7756	7
New Buildings			
Village History Museum	1105	2210	2
Dragon Boat Museum	805	1610	2
Village Committee Office	572	2288	4
Waterway Ecological Conservation Center	5040	10080	2
Urban Waterway Conservation Base	5681	22724	4
Office building	1081	19458	18
Fashion Industry Incubation Base	2742	19194	7
Independent Designer Studios	2536	5072	2
Commercial buildings	2012	44264	22
Apartments	1664	36608	22
Green space	52511	–	–
Total	83141	209024	–
Green Space Ratio	63.2%	–	–
Floor Area Ratio	2.514	–	–

From the perspective of the overall spatial structure, land-use organization is developed around the waterway, which serves as the most stable and continuous linear backbone of the site, while riverside open space, historical and cultural nodes, and spaces for industrial reinterpretation function as the principal spatial carriers. Among these, land designated for

cultural preservation and display is mainly concentrated in the northern section, where it supports the integration of ancestral halls, historic temples, dragon-boat culture, and related forecourt spaces. Land for ecological conservation and public education primarily corresponds to the middle section, which serves as the core area for ecological restoration of the waterway, public education and interpretation, and slow-mobility experience. Land for industrial upgrading and creative services is mainly distributed in the southern section, where representative retained buildings, interface renewal, and the insertion of new functions promote the reinterpretation of spaces of industrial memory and the coordinated upgrading of riverside functions. At the same time, the system of waterfront open spaces, slow-mobility connections, and public nodes runs throughout the site, forming the basic public structure that links the three sections.

Therefore, the purpose of this table is to present, in a more intuitive manner, the allocation relationships embedded in the scheme in terms of functional organization, spatial hierarchy, and regeneration priorities. Through a summarized arrangement of the principal land-use and spatial control indicators, the table further supports the design logic expressed in the overall plan: namely, to take the waterway as the principal spatial axis, coordinate the three major objectives of heritage conservation, ecological restoration, and industrial reinterpretation, and translate them into an integrated riverside spatial order characterized by continuity, hierarchy, and legibility.



Figure 5-4 Before-and-After Comparison

(Source: Drawn by the author)

In summary, the overall plan layout represents a further implementation of the overall spatial structure. Under the guidance of the waterway as the main axis, the three sections together constitute the overall riverside regeneration proposal through their differentiated functional emphases and spatial interfaces. On the basis of this overall plan, the subsequent design of key fragments and major nodes can proceed with a clear spatial placement and organizational logic.

5.3. The Waterway Backbone and Public Interfaces

The construction of the waterway backbone and public interfaces constitutes the key step through which the overall design shifts from functional allocation to spatial experience. The previous two sections have already clarified the role of the waterway as the principal axis within the overall spatial structure, as well as the functional arrangement of the cultural headwater section in the north, the ecological conservation section in the middle, and the industrial translation section in the south. This section further examines how the waterway can be transformed from a single linear water body into the spatial backbone that structures the overall regeneration, and how the public interfaces on both banks can be organized in relation to that backbone. More specifically, through the combination of continuous riverside paths, cross-river bridge connections, and a hierarchical nodal system, the proposal reintegrates the previously separated, back-of-house, and fragmented spaces on both sides of the waterway into a unified public system.

5.3.1. Construction of the Waterway Backbone

In this proposal, the construction of the waterway backbone does not simply mean preserving the existing channel as it is; rather, it treats the waterway together with the interfaces on both sides as a unified spatial structure. As shown in Figure 5-5, the specific design operations include three aspects.

First, a continuous waterfront slow-mobility interface is established along the waterway, so that both banks are transformed from marginal circulation strips into public edges that allow walking and staying. In the northern section, a cultural waterfront interface is formed through the forecourts of the historic buildings, the dragon boat plaza, and the activity park. In the middle section, an ecological waterfront interface is formed through the conservation base, ecological embankments, and open green space. In the southern section, an open waterfront interface is formed through retained factory buildings, opened ground floors, commercial frontages, and the promenade walkway. Although these three interface types differ in

expression, they all serve the continuity of the waterway as the principal axis.

Second, the waterway backbone acquires a more legible spatial width through interface setbacks and localized openings. In the northern section, the main emphasis lies in restoring the visual relationship and forecourt connection between the historic buildings and the waterway. In the middle section, the focus is on creating buffering and ecological transition between the waterway and the cleared site. In the southern section, attention is given to opening the relationship between the retained buildings, their ground-floor interfaces, the street-facing edge, and the waterway. In other words, the waterway backbone is not an isolated water line, but rather a composite banded space formed jointly by water, walkways, platforms, green strips, and spatial interfaces.

Third, the waterway backbone assumes the principal longitudinal organizational role across the entire site. The historical core of the northern section, the waterway conservation core of the middle section, and the industrial translation core of the southern section all unfold along the waterway and achieve continuous spatial legibility through the waterway main axis. This mode of organization avoids an isolated layout in which each section operates independently, ensuring instead that the entire site is consistently developed around a shared spatial axis.

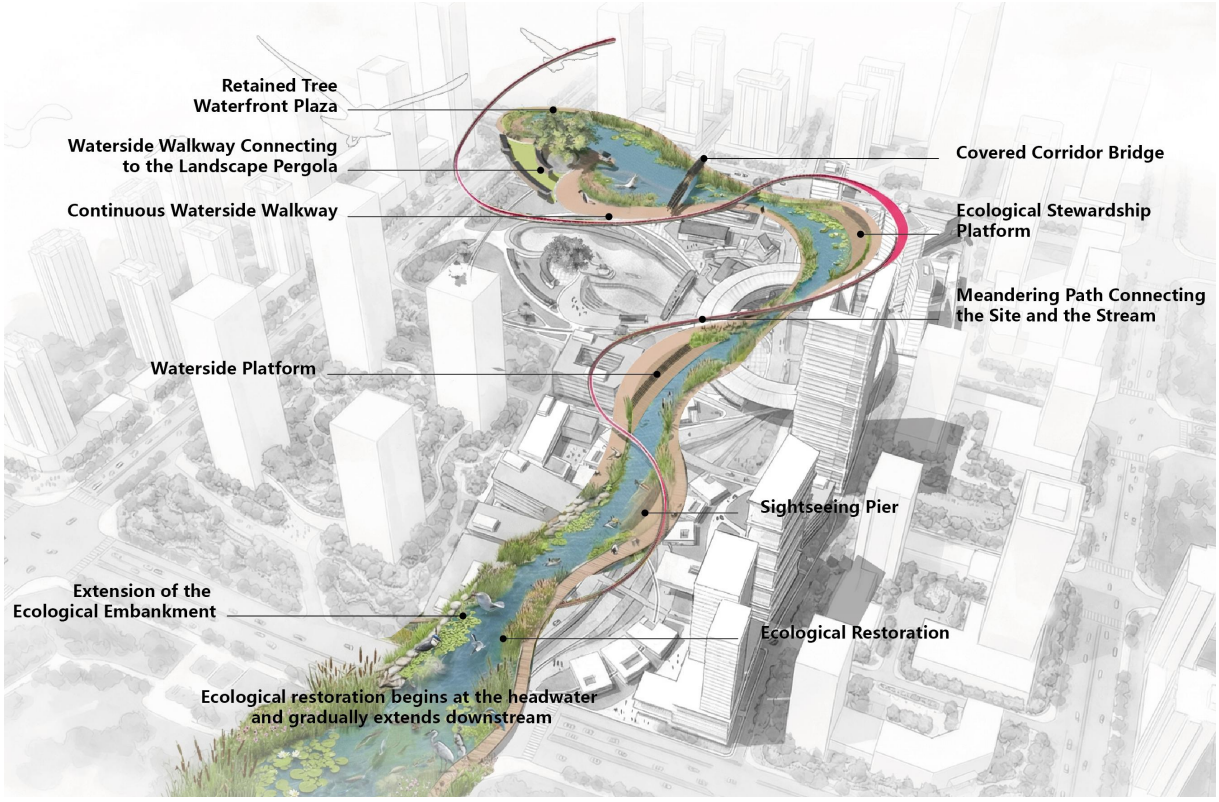


Figure 5-5 Analysis of the Waterway Backbone

(Source: Drawn by the author)

5.3.2. Public Nodes and the Organization of Spatial Sequence

After establishing the waterway backbone, the proposal further translates the different types of spatial content along the corridor into specific places through a system of public nodes. The purpose of the nodal system is to rely on retained buildings, preserved environmental elements, and newly introduced functional interfaces to organize the key spaces along the Kangle Waterway in a hierarchical manner, thereby transforming the overall design from a linear backbone into a public system with a clear structure of place. According to differences in functional intensity, spatial scale, and organizational role, and as shown in Figure 5-6, the nodes in the proposal can be divided into two categories: primary nodes and secondary nodes.

The primary nodes correspond to the most important spatial cores of the entire site, including the historical core in the northern section, the dragon boat park node, the waterway conservation core in the middle section, and the industrial translation core in the southern section. These nodes are typically directly associated with protected historic buildings, retained factory buildings, large-scale open spaces, or key functional structures, and they assume the principal roles of functional concentration, spatial legibility, and the organization of public activity. The historical core in the northern section is centered on the protected historic buildings and their forecourt spaces, carrying the functions of cultural display, the continuation of local memory, and spatial entry recognition for the site. The dragon boat park node, by contrast, integrates dragon boat activities, a waterside plaza, and under-tree activity space, and supports both folk-cultural activities and public staying. The waterway conservation core in the middle section is formed through the conservation base, the water surface, platforms, and surrounding green space, and carries the functions of ecological display, public education, and cross-sectional transition. The industrial translation core in the southern section unfolds around retained factory buildings, opened ground floors, and riverside commercial interfaces, and accommodates the composite functions of industrial upgrading, memory display, and everyday commercial activity. In this sense, the primary nodes constitute the most important spatial support points along the entire Kangle Waterway corridor.

The secondary nodes are distributed between the primary nodes and mainly serve auxiliary functions such as staying, turning, viewing, bridgehead transition, and localized activity. In the northern section, the secondary nodes mainly serve the interior of the historic building cluster and the areas surrounding the dragon boat activity zone. In the middle section, the secondary nodes are arranged around the conservation core, supporting ecological

observation, near-water staying, and path transition. In the southern section, the secondary nodes are more closely associated with the promenade walkway, opened ground-floor interfaces, and small outdoor spill-out spaces, enhancing the everyday accessibility and publicness of the industrial translation section. Through the nested relationship between primary and secondary nodes, the corridor along the waterway forms a clear hierarchy of place, rather than remaining merely a continuous but undifferentiated linear space.

After this nodal hierarchy is established, the proposal further organizes these nodes into a continuous spatial sequence through the riverside main path and bridge connections, as shown in Figure 5-7. Here, "sequence" refers to the way in which place experience along the riverside main axis progresses from one node to the next, generating changes in rhythm through transitions. Overall, the sequence unfolds from north to south. It begins with the historical core and the dragon boat park node in the northern section, which together form the cultural sequence at the point of entry into the site. It then transitions, through bridges and pedestrian connections, to the waterway conservation core in the middle section, where spatial experience shifts from historical culture toward ecological observation and public education. Finally, through the path and bridge relationships extending from the middle section toward the south, pedestrian flow is guided into the industrial translation core and its surrounding open interfaces, forming a continuous experiential chain that unfolds progressively from history, to ecology, and then to industry.

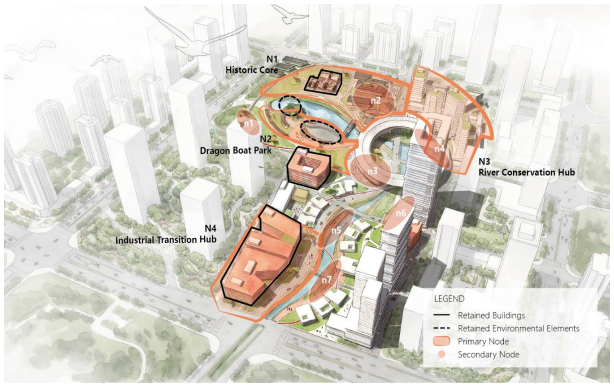


Figure 5-6 Diagram of the Hierarchy of Nodes and Their Relationship to the Retention System

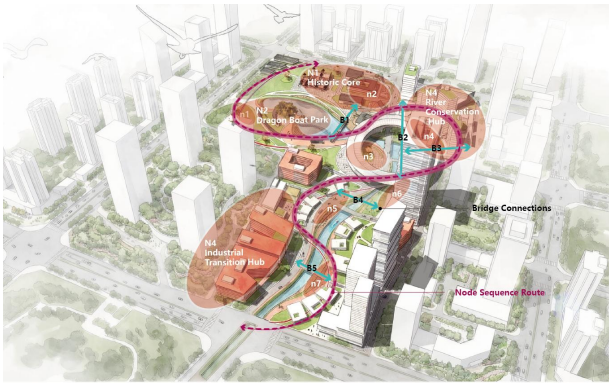


Figure 5-7 Diagram of the Nodal Sequence and Bridge-Linkage System

(Source: Drawn by the author)

Through this organizational logic, the Kangle Waterway corridor ultimately forms a public-space sequence system composed jointly of nodes, bridge transitions, and the riverside main path. The primary nodes provide the strongest functional and visual anchors for the entire site, the secondary nodes fill in the spaces of staying and transition between them, the bridge connections strengthen the interaction between the two banks and the transitions

between nodes, and the riverside main path integrates all nodes into a continuous and accessible public axis. In this way, both sides of the waterway together form a public nodal network with a clear hierarchy, continuous rhythm, and a complete spatial experience.

5.4. Design of the Historical and Cultural Section

This section takes historical and cultural restoration as the leading objective, while simultaneously achieving the interweaving of all three objectives within the same historical space through the softening of ecological shorelines and the implantation of industrial exhibition spaces.This section takes historical and cultural restoration as the leading objective, while simultaneously achieving the interweaving of all three objectives within the same historical space through the softening of ecological shorelines and the implantation of industrial exhibition spaces. The historical and cultural section is located in the northern part of the site and is the segment with the most concentrated historical resources and the highest degree of cultural legibility within the entire waterway regeneration system. The focus of its design is not the isolated conservation of individual buildings, but rather the reorganization of the protected historic buildings, Longchuan'ao, the dragon boat plaza, the old-tree plaza, village-history display spaces, and the riverside public interface into a cultural cluster with a clear hierarchy and continuous spatial relationships. In this way, the section may both sustain the original use attributes of the historic place and enter the system of contemporary public life.

5.4.1. Spatial Structure and Connections

As shown in Figure 5-8, the overall organization of this section adopts a clustered structure composed of core anchors, forecourt spaces, waterfront activity interfaces, and peripheral supporting functions. The protected historic buildings occupy the core of the cluster and constitute the most important historical anchors of the entire section. Supporting functions such as the village-history museum, the dragon boat culture museum, and the village committee office are arranged around the outer edge and undertake roles of display, management, and service. Longchuan'ao, the dragon boat plaza, and the riverside activity spaces are positioned between the cluster forecourt and the water, forming the public interface through which the historic cluster opens toward the Kangle Waterway. Through this arrangement, the historical and cultural section is no longer a simple accumulation of historical objects and auxiliary functions, but is transformed into an integrated cultural spatial unit centered on historic buildings, mediated by dragon boat culture, and fronted by the

waterway interface.

On the basis of this clustered structure, and as shown in Figure 5-9, direct relationships between the historic buildings and the waterway are further established through conservation setbacks, visual corridors, and the organization of a pedestrian loop. The design first reserves the necessary protection setback around the protected historic buildings, controlling the openness of the surrounding space and preventing them from continuing to be compressed by the dense built environment. This setback, together with the forecourt plaza, pedestrian paths, and waterfront interface, forms the spatial setting through which the historic buildings may once again be recognized. On this basis, the design gives particular emphasis to opening a visual corridor from the forecourt of the historic buildings toward the waterway. This corridor takes the form of an open plane jointly composed of the historic forecourt, the dragon boat plaza, Longchuan'ao, and the waterside platform. Through the removal of obstructions and the adjustment of the relationship between ground-level activity space and the water's edge, the historic buildings are able to establish direct visual relationships with Longchuan'ao, the water surface, and riverside activities.

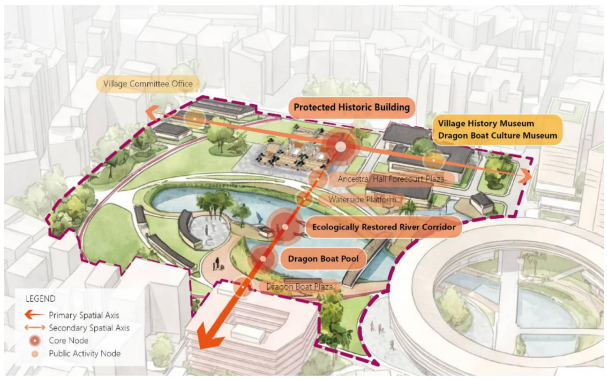


Figure 5-8 Diagram of the Cluster Structure of the Historical and Cultural Section

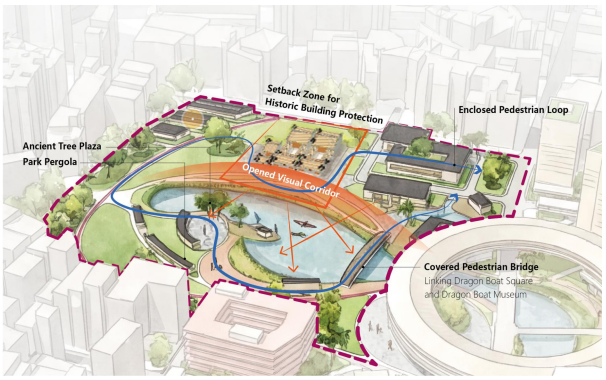


Figure 5-9 Diagram of Spatial Organization and Visual Connections

(Source: Drawn by the author)

The pedestrian system is organized through a combination of an outer loop and core connective paths. The outer pedestrian loop links the old-tree plaza, the park colonnade, the village-history exhibition spaces, and the outer spaces of the historic buildings into a continuous slow-mobility route, thereby forming a complete outer ring for walking, visiting, and staying. The core connective paths pass through the forecourt plaza and dragon boat plaza and directly connect the protected historic buildings, Longchuan'ao, and the edge of the waterway, constituting the most important activity routes within the cluster. In addition, a covered bridge across the water links the dragon boat plaza with the dragon boat culture exhibition space, allowing the folk-cultural activity interface of the northern section and the

exhibition facilities on the eastern side to form a more complete public system. This mode of pedestrian organization not only accommodates everyday visiting and festive activities, but also enables the historical and cultural section to connect spatially with the entire waterway backbone.

5.4.2. Sectional Relationship of the Waterway

From the perspective of sectional relationships, the key design task in this section lies in handling the continuous layering among the historic buildings, the forecourt plaza, Longchuan'ao, and the ecologically restored waterway interface. As shown in Figure 5-10, the protected historic buildings occupy a relatively stable elevated interface, in front of which a forecourt plaza is reserved as a buffer space through which the historic buildings open toward public space. The forecourt plaza then transitions southward into the dragon boat plaza and the retained dragon boat passage, and finally connects to the waterway itself and the ecologically restored waterfront interface. In this way, the northern section forms a spatial sequence that unfolds step by step from building to water's edge through a series of level changes, platforms, and interface transitions.

Sufficient setback space is reserved around the protected historic buildings so that, while retaining their original use attributes, they may also obtain a more complete forecourt setting. No abrupt separation is introduced between the forecourt plaza and the dragon boat plaza; instead, the two are gradually connected through continuous topography and activity platforms, allowing the historic buildings, Longchuan'ao, and the waterway interface to be read within the same visual field. Longchuan'ao, in turn, is treated as the core of the retained dragon boat passage and folk-cultural activities, establishing direct relationships with both the forecourt plaza and the waterway, rather than being reduced to a mere ornamental water basin or isolated facility.

From the perspective of the waterway backbone, this sectional relationship makes the historical and cultural section the starting spatial sequence of the entire waterway main axis. Here, the waterway becomes the structural thread linking the forecourt plaza, dragon boat activities, and the riverside pedestrian interface. In this way, the historic buildings connect to the waterway through the forecourt, Longchuan'ao is embedded into the waterway through its activity interface, and the ecologically restored channel continues southward toward the middle section, forming the continuous public main axis of the entire site.

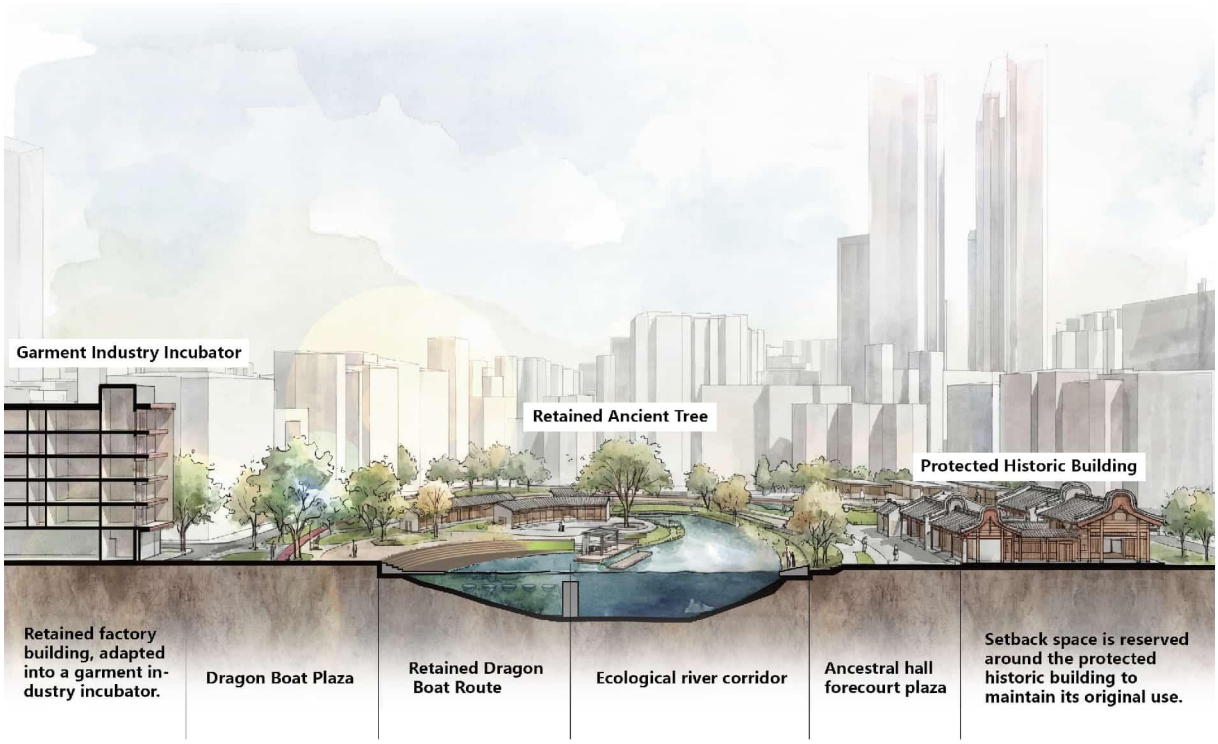


Figure 5-10 Sectional Relationship Diagram of the Historical and Cultural Section

(Source: Drawn by the author)

The design of the node where the historic buildings meet the waterway interface focuses on the relationship among conservation setbacks, forecourt organization, and the unfolding of waterside space. As shown in Figure 5-12, the protected historic buildings are not obscured by new interface elements; rather, they regain an open posture toward the water, framed by the forecourt plaza, the ecological waterway corridor, and low-scale exhibition buildings. No overly complex level changes or landscape obstacles are placed in front of the historic buildings. Instead, a relatively gentle ground transition and waterside walkway extend the forecourt directly to the waterway interface. The waterside platform and the riverside promenade interface node assume the functions of near-water staying and interface transition. As shown in Figure 5-13, the edge of the waterway is not treated as a single hard embankment, but as a composite waterside interface formed jointly by timber platforms, ecological slopes, small-scale structures, and continuous walkways. These small structures can serve both as resting elements and as dock-related spaces, while also softening the emptiness between the plaza and the water in terms of spatial scale.

5.4.3. Node Design

The node design of this section is organized around the continuous relationship among the historic-building forecourt, Longchuan'ao, the dragon boat plaza, and the waterside platform. Its emphasis lies in forming a place system that can be continuously read and used

by coordinating nodes of different scales, thereby linking the historical core, folk-cultural activity spaces, and the public waterway interface. Combined with the perspective renderings, the node design in this section may be divided into four levels: the overall relational node, the historic-building waterfront-interface node, the waterside promenade node, and the dragon boat plaza node.

The design of the cultural section centers on the continuity of Lingnan local cultural scenes and the reorganization and activation of historical and cultural nodes. Rather than beginning with superficial symbols, it starts from spatial prototypes and integrates ancestral halls, forecourts, water, old trees, and dragon-boat culture into a riverside cultural interface with strong public character and sense of place. As shown in Figure 5-11, the design does not treat the historic buildings in isolation. Instead, through the integration of forecourts, the opening of the riverbank, and the insertion of plazas, it re-establishes both visual and pedestrian connections between the ancestral hall complex and the waterway, allowing the historic buildings to re-enter the contemporary public-space system. The introduction of the old-tree activity node and the dragon-boat plaza further reinforces the dual role of the cultural section in everyday leisure, community activities, and festive rituals, so that culture no longer remains merely a relic to be viewed, but is transformed into a spatial scene that can be experienced and participated in. In terms of material strategy, the proposal retains original historic materials such as stone, grey brick, dark brick, grey roof tiles, and slate, while introducing new elements with a distinct Lingnan regional character—such as timber boards, dark timber finishes, clay tiles, and bamboo—in newly inserted parts. In this way, the juxtaposition of old and new produces an expression of continuity rather than imitation of the past. As a result, the regeneration of the cultural section moves beyond the protection of historic buildings toward the reconstruction of local cultural scenes, enabling Lingnan culture to gain new spatial support and a renewed foundation in public life within the waterway space.

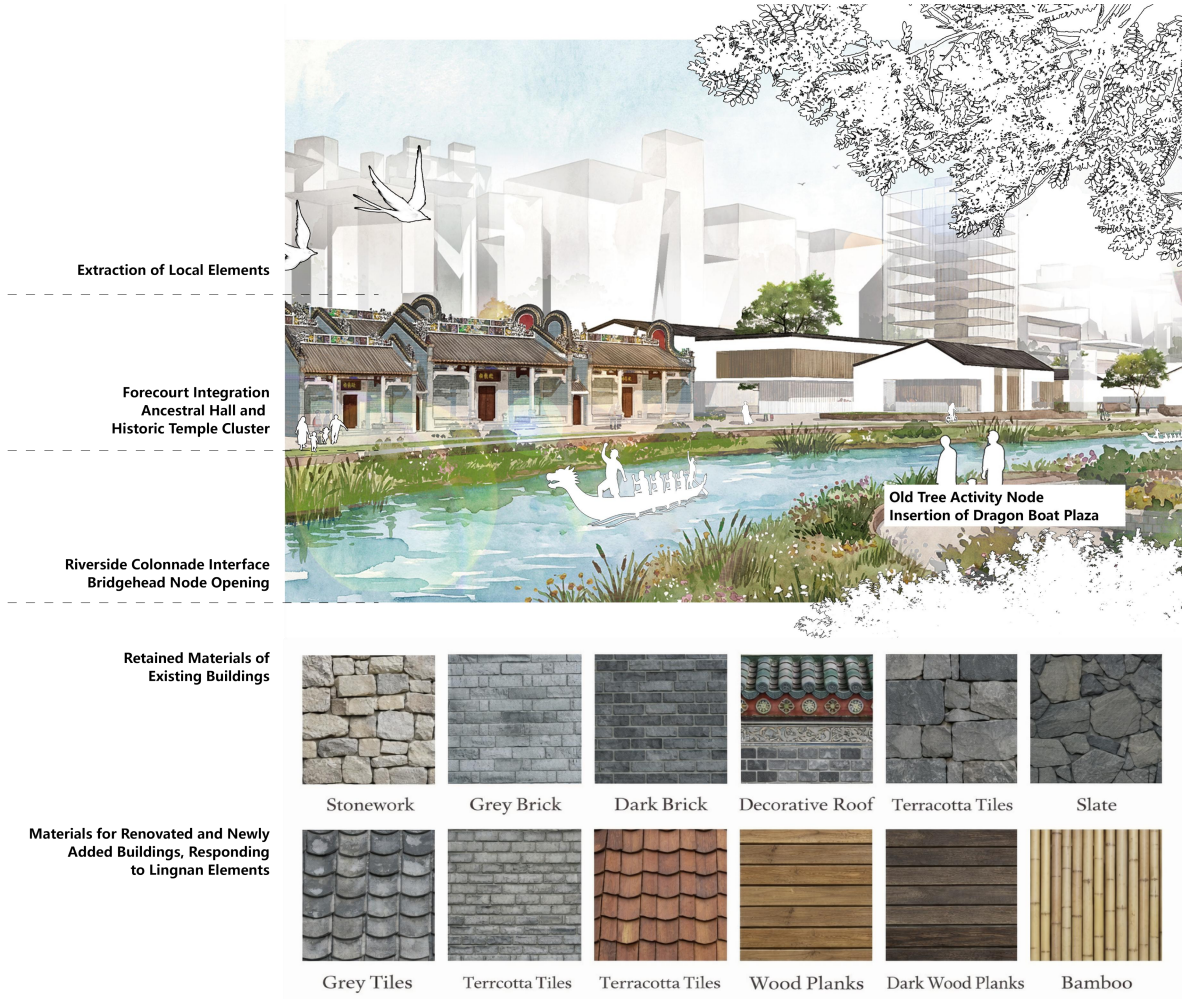


Figure 5-11 Analysis of Spatial Reinterpretation and Material Expression in the Cultural Memory Section *(Source: Drawn by the author)*

At the level of the overall relationship, this section forms a composite cultural space with the protected historic buildings as anchors, Longchuan'ao and the dragon boat plaza as activity forecourts, the ecologically restored waterway interface as the open edge, and pedestrian bridges and the conservation core in the middle section as connective elements. As shown in the overall aerial perspective in Figure 5-12, a complete plaza and waterside activity space are reserved in front of the historic buildings, allowing them to establish direct relationships with the waterway interface across the forecourt. At the same time, the walkways, platforms, and green spaces on both sides of the waterway form a continuous public edge, enabling the nodes of the northern section to maintain a strong cultural identity while also being embedded within the overall waterway backbone.

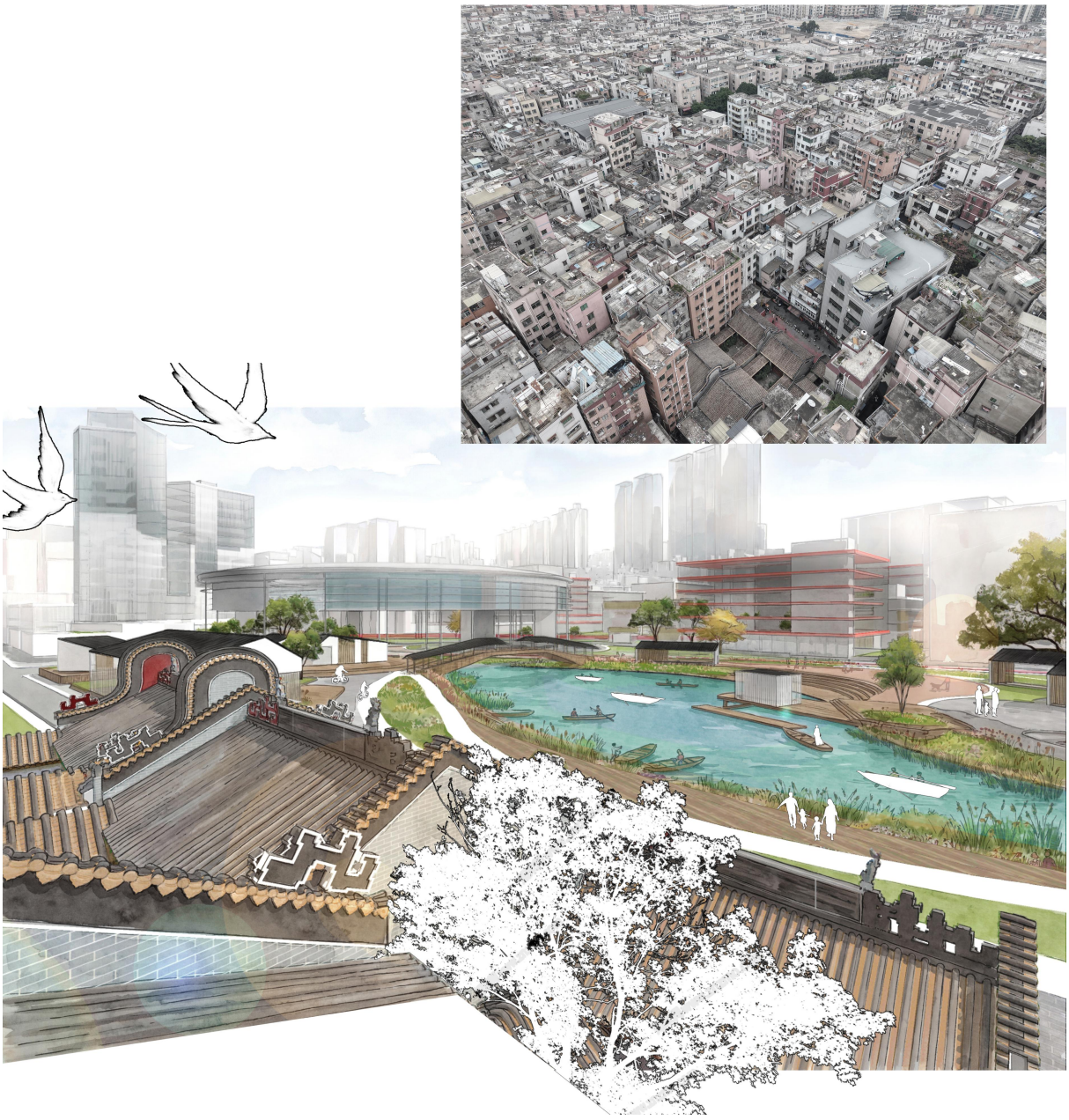


Figure 5-12 Before-and-After Aerial Perspective Rendering of the Historical and Cultural Section

(Source: Drawn by the author)



Figure 5-13 Perspective Rendering of the Waterside Platform and the Riverside Promenade Interface

(Source: Drawn by the author)



Figure 5-14 Relationship between the Covered Bridge and the Historic Buildings

(Source: Drawn by the author)

The dragon boat plaza node is the most important open activity space within the historical and cultural section, and its design focuses on accommodating both everyday open use and festive-event organization. As shown in Figure 5-15, under everyday conditions the plaza primarily functions as an open public space and outdoor exhibition ground, capable of accommodating walking, staying, children's activities, small-scale art display, and daily leisure activities oriented toward the waterway. The waterside platform and terraced edge conditions provide opportunities for near-water staying and viewing, giving the plaza a continuous everyday public character. Figure 5-16 further shows that, during festive periods, the plaza can be transformed into a space supporting clan gatherings and dragon boat activities. Through the addition of temporary seating, gathering crowds, and dragon boat performances on the water, it becomes a festive public space with a strong sense of ritual and spectatorship.



Figure 5-15 Everyday Use Scenario of the Dragon Boat Plaza



Figure 5-16 Festive-Event Scenario of the Dragon Boat Plaza

(Source: Drawn by the author)

In summary, the node design of this section is built around a continuous spatial system formed by the historic buildings, dragon boat culture, and the waterway interface. The overall aerial view establishes the overall relationship of the cluster; the historic-building interface drawing explains how the historical core is reoriented toward the waterway; the waterside platform drawing reinforces near-water experience and slow-mobility continuity; and the dragon boat plaza together with its everyday and festive scenario transformations further demonstrates the composite-use capacity of the northern section's open spaces.

5.5. Design of the Ecological Conservation and Demonstration Section

This section takes ecological conservation as the core objective, while simultaneously linking historical paths and establishing industrial memory nodes, enabling the ecological space to carry cultural experience and industrial narrative functions. This section serves as the

intermediary zone linking the historical and cultural section in the north with the industrial memory section in the south. The design focus lies in relying on the waterway itself and the cleared open site to establish a conservation and demonstration core that integrates ecological restoration, public education, everyday staying, and inter-sectional linkage. On the one hand, the intention is to transform the waterway from a simple water boundary into an ecological corridor that can be observed, approached, and understood. On the other hand, through the organization of a conservation complex, ecological exhibition corridors, waterside platforms, and activity terraces, the middle section becomes the ecological node with the most concentrated spatial transition and the strongest publicness within the entire waterway system.

5.5.1. Spatial Structure and Connections

The waterway itself occupies the center of the entire section and serves as the fundamental object of ecological restoration and spatial organization. The conservation complex and exhibition corridor system arranged around the waterway undertake the functions of observation, display, education, and circulation transition. The learning lawn, activity terraces, and waterside platforms located along the outer edge collectively form interfaces open to the public, so that ecological processes may be transformed into public-space experiences perceptible in everyday life. In this way, the section becomes a three-dimensional ecological node organized around the waterway and jointly enclosed and unfolded by architecture, paths, and terraces.

In terms of functional relationships, the core space of the middle section is the waterway core zone. As shown in Figure 5-17, the urban water-body conservation complex arranged around the waterway core spatially forms an enclosing and embracing relationship with the waterway. Through lifting, wrapping, and localized stilted conditions, the complex organizes buildings, exhibition corridors, and platforms into a three-dimensional observation system oriented toward the waterway. The connected ecological conservation exhibition corridor further links the conservation complex, the outer building groups, and the waterway interface, thereby establishing a continuous educational route through the middle section. The learning lawn / activity terraces and waterside platforms arranged along the outer edge assume the functions of public staying, resting, and outdoor activity, not only providing open public space for the middle section, but also serving as an important buffer interface connecting the cultural space in the north with the industrial space in the south.

From the perspective of path organization, the most important feature of this section lies in the intertwining of visitor circulation and educational circulation. As shown in Figure 5-18,

the outer path mainly serves public visiting and overall looping movement, ensuring that people arriving from the northern and southern sections can smoothly enter the middle section and experience a continuous pedestrian route around the outer edge of the conservation complex. The inner path, by contrast, places greater emphasis on observation and education oriented toward the waterway core, creating multilayered and multi-angled routes for viewing and understanding the waterway. These two circulation systems intersect at several core nodes and platform locations, allowing visitors either to pass through the middle section efficiently or to stay, observe, and participate in ecological education activities.

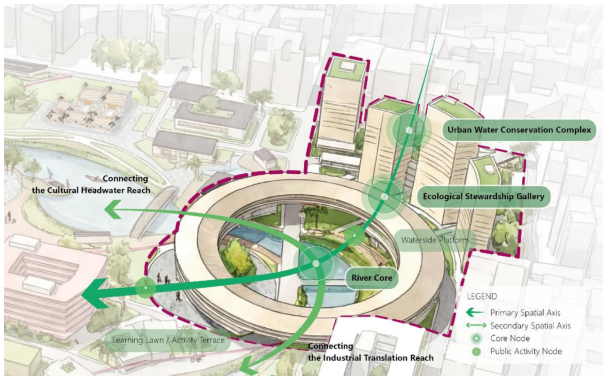


Figure 5-17 Diagram of the Cluster Structure of the Ecological Conservation and Demonstration Section

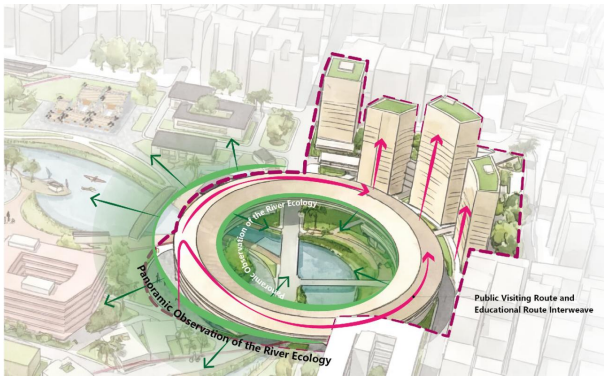


Figure 5-18 Diagram of Spatial Organization and Visual Connections in the Ecological Conservation and Demonstration Section

(Source: Drawn by the author)

5.5.2. Sectional Relationship of the Waterway

From the perspective of sectional relationships, the key to the ecological conservation and demonstration section lies in organizing the layered relationship among the elevated activity interface, the ecological waterway interface, the near-water platforms, and the three-dimensional exhibition corridor. As shown in Figure 5-19, retained buildings and newly inserted volumes on both sides of the middle section release the central space through lifting, setback, and stilted conditions, enabling the waterway, the green spaces on both sides, the walkways, and the public activity interfaces to form a complete transverse section. Through the separation between buildings and the ground plane, sufficient spatial width and public interface are reserved for the ecological corridor of the waterway.

The waterway corridor occupies the center of the section and is the most important ecological interface in the middle section. On both sides, ecological transition is established through relatively gentle topography and planted belts. Waterside platforms are embedded along the waterway edge, providing opportunities for direct near-water access and staying.

The elevated activity platforms are positioned above the waterway or at higher levels on both sides: on the one hand, they provide continuous sheltered interfaces for walking and staying; on the other hand, they strengthen the overall observation of the waterway core through elevated viewpoints. This sectional relationship therefore enables the middle section to simultaneously accommodate two spatial layers: ground-level near-water experience and elevated panoramic observation.

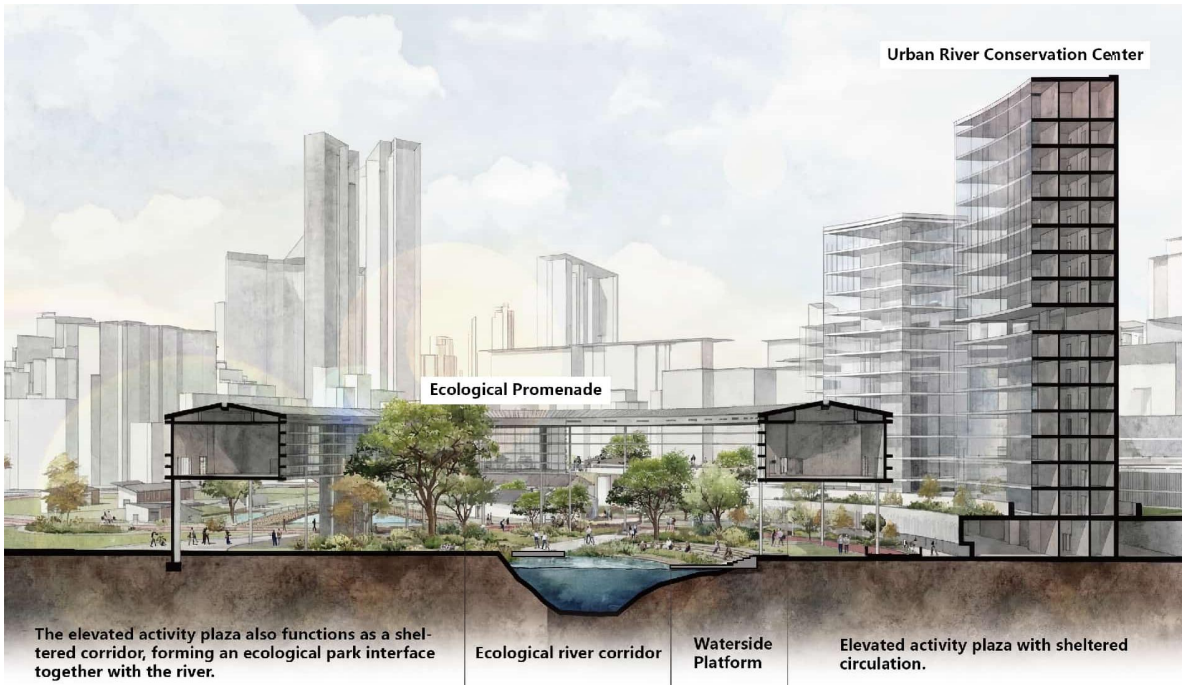


Figure 5-19 Sectional Relationship Diagram of the Ecological Conservation and Demonstration Section *(Source: Drawn by the author)*

From the perspective of the waterway backbone, this sectional relationship further reinforces the intermediary-core role of the middle section within the entire waterway system. In this sense, the middle section becomes the location where the waterway backbone obtains its most complete capacity for display and interpretation: the ground level supports ecological restoration and near-water activity, while the elevated level supports observation, visiting, and education. Together, they form the most three-dimensional spatial node along the entire waterway backbone.

5.5.3. Node Design

Design of the exhibition corridor and elevated activity-interface node. This node is one of the most recognizable spatial structures in the middle section. Its purpose is to connect the conservation complex, the waterway core, and the outer activity interfaces into a three-dimensional spatial system. As shown in Figure 5-20, the ground level beneath the exhibition corridor is released through a stilted treatment, ensuring that the waterway edge

and the outer lawn are not blocked by the building mass. The continuous upper-level interface forms an observation band and pedestrian band facing the waterway, allowing people within the building to maintain continuous perception of the ecological corridor and making it a carrier for organizing waterway observation and public activity.

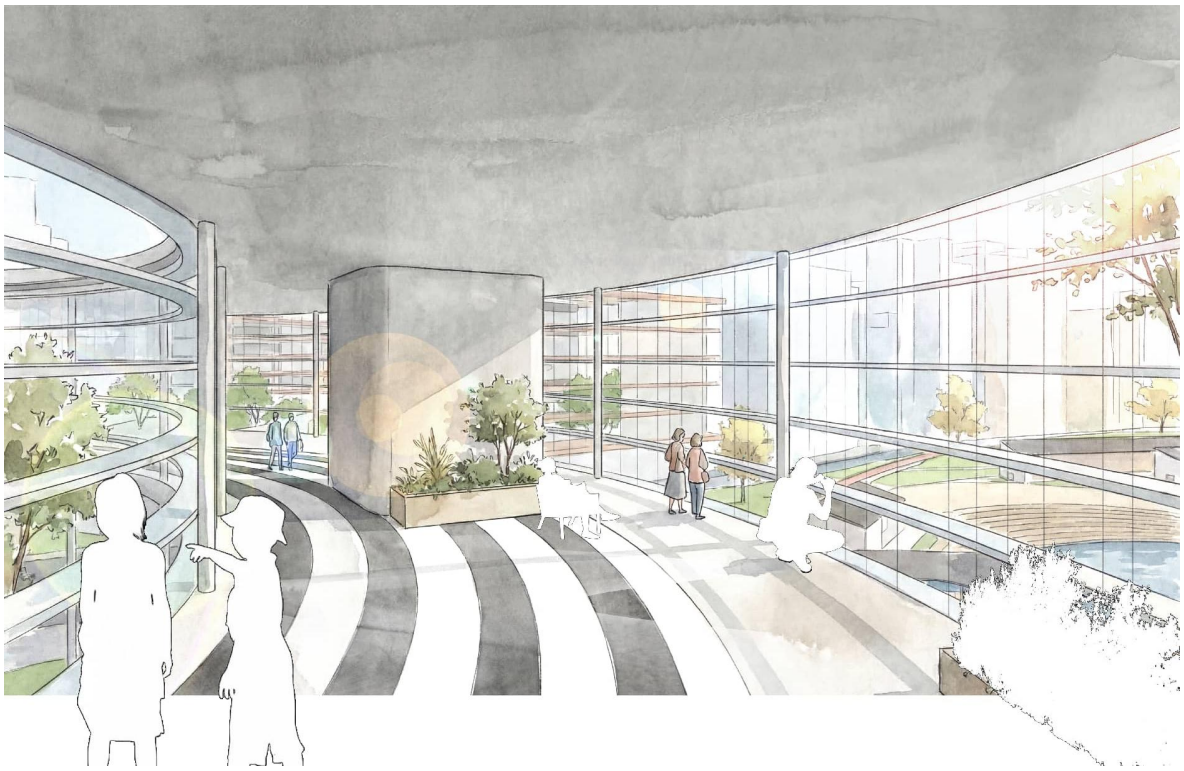


Figure 5-20 Perspective Rendering of the Ring-Shaped Ecological Conservation Exhibition Corridor

(Source: Drawn by the author)

The design of the ecological section is grounded in waterway restoration and the reconstruction of waterfront public space, emphasizing the coordinated organization of ecological processes, public activities, and urban interfaces. As shown in Figure 5-21, the space is not conceived as a mere landscaped green area, but as a composite open space structured around the ecological restoration of the waterway. On the one hand, building setbacks create a sufficient ecological forecourt, ensuring a continuous buffer zone and permeable space along the waterway, thereby providing conditions for water purification, vegetation recovery, and stormwater retention. On the other hand, through elevated grey spaces, a looped viewing corridor, and a slow-mobility path system, public activities are introduced into the waterfront environment, allowing ecological space not only to be protected, but also to be perceived and experienced. In terms of spatial organization, the pilotis treatment at the ground floor draws upon Lingnan climate-responsive strategies to create shaded and ventilated transitional interfaces, which, together with the riverside promenade, waterside platforms, and low-impact landform design, form a multi-layered

open-space system. In terms of material expression, the proposal adopts low-intervention and lightweight materials such as white concrete, large-format stone, aluminum panels, glass, timber, and permeable paving, in response to the ecological section's emphasis on naturalness, sustainability, and environmental friendliness. In this way, the ecological section is not merely a technical space for river regulation, but a demonstrative waterfront place that integrates ecological restoration, public education, and everyday recreation.

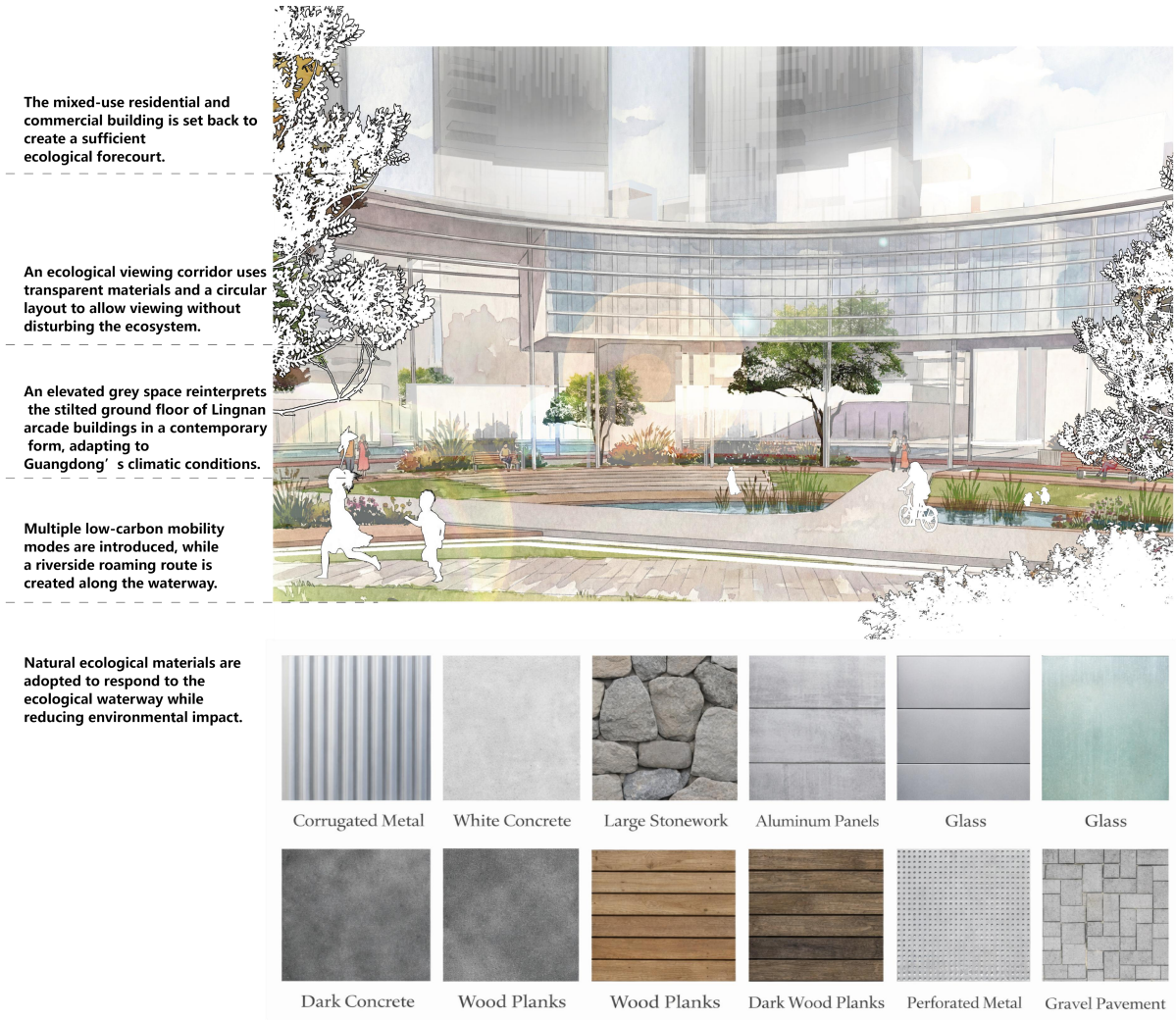


Figure 5-21 Analysis Diagram of Spatial Design and Material Expression in the Ecological Conservation Section*(Source: Drawn by the author)*

Moving into the interior of the ring-shaped exhibition corridor, Figure 5-21 shows a circular walking and staying interface organized around the waterway core. The spatial focus here lies in the use of a continuous inner-ring path and transparent interface to allow visiting, observation, and education to occur simultaneously. As people move through the exhibition corridor, they can continuously maintain visual relationships with the external waterway, platforms, and activity terraces. Planting beds, seating, and the circular path together create a relatively gentle internal public space, so that educational experience can proceed in parallel

with walking and observation.

In summary, the node design of the ecological conservation and demonstration section forms an ecological-conservation place that can be continuously read and used through the coordinated organization of the waterway core, exhibition-corridor paths, platform interfaces, and the internal observation system. The external nodes emphasize public approach to the waterway and the experience of staying; the elevated-interface node emphasizes the interaction between architecture and open space; and the internal ring-shaped exhibition-corridor node emphasizes three-dimensional observation and educational interpretation of the waterway ecology.

5.6. Design of the Industrial Memory Section

This section takes industrial memory translation as the main thread, while simultaneously repairing ecological shorelines and creating cultural public interfaces, forming a waterfront space where industry, ecology, and culture coexist symbiotically. This section is located in the southern part of the site and serves, within the overall waterway regeneration system, as the segment that both carries the spatial memory of the modern garment industry and introduces new industrial functions and public activities. The focus of the design lies in reorganizing the relationships among the retained factory buildings, the waterway interface, open commercial activity, and public circulation. In other words, on the basis of retaining part of the representative factory framework and industrial traces, the design transforms the southern section from a formerly enclosed, back-of-house productive space into an open zone that integrates industrial upgrading, exhibition and exchange, and everyday public activity through ground-floor opening, waterfront setback, bridge connections, and the insertion of new buildings.

5.6.1. Spatial Structure and Connections

The overall organization of this section adopts a spatial structure composed of retained factory buildings as the core, waterfront forecourts, bridge connections, and new industrial-support buildings. The retained factory buildings and their adapted functions as industrial incubators constitute the most important core objects of this section. The open setback band and waterfront forecourts formed along the river undertake the functions of public activity, slow-mobility circulation, and waterside staying. Bridge connections organize the spaces on both banks into continuous loops, allowing the southern section to form a public system with transverse conversion capacity. Newly introduced functions such as design

studios, market retail, and commercial support are embedded within this system to provide conditions for the sustained operation of industrial transformation.

In terms of functional relationships, as shown in Figure 5-22, the most important existing object in the southern section is the retained factory building, which the design reinterprets as a garment-industry incubator and retains as the core of industrial activity. The retained factory building plays two spatial roles: first, it preserves the volumetric scale and structural memory formed by the modern insertion of the garment industry into the site; second, it provides a relatively complete spatial framework for the insertion of new functions. The independent design studios, commercial support facilities, and market-retail spaces arranged around the retained factory building respectively accommodate design research and development, exhibition and exchange, everyday operation, and consumer services.

In terms of interface organization, Figure 5-23 shows that this section is treated through a combination of ground-floor activation, waterfront setback, and everyday looped circulation. The ground floors of the retained factory buildings and some new buildings form a continuous and accessible grey space through stilted treatment, openness, and the insertion of market-like interfaces, transforming what were once closed factory ground floors into open edges directly connected with the public interface of the waterway. Continuous waterfront forecourts are created on both sides of the waterway through spatial setback, which not only release the width required for ecological riverbanks and the pedestrian system, but also provide room for everyday activity, temporary stalls, and scenic stopping. Bridges connect the pedestrian paths on both banks into several closed loops, allowing pedestrian flows to circulate among the interior and exterior of the factory buildings, the two sides of the waterway, and the public nodes.



Figure 5-22 Diagram of the Cluster Structure of the Industrial Memory Section

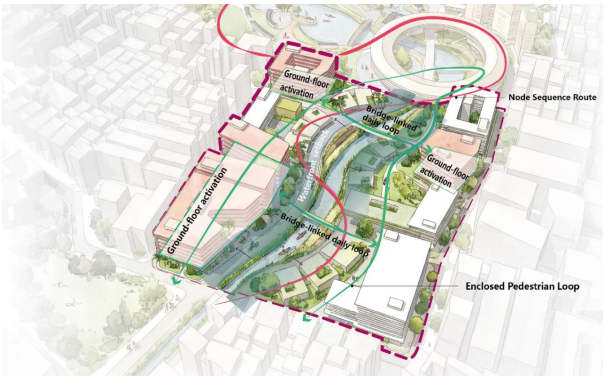


Figure 5-23 Diagram of Spatial Organization and Visual Connections in the Industrial Memory Section

(Source: Drawn by the author)

5.6.2. Sectional Relationship of the Waterway

From the perspective of sectional relationships, the core task of this section lies in reorganizing the transverse relationship among the retained factory buildings, the ecological waterway interface, the open forecourts, and the new industrial-support buildings. Through retaining the main factory framework, releasing the waterfront setback, and introducing ecological riverbanks together with pedestrian activity bands, the design allows the waterway to regain sufficient spatial width and become the central interface organizing the relationship between the buildings on both sides.

As shown in Figure 5-24, the buildings on the two sides of the southern section are clearly differentiated in terms of height, function, and spatial character. On the left side, the retained factory buildings are adapted into garment-industry incubators; after the opening of the ground floor, they form a market-like plinth and open activity interface facing the waterway, while the upper floors accommodate composite functions such as commerce, offices, and incubation. On the right side, the new buildings carry industrial-support and exhibition functions, but they do not directly press against the waterway; instead, they maintain a relationship with the central channel through spatial setback and low-rise open spaces. The center of the section is organized around the ecological channel, with gently sloped ecological boundaries, pedestrian paths, and public activity grounds arranged on both sides.

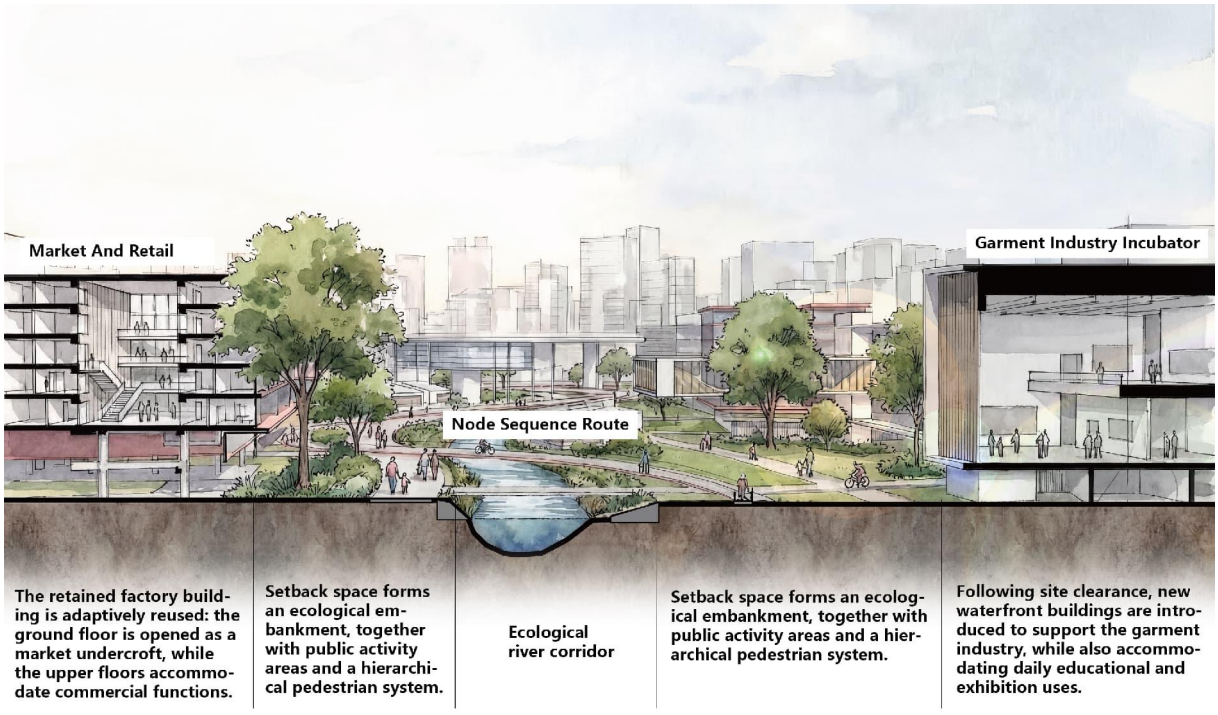


Figure 5-24 Sectional Relationship Diagram of the Industrial Memory Section

(Source: Drawn by the author)

From the perspective of the waterway backbone, this sectional relationship enables the southern section to truly enter the overall main-axis system of the Kangle Waterway. The waterway is translated from a drainage boundary formerly hidden behind the factory buildings into a public central axis that links the industrial buildings, market spaces, and pedestrian activities on both sides. The retained factory buildings on the left establish direct relationships with the waterway through ground-floor opening, while the new industrial-support buildings on the right form new interface relationships with the waterway through setback and forecourt organization.

5.6.3. Node Design

The first node type is the waterfront promenade node. As shown in Figure 5-25, this node forms a relatively complete forecourt space along the waterway through the combination of continuous walkways, ecological riverbanks, and bridge connections. Along the edge of the waterway, the walkway, green space, sloped embankments, and open platforms together create a curvilinear promenade interface, allowing people in the southern section either to stay by the water or to move between the two banks via the bridges. The bridges are not only circulation facilities, but also important devices of nodal legibility: together with the curved shoreline, building openings, and activity grounds, they define the changing rhythm of spatial experience in the southern section.

The second node type is the open factory ground-floor and market-interface node. As shown in Figure 5-25, the retained factory buildings and new buildings together form an everyday commercial interface through stilted ground floors, continuous colonnades, and open plinths capable of accommodating stalls. Through this treatment, the ground floor can accommodate temporary markets, small-scale retail, and outdoor spill-out activities, while also functioning as a grey space for circulation and staying in rainy weather. In this way, the permeability between industrial buildings and public circulation is significantly enhanced. The upper parts of the buildings continue to support incubation, office, and design functions, while the ground level is transformed into an open space directly serving the public, allowing industrial functions and public activity to overlap within the same node.

The value of this node lies in its continuation of the spatial memory of the original logic of production and exchange. The market at the ground floor and the open commercial interface enable the southern section to retain exhibition, exchange, and transaction attributes associated with the garment industry, but transform them from originally enclosed,

inward-oriented productive interfaces into open and accessible public interfaces.



Figure 5-25 Before-and-After Perspective Rendering of the Waterfront Space

(Source: Drawn by the author)

The design focus of the industrial section does not lie in the simple preservation of the original garment-industry spaces, but rather in upgrading and reinterpreting their functional structure and spatial interfaces while continuing the site's industrial memory. As shown in Figure 5-26, the proposal retains the original sense of scale of the industrial buildings and their linear riverside layout, while transforming the traditional production spaces into composite industrial carriers integrating display, exchange, incubation, and service. At the ground-floor level, continuous pilotis treatment and open interfaces alter the former enclosed

and fragmented condition of the back-of-house production spaces along the water, allowing the waterside pedestrian system, commercial display, and public staying spaces to permeate one another. The upper levels accommodate functions such as design offices, light production, and exchange and training, thereby forming an upgraded industrial chain composed of production, display, incubation, and service. In terms of material expression, the proposal continues the original industrial vocabulary of lightweight metal, concrete, and timber elements. Through the combination of corrugated metal panels, aluminum panels, glass, and timber finishes, it both preserves the rational character of the site's modern industrial buildings and strengthens the openness and contemporary quality of the renewed interfaces. In this way, the industrial section is no longer merely a place for the continuation of former productive activities, but becomes an important carrier linking waterfront public life with emerging fashion and creative industries.

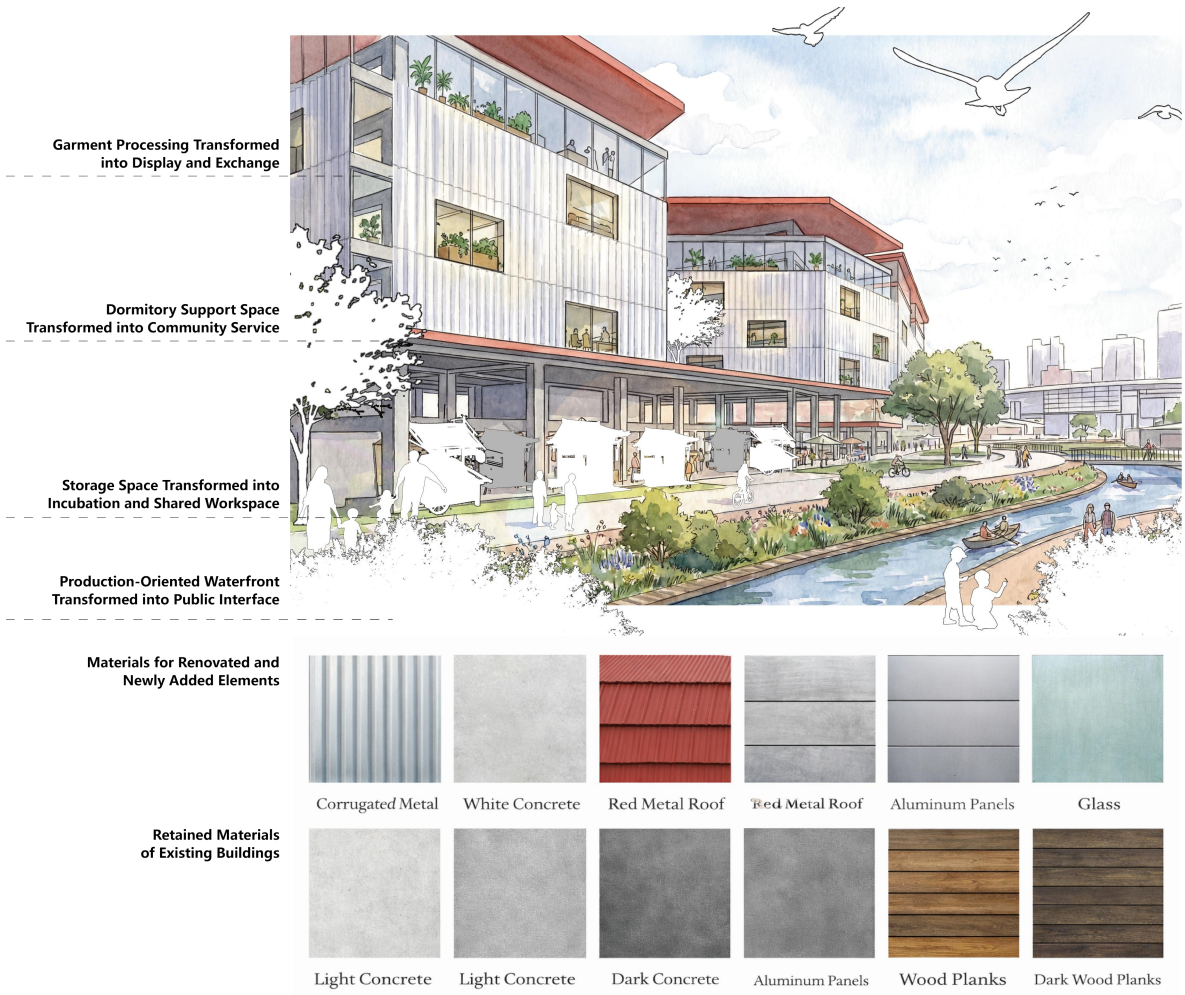


Figure 5-26 Analysis Diagram of Spatial Reinterpretation and Material Expression in the Industrial Memory Section *(Source: Drawn by the author)*

In summary, the node design of the industrial memory section is organized around an integrated system composed of retained factory buildings, new industrial-support structures,

waterfront setbacks, and bridge connections. The waterfront promenade nodes strengthen the continuous experience and open interfaces along both sides of the waterway, while the open ground-floor and market nodes combine industrial functions with public activity.

5.7. Chapter Summary

Building on the strategy formation developed in Chapter 4, this chapter further elaborates the overall design proposal and the design of key spatial fragments along the Kangle Waterway corridor. First, through the overall spatial structure, the overall plan layout, and the organization of the waterway backbone and public interfaces, the proposal clarifies the role of the waterway as the principal axis of the entire regeneration project and integrates the cultural headwater section, the ecological conservation section, and the industrial memory section into a continuous riverside spatial system. Second, focusing on the three key sections, the chapter develops the functional organization, sectional relationships, and key-node design of the historical and cultural section, the ecological conservation and demonstration section, and the industrial memory section respectively, thereby further translating the three objectives of historical conservation, ecological restoration, and industrial-memory translation into spatial form and place structure. In this way, the chapter accomplishes the transformation from a strategy system into a design proposal, providing the research as a whole with a spatial response that can be recognized, represented, and implemented.

Conclusion

This thesis takes the area surrounding the Kangle Waterway in Haizhu District, Guangzhou as its research object and focuses on the spatial contradictions produced by the superimposition of the threefold structure of waterway, history, and industry within a high-density industrial urban village. It attempts to explore a regeneration design approach that takes the waterway as the principal organizing axis while simultaneously addressing ecological restoration, historical conservation, and the restructuring of public space. Based on literature review, policy analysis, case-study translation, and site investigation, the research has completed a full process of reasoning from problem identification to strategy generation and design proposal. The main conclusions are as follows. First, the core problems of the area surrounding the Kangle Waterway lie in the combined effects of the failure of the waterway as a public spatial backbone, the rupture of the relationship between historical anchors and the waterway, the degradation of ecological interfaces, and the long-term compression of public space by industrial activities. Second, at the level of theory and case-study analysis, this thesis has established a relatively clear cognitive framework for regeneration. By introducing the perspectives of Landscape Urbanism, Water Urbanism, and Ecological Urbanism, and combining them with a comparative analysis of domestic and international waterfront-regeneration cases, the study ultimately develops a relatively complete set of riverside regeneration strategies and a corresponding spatial design proposal.

From the perspective of social value, this research has a certain degree of practical relevance and potential for broader application. In the context of Guangzhou's ongoing systematic regeneration of urban villages, the regeneration of the area surrounding the Kangle Waterway demonstrates how the reconstruction of the waterway as the main axis, the repair of historical interfaces, and the translation of industrial space can improve both the quality of public space and the cultural legibility of the district. The regeneration approach proposed in this thesis contributes to the exploration of a more refined and composite path of renewal within high-density existing urban environments. That is, while controlling the intensity of demolition and reconstruction, it seeks to reorganize the relationships among different resource carriers and to promote the transformation of the district from environmental governance toward spatial regeneration. More broadly, this research may also offer a certain degree of reference value for the integrated regeneration of similar waterway spaces in Guangzhou and in other southern Chinese cities characterized by dense water networks.

At the same time, this thesis still has certain limitations. First, the research is mainly

grounded in reasoning at the level of spatial design, and therefore pays relatively limited attention to issues such as property-right coordination, benefit distribution, policy coordination, and operational mechanisms in the implementation process, even though these factors often directly affect the feasibility of the proposal. Second, the discussion of ecological restoration along the waterway is focused more on spatial interfaces and public perception, and lacks more in-depth quantitative research on ecological technical indicators such as hydrology, water quality, and habitat restoration. Third, the discussion of industrial translation remains mainly at the level of space and function, while research on operational models, market mechanisms, and long-term patterns of use still requires further development.

In light of these limitations, future research may proceed in several directions. First, it may strengthen the connection between waterway regeneration and urban-village governance, property-right integration, and phased implementation mechanisms, so as to explore pathways through which design proposals may be translated into practical realization. Second, methods such as hydrological simulation, ecological performance evaluation, and microclimatic analysis may be further introduced in order to quantitatively verify the environmental effects of the ecological conservation and demonstration section. Third, research on industrial translation and community participation mechanisms may be deepened, so that spatial regeneration may not remain only at the level of formal improvement, but may also establish sustainable support at the levels of operation and governance. Overall, the study of the area surrounding the Kangle Waterway demonstrates that, within a high-density industrial urban village, spatial restructuring organized around the waterway as the principal axis can rebuild historical places, sustain industrial memory, and activate public life. This is precisely an important direction that deserves continued exploration in the future regeneration of similar existing urban districts.

References

[1] 住房和城乡建设部. 住房城乡建设部关于加强生态修复城市修补工作的指导意见[EB/OL]. (2017-03-06)[2026-03-24]. https://www.mohurd.gov.cn/gongkai/zc/wjk/art/2017/art_17339_230930.html

[2] 张歆越, 高晓路, 柴琪, 等. 中国地级城市建成区蓝绿空间时空格局及其气候影响因素分析[J]. 地球信息科学学报, 2023, 25(1): 190-207.

[3] 广州市规划和自然资源局. 《广州市城市更新专项规划(2021、2035 年)》《广州市城中村改造专项规划(2021、2035 年)》解读[EB/OL]. (2024-01-26)[2026-03-24]. https://www.gz.gov.cn/zwgk/ghjh/zxgh/content/mpost_9473584.html

[4] 王敏, 赵美婷, 朱竑. 广州河涌的自然社会构建与城市记忆[J]. 地理学报, 2019, 74(2): 353-365.

[5] 海珠区人民政府. 海珠区凤和(康乐村、鹭江村)片区城市更新单元详细规划[R]. 广州: 广州市海珠区人民政府, 2023.

[6] BREEN A, RIGBY D. The New Waterfront: A Worldwide Urban Success Story[M]. New York: McGraw-Hill, 1996.

[7] WALDHEIM C, ed. The Landscape Urbanism Reader[M]. New York: Princeton Architectural Press, 2006.

[8] FEYEN J, SHANNON K, NEVILLE M, eds. Water and Urban Development Paradigms: Towards an Integration of Engineering, Design and Management Approaches[C]. London: CRC Press, 2008.

[9] HAYDEN D. The Power of Place: Urban Landscapes as Public History[M]. Cambridge, MA: MIT Press, 1997.

[10] 陈墅香, 陈溢晨, 刘琳. 基于共词分析的国内外滨水区域城市更新比较研究[J]. 城市问题, 2023(10): 54-65.

[11] 马学广. 城中村空间的社会生产与治理机制研究——以广州市海珠区为例[J]. 城市发展研究, 2010, 17(2): 126-133.

[12] 张京祥, 胡毅, 孙东琪. 空间生产视角下的城中村物质空间与社会变迁——南京市江东村的实证研究[J]. 人文地理, 2014, 29(2): 1-6.

[13] 闫小培, 魏立华, 周锐波. 快速城市化地区城乡关系协调研究——以广州市"城中村"改造为例[J]. 城市规划, 2004, 28(3): 30-38.

[14] 田莉, 郭旭. "三旧改造"推动的广州城乡更新: 基于新自由主义的视角[J]. 南方建筑, 2017(4): 9-14.

[15] 谭肖红, 袁奇峰, 吕斌. 城中村改造村民参与机制分析——以广州市猎德村为例[J]. 热带地理, 2012, 32(6): 618-625.

[16] 梁小薇, 袁奇峰. 领域化视角下商贸型城中村改造困境探析——以广州康乐村为例[J]. 城市发展研究, 2023, 30(10): 128-133.

[17] 傅俊尧, 肖菲. 城中村治理秩序的领域建构与自治失灵——以广州市海珠区康乐村为例[J]. 城乡规划, 2024(4): 66-74.

[18] ROY A. Urban Informality: Toward an Epistemology of Planning[J]. Journal of the American Planning Association, 2005, 71(2): 147-158.

[19] MCFARLANE C. Rethinking Informality: Politics, Crisis, and the City[J]. Planning Theory & Practice, 2012, 13(1): 89-108.

[20] 黄亚平, 陈瞻, 等. 城中村更新中的利益主体识别与参与机制研究[J]. 城市规划, 2021, 45(6): 42-50.

[21] 李郇, 徐毅松, 等. 共同缔造理念下社区微更新的实践路径[J]. 规划师, 2021, 37(15): 5-11.

[22] 赵渺希, 等. 参与式规划在存量空间更新中的应用研究[J]. 国际城市规划, 2023, 38(2): 56-63.

[23] 陆琦, 潘莹. 珠江三角洲水乡聚落形态[J]. 南方建筑, 2009(6): 61-67.

[24] ICOMOS, TICCIH. The Dublin Principles: Joint ICOMOS-TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes[R]. Dublin, 2011.

[25] PLEVOETS B, VAN CLEEMPOEL K. Adaptive Reuse as a Strategy towards Conservation of Cultural Heritage: A Literature Review[J]. WIT Transactions on The Built Environment, 2011, 118: 155-164.

[26] WALDHEIM C, ed. The Landscape Urbanism Reader[M]. New York: Princeton Architectural Press, 2006.

[27] 王建国, 蒋楠. 后工业时代中国产业类历史建筑遗产保护性再利用[J]. 建筑学报, 2006(8): 8-11.

[28] 海珠区人民政府. 关于公布海珠区历史文化遗产预先保护对象的通告[R]. 广州: 广州市海珠区人民政府, 2026.

[29] 冯江. 明清广州府的开垦、聚族而居与宗族祠堂的衍变研究[D]. 广州: 华南理工大学, 2010.

[30] RUAN Z J. Study of Spatial Urban Mapping: The Case Study of Ancient Guangzhou: Spatial History and Urban Morphology of Hydro-Cities[D]. Master of Architecture Thesis, 2019.

[31] 潘建非. 广州城市水系空间研究[D]. 北京: 北京林业大学, 2013.

[32] 宫清华, 袁少雄, 陈波. 珠江在广州城区河段的演变及其对城市生态环境的影响[J]. 热带地理, 2013, 33(4): 388-394.

[33] 夏丽丽, 赵耀龙, 欧阳军, 刘望保. 城中村制造业空间集聚研究——以广州康乐村服装生产企业为例[J]. 地理研究, 2012, 31(7): 1294-1304.

[34] 广州市海珠区生态环境部门. 创新机制、系统治理、绿心蓝脉、人水和谐——海珠区积极创建美丽河湖优秀案例[R]. 广州: 广州市海珠区生态环境部门, 2024.

[35] 广州市海珠区人民政府. 康乐涌流域污水治理督查整改工作情况(7月13日续报)[R]. 广州: 广州市海珠区人民政府, 2022.

[36] 广州市人民政府. 147条河涌全部消除黑臭[R]. 广州: 广州市人民政府, 2020.

[37] OKE T R. Street design and urban canopy layer climate[J]. Energy and Buildings, 1988, 11(1-3): 103-113.

[38] 邝敏毅. 城市规划中应构造生态的河涌水网——以广州河涌断面的设置形式为例[J]. 规划师, 2004, 20(8): 33-36.

[39] 广州市文化广电旅游局. "文旅最广州系列名录"之十大非遗节庆活动发布散发传统魅力[EB/OL]. (2024-02-21)[2026-03-25].https://wglj.gz.gov.cn/gzdt/wlzc/content/post_9497554.html

[40] 南方都市报. 康鹭拆迁区响起端午龙舟锣鼓，康乐村最老龙舟重修骏水回村[EB/OL]. (2024-07-25)[2026-03-25].https://baijiahao.baidu.com/s?id=1805560626606298892&wfr=spider&for=pc

[41] 广东省博物馆. 广东民俗·龙舟[EB/OL]. (2022-01-01)[2026-03-25].

[42] GB 50180-2018, 城市居住区规划设计标准[S]. 北京: 中国建筑工业出版社, 2018.

[43] 陈兴, 刘铮. 广州产业型城中村更新改造策略[J]. 规划师, 2025, 41(6): 139-144.

[44] 邓毛颖, 刘洋, 高慧智, 等. 长尾经济驱动的空间重构——对广州康鹭片区产业型城中村的观察[J]. 城市发展研究, 2025, 32(3): 128-136.

[45] WALDHEIM C. Landscape as Urbanism: A General Theory[M]. Princeton: Princeton University Press, 2016.

[46] SHANNON K, et al., eds. Water Urbanisms[M]. Amsterdam: SUN/Idea Books, 2008.

[47] TU Delft Urban Design Group. Publications on Water Sensitivity and Urban Design[R]. Delft: Delft University of Technology.

[48] MOSTAFAVI M, DOHERTY G, eds. Ecological Urbanism[M]. Cambridge, MA: Harvard Graduate School of Design; Baden: Lars Müller Publishers, 2010.

[49] MOSTAFAVI M. Why Ecological Urbanism? Why Now?[J]. Harvard Design Magazine (Intro to Ecological Urbanism), 2010.

[50] STOKMAN A. Water Purificative Landscapes-Constructed Ecologies and Contemporary Urbanism[C]//Transforming with Water. 2008.

[51] HÄDRICH SILVA R, et al. Bringing Ecological Urbanism and Urban Political Ecology to Transformative Visions of Water Sensitivity in Cities[J]. Cities, 2024.

[52] OKRA landschapsarchitecten. Catharijnesingel[EB/OL]. Utrecht: OKRA, (2026)[2026-03-22]. https://www.okra.nl/nl/project/catharijnesingel/

[53] IFLA Europe. Press Release: Winners of the 2022 European Prize for Urban Public Space[EB/OL]. 2022[2026-03-22].https://www.e-flux.com/announcements/504447/winner-of-the-european-prize-for-urban-public-space-2022

[54] Biennal Internacional de Paisatge de Barcelona. Catharijnesingel[EB/OL]. 2023[2026-03-22].https://landscape.coac.net/catharijnesingel

[55] U.S. Environmental Protection Agency. "Daylighting" the Saw Mill River[EB/OL]. 2011[2026-03-22]. https://19january2017snapshot.epa.gov/sites/production/files/2015-09/documents/bf_ss-yonkers-saw-mill-032911.pdf

[56] Groundwork USA. Daylighting the Saw Mill River[EB/OL]. 2024[2026-03-22]. https://groundworkusa.org/spotlight/daylighting-saw-mill-river/

[57] Groundwork Hudson Valley. Story of the Daylighting[EB/OL]. 2024[2026-03-22].https://www.groundworkhv.org/programs/community-adaptation/saw-mill-river-coalition/story-of-the-daylighting/

[58] 广州市生态环境局. 海珠区以"美丽河湖"撬动生态与发展共赢[EB/OL]. (2025-12-12)[2026-03-25].https://www.haizhu.gov.cn/hzdt/ztlm/zzyyzq/bm/content/post_10576335.html

[59] 广州市生态环境局. 荔湾区大沙河碧道：生态优先与文化传承的碧道建设典范[EB/OL]. (2024-12-30)[2026-03-25].https://sthjj.gz.gov.cn/qxxx/lwq/content/post_10050509.html

[60] 南方日报. 顺·势|韧性+智慧，顺德是治水更是营城[EB/OL]. (2025-11-20)[2026-03-25]. https://baijiahao.baidu.com/s?id=1849322611831523767&wfr=spider&for=pc

[61] 新浪佛山. 北滘黄龙：泊船水乡活力美岸[EB/OL]. (2023-04-08)[2026-03-25]. https://weibo.com/ttarticle/p/show?id=2309404888178992742797

[62] 广州市水务局. 走进水务遗产丨隐于闹市中的"西关水客厅"[EB/OL]. (2024-12-04)[2026-03-25]. https://swj.gz.gov.cn/zzfw/rdxw/content/post_10041527.html

[63] 广州市生态环境局. 荔枝湾涌——历史长河中的璀璨明珠[EB/OL]. (2024-10-12)[2026-03-25]. https://sthjj.gz.gov.cn/mlzg/sfyb/mlxb/content/post_9910346.html

[64] 广州市水务局. 更多亲水乐水空间，广州累计建成碧道 1456 公[EB/OL].(2025-07-25)[2026-03-25]. https://www.gz.gov.cn/zt/mlxgzjqswy/qyhmcssj/content/post_10366533.html

[65] 新华网. 新华全媒+丨广州 CBD 里的龙舟文化传承[EB/OL]. (2024-06-10)[2026-03-25]. https://www.xinhuanet.com/ci/20240611/f522058f4167464fb172962ef5bf849c/c.html

[66] Comune di Milano. Progetto Navigli[EB/OL].(2018-07-24)[2026-03-25]. https://progettonavigli.comune.milano.it/

[67] DONKOR C, BAVUSO MARONE A, APREA A. Unveiling Milan's Navigli and Underground Water Heritage through Integrated Urban (Water) Design[J]. Blue Papers, 2024, 3(1).

[68] 上海市发展和改革委员会. 上海市"一江一河"发展"十四五"规划[EB/OL]. 2021[2026-03-25].https://fgw.sh.gov.cn/sswghgy_zxghwb/20210910/04ac92eedb964c9a8315bc3319a48557.html

[69] 上海市规划和自然资源局. 苏州河沿岸地区整体风貌与开放空间提升专项规划[EB/OL]. 2020[2026-03-25].https://ghzyj.sh.gov.cn/cmsres/80/80bc624543814377a64e832016968a11/08b030a1c2d3de3669bfb9480eb7a5f9.pdf

[70] Shanghai Municipal Government. M50 Creative Park[EB/OL]. 2025[2026-03-25]. https://english.shpt.gov.cn/living/entertainment/994.shtml

[71] 孙鹏, 王志芳. 遵从自然过程的城市河流和滨水区景观设计[J]. 城市规划, 2000, 24(9): 19-22.

读硕士学位期间取得的研究成果

一、已发表（包括已接受待发表）的论文，以及已投稿、或已成文打算投稿、或拟成文投稿的论文情况**（只填写与学位论文内容相关的部分）：**

序号	作者（全体作者，按顺序排列）	题　　目	发表或投稿刊物名称、级别	发表的卷期、年月、页码	与学位论文哪一部分（章、节）相关	被索引收录情况

注：在“发表的卷期、年月、页码”栏：

1 如果论文已发表，请填写发表的卷期、年月、页码；

2 如果论文已被接受，填写将要发表的卷期、年月；

3 以上都不是，请据实填写“已投稿”，“拟投稿”。

不够请另加页。

二、与学位内容相关的其它成果（包括专利、著作、获奖项目等）

致谢

三年的研究生学习即将结束，毕业论文也在不断修改与完善中走向完成。在论文写作过程中，我得到了导师、老师、同学、朋友和家人的许多帮助与支持。在此，谨向所有关心和帮助过我的人致以诚挚的感谢。

首先，衷心感谢华南理工大学与都灵理工大学导师组内的各位教授与老师。从论文选题、研究框架到设计深化与文本修改，导师始终给予我耐心细致的指导。导师严谨的治学态度和对研究逻辑、设计方法的严格要求，使我受益良多。论文能够顺利完成，离不开导师的悉心帮助。

其次，感谢建筑学院各位老师在研究生阶段的培养与指导。各位老师在课程教学、设计训练和学术研究中给予我的启发，为本论文的完成奠定了重要基础。

感谢我的同学和朋友们在研究生学习过程中给予的帮助。与你们的交流和讨论，使我不断完善自己的学习思路与表达方式，也让这段学习经历更加充实。

最后，感谢我的家人和我的小猫一直以来给予我的理解、支持与鼓励。正是因为有你们的陪伴，我才能够坚持完成研究生阶段的学习与毕业论文写作。

谨以此文，向所有帮助过我的人致以最诚挚的谢意。

四、答辩委员会决议书

答辩委员会对学位（毕业）论文的评语（主要内容包括：1. 论文选题与综述；2. 学术水平与创新性；3. 论文综合能力表现；4. 学位（毕业）论文答辩情况；5. 存在的不足之处和建议等）

论文以广州海珠区康乐涌周边城中村空间为研究对象，聚焦高密度产业型城中村中河涌、历史、产业三重结构叠加所形成的空间矛盾，探索以河涌为组织主线的更新设计方法。选题契合城市存量提质的现实背景，具有一定的学术参考价值与实践意义。作者较系统地梳理了景观都市主义、水都市主义与生态都市主义等相关理论，并对国内外滨水更新案例进行了归纳分析。

论文提出“生态—文化—产业”协同更新框架，构建了以河涌生态骨架重构为前提、分段策略生成与重点片段设计为路径的更新体系。现状调研较为扎实，对沿线空间形态、界面、历史建筑及产业空间进行了系统梳理，反映出作者具备一定的独立科研与设计实践能力。论文结构清晰，逻辑基本自洽，研究路径从问题提出到方案验证较为完整，作者较好地掌握了城市设计专业基础理论与调研方法。

根据投票结果，答辩委员会一致同意罗欣琳通过硕士学位论文答辩，同意其毕业，并建议授予建筑学硕士学位。

论文答辩日期：2026 年 5 月 21 日　　答辩委员会委员 5 人

毕业表决票数：通过（5）票；不通过（0）票

学位表决票数：通过（5）票；不通过（0）票

答辩委员会决议（打“√”）：

毕业：通过（√）；不通过（　）

学位：通过（√）；不通过（　）

答辩成员签名	（主席）　Emanuele Morezzi（附件）
答辩秘书签名	