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South China University of Technology

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基于触媒理论的文旅型村落慢行廊道
设计研究——以广州紫坭村为例

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**A Study on Non-motorized Corridors Design for Cultural
Tourism Villages Based on Catalyst Theory: A Case Study
of Zini Village, Guangzhou**

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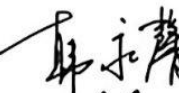
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摘要

广州市传统村落具有岭南水乡特色与广府文化底蕴，是乡村振兴战略与“百千万工程”推进实施的重要空间载体。然而，在文旅融合背景下，传统村落普遍面临核心景点连接不畅、游客动线割裂、空间活力不足等现实困境，需要通过科学的更新策略整合碎片化文旅资源，激活公共空间活力，促进文旅型村落的可持续发展。因此，本研究以触媒理论为分析视角，将慢行廊道作为整合各类空间要素的公共空间体系，探讨触媒理论在文旅型村落空间的设计方法，并以广州市番禺区紫坭村为典型案例开展实证研究。

首先，建立慢行廊道与触媒理论的耦合机制。系统梳理慢行廊道理论与触媒理论的相关理论。将慢行廊道的空间连通性、功能复合性、文化可读性与触媒的系统层次性、局部渐进性、文脉延续性相对应。并进一步转化为九项触媒视角下的评价指标，形成村落慢行廊道触媒潜力的评估工具。通过国内外典型案例验证其有效性，为后续策略构建奠定理论基础与实践支撑。

在此基础上，构建广州文旅型村落慢行廊道更新的地域化策略体系。基于理论框架，结合广州村落的共性特征，从空间、功能、文化三个维度，提出原始触媒的选取原则。将其归纳为点状、线状、面状、非物质性四类触媒类型，并阐明其协同联动关系。从三个维度提出触媒的选取方法，并建立五项筛选原则。针对四类触媒提出差异化的重塑与激活策略，并构建触媒反应的引导与控制体系，形成广州村落慢行廊道更新的策略框架。

最后，以紫坭村为实证案例，从点、线、面、非物质四个维度，系统分析村的基本情况与现状问题。通过构建贯穿村落的示范性慢行廊道，打通关键堵点，形成三个主题分段。综合运用点状锚固、线状串联、面状辐射、非物质激活的更新策略，有效提升空间连通性、功能复合性、文化可读性，改善原有空间问题。

本文将触媒理论应用于文旅型村落慢行廊道设计，明确触媒理论在村落慢行廊道中的理论框架，并建立广州村落慢行廊道的地域化策略，为广州文旅型村落的慢行廊道设计提供系统的理论依据与实践参考。

关键词：传统村落；触媒理论；慢行廊道；文旅融合；紫坭村

Abstract

Traditional villages within Guangzhou's administrative area possess distinctive Lingnan water-town characteristics and a profound Guangfu cultural heritage, serving as important spatial carriers for the Rural Revitalization Strategy and the "Hundred-Thousand-Million Project". However, in the context of cultural tourism integration, these villages commonly face practical challenges such as poor connectivity between core attractions, fragmented visitor routes, lack of non-motorized traffic experience, and insufficient spatial vitality. Therefore, it is necessary to adopt scientific renewal strategies to integrate fragmented cultural tourism resources, activate the vitality of public spaces, and promote the sustainable development of cultural tourism villages. Accordingly, this study adopts catalyst theory as its analytical framework, considering the non-motorized corridors as a public spatial system that integrates various spatial elements. It explores the application of catalyst theory to the design of cultural and tourism-oriented village spaces, and conducts an empirical study taking Zini Village in Panyu District, Guangzhou, as a case study.

Firstly, a coupling mechanism between non-motorized corridors and Catalyst Theory is established. The relevant theories of non-motorized corridors and Catalyst Theory are systematically reviewed. The spatial connectivity, functional diversity and cultural legibility of non-motorized corridors are correlated with the systemic hierarchy, incremental nature and contextual continuity of catalysts. These are further translated into nine evaluation indicators from a catalyst perspective, forming an assessment tool for the catalyst potential of village non-motorized corridors. The validity of this coupling mechanism is verified through typical domestic and international case studies, laying a theoretical foundation and providing practical support for subsequent strategy development.

On this basis, a localized strategy system for the renewal of Non-motorized Corridors in cultural tourism villages in Guangzhou is constructed. Based on the theoretical framework and the common characteristics of Guangzhou villages, selection principles for original catalysts are proposed from three dimensions: space, function, and culture. These catalysts are

summarized into four types—point, linear, planar, and intangible—and their synergistic relationships are clarified. A selection method for catalysts is proposed from three dimensions, and five screening principles are established. Differentiated reshaping and activation strategies are proposed for the four types of catalysts, and a guidance and control system for catalyst reactions is constructed, forming a strategic framework for the renewal of Non-motorized Corridors in Guangzhou villages.

Finally, taking Zini Village as an empirical case, the basic situation and existing problems of the village are systematically analyzed from the four dimensions of point, line, plane, and intangibility. By constructing a demonstrative Non-motorized Corridors that runs through the village and breaking through key bottlenecks, three thematic segments are formed. The renewal strategies of point anchoring, linear linking, planar radiating, and intangible activating are comprehensively applied to effectively enhance spatial connectivity, functional complexity, and cultural legibility, thereby improving the existing spatial problems.

This study applies Catalyst Theory to the design of Non-motorized Corridors in cultural tourism villages, clarifies the theoretical framework of Catalyst Theory in village Non-motorized Corridors, and establishes localized strategies for Non-motorized Corridors in Guangzhou villages, providing a systematic theoretical basis and practical reference for the design of Non-motorized Corridors in cultural tourism villages in Guangzhou.

Keywords: Traditional Village; Catalyst Theory; Non-motorized Corridors; Cultural Tourism Integration; Zini Village

Contents

摘 要	I
Abstract	II
Contents	IV
Figure List	VIII
Table List	XIII
Chapter 1 Introduction	1
1.1 Research Background	1
1.1.1 Policy Background: The Sustained Advancement of Rural Revitalisation and the Integration of Culture and Tourism	1
1.1.2 Reality Background: Common Challenges in the Development of Cultural and Tourism Villages	1
1.1.3 Theoretical Background: Catalyst Theory Offers New Approaches to the Revitalisation of Village Spaces	2
1.2 Research Objectives and Significance	3
1.2.1 Research Objectives	3
1.2.2 Research Significance	4
1.3 Definition of relevant concepts	5
1.3.1 Cultural and tourism-oriented villages	5
1.3.2 Non-motorized Corridors	6
1.4 Research Methods	7
1.5 Research Content and Framework	8
1.5.1 Research Content	8
1.5.2 Research framework	11
Chapter 2 The Mechanism of Catalytic Theory in Village Non-motorized Corridors	12
2.1 The Theoretical Evolution and Contemporary Shift in the Conservation and Development of Traditional Villages	12
2.1.1 Authenticity in Conservation: Theoretical Starting Point and Cornerstone	12
2.1.2 Holistic Conservation: From the Tangible to the Intangible	12
2.1.3 Sustainable Development: Synergistic Symbiosis of Urban-Rural Integration	13
2.2 A Theoretical Study of Non-motorized Corridors	14
2.2.1 The theoretical basis of shared-space corridors	15
2.2.2 Components of a Non-motorized Corridors	18

2.2.3 The distinctive features of village Non-motorized Corridors	21
2.2.4 An Analytical Framework for Village Non-motorized Corridors	23
2.3 Research into Catalytic Theory	25
2.3.1 Concepts Related to Catalytic Theory	25
2.3.2 Operational characteristics of catalytic theory	27
2.3.3 The mechanism of action of catalytic theory	29
2.4 The Application of Catalyst Theory in the Regeneration of Village Non-motorized Corridors	31
2.4.1 Necessity Analysis of Catalyst Theory Intervention	31
2.4.2 Adaptability Analysis of Catalyst Theory Intervention	32
2.4.3 Evaluation Dimensions from a Catalyst Perspective	34
2.5 The Case Study of Spatial Regeneration in Traditional Villages Based on Catalyst Theory	38
2.5.1 Sha Wan Ancient Town: Catalyst Practices Guided by Cultural Tourism	38
2.5.2 Orta San Giulio: Catalytic practices driven by Non-motorized Corridors	47
2.6 Summary	54
Chapter 3 Applications of the Catalyst Theory in Non-motorized Corridors in Guangzhou' s Villages	56
3.1 Principles for Selecting Original Catalysts in Guangzhou Villages	56
3.1.1 Spatial dimension	56
3.1.2 Functional dimension	57
3.1.3 Cultural dimension	58
3.2 Extraction and Identification of the Original Catalyst in Guangzhou Villages	62
3.2.1 Basic Types of Original Catalysts	62
3.2.2 Selection of Original Catalysts	71
3.2.3 Screening Principles for Original Catalysts	72
3.3 Reformation and Reactivation of the Original Catalyst in Guangzhou Villages	74
3.3.1 Point catalysts	74
3.3.2 Linear catalysts	78
3.3.3 Planar catalysts	83
3.3.4 Intangible catalysts	85
3.4 Guidance and Control of Catalytic Reactions in Guangzhou Villages	88
3.4.1 Multi-stakeholder participation: Building a governance framework based on	

joint construction, co-governance and shared benefits	88
3.4.2 Gradual updates: phased implementation and dynamic adjustments	89
3.4.3 Improving management systems: establishing a long-term operational framework and a dynamic evaluation mechanism	91
3.5 Summary	92
Chapter 4 Field Research on the Basic Situation of Zini Village, Guangzhou	94
4.1 Overview of the village	94
4.1.1 Location and transport	94
4.1.2 Historical Development	95
4.1.3 Overall layout	97
4.1.4 Functional Zoning and Development Planning	98
4.1.5 Distribution of cultural and tourism resources	99
4.2 Basic Characteristics of Non-motorized Spaces	101
4.2.1 Buildings and elements of the historical environment	101
4.2.2 Streets, waterways and green spaces	105
4.2.3 Squares	108
4.2.4 Intangible Cultural Heritage	109
4.3 Analysis of Current Issues and Catalytic Potential in Pedestrian and Cyclist Spaces	111
4.3.1 Buildings and elements of the historical environment	111
4.3.2 Streets, waterways and green spaces	115
4.3.3 Squares	118
4.3.4 Intangible Cultural Heritage	120
4.4 Analysis of the Survey Questionnaire	121
4.4.1 Basic characteristics of respondents	122
4.4.2 Spatial Requirements Analysis	122
4.4.3 Infrastructure Requirements Analysis	124
4.4.4 Cultural Experience Needs Analysis	125
4.5 Summary	127
Chapter 5 Catalyst Renewal Design of Non-motorized Corridors in Zini Village	129
5.1 Design content and objectives	129
5.1.1 Project positioning	131
5.1.2 Definition of the Scope of Design	133
5.1.3 Design Objectives	133
5.2 Principles for selecting original catalysts	136

5.2.1 Spatial dimension	136
5.2.2 Functional dimension	138
5.2.3 Cultural dimension	140
5.3 Extraction and Identification of the Original Catalyst	143
5.3.1 Extraction of the Original Catalyst	143
5.3.2 Identification of the Original Catalyst	146
5.4 Reformation and Reactivation of the Original Catalyst	155
5.4.1 Point catalysts	155
5.4.2 Linear catalysts	166
5.4.3 Planar catalysts	175
5.4.4 Intangible catalysts	184
5.5 Guidance and Control of Catalytic Reactions	192
5.5.1 Multi-stakeholder participation	192
5.5.2 Gradual updates	193
5.5.3 Improving management systems: establishing a long-term operational framework and a dynamic evaluation mechanism	195
5.6 Summary	197
Conclusion and Prospect	199
References	205
Appendix 1	210
Acknowledgements	217

Figure List

Figure1-1	Completed view of the roundabout road in Zini Village	2
Figure1-2	Research framework	11
Figure2-1	Shawan Beicun Conservation Plan (2019 – 2035)	39
Figure2-2	Conservation and Control Factors for Shawan Ancient Town	40
Figure2-3	Catalyst selection for Shawan North Village	41
Figure2-4	Point and linear catalysts in Shawan North Village	42
Figure2-5	Site plan for the regeneration of Shawan Ancient Town	42
Figure2-6	Point catalytics regeneration in Shawan Ancient Town	43
Figure2-7	Linear catalytics regeneration in Shawan Ancient Town	44
Figure2-8	Renovation of Anning Square in Shawan Ancient Town as a Planar Catalyst	45
Figure2-9	The intangible catalyst for the revitalisation of Shawan Ancient Town	46
Figure2-10	Regenerating the point catalyst in the town of Orta	49
Figure2-11	Linear catalytic regeneration of Orta	50
Figure2-12	Plan of Piazza Motta as a Planar catalyst	51
Figure2-13	Reconstruction of Orta’ s Piazza Motta as a Planar catalyst	51
Figure2-14	Map of the walking route at Sacro Monte of Orta	52
Figure3-1	The distribution of buildings in the traditional villages of Daling and Langtou, Guangzhou	64
Figure3- 2	Historic and cultural lanes and cultural-creative lanes	67
Figure3-3	Residential alleys and public service alleys	67
Figure3-4	Traffic-oriented lane	67
Figure3-5	Natural watercourses and living watercourses	68
Figure3-6	Linear green space	69
Figure3-7	Schematic diagram of the renovation of a historic building	75
Figure3-8	Public spaces along the streets of Turin	77
Figure3-9	The calming streets design for the Piazze Aperte project in Milan	79

Figure3-10	Super-blocks project in Bari	80
Figure3-11	Riverside Space in Bijiang Village, Shunde, Foshan	82
Figure3-12	Rendering of the High Line Park in New York	83
Figure3-13	The play streets design for the Piazza Aperte project in Milan	84
Figure3-14	Open Space program in Bari	85
Figure4-1	Location map of Zini Village, Panyu District, Guangzhou	95
Figure4-2	Map of Zini Island (Jiuruwei) from the late Qing Dynasty and early Republican period	97
Figure4-3	Development and Conservation Plan for the Traditional Village of Zini, Panyu District, Guangzhou	98
Figure4-4	Map of Village-Specific Tourist Attractions	100
Figure4-5	Location of Historic and Cultural Buildings	102
Figure4-6	Distribution of scattered infrastructure facilities	105
Figure4-7	Analysis of Road Structure Hierarchy	106
Figure4-8	Cross-sections of main streets and roundabouts	106
Figure4-9	Cross-sections of secondary and tertiary roads	107
Figure4-10	Distribution of linear waterways and green spaces	108
Figure4-11	Analysis of planar catalyst	109
Figure4-12	Current condition of the Zhang Clan Ancestral Hall and the Zhang Clan Dayat Hall	112
Figure4-13	Current situation regarding the accumulation of rubbish at the ancestral hall on Xiaoyou Street and the residential property at No. 4 Xiaoyou Street	112
Figure4-14	Current condition of the traditional-style dwellings north of the Zhang Clan Ancestral Hall	113
Figure4-15	Current layout of the area surrounding Fushan Pavilion and the ancient trees	114
Figure4-16	The phenomenon of residents gathering at the junction of roads in the centre of the village	115
Figure4-17	Photos of the current state of the alleys	116

Figure4-18	Photos of the current state of historic and cultural lane	116
Figure4-19	Vacant land and substandard housing	117
Figure4-20	The location of the path and boundary wall leading to Zini Hall	117
Figure4-21	Current view of the front of the Zhang Clan Ancestral Hall	118
Figure4-22	Current view of the square in front of the Baomo Garden office building	119
Figure4-23	A photograph of the village entrance square in Sanshan Village	120
Figure4-24	Analysis of Public Facility Evaluation Scores	124
Figure4-25	Analysis of Infrastructure Issues	125
Figure5-1	The master plan of the Zini Village Non-motorized Corridors	130
Figure5-2	Master plan of the cultural section of the traditional culture section	131
Figure5-3	Master plan of the cultural section of the ecological rural section	132
Figure5-4	Master plan of the cultural section of the historical village section	132
Figure5-5	Structural analysis of the Non-motorized Corridors	137
Figure5-6	Functional analysis of the Non-motorized Corridors	140
Figure5-7	Cultural analysis of the Non-motorized Corridors	142
Figure5-8	Point catalysts for the historic village section	147
Figure5-9	Point catalysts for the traditional culture section	148
Figure5-10	Point catalysts for the ecological rural scenery section	148
Figure5-11	Planar catalyst for the historic village section	151
Figure5-12	Planar catalyst for the traditional culture section	152
Figure5-13	Planar catalyst for the ecological rural scenery section	152
Figure5-14	Functional Design of the Point Catalyst for the Historic Village Section	155
Figure5-15	Rendering of the Point Catalyst 1 update for the historic village section	156
Figure5-16	Rendering of the Point Catalyst 2 update for the historic village section	158
Figure5-17	The Master Plan of the Point Catalyst for the historic village section	159
Figure5-18	Functional Design of the Point Catalyst for traditional culture section	160
Figure5-19	Rendering of the Point Catalyst update for the traditional culture section	160
Figure5-20	Rendering of the Point Catalyst 1 update for the traditional culture section	162

Figure5-21	Renderings of the interior and exterior of Point Catalyst 1 for the traditional culture section	162
Figure5-22	Rendering of the Point Catalyst 2 update for the traditional culture section	164
Figure5-23	The Master Plan of the Point Catalyst for the traditional culture section	164
Figure5-24	Rendering of the Point Catalyst update for the ecological rural scenery section	165
Figure5-25	Selection of linear catalysts for the historic village section	167
Figure5-26	Rendering of the linear Catalyst 1 update for the historic village section	168
Figure5-27	Rendering of the linear Catalyst 2 update for the historic village section	168
Figure5-28	Section Drawing of a Street Showing Linear Catalytic Regeneration of the historic village section	169
Figure5-29	Modular design of infrastructure	170
Figure5-30	The Section Drawing of Linear Cultural Catalyst Regeneration in the Traditional Culture Section	171
Figure5-31	Section of Linear Catalytic Regeneration of the Traditional Village Culture .	171
Figure5-32	Plan of Spatial Regeneration Along the Cultural Corridor of Traditional Villages	172
Figure5-33	Spatial Site Analysis Map of the Cultural Corridor of Traditional Villages	172
Figure5-34	Rendering of The Linear Catalyst Update for The Traditional Culture Section	173
Figure5-35	Section of Linear Catalytic Regeneration of the ecological rural scenery section	175
Figure5-36	Rendering of the linear catalyst update for the ecological rural scenery section	175
Figure5-37	Functional design of planar catalysts in the ancient village experience section	176
Figure5-38	Master Plan of Planar Catalysts in the Ancient Village Experience Section	178
Figure5-39	Rendering of the Planar catalyst update for the historic village section	178
Figure5-40	Design of the planar catalytic function of the traditional culture section	179
Figure5-41	Master Plan of Planar Catalysts in the Ancient Village Experience Section	180
Figure5-42	Rendering of the Planar catalyst update for the traditional culture section	181
Figure5-43	Design of the planar catalytic function of the ecological rural scenery section	182
Figure5-44	Modular design of production spaces	183
Figure5-45	Rendering of the Planar catalyst update for the ecological rural scenery section	183

Figure5-46	Intangible Catalyst Reshaping During Weekday Period	185
Figure5-47	Intangible Catalyst Reshaping During Weekend Period	186
Figure5-48	Intangible Catalyst Reshaping During Festival Period	187
Figure5-49	Narrative sequence of the historic village section	189
Figure5-50	cultural narrative Narrative sequence of the traditional culture section	190
Figure5-51	Narrative sequence of the ecological rural scenery section	191

Table List

Table2-1	Theoretical Developments in Village Non-motorized Corridors	18
Table2-2	Components of a Non-motorized Corridors	20
Table2-3	The distinctive features of village Non-motorized Corridors	23
Table2-4	Analytical framework for village Non-motorized Corridors	24
Table2-5	Types and characteristics of catalysts	26
Table2-6	Operational characteristics of the catalyst theory	29
Table2-7	Theoretical Mechanisms of Catalysis	30
Table2-8	The compatibility between the catalytic theory and the village-level Non-motorized Corridors	34
Table2-9	Evaluation dimensions of the catalyst effect	36
Table3-1	Principles for Selecting Original Catalysts in Guangzhou Villages	59
Table3-2	Types of Original Catalysts in Guangzhou Villages	63
Table3-3	The four categories of primary catalysts and their synergistic relationships	70
Table4-1	Summary of Tourist Attractions in Zini Village and Sanshan Village	100
Table4-2	List of Historic and Traditional Buildings in Zini Village and Sanshan Village ..	102
Table5-1	Point catalyst excavation in the historic village section	144
Table5-2	Point catalyst excavation in the traditional culture section	144
Table5-3	Point catalyst excavation in the ecological rural scenery section	145
Table5-4	Linear catalyst excavation	145
Table5-5	Planar catalyst excavation	146
Table5-6	Linear catalyst excavation	150
Table5-7	Intangible catalysts	154
Table5-8	Integration of Intangible Catalysts During Weekday Period	185
Table5-9	Intangible Catalyst Reshaping During Weekend Period	187
Table5-10	Intangible Catalyst Reshaping During Festive Period	188

Chapter 1 Introduction

1.1 Research Background

1.1.1 Policy Background: The Sustained Advancement of Rural Revitalisation and the Integration of Culture and Tourism

Guided by national strategies such as new-type urbanisation and rural revitalisation, Guangdong Province is vigorously advancing the ‘Hundred-Thousand-Million Project’ and the development of rural revitalisation demonstration zones, driving the transformation of traditional villages from extensive expansion towards intensive upgrading. By leveraging cultural tourism as a catalyst to revitalise the existing resources of traditional villages, this approach has become a key pathway to sustainable rural development.

1.1.2 Reality Background: Common Challenges in the Development of Cultural and Tourism Villages

Traditional villages within the Guangzhou metropolitan area share the distinctive characteristics of Lingnan water towns and Guangfu culture, making them popular weekend destinations for city dwellers seeking short-distance getaways. However, in practice, there are widespread issues such as poor connectivity between key attractions, fragmented visitor routes, a lack of pedestrian-friendly experiences, and insufficient spatial vitality. These problems prevent the full potential of the villages’ cultural and tourism resources from being realised. Visitors tend to stay for only a short time and have a poor experience, whilst the quality of life for local villagers is also severely affected.

Furthermore, last year Zini Island completed the construction of its ring road and established the Jiangyuanfang Visitor Centre, thereby largely completing its tourism infrastructure. However, these developments have primarily been concentrated on the outer perimeter of the island and at key tourist sites. Whilst the internal streets and alleys of the village already possess a basic framework for pedestrian and cycle traffic, a systematic network has yet to be established, resulting in issues such as disrupted connectivity, inconsistent quality of public spaces, and a lack of diversity in functions. Consequently, this thesis proposes a catalyst-driven renewal and optimisation of the island’s Non-motorized

Corridors, building upon the existing street and alleyway structure. The aim is to link cultural and tourism nodes across the island, establishing a comprehensive spatial circulation network that addresses common challenges faced in the development of cultural and tourism-oriented villages.

This design takes the existing linear spatial framework of Zini's main streets, alleys and waterfront paths as its foundation. By removing key bottlenecks, enhancing the quality of the built environment and introducing catalytic nodes, it achieves the regeneration of Zini's Non-motorized Corridors.



Figure1-1 Completed view of the roundabout road in Zini Village

Source: Internet

1.1.3 Theoretical Background: Catalyst Theory Offers New Approaches to the Revitalisation of Village Spaces

The core concept of catalyst theory is that by introducing or modifying specific elements on a small scale and in a localised manner, a chain reaction is triggered in the surrounding environment, thereby driving the gradual renewal of the entire area. This theory has been widely applied in fields such as urban regeneration and the conservation of historic districts. However, there remains a lack of research into its application in the design of Non-motorized Corridors in rural villages. By applying the catalyst theory to the design of Non-motorized Corridors in cultural and tourism-oriented villages, and using linear corridors as the core catalyst to link dispersed nodes, the vitality of spaces along the corridor can be revitalised,

thereby facilitating a transition from a spatial structure characterised by isolated points to one of networked synergy.◦

1.2 Research Objectives and Significance

1.2.1 Research Objectives

This study adopts catalyst theory as its core methodology, focusing on the common problems in the renewal of Non-motorized Corridors in cultural tourism villages—namely, poor connectivity between core attractions, fragmented tourist routes, lack of non-motorized traffic experience, and insufficient spatial vitality. Taking Zini Village in Panyu District, Guangzhou as a typical case, this research systematically carries out the design of Non-motorized Corridors under the guidance of catalyst theory. The specific objectives include the following three aspects:

(1) Theoretical level: Establishing a coupling mechanism and evaluation tool between Non-motorized Corridors and catalyst theory.

In response to the lack of dynamic renewal perspectives in existing studies on village non-motorized traffic spaces, this research systematically reviews Non-motorized Corridors theory and catalyst theory, and establishes a coupling relationship between the two. The spatial connectivity, functional diversity and cultural legibility of non-motorized corridors are correlated with the systemic hierarchy, incremental nature and contextual continuity of catalysts. These dimensions are further translated into evaluation indicators from a catalyst perspective, forming an assessment tool for the catalyst potential of village Non-motorized Corridors. The validity of this coupling mechanism is verified through typical domestic and international case studies.

(2) Methodological level: Constructing a localized strategy system for the renewal of Non-motorized Corridors in cultural tourism villages in Guangzhou.

Based on the common characteristics of Guangzhou villages, selection principles for original catalysts are proposed from three dimensions: space, function, and culture. These catalysts are summarized into four types—point, linear, planar, and intangible—and their

synergistic relationships are clarified. A selection method for catalysts is proposed from three dimensions: historical and cultural value, spatial potential and practical needs, and public property rights. Five screening principles—holism, locality, hierarchy, diversity, and linkage—are established. Differentiated reshaping and activation strategies are proposed for the four types of catalysts, and a guidance and control system for catalyst reactions is constructed from three dimensions: multi-stakeholder participation, gradual renewal, and management systems, thereby forming a renewal strategy for Non-motorized Corridors in cultural tourism villages in Guangzhou.

(3) Practical level: Practical Application of the Catalytic Regeneration Design for the Zini Village Non-motorized Corridors

Taking Zini Village as a typical case, the existing problems of the village are systematically analyzed from the four dimensions of point, line, plane, and intangibility through field investigations, data mapping, and interviews. Guided by the core concept of “one main corridor, three thematic sections, and multiple catalysts,” a demonstrative Non-motorized Corridors running through the village is constructed. Through the synergistic strategies of point anchoring, linear linking, planar radiating, and intangible activating, the node refinement design of the three thematic sections is completed, providing a practical reference for the renewal of Non-motorized Corridors in cultural tourism villages.

1.2.2 Research Significance

(1) Theoretical Significance

This study extends catalyst theory from the fields of urban regeneration and historic district conservation to linear public spaces in villages, establishing a correspondence between catalyst theory and Non-motorized Corridors, and systematically analysing the mechanisms through which catalyst theory operates in village Non-motorized Corridors. An analytical framework is constructed based on three dimensions—spatial connectivity, functional complexity and cultural legibility—which is further translated into nine evaluation indicators from a catalyst perspective, thereby forming an assessment tool for evaluating the catalytic

potential of Non-motorized Corridors in villages. In doing so, this study expands the scope of application of catalyst theory in the spatial regeneration of villages, providing new theoretical tools and analytical perspectives for research into pedestrian and cycle systems in traditional villages.

(2) Methodological Significance

This study forms a comprehensive research system, progressing from the construction of a theoretical framework and regionalisation strategies to empirical case validation. Based on the common characteristics of Guangzhou's villages, a regionalised strategy system for Non-motorized Corridors in cultural and tourism-oriented villages in Guangzhou has been established—encompassing selection principles, typological categorisation, extraction and screening, as well as revitalisation and guidance—thereby bridging the gap between theoretical construction and regional adaptation, and providing methodological support for the planning and design of Non-motorized Corridors in such villages.

(3) Practical Significance

This study selects Zini Village as a typical case study. Through in-depth research and problem analysis, it constructs demonstrative Non-motorized Corridors that run through the village. By comprehensively applying catalyst-driven regeneration strategies, the study enhances the village's spatial connectivity, functional diversity and cultural legibility, thereby addressing current issues such as spatial fragmentation, functional isolation and cultural stagnation. It provides a reference for the regeneration of Non-motorized Corridors and the revitalisation of public spaces in cultural and tourism-oriented villages in Guangzhou and the wider Pearl River Delta region.

1.3 Definition of relevant concepts

1.3.1 Cultural and tourism-oriented villages

According to the criteria set out by the Ministry of Housing and Urban-Rural Development during its survey of traditional villages, a traditional village is defined as ‘a village that was established at an early stage, possesses a wealth of traditional resources, and

holds significant historical, cultural, scientific, artistic, social and economic value, and which should therefore be protected' [1].

A cultural and tourism-oriented village refers to a type of tourism where the village is utilised as a tourist destination, drawing visitors through its unique spatial layout, natural scenery, and local customs and traditions[2]. Such villages, with their favourable ecological environment and distinctive historical and cultural heritage, can enhance a sense of cultural identity and belonging among both villagers and visitors.

Guangzhou's traditional villages share the common regional characteristics of Lingnan water towns and Guangfu culture, serving as the foundational elements for the development of village tourism. Their advantageous geographical location makes them well-suited to meeting the needs of urban residents for short weekend or holiday getaways.

When planning for the development of these villages, it is necessary to adopt a user-centred approach, taking into account the needs of both villagers and tourists. From the villagers' perspective, emphasis must be placed on their level of participation. Whilst preserving and passing on rural culture and traditional ways of life, the development of the cultural tourism industry should drive rural economic growth, thereby increasing villagers' incomes and improving their standard of living.

From the visitors' perspective, emphasis must be placed on the quality of the tourism experience. A rich array of cultural activities and comprehensive services should be provided, with a focus on visitor engagement and the overall experience. By meeting the diverse needs of visitors, the overall satisfaction with the village can be enhanced.

1.3.2 Non-motorized Corridors

The concept of Non-motorized Corridors originates from research into urban pedestrian and cycle systems. Scholars such as Shi Xudong have constructed a spatial framework for pedestrian and cycle systems based on three dimensions: units, corridors and nodes. They

define Non-motorized Corridors as the key linear links connecting nodes and units^[3]. Scholars such as Li Congying position Non-motorized Corridors as the main backbone of the pedestrian and cycle network, serving the primary demand for such travel^[4].

This study focuses on Non-motorized Corridors, the design scope of which encompasses the external public spaces along the corridors, primarily comprising streets, alleys, squares, waterfront spaces and vacant lots. It should be clarified that the subject of this study is not merely the linear path itself, but also encompasses the point-based and area-based public spaces linked by this path, as well as intangible cultural elements. The concept of ‘Non-motorized Corridors’ is adopted because it emphasises the use of slow-moving transport as a framework, utilising linear paths to link various catalytic nodes along the route and construct a comprehensive network system of slow-moving spaces. In this context, ‘corridor’ conveys the meaning of ‘connectivity’; it refers to a structural passageway that links catalytic nodes and integrates dispersed resources, rather than the concept of ‘barrier’ in an ecological sense. Methodologically distinct from the isolated regeneration of point-based or area-based spaces, Non-motorized Corridors emphasise a systematic and networked logic of spatial organisation, rather than the simple aggregation of isolated nodes.

1.4 Research Methods

(1) Literature review method

This study systematically reviews domestic and international literature across multiple relevant fields, including the design of Non-motorized Corridors, catalytic theory, and the regeneration of traditional villages. It provides an in-depth analysis of the evolution and future directions of these theories, thereby laying the theoretical foundation for the development of an analytical framework for village Non-motorized Corridors.

(2) The comparative case method

This paper selects relevant case studies from both domestic and international contexts and conducts a systematic analysis across four dimensions: principles of catalyst selection;

identification and selection of catalytic agents; reshaping and activation; and control and guidance. It distils design approaches and strategies that can serve as useful references.

(3) Survey and interview method

Through multiple field surveys, we have gained a comprehensive understanding of the current state and practical challenges facing traditional villages. We conducted questionnaire surveys targeting both villagers and visitors to systematically gather data on their satisfaction with the village environment and their actual needs. At the same time, we utilised structured interviews to identify the practical constraints on village development and the community's planning aspirations. This provides a solid and reliable factual basis and a clear direction for the design of the village's Non-motorized Corridors.

1.5 Research Content and Framework

1.5.1 Research Content

(1) Part I: Basic Theoretical Research - Establishing a Coupling Mechanism between Non-motorized Corridors and Catalyst Theory

This part systematically reviews the theoretical evolution, constituent elements, village specificity, and analytical framework of Non-motorized Corridors, and elaborates the core concepts, typologies, operational characteristics, and mechanisms of catalyst theory. On this basis, a coupling relationship between the two is established. The spatial connectivity, functional diversity and cultural legibility of non-motorized corridors are correlated with the systemic hierarchy, incremental nature and contextual continuity of catalysts. These dimensions are further translated into evaluation indicators from a catalyst perspective, forming an assessment tool for the catalyst potential of village Non-motorized Corridors. At the same time, the necessity and adaptability of applying catalyst theory to the renewal of village Non-motorized Corridors are demonstrated, and the validity of the coupling mechanism is verified through typical domestic and international case studies.

(2) Part II: Application Strategy Construction - Forming a Localized Strategy System for the Renewal of Non-motorized Corridors in Cultural Tourism Villages in Guangzhou

Based on the common characteristics of Guangzhou's villages, this study establishes selection criteria for primary catalysts across three dimensions — spatial, functional and cultural — categorising them into four types: point, linear, planar and immaterial, whilst elucidating their synergistic relationships. This research employs a classification method comprising these four categories: point, linear, planar and immaterial. The material and immaterial analytical frameworks of catalyst theory are combined with the typological classification of village public space research. Material catalysts are further subdivided into three categories — point, linear and planar — according to their spatial characteristics. This four-dimensional classification framework retains the core essence of catalyst theory whilst aligning with village spatial research, facilitating the differentiated expression of subsequent selection, screening and design strategies.

Furthermore, this paper proposes a method for selecting catalysts based on three dimensions: historical and cultural value, spatial potential and practical needs, and public ownership, and establishes five screening principles: holistic approach, in-situ approach, prioritisation, diversity, and interconnectedness. Differentiated strategies for reshaping and revitalising the four categories of catalysts are proposed. Furthermore, a guidance and control system for catalyst reactions is constructed across three dimensions — multi-stakeholder participation, incremental renewal and management systems — to form a framework for the renewal of Non-motorized Corridors in Guangzhou's cultural and tourism-oriented villages.

(3) Part III: Site Investigation and Problem Diagnosis - Analyzing the Current Situation of non-motorized traffic Spaces in Zini Village

Taking Zini Village in Panyu District, Guangzhou as an empirical case, this part systematically analyzes the existing problems of the village — including poor connectivity between core attractions, fragmented tourist routes, lack of non-motorized traffic experience, and insufficient spatial vitality — from the four dimensions of point, line, plane, and intangibility through field investigations and data analysis. It also identifies the core contradictions in spatial connectivity, functional complexity, and cultural legibility, providing a direct problem orientation and empirical basis for the subsequent catalyst-based renewal

design of the Non-motorized Corridors.

(4) Part IV: Design Practice – Completing an Empirical Application of Catalyst-Based Renewal Design for the Non-motorized Corridors in Zini Village

Taking catalyst theory as the core methodology and targeting the identified problems of the village, this part adopts the spatial organization model of “one main corridor, three thematic sections, and multiple catalysts” to construct a demonstrative Non-motorized Corridors running through the village. The synergistic strategies of point anchoring, linear linking, planar radiating, and intangible activating are comprehensively applied to complete the node refinement design of the three thematic sections: the Ancient Village Experience Section, the Traditional Village Culture Section, and the Ecological Rural Scenery Section. In addition, a guidance and control system for catalyst reactions is constructed from the three dimensions of multi-stakeholder participation, gradual renewal, and management systems, ensuring the sustainable release of catalyst effects and providing a practical reference for the renewal of Non-motorized Corridors in cultural tourism villages in Guangzhou and the wider Pearl River Delta region.

1.5.2 Research framework

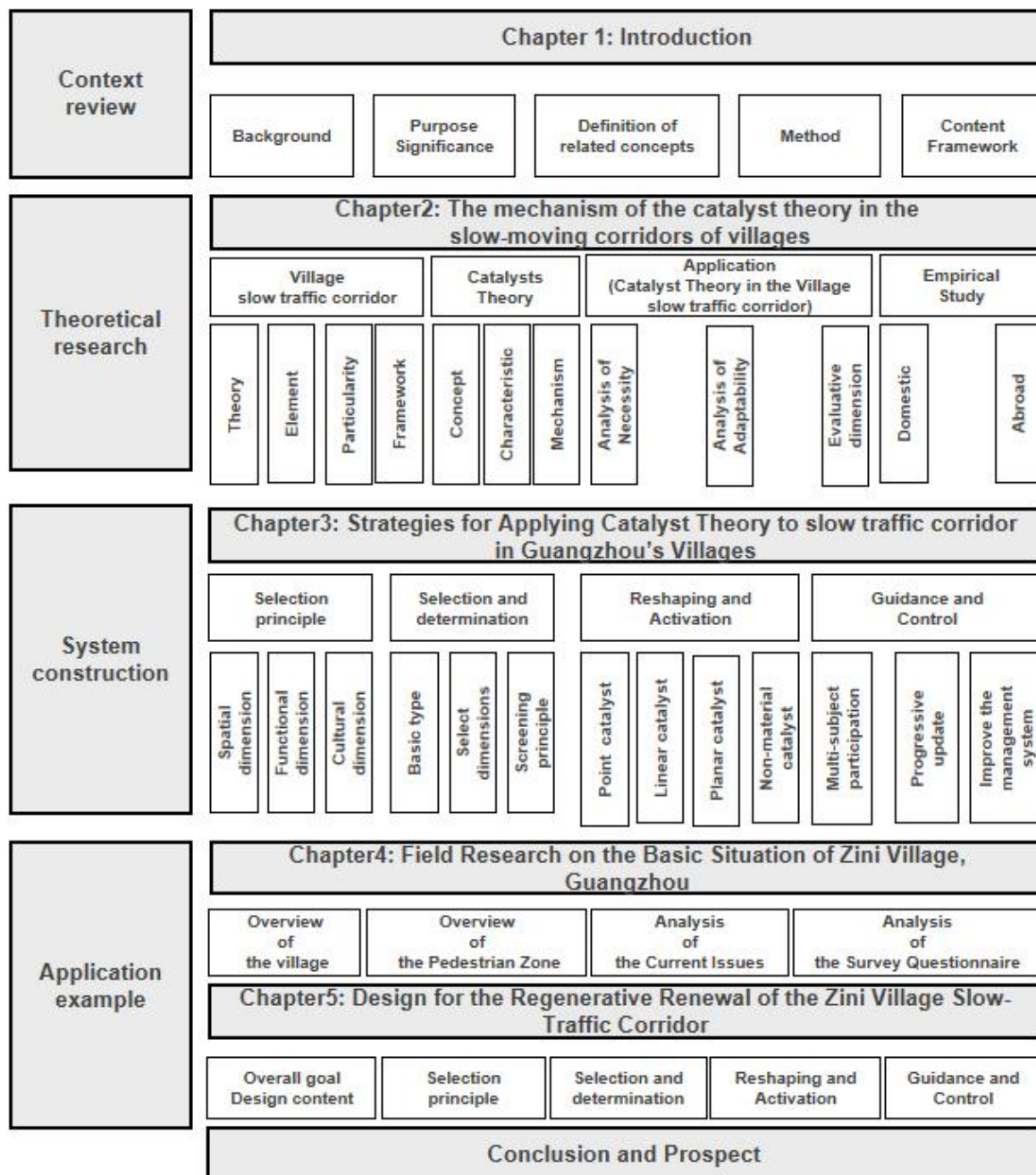


Figure1-2 Research framework

Source: Author' s own illustration

Chapter 2 The Mechanism of Catalytic Theory in Village Non-motorized Corridors

2.1 The Theoretical Evolution and Contemporary Shift in the Conservation and Development of Traditional Villages

As important repositories of profound historical memory and unique cultural heritage, traditional villages are currently undergoing a critical phase of transformation. They face the challenge of shifting from static conservation to living heritage transmission, and from the preservation of individual structures to holistic development. By systematically reviewing the theoretical developments in the conservation and development of traditional villages both domestically and internationally, this study provides a theoretical foundation for the introduction of catalyst theory.

2.1.1 Authenticity in Conservation: Theoretical Starting Point and Cornerstone

The Nara Document explicitly emphasises the authenticity of cultural heritage, asserting that all forms of cultural expression should be fully respected^[5]. The 1964 Venice Charter expanded the scope of conservation from individual buildings to encompass the overall environment, including villages. In China, from the 1961 Provisional Regulations on the Protection and Management of Cultural Relics to the 1982 Law of the People's Republic of China on the Protection of Cultural Relics, the principle of 'prioritising protection and restoring old structures to their original state' has consistently been upheld, with an emphasis on preserving the authentic information of the physical space. Scholars such as Ruan Yisan championed the establishment of the 'Historical and Cultural Cities, Towns and Villages' protection system, providing the institutional framework for the conservation of traditional villages^[6].

2.1.2 Holistic Conservation: From the Tangible to the Intangible

Since the 1970s, the concept of holistic conservation has gradually gained international consensus. The 1976 Nairobi Recommendations explicitly introduced the concept of 'historic districts', treating these districts and their surrounding built and natural

environments as a unified whole ^[5]. The 1998 Machu Picchu Charter highlighted the need to balance the dual requirements of cultural heritage and the natural environment. The 2003 UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage emphasised the multifaceted protection of cultural heritage. On this basis, China announced its first batch of Historic and Cultural Villages in 2003 and implemented protection regulations in 2008, establishing a systematic policy framework. The implementation of the 2011 Law on the Protection of Intangible Cultural Heritage, alongside the establishment of the ‘List of Traditional Villages of China’ in 2012, signalled a shift in the focus of conservation from physical structures to the organic integration of traditional layouts, overall character and intangible cultural heritage.

Concurrently, research on the conservation of traditional villages by scholars both domestically and internationally has gradually expanded from the physical spatial dimension to the social level. Shi Dandan’s research indicates that developed countries such as France and Japan have generally established comprehensive conservation systems comprising legislation, institutional frameworks, financial investment and specific measures, whilst placing emphasis on stimulating endogenous momentum through community participation^[7]. Hu Wenyue^[8], based on bibliometric analysis, points out that domestic research priorities have gradually shifted from material dimensions such as ‘traditional architecture’ and ‘landscape genes’ to socio-cultural dimensions such as ‘cultural heritage’, ‘tourism development’ and ‘living environment’, reflecting a transition from ‘living space’ to ‘spiritual belonging’. Scholars such as Chen Xiaohua have systematically examined the functional evolution of public spaces in traditional villages, indicating that traditional functions — such as communal gatherings, ritual ceremonies, defence and hospitality — are waning, necessitating the revitalisation of public spaces through functional reallocation^[9].

2.1.3 Sustainable Development: Synergistic Symbiosis of Urban-Rural Integration

From the warnings of Silent Spring to the rise of the ‘Garden Tourism’ model, seeking a balance between economic growth and ecological conservation has become a major trend in

the protection and development of traditional villages. In 2017, China proposed the ‘Rural Revitalisation Strategy’, emphasising the comprehensive revitalisation of industry, talent, culture, ecology and organisation. The 2021 ‘14th Five-Year Plan for the Urban-Rural Historical and Cultural Protection and Inheritance System’ further called for breaking down the urban-rural dichotomy, integrating the protection of traditional villages into a macro-framework of urban-rural coordination, and promoting their sustainable development through living heritage transmission.

At the academic level, domestic scholars have focused primarily on constructing evaluation systems and exploring development models for the sustainable development of traditional villages. Scholars such as Wang Shujia^[10] have constructed a systematic evaluation framework for the sustainable development of traditional villages by applying the Analytic Hierarchy Process (AHP) and the Delphi method across the dual dimensions of community development and heritage conservation, subsequently validating this framework through empirical testing on ten Lingnan traditional villages in the Pearl River Delta. Cheng Juan^[11], through cluster analysis and an analysis of conservation drivers, concluded that the integration of heritage value with distinctive local industries represents a key pathway to achieving sustainable development in traditional villages within the Pearl River Delta region. At the international research level, the central role of the community and the visitor experience are receiving increasing attention. Scholars such as Li Wenbing^[12] point out that research on traditional village tourism abroad generally focuses on community participation mechanisms, visitor behaviour characteristics and sustainable development models, emphasising the view of traditional villages as organic systems where humans and nature coexist in harmony.

2.2 A Theoretical Study of Non-motorized Corridors

Non-motorized Corridors form part of the ‘slow mobility system’, which refers to the non-motorised transport system. This comprises transport spaces consisting primarily of pedestrian and non-motorised traffic, as well as public areas and landscape environments linked by routes for slow mobility — that is, non-commuter-oriented spaces for slow

mobility^[13]. The slow mobility system not only focuses on transport functions but also increasingly incorporates activities such as social interaction and recreation, becoming a ‘third space’ within urban life. Against the backdrop of the integration of culture and tourism, Non-motorized Corridors in traditional villages have gradually evolved from serving a purely functional purpose of passage to becoming composite spaces that integrate the village’s various resources. They have thus become the linear core carriers within the village’s public space system, undertaking the organisation of traffic, social interaction and cultural experiences. This paper unfolds across four dimensions of theoretical research, constituent elements, the specific characteristics of villages and an analytical framework, laying the groundwork for the introduction of catalyst theory.

It should be emphasised that while the primary focus of this paper is on Non-motorized Corridors, the research is not confined to linear spaces. In the context of traditional villages, these corridors act as linear catalysts, playing a structurally integrative role. They function not merely as linear pathways, but as the organisational framework that links the point-like and area-like public spaces, as well as the intangible cultural elements, along their routes. Consequently, this paper does not confine itself to the linear form of the corridor, but extends its scope to encompass the various catalytic nodes linked and activated by Non-motorized Corridors. These primarily include non-purely linear spatial forms — such as point-like architectural spaces and area-like plaza spaces along the route — which are organised by the corridor’s core functions. The paper provides an in-depth analysis and discussion of these elements.

2.2.1 The theoretical basis of shared-space corridors

Research on Non-motorized Corridors theory has gradually shifted its focus from transportation efficiency to public life. A Non-motorized Corridors is not merely infrastructure that connects spaces. It is also a vital medium for stimulating public life in villages, preserving local cultural continuity, and enhancing the quality of living environments.

(1) A shift in approach: from car-centric to pedestrian-friendly

In the 1960s, the Danish architectural scholar Jan Gehl, through field observations, was the first to systematically demonstrate the link between the quality of public space and human activity. He pointed out that urban design ‘placed a low priority on public space, pedestrianism and the role of city space as a meeting place for urban dwellers’^[14], criticising the traditional planning mindset centred on the efficiency of motor vehicles. In the 1980s, he further proposed the design philosophy of ‘Human-Scale Design’^[15], emphasising the experience of non-motorized traffic transport and public spaces as the core of design.

The New Urbanism movement, which emerged during the same period in response to the spread of suburbanisation in the United States, proposed the TND model and the TOD model. Through high-density street grids, compact mixed-use land development and walkability, these approaches established non-motorized traffic transport systems as the core framework of community planning.

(2) Value expansion: from spatial efficiency to social interaction

Since the 1990s, the conceptual scope of pedestrian and cycle spaces has continued to expand. Jan Gehl has placed greater emphasis on the social functions of public spaces, viewing them as key to enhancing the quality of everyday life. The Public Space Quality Assessment Standards developed by the Project for Public Spaces (PPS) identify accessibility, environmental creativity, diversity of activities and social interaction as the four core elements. In the 21st century, the US-initiated national programme ‘Active Living by Design’ integrated public health principles into spatial design. The 2017 International WELL Community Assessment further incorporated pedestrian and cycle networks into the community health indicator system, signalling that the scope of pedestrian and cycle spaces has gradually expanded from mere transport efficiency into the realm of public health.

(3) Macro-narrative: From Cultural Routes to Village Non-motorized Corridors

Jan Gehl and New Urbanism laid the foundations for a people-centred approach to pedestrian spaces. The value of Non-motorized Corridors in a village context can be traced

back to the theories of ‘cultural routes’ and ‘heritage corridors’ in the field of cultural heritage conservation, which offer a contemporary interpretation of Non-motorized Corridors, transforming them from mere transport spaces into linear cultural heritage.

At the macro level, the ‘Charter on Cultural Routes’ (2008) published by the International Council on Monuments and Sites (ICOMOS) defines cultural routes as dynamic collections of heritage that transcend time and space and span cultures. In the United States, the National Heritage Corridor system uses linear spaces such as greenways, footpaths or waterways as its framework; by linking dispersed natural and cultural resources, it achieves multiple objectives including heritage conservation, leisure and recreation, and economic development. Building upon this, Chinese scholars have proposed the localised concept of ‘cultural corridors’. Scholars such as Tao Li argue that cultural corridors are based on transport routes and cultural sites, encompassing settlements along the route and their surrounding areas, thereby integrating the historical and cultural heritage of the route with the geographical space into a dynamic system that transcends time and space^[22]. Scholars such as Wang Haiying have further elaborated that cultural corridors balance the spatial integrity and cultural continuity of linear heritage, emphasising the inclusion of settlements along the route within an integrated conservation system, linking dispersed cultural elements and avoiding fragmented conservation within linear areas^[23].

The village Non-motorized Corridors represent a spatial translation and functional extension of cultural corridor theory at the village scale. This study adopts cultural legibility as the core analytical dimension of the Non-motorized Corridors, emphasising the integration of villagers’ daily life pathways with cultural narratives, thereby shaping the Non-motorized Corridors into a vehicle for linear cultural narratives.

Table2-1 Theoretical Developments in Village Non-motorized Corridors

Source: Author' s own compilation

Stages of Development	Paradigm Shifts	Expansion of Values	Macro-narratives
	1960s – 1980s	Post-1990s	Contemporary
			Cultural Routes
Expansion of Values	Vehicle-oriented → Pedestrian-friendly	Spatial Efficiency → Social Interaction	→ Village Non-motorized Corridors
Relevant Theories	• Jan Gehl: People-Oriented Planning • New Urbanism: TND/TOD Models	• Public Space Quality Assessment Criteria: Spatial Accessibility, Environmental Creativity, Activity Diversity and Social Interaction • WELL Standard: Public Health	• Cultural Legibility • Linear Cultural Narratives

2.2.2 Components of a Non-motorized Corridors

Based on systematic research by scholars both in China and abroad, the components of Non-motorized Corridors primarily include spatial form, functional positioning and quality of experience. Specifically, spatial form refers mainly to the physical structure and spatial layout of these corridors. Functional positioning emphasises the need to meet practical requirements such as transport, leisure and social interaction. Quality of experience primarily concerns historical context, landscape characteristics and emotional connection.

(1) Spatial form

Shi Xudong^[3] proposed that the spatial structure of urban non-motorized traffic transport systems follows a basic ‘function – space – facility’ framework, constructing such systems across three dimensions: ‘units, corridors and nodes’. Among these, corridors, as linear connecting spaces, serve as the key medium linking nodes and units. Li Congying^[4] further

subdivides the non-motorized traffic transport network into three tiers: Non-motorized Corridors, non-motorized traffic pathways, and non-motorized traffic tourism and leisure routes. Non-motorized Corridors, as the main framework of the network, cater to the primary demand for non-motorized traffic travel. non-motorized traffic pathways, meanwhile, serve to divert traffic and provide connectivity.

In research on village public spaces, Ma Xinyao^[24] categorises village public spaces into point, linear and planar spaces. Geng Hong^[25] elaborates on this further, specifically classifying village public spaces into planar spaces represented by ponds and squares, linear spaces dominated by streets and alleys, and point spaces centred on ancient trees and wells. The connectivity and integrity of space directly determine the accessibility and vitality of village public spaces. Huang Yuangang^[31], through empirical research, demonstrated that road network density exerts a dominant influence on necessary walking activities within neighbourhoods, whilst the connectivity of the walking network plays a decisive role in spontaneous activities.

(2) Functional position

Non-motorized Corridors serve not only as transport spaces but also fulfil multiple functions, including recreation, social interaction, commerce and cultural display. Zeng Jia^[27] argues that pedestrian and cycle path systems provide spaces for rest and daily life, and are a key means of enhancing spatial quality. Wu Jiaorong^[28], through research into the correlation between non-commuting activities and the layout of public service facilities, found that residents in mixed-use residential areas exhibit the strongest preference for non-motorized traffic travel, and proposed the principle of ‘large-scale concentration and small-scale dispersion’ for facility layout.

The functional complexity of pedestrian corridors primarily encompasses the capacity of a single space to accommodate different activities at different times, as well as a single route connecting multiple functional nodes. Zhao Xiaonan^[29] proposed five key principles for constructing pedestrian systems, namely systematicity, human-centred design, diversity,

contextualism and respect for the environment. Among these, the principles of systematicity and diversity directly influence the functional complexity and networked synergy of pedestrian spaces.

(3) Quality of Experience

The quality of experience along Non-motorized Corridors is determined by a combination of factors. Chang Le^[30] proposed a comprehensive strategy for pedestrian streets characterised by ‘convenient accessibility, efficient services, safe and comfortable facilities, and green, harmonious public spaces’. Huang Yuangang^[31] demonstrated through research that the quality of greening has a decisive influence on the duration of walking activities. Luo Tan^[32] summarised the spatial characteristics, network patterns and constituent elements of the landscape environment of pedestrian systems, thereby deriving fundamental design principles for community pedestrian systems. At the level of cultural experience, pedestrian corridors serve as linear carriers of cultural narratives. The recognisability of historical environmental elements, the coherence of cultural narratives, and the perceptibility of the sense of place have become key characteristics distinguishing village non-motorized traffic systems from their urban counterparts. ‘Sociality’ and ‘livability’, as PPS standards for public space quality, are further transformed within village spaces into the preservation of local character and collective memory.

Table2-2 Components of a Non-motorized Corridors

Source: Author’s own diagram

Constituent Elements	Spatial Form	Functional Position	Quality of Experience
Core Positioning	Physical structure and spatial layout	Meeting practical needs such as transport, leisure and social interaction	Historical context, landscape characteristics and emotional connection

Table2-2 Components of a Non-motorized Corridors(continued)

Source: Author' s own diagram

Constituent Elements	Spatial Form	Functional Positioning	Quality of Experience
Specific Content	Units,nodes, corridors	• Transport, recreation, social interaction, commerce and cultural display	• Easy access, efficient services, safe and comfortable facilities, green and harmonious public spaces
	• Non-motorized Corridors, non-motorized traffic paths, leisure trails • Point, linear and planar spaces	• Large-scale concentration,small-scale dispersion • Mixed-use: systematic,people-centred, diverse, context-sensitive and ecologically respectful	• Spatial characteristics, network patterns, landscape environment • Recognisability of historical elements, coherence of cultural narratives, perceptibility of the spirit of place

2.2.3 The distinctive features of village Non-motorized Corridors

(1) Ecological level

Most traditional villages are built against mountains and beside water, with their siting and layout closely integrated with the surrounding natural landscape. Non-motorized corridors are often closely intertwined with natural elements such as rivers, ponds and woodland. When designing such corridors in villages, it is necessary to balance the protection of ecosystems with the enhancement of the recreational experience for users, whilst avoiding damage to the existing natural environment.

(2) Cultural level

Non-motorized Corridors and cycle corridors are key elements constituting the unique cultural landscape of a village. In traditional villages, spatial features such as the street and alleyway fabric, waterfront landing stages, resting spots beneath ancient trees, and the open

spaces in front of clan halls collectively form the village' s cultural narrative sequence. These spatial elements not only facilitate daily interactions and collective memories among villagers but also embody the continuity of local culture and way of life. Consequently, village Non-motorized Corridors are not merely transport routes, but also vital vessels for villagers' cultural identity and collective memory.

(3) Functional level

As composite public spaces, village Non-motorized Corridors accommodate diverse functional requirements within the same physical area. This multifunctionality can be divided into temporal and spatial dimensions, primarily manifested in serving different types of activities at different times, as well as the juxtaposition and coexistence of multiple functions within the same space. Wu Jiaorong^[28] proposed the spatial organisation principle of 'large-scale concentration and small-scale dispersion' . In the practical context of villages, this is primarily manifested in the linear arrangement of various public service facilities along main thoroughfares and alleys, forming highly multifunctional public interfaces that enhance the overall vitality and cohesion of the village' s public spaces.

(4) Social level

The development of village Non-motorized Corridors faces multiple challenges, including fragmented land ownership, insufficient funding and complex villagers' preferences, making it difficult to apply the unified development model used in urban regeneration. Consequently, an incremental, modular and low-intervention micro-regeneration strategy is required. Emphasis should be placed on thoroughly understanding and preserving the historical and cultural context of the village during the renovation process, whilst also prioritising the protection and restoration of the ecological environment. Systematic planning and design should be employed to strengthen the interconnections and synergy between various elements. Within the village landscape, whilst maximising the preservation of the original spatial fabric, the overall spatial quality and user experience of the village' s Non-motorized Corridors should be gradually and effectively enhanced through a variety of

measures, including the activation of carefully designed nodes, the improvement of interface environments, and the skilful integration of necessary facilities.

Table2-3 The distinctive features of village Non-motorized Corridors

Source: Author' s own diagram

Special Aspects	Characteristics	Design principles
Ecological Dimension	Nestled amidst mountains and water, integrated with natural elements	Balancing ecological conservation with recreational experiences
Cultural Dimension	Forms a sequence of cultural narratives	A vital medium bearing the collective memory of villagers and regional cultural identity
Functional Dimension	A single space accommodates diverse needs	Enhances the overall vitality and cohesion of public spaces through mixed-use design
Social Dimension	Faces challenges such as fragmented property rights, insufficient funding and complex stakeholder interests	Adopts a micro-renewal strategy characterised by incremental, modular and low-intervention approaches

2.2.4 An Analytical Framework for Village Non-motorized Corridors

(1) Spatial connectivity

At the spatial level, the integrity and accessibility of village Non-motorized Corridors form the physical foundation of the village' s pedestrian and cycle environment. Specifically, this encompasses the continuity of routes, the smoothness of connections at junctions, and a clear hierarchy of spaces. Bottlenecks caused by barriers such as walls, encroaching unauthorised structures or other obstacles directly affect the continuity and flow of these routes. Locations such as road bends and junctions are key to ensuring the convenience and safety of pedestrian and cycle travel. Pedestrian and cycle spaces of varying scales and functions form a coherent, multi-tiered network.

(2) Functional complexity

In terms of functionality, this primarily encompasses the degree of functional integration within the pedestrian and cycle corridor, as well as the standard of supporting facilities. By utilising underused spaces and adapting their functions at different times of the day, the corridor caters to both the daily needs of local residents—such as relaxation, exercise and socialising—and the sightseeing and experiential requirements of visitors. The introduction of functional nodes along the route serves to invigorate the spaces along the corridor.

(3) Cultural legibility

At the cultural level, the Non-motorized Corridors are primarily treated as vehicles for cultural narratives, forming the core value of the village's pedestrian and cycle spaces. Specifically, this involves the revitalisation of historic buildings, the contextualised presentation of elements of the historic environment, the preservation of the traditional character of streets and alleys, and the regular performance of intangible cultural heritage, thereby establishing the corridors as pathways for a continuous cultural experience.

Table2-4 Analytical framework for village Non-motorized Corridors

Source: Author's own diagram

Analytical Framework	Spatial Connectivity	Functional Complexity	Cultural Legibility
Objectives	Physical Framework	Content Support	Core Values
Specific Measures	• Continuity of pathways • Connectivity of nodes • Clarity of hierarchy	• Integration of functions • Flexibility across time periods • Comprehensive service coverage	• Revitalisation and utilisation of historic buildings • Display of elements of the historic environment • Regular performances and exhibitions of intangible cultural heritage

2.3 Research into Catalytic Theory

The term ‘catalyst’, originally a chemical term, refers to a substance that alters the rate of a chemical reaction without itself being consumed; the resulting acceleration or deceleration is known as the ‘catalytic effect’. In the late 1980s, against the backdrop of large-scale urban renewal involving demolition and reconstruction, American architects Wayne Attoe and Donn Logan introduced this concept into the field of urban design, proposing the theory of ‘Urban Catalysts’^[38].

2.3.1 Concepts Related to Catalytic Theory

(1) Catalysts and urban catalysts

In chemistry, a catalyst is a substance that alters the rate of a chemical reaction without being consumed itself. In urban design, an urban catalyst is defined as ‘a new element capable of driving urban change and accelerating or altering the pace of urban development and construction’^[39]. More specifically, a catalyst is “an element that can stimulate and guide subsequent development”^[38]. Without fundamentally altering existing elements, the strategic introduction of new elements influences the form, character and quality of existing urban elements, thereby driving continuous and gradual reform of the urban fabric and achieving urban renewal and revitalisation.

(2) Catalyst type

Depending on the classification criteria used, urban catalysts can be divided into various types based on their form, appearance and function (Table 2-5).

In terms of form, catalysts can be divided into physical and non-physical catalysts. Physical catalysts include tangible elements such as buildings, public spaces, transport facilities and landscape features. Non-physical catalysts include intangible elements such as festivals, cultural events and art exhibitions. The synergistic interaction between these two types of catalyst maximises their effectiveness.

In terms of morphological characteristics, catalysts can be categorised into point catalysts, linear catalysts and area catalysts^[40]. Point catalysts, centred on elements such as

individual buildings and landscape nodes, possess a clustering effect. Linear catalysts, comprising linear spaces such as streets, alleys and waterways, possess a linking effect; area catalysts, primarily consisting of areas such as squares and neighbourhoods, possess a radiating and driving effect.

In terms of functional attributes, research on village spaces based on catalyst theory classifies catalysts into spatial, functional and cultural catalysts^{[41][42]}. Specifically, spatial catalysts focus on the activation of physical spatial elements, primarily acting to optimise spatial structures and reshape forms. Functional catalysts concentrate on functional substitution and integration, primarily acting to transform spatial usage patterns. Cultural catalysts emphasise the transmission and living expression of intangible culture, primarily serving to sustain cultural identity and the spirit of place. Spatial catalysts provide a physical substrate for the integration of functions; functional catalysts infuse spaces with sustained vitality; and cultural catalysts endow spaces and functions with a core of value. These three elements are closely interlinked and together constitute the complete mechanism of the catalytic effect.

Table2-5 Types and characteristics of catalysts

Source: Author' s own illustration

Classification dimensions	Catalyst type	Feature description
Morphological characteristics	Point catalyst	To generate a clustering effect through a network of individual nodes
	Linear catalyst	To generate a cascade effect in a linear configuration
	Planar catalyst	To generate a radiation effect in a planar form
Forms of expression	Physical catalyst	Buildings, public spaces, transport facilities, landscape features and other physical structures
	Intangible catalyst	Intangible elements such as development policies, festivals, cultural events and art exhibitions

Table2-5 Types and characteristics of catalysts(continued)

Source: Author' s own illustration

Classification dimensions	Catalyst type	Feature description
Functional properties	Spatial Catalyst	The activation of physical spatial elements and the optimisation of spatial structures
	Functional catalyst	Functional substitution and composite superposition
	Cultural Catalyst	The Transmission and Living Expression of Intangible Cultural Heritage

(3) Catalytic effect

The catalytic effect refers to the entire process of a catalyst' s reaction and the lasting impact it generates. By strategically introducing new elements or adapting existing ones to interact with the surrounding environment, a local chain reaction is triggered, thereby driving the renewal and revitalisation of the surrounding area. Through further guidance, subsequent new elements or adapted existing elements are stimulated, achieving renewal on a larger scale and generating a catalytic effect over a wider area^[38]. The core concept of this effect involves using small-scale, localised interventions to construct a dynamic process of ‘spreading from a point to a wider area and incremental renewal’ , thereby stimulating spatial vitality across a broader scope.

2.3.2 Operational characteristics of catalytic theory

(1) System hierarchy

Based on the objectives of the catalyst, the various elements of a given spatial environment are classified according to factors such as their comparative advantages, importance and degree of influence on the surrounding environment. The sequence of the catalysts is then determined in order of priority, from primary to secondary. By enhancing the synergistic effects between the various catalysts, the catalytic reaction is thereby stimulated.

(2) Partial progression

Catalytic regeneration is a gradual process of renewal that progresses from the local to the whole. By implementing targeted local improvements and functional enhancements, it revitalises specific areas, creating a demonstration effect and catalytic impact that drives the regeneration of the entire space. Through a gradual regeneration strategy that moves from specific points to broader areas and from the interior to the exterior, it facilitates the optimisation of the overall spatial structure and functional upgrades, thereby achieving sustainable regeneration.

(3) Overall coherence

A catalyst does not exist in isolation. From a macro-level, holistic perspective, the various elements of the catalyst must form a networked, interlinked relationship in which individual points connect to lines, and lines extend to cover broader areas. By systematically coordinating the intrinsic links between local spaces and the wider environment, we can collectively stimulate the catalytic effect, thereby achieving sustainable development that progresses from local optimisation to overall enhancement.

(4) Continuity of Cultural Heritage

The catalyst strategy emphasises respect for and the continuation of local culture. In the process of selecting and shaping catalysts, it is necessary to conduct an in-depth analysis of local culture, historical traditions and the spatial fabric, to ensure that the regeneration activities triggered by the catalysts harmonise with the existing historical context and to avoid homogenisation.

(5) Controllability

The catalytic effect is both logical and systematic. It requires effective management through policy guidance, event planning and public relations campaigns to ensure that the entire catalytic process progresses steadily in a positive direction, thereby achieving the desired outcomes and impact.

Table2-6 Operational characteristics of the catalyst theory

Source: Author's own diagram

Dimensions	System hierarchy	Partial progression	Overall coherence	Continuity of Cultural Heritage	Controllability
Strategies	• Value hierarchy	• From Point to Area	• Point-to-Line	• Respect for Culture	• Policy Guidance
	• Prioritisation	• From Interior to Exterior	• Line-to-Area	• Textural Continuity	• Event Planning
	• Synergistic effects	• Demonstration and Catalysis	• Network Interconnection	• Avoid Homogenisation	• Public Relations

2.3.3 The mechanism of action of catalytic theory

The mechanism of action of the catalyst theory can be divided into the screening and selection of catalysts, the reshaping and activation of catalytic media, and the guidance and control of catalytic reactions.

(1) Screening and selection of catalysts

During the selection and shaping of catalysts, it is necessary to identify and screen them, and to adapt and optimise them according to the specific context. When identifying and screening potential catalysts, it is necessary to systematically analyse factors such as the area's developmental context, resource conditions and current issues, selecting elements with vitality and development potential as potential catalysts. In the process of shaping these potential catalysts, adjustments are made to their physical and functional aspects to enhance their vitality and effectiveness.

(2) The reshaping and activation of catalytic media

During the catalytic reaction phase, the synergistic interaction between catalysts at

various levels can effectively stimulate the catalytic reaction. Given the inherent complexity of the catalytic reaction, measures such as policy support, financial investment and public awareness campaigns ^[12] can effectively promote the catalytic reaction to generate positive transformative outcomes.

(3) Guidance and control of catalytic reactions

Once a relatively stable catalytic reaction has been established, it can be further sustained and reinforced through policy support, event planning and industrial development. By amplifying the initial catalytic effect, deeper and more widespread renewal can be stimulated, creating a chain reaction^[43] that drives the positive cyclical development of the entire spatial system.

Table2-7 Theoretical Mechanisms of Catalysis

Source: Author' s own diagram

	Phase 1	Phase 2	Phase 3
Phase	Selection and Identification	Reimagining and Revitalisation	Guidance and Control
Specific Measures	• Identify original catalysts	• Differentiated reimagining	• Continuous reinforcement
	• Screen for elements with potential	• Layered revitalisation	• Create a chain reaction
	• Set priorities	• Synergistic coordination	• Advance spatial renewal

2.4 The Application of Catalyst Theory in the Regeneration of Village Non-motorized Corridors

2.4.1 Necessity Analysis of Catalyst Theory Intervention

Traditional villages embody the essence of the Chinese agrarian civilisation, bearing rich historical memories, folk traditions and a culture of nostalgia^[1]. With the acceleration of urbanisation, traditional villages are universally facing issues such as population hollowing-out, the abandonment of historic buildings, homogenisation of the overall landscape, a monolithic industrial structure, and a lack of vitality in public spaces. Within the village landscape, Non-motorized Corridors—as the core linear connectors linking various functional zones—suffer from problems such as circuitous routes, fragmented nodes, and inconsistent interface quality, which severely impact both villagers’ daily mobility and visitors’ experience.

The conservation and development of traditional villages require new theoretical perspectives and practical approaches. Existing research, which adopts a ‘top-down’ planning and control approach or a ‘static conservation’ perspective, struggles to meet the demands of the dynamic evolution of village spaces. The catalytic theory concept of ‘point-driven, area-wide, incremental renewal’ offers a new solution to the challenges facing village development.

(1) Addressing the drawbacks of ‘large-scale demolition and reconstruction’ style regeneration

In the regeneration of traditional villages, the prevailing approach has typically been one of large-scale demolition and reconstruction, resulting in the disruption of the village fabric, the severing of historical continuity, and the disruption of villagers’ daily lives. The catalyst theory emphasises localised intervention and incremental regeneration, using low-cost, small-scale interventions to revitalise spaces. This approach can effectively avoid the damage to the village’s cultural heritage caused by regeneration strategies involving large-scale demolition and reconstruction.

(2) Responding to the demand for ‘bottom-up’ renewal

The regeneration of traditional villages should not be led solely by the government or developers; it must also fully respect the central role of the villagers and their practical needs. The catalyst theory involves creating exemplary catalyst nodes that allow villagers to directly experience improvements in spatial quality, thereby stimulating their enthusiasm for active participation in the regeneration process and generating a ‘bottom-up’ impetus for change^[44].

(3) Achieving a harmonious balance between conservation and development

The conservation and development of traditional villages are often treated as separate concerns, making it difficult to achieve effective integration. The catalyst theory, however, seeks to revitalise existing resources through measures such as functional reallocation and the introduction of new business formats, whilst fully respecting the existing cultural context, thereby fostering the synergistic development of cultural conservation and economic growth. As linear spaces that link the various resources within a village, Non-motorized Corridors serve as the core vehicles through which the catalyst strategy is implemented.

2.4.2 Adaptability Analysis of Catalyst Theory Intervention

(1) The hierarchical structure of catalysts and the spatial hierarchy requirements of Non-motorized Corridors

Village Non-motorized Corridors possess a clear spatial hierarchy. Specifically, they consist primarily of a linear framework formed by streets and alleys and waterside footpaths; point-like nodes comprising ancient trees, historic wells and the forecourts of ancestral halls; and area-like cores consisting of clan hall squares and village entrance gathering points. The requirement for a systematic hierarchy in catalytic elements involves the classification, selection and shaping of catalytic elements at different levels. This aligns with the ‘point-line-surface’ spatial structure of the Non-motorized Corridors, forming a clearly hierarchical catalytic network.

(2) The local gradualism of catalysts and the need for micro-renewal in Non-motorized Corridors

The regeneration of village Non-motorized Corridors is constrained by a variety of

factors, including fragmented land ownership, limited funding and the complex and varied views of villagers, making it difficult to adopt a large-scale, standardised approach. The catalyst theory, which emphasises incremental strategies focused on small-scale regeneration to enhance the vitality of local spaces, aligns well with the need for micro-regeneration and incremental improvements to these corridors. It enables an enhancement of the quality of the village environment without disrupting the fabric of the village.

(3) The overall coherence of catalysts and the need for a networked system of Non-motorized Corridors

As linear spaces that connect various resources within a village, pedestrian corridors facilitate a shift in the village's spatial structure from 'isolated points' to 'networked synergy'. The holistic interconnectedness of catalysts emphasises the interrelationships between their constituent elements; by linking point and planar catalysts through linear catalysts, a comprehensive network of catalysts is formed. This aligns with the spatial organisation logic of pedestrian corridors, which 'connects points through lines and extends from points to areas'.

(4) The continuity of the catalyst's cultural context and the need for cultural venues along the slow-paced corridor

Village Non-motorized Corridors serve not only a transport function but also act as key vehicles for cultural narratives. Elements such as the layout of streets and alleys, ancient trees, wharves and historic buildings collectively form an integral part of the cultural landscape. The continuity of the cultural context is maintained by ensuring that, in the selection and shaping of these elements, existing contexts are respected and damage to elements of the historic environment is avoided, thereby aligning with the development of Non-motorized Corridors as cultural pathways.

(5) The controllability of catalytic guidance and the orderly advancement of the renewal of Non-motorized Corridors

The regeneration of village Non-motorized Corridors involves the interests of multiple stakeholders, including the government, villagers and businesses. By leveraging the

controllable nature of catalytic processes—through policy guidance, event planning and public communication—we can steer the direction of these processes to ensure that spatial regeneration progresses towards its intended objectives, thereby providing the institutional framework necessary for the orderly advancement of the corridor regeneration project.

Table2-8 The compatibility between the catalytic theory and the village-level Non-motorized Corridors

Source: Author' s own illustration

Characteristics of the catalyst theory	Demand for the update of the Non-motorized Corridors		Integrating point
System hierarchy	Spatial hierarchy		Hierarchical catalyst network
Local gradualism	Micro-updates		Low-cost and small-scale intervention
Overall coherence	Networked spatial organization		Connect points with lines and lead the surface with points
Continuity of cultural context	Cultural media		Respect historical environmental elements
Guide controllability	Orderly advancement		Policy and event guidance

2.4.3 Evaluation Dimensions from a Catalyst Perspective

Based on an analytical framework of spatial connectivity, functional diversity and cultural legibility in village-level Non-motorized Corridors, the catalyst theory is incorporated to transform these aspects into evaluative measures of catalytic effects, aiming to assess the potential of original catalysts within the corridors.

(1) Spatial Connectivity: The Pathway Framework for Catalytic Reactions

Spatial connectivity determines the ability of the catalytic effect to spread along the corridor to wider areas, requiring an assessment of the reparability of disconnections and the connectivity of nodes.

Regarding the reparability of disconnections, it is necessary to evaluate whether barriers such as walls, unauthorised structures, buildings encroaching on the right of way, and

abandoned facilities along the route can be removed or functionally adapted. Temporary structures that can be demolished, walls that can be opened through negotiation, and abandoned facilities that can be relocated are all classified as high-repairability breakpoints. Permanent obstacles constrained by property rights or structural safety, however, require strategies involving detours or alternative routes.

Regarding the connectivity of nodes, the smoothness of node connections directly affects the transmission efficiency of catalytic reactions. It is necessary to assess whether key nodes—such as corners, intersections, bridgeheads, gatehouses and wharves—are equipped with signage and wayfinding, public spaces, safe crossing facilities or landscape features.

Regarding hierarchical usability, it is necessary to assess whether main streets, alleys and lanes form a clear hierarchical structure, facilitating the placement of core catalysts at main street nodes and the distribution of secondary catalysts along alleys and lanes, thereby creating a catalyst network with a clear distinction between primary and secondary elements.

(2) Functional Complexity: Content Support for Catalyst Activation

Functional complexity determines a catalyst node's capacity to host diverse activities and trigger chain reactions. It is necessary to identify the feasibility of introducing new functions into existing spaces and the flexibility for time-slot transitions.

Regarding the suitability of facilities for installation, the focus should be on spatial scale, accessibility, safety, and coordination with surrounding functions. It is necessary to assess whether vacant plots along the street, corner spaces, and disused courtyards possess the spatial conditions required for the installation of modular facilities such as seating, fitness equipment, cultural display boards, wayfinding signage, bicycle stations, and public toilets.

Regarding temporal flexibility, it is necessary to assess whether area-based or point-based spaces—such as squares, open spaces in front of ancestral halls, and bridgehead platforms—possess the flexibility to switch functions at different times of day. Spaces with a high degree of temporal adaptability are more likely to serve as flexible spaces capable of triggering catalytic reactions.

Regarding service coverage, it is necessary to assess whether the service radius of existing and potential catalytic nodes can cover both core tourist areas and residential areas. Service nodes should be prioritised in service blind spots. In overlapping areas, consideration should be given to configuring distinct functions.

(3) Cultural Legibility: The Value Space of the Catalytic Effect

Cultural legibility determines whether a catalytic node can serve as a vessel for cultural identity and collective memory; it requires identifying the display potential of historical environmental elements and the spatial suitability for folk activities.

In terms of element visibility, it is necessary to assess the visibility and display effectiveness of historical environmental elements—such as ancient trees, old bridges, clan halls, gate towers, memorial arches, wharves and ancient wells—within the line of sight of pedestrians and cyclists; elements with high visibility should be prioritised as cultural catalysts.

Regarding spatial suitability, it is necessary to assess whether spaces such as squares, waterways, bridgeheads and open areas in front of ancestral halls possess the physical conditions required to host traditional festivals and folk activities; spaces with high suitability can be transformed into permanent or flexible venues for cultural performances.

Table2-9 Evaluation dimensions of the catalyst effect

Source: Author' s own creation

Evaluation	Assessment	Assessment Content
Dimensions	Indicators	
Spatial Connectivity (Path framework)	① Repairability of Disconnections	Whether disconnections can be removed or functionally adapted
	②Connectivity of Nodes	Whether key nodes are equipped with signage and wayfinding, public seating areas, safe crossing facilities or landscape features
	③ Hierarchical Usability	Whether main streets, alleys and lanes form a clear hierarchical structure

Table2-9 Evaluation dimensions of the catalyst effect(continued)

Source: Author' s own creation

Evaluation Dimensions	Assessment Indicators	Assessment Content
Functional Integration (Content Support)	① Facility Integration	Whether vacant plots, corner spaces and disused courtyards along the street provide the spatial conditions for integrating modular facilities
	② Temporal Flexibility	Whether point or planar spaces possess the flexibility to switch functions at different times of day
	③ Service Coverage	Whether the service radius of existing and potential catalytic nodes covers both the core visitor areas and residential areas
Cultural Legibility (Value Space)	① Visibility of Elements	The degree to which elements of the historical environment are visible and effectively showcased during pedestrian and cycle journeys
	② Spatial Suitability	Whether public spaces possess the physical conditions to host traditional festivals and folk activities
	③ Activity Participation	The degree of integration between traditional folk activities and non-motorized traffic spaces, and the potential for interaction between visitors and villagers

2.5 The Case Study of Spatial Regeneration in Traditional Villages Based on Catalyst Theory

This study selects two representative case studies for in-depth analysis: Shawan Ancient Town in Panyu District, Guangzhou, as a typical example of a traditional village focused on cultural tourism; and Orta San Giulio in the Piedmont region of Italy, as a classic example of the revitalisation and adaptive reuse of historic towns in Europe. A systematic analysis is conducted across four key dimensions: the selection criteria for the original catalyst, the identification and determination of the catalytic medium, the reshaping and activation of the catalytic medium, and the control and guidance of the catalytic medium. This explores the specific application pathways, mechanisms of action and practical outcomes of catalyst theory in guiding the spatial regeneration of traditional villages.

2.5.1 Sha Wan Ancient Town: Catalyst Practices Guided by Cultural Tourism

(1) Basic Overview

Sha Wan Ancient Town is situated in Panyu District, Guangzhou. Founded during the Southern Song Dynasty, it boasts a history of over 800 years and stands as a quintessential example of Guangfu culture. It has been designated as a Chinese Historic and Cultural Town and a Traditional Chinese Village. Centred around the ‘Liugeng Hall’, the village exhibits the typical comb-shaped layout characteristic of the Lingnan region. It preserves a wealth of historical buildings, including ancestral halls, temples and academies, as well as a rich heritage of intangible cultural traditions such as the Shawan ‘Piaose’ parade and Guangdong lion dance. In 2008, the local government launched a cultural tourism-oriented revitalisation plan for the ancient town. Through the exploration of cultural resources, the conservation and regeneration of historical spaces, and the planning of tourism activities, the initiative aims to stimulate the town’s intrinsic vitality and promote its sustainable development.

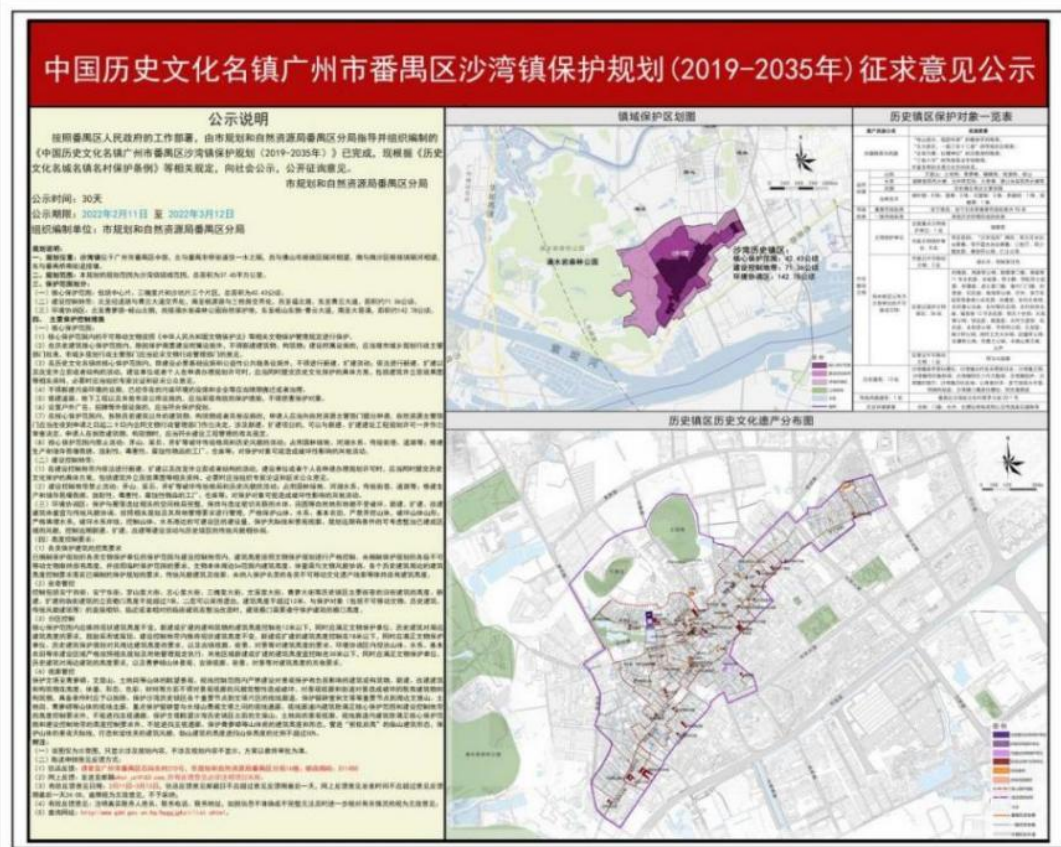


Figure 2-1 Shawan Beicun Conservation Plan (2019 - 2035)

Source: Panyu District People's Government

(2) Principles for selecting the original catalyst

The selection of catalysts for Shawan Ancient Town adheres to criteria across three dimensions: spatial, functional and cultural.

In terms of the spatial dimension, emphasis is placed on spatial structure, continuity and a sense of place. Priority is given to identifying key structural elements such as Liugeng Hall, Anning Street and Chebei Street. To address issues such as the uneven quality of street and alley interfaces and on-street parking, key nodes are selected to restore spatial continuity. At the same time, spaces that carry collective memories, such as the square in front of Liugeng Hall and the areas beneath ancient trees, are prioritised as catalysts.

In terms of function, the focus is on functional integration and demand-driven approaches. Sites such as clan hall squares, disused buildings and high-traffic street junctions are selected to achieve functional integration. Intersections where villagers and tourists converge—such as village entrances, main streets and clan hall squares—are prioritised for

renovation, with the introduction of cultural exhibitions, interactive experiences and public services.

In terms of culture, the emphasis is on authenticity and vitality. Priority is given to ancestral hall buildings, traditional-style dwellings, and historical environmental elements such as ancient trees, ancient wells and gate towers, employing a ‘restore-as-original’ strategy for their conservation and utilisation. Furthermore, intangible cultural heritage projects such as the Sha Wan Floating Colours and Guangdong Lion Dance are selected, with regular displays established through the integration of these elements into the fabric of daily life.

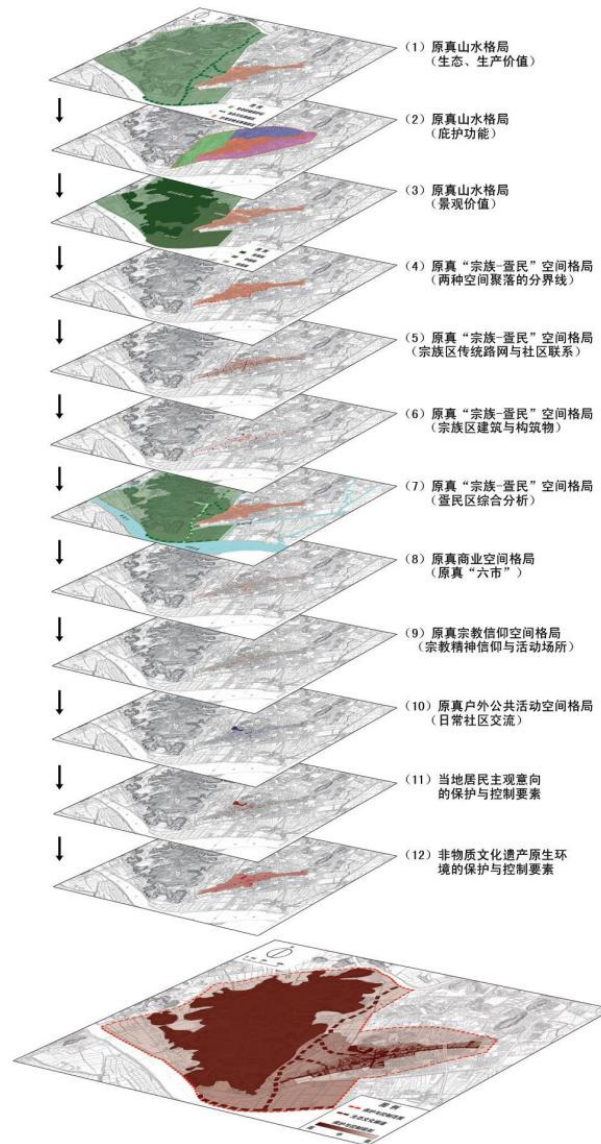


Figure2-2 Conservation and Control Factors for Shawan Ancient Town

Source: Reference^[45]

(3) Extraction and identification of the original catalyst

The catalysts for Shawan Ancient Town primarily comprise four types: point, linear, area and intangible.

Point catalysts centre on representative ancestral hall buildings such as Liugeng Hall, Sanren Hall and Yanqing Hall; historical environmental elements such as Wenfeng Tower, ancient trees and ancient wells; and basic service facilities such as visitor centres, car parks and seating areas planned for village entrances and key street junctions. Linear catalysts are structured around historical and cultural streets such as Anning Street and Chebei Street as the primary framework, with residential alleys serving as secondary networks. These are integrated with the Dishuiyan Forest Park to the west of the village, as well as the internal farmland and ponds, to form an ecological and cultural corridor. planar catalysts encompass traditional activity-oriented squares such as the square in front of Liugeng Hall and Anning Square, as well as lifestyle and leisure-oriented squares such as the village entrance gathering square. Intangible catalysts include traditional cultural elements such as the Shawan Piaose (a provincial-level intangible cultural heritage), the Guangdong Lion Dance (a national-level intangible cultural heritage), and the traditional craft of making Shawan water buffalo milk snacks.

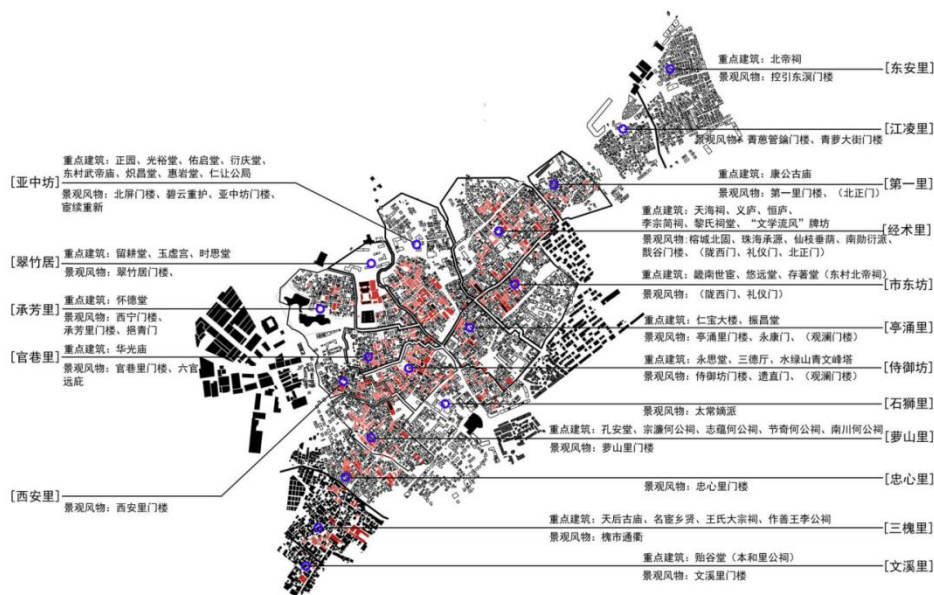


Figure 2-3 Catalyst selection for Shawan North Village

Source: Reference^[46]

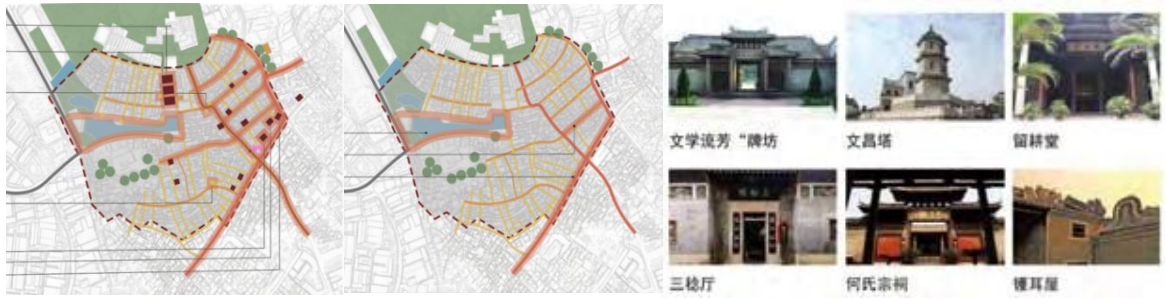


Figure2-4 Point and linear catalysts in Shawan North Village

Source: Author's own illustration and reference^[47]

(4) Regeneration and reactivation of the original catalyst



Figure2-5 Site plan for the regeneration of Shawan Ancient Town

Source: Conservation Plan for the Anning West Street Historic District

In terms of the revitalisation of point catalysts, the Sanren Hall and the ancient walls of Sha Wan serve as prime examples. Located on Anning West Street, the Sanren Hall was originally a music society for the He clan and is a significant birthplace of Cantonese music. Prior to the renovation, the building stood vacant, and its musical and cultural value had not been effectively realised. The design adopted a strategy of functional repurposing, transforming it into the Cantonese Music Memorial Hall. The restoration adhered to the principle of ‘restoring the old as it was’, preserving the original architectural form, structural characteristics and craftsmanship. The interior space was repurposed to house exhibitions on

Cantonese music, showcasing the biographies and representative works of musicians such as the ‘Three Greats of the He Family’, whilst also hosting regular private gatherings for Cantonese music performances. This revitalisation transformed the building from a derelict structure into a living cultural catalyst. By continuing the historical function of a music society, it fully embodies the characteristic of contextual continuity inherent in catalyst theory.

The ancient walls of Sha Wan, as a key element of the historic environment of Sha Wan Ancient Town, feature layers of building materials from different periods—from the rammed earth of the Ming Dynasty, through the yellow mud and shells of the Qing Dynasty, to the blue bricks of the Republic of China era, and are regarded as a vital testament to the history of construction materials in Sha Wan. Prior to the renovation, these ruined walls lay in a state of neglect, with their historical significance failing to be effectively conveyed. The design employs modern materials to construct a protective shell, whilst showcasing the building materials from different periods as catalytic information. By enhancing the visibility and presentation of these historical elements within the pedestrian view, the derelict wall is transformed into a legible cultural catalyst node.



Figure2-6 Point catalytic regeneration in Shawan Ancient Town

Source: Website

In terms of revitalising linear catalysts, Anning West Street, a historic and cultural thoroughfare, serves as a prime example. Anning West Street forms a central component of Anning City, one of the ‘Six Markets’ of Shawan. Historically a hub for merchants, the street is lined with numerous ancestral halls, temples and traditional shops. Prior to the renovation, there were issues such as new buildings clashing severely with the traditional

character, a mishmash of materials along the street frontage, sections of traditional bluestone paving having been replaced with concrete, and a lack of vitality in the alleyway due to the decline of commercial activity. The design adopted a tiered and categorised regeneration strategy. In terms of façade restoration, modern buildings with poor architectural character were refurbished. Regarding paving restoration, the concrete surfaces were replaced with traditional bluestone paving, thereby preserving the historical street's pedestrian ambience and spatial scale. In terms of functional continuity, Anning West Street retains its primary commercial function; by introducing local speciality cuisine and traditional handicrafts, the traditional spatial pattern of 'shops below, residences above' is maintained, restoring the street's commercial vitality.



Figure2-7 Linear catalytic regeneration in Shawan Ancient Town

Source: Website

The revitalisation of Shawan Ancient Town through a planar catalyst is exemplified by the redevelopment of Anning Square. Before transformation, the square was disorganised and lacked cultural space. Centred around the clean-water well, the design involved demolishing conflicting structures to create an open square. The square features large-scale folded paving to accommodate the needs of festive gatherings, whilst small courtyards utilise the gaps to create rest areas. In terms of functionality, it continues to serve as a hub for commercial trade and community interaction. On weekdays, it functions as a public living room for residents to rest and for tourists to gather; at weekends, it becomes a venue for Guangdong music performances. During festivals, it serves as a central hub for the 'Piaose' parade and

fish-shaped lantern displays, fully embodying the time-switchable characteristic of the catalyst theory.



Figure2-8 Renovation of Anning Square in Shawan Ancient Town as a Planar Catalyst

Source: Reference^[48]

In terms of intangible catalysts, the Shawan Piao Se, a provincial-level intangible cultural heritage, serves as a prime example. Before conservation and revitalisation, the Piao Se was performed only on specific festive occasions such as the Festival of the Northern Emperor, with no opportunity for everyday engagement. Props were stored exclusively in enclosed spaces including the Shisi Hall, failing to establish a meaningful connection with the surrounding public spaces. The design extends the display and performance of the Piao Se from confined festive settings to everyday exhibitions in public spaces. Temporary or permanent display areas have been established at Anning Square and the forecourt of Liugeng Hall. Shisi Hall has been converted into a Piao Se Cultural Exhibition Hall, showcasing classic colour palettes and production tools from past years. Cultural interpretation points featuring explanations of the Piao Sè tradition, including details of its craftsmanship and historical anecdotes, are established along major streets and alleys such as Chebei Street and Anning West Street. By transforming festival events, which are currently concentrated within specific timeframes, into everyday cultural touchpoints scattered throughout the ancient town, the project facilitates a shift in intangible cultural elements from sporadic festival-time bursts to a state of constant, everyday permeation.



Figure2-9 The intangible catalyst for the revitalisation of Shawan Ancient Town

Source: Website

(5) Guidance and Control of Catalytic Reactions

In terms of policy guidance, the government has issued the ‘Shawan Ancient Town Protection and Management Measures’, which clarify the standards for the restoration of historic buildings, the eligibility criteria for commercial enterprises, and the requirements for controlling the architectural character of the town.

In terms of multi-stakeholder participation, a collaborative governance model has been established based on ‘government guidance, enterprise operation and villager participation’. The Shawan Ancient Town Tourism Development Company is responsible for unified operations, event planning and external publicity. The Village Committee has organised villagers to form cooperatives, enabling them to participate in operations through mechanisms such as contributing properties as equity and sharing rental income. Villagers can undergo training to transition into roles such as tour guides, craftspeople and homestay operators. This multi-stakeholder governance framework effectively balances the interests of all parties, ensuring the sustainability of the catalytic process.

In terms of phased implementation, a strategy of “pilot projects first, phased rollout” is adopted. Phase One (2008 – 2012) focused on the restoration and functional repurposing of key catalytic sites to create a demonstration effect. Phase Two (2013 – 2018) expanded into surrounding streets and alleys to improve tourism service facilities; Phase Three (2019 to present) deepens cultural operations and creates signature events. This phased approach

effectively prevents large-scale renovations from disrupting the village's fabric, whilst also allowing room for dynamic adjustments.

In terms of dynamic evaluation and feedback, an annual assessment mechanism has been established to quantify the catalytic effects across various dimensions, including visitor satisfaction, villagers' income, the state of architectural conservation, and the level of cultural vitality. Based on the assessment results, adjustments are made in a timely manner to the layout of commercial enterprises, event planning schemes, and conservation measures, ensuring that the catalytic reaction continues to develop in the intended direction.

2.5.2 Orta San Giulio: Catalytic practices driven by Non-motorized Corridors

(1) Basic Overview

Orta San Giulio, situated on the shores of Lake Orta in the Piedmont region of Italy, is a quintessential example of a medieval European village. The history of Orta San Giulio dates back to 1219 AD. Since the 19th century, Lake Orta has served as a holiday destination for affluent families from Milan and other neighbouring cities, and is a key asset for modern 'garden tourism' [49].

The region's core cultural and historical assets include the island of San Giulio at the centre of Lake Orta, Piazza Motta and Prarondo. Through a network of slow-paced walking trails, scattered cultural and tourism resources are linked together, forming a catalytic network that 'connects points with lines and expands from points to areas', thereby achieving synergy between historical preservation and tourism development.

(2) Principles for selecting the original catalyst

In terms of spatial planning, priority is given to identifying key structural elements such as Motta Square, the Holy Mountain Trail and the Waterfront Walkway. Discontinuities in the historic alleyways will be repaired, and gaps between buildings will be opened up to create a seamless pedestrian experience. At the same time, sites that hold collective memories for residents—such as Motta Square, the viewing platform in front of the Holy Mountain Chapel and the area beneath the ancient trees—will be selected.

In terms of functionality, emphasis is placed on Motta Square serving as a hub for transport, commercial services, cultural performances, and social interaction; along the waterfront walkway, waterfront platforms, viewing benches and mobile coffee kiosks are installed to achieve a mix of functions. To meet tourists' needs for guidance, rest and refreshments, multilingual signage, seating and drinking fountains will be installed at the pier, the square and the chapel entrance, whilst small squares and children's play facilities will be retained for residents away from the core tourist areas.

Culturally, the historic buildings on the Island of San Giulio, including the Romanesque cathedral, bell tower and monastery—will be restored using a 'restore-to-original' approach. Furthermore, the overall architectural character is preserved: cobblestone paving is retained in streets and alleys, and building facades maintain their original window arrangements and colour schemes, whilst the construction of new modern buildings is strictly prohibited within the historic core area. At the same time, intangible cultural heritage initiatives—such as the Pilgrimage Day to the Holy Mountain, Gregorian chant concerts and traditional craft demonstrations—are being revitalised through the integration of these events into the local fabric.

(3) Extraction and identification of the original catalyst

The key heritage features include the Romanesque cathedral, bell tower and monastery on the island of San Giulio, the Church of Santa Maria Assunta in Piazza della Motta, and 20 Baroque chapels. The historical environment is characterised primarily by ancient trees, historic wells, fountains and piers. Basic service facilities include a tourist information kiosk and public toilets in the pier area, as well as bicycle parking and drinking water points at the start of the Monte San Giulio route.

Linear catalysts comprise five themed slow-travel routes: the Holy Mountain pilgrimage route, the island circuit, the waterside walking route, and two regional connecting footpaths. These also include the Lake Orta waterside walkway, featuring multiple viewing platforms and rest areas along the lake.

The spatial catalysts include Motta Square, the square in front of the church, and the waterfront viewing platforms. The intangible catalysts encompass the cultural traditions of the Holy Mountain pilgrimage, Gregorian chant, and traditional handicrafts.

(4) Regeneration and reactivation of the original catalyst

In terms of revitalising point catalysts, a differentiated approach is adopted for different types of catalysts. For religious buildings of exceptional historical value, such as the Chapel of the Holy Mountain, a ‘restore-to-original’ strategy is employed, involving only structural reinforcement and the conservation of murals, without the addition of modern decorative elements, thereby ensuring the cultural authenticity of the core catalyst. Furthermore, for historical environmental elements such as the wharf and ancient trees, stone benches and flower beds will be installed to showcase the historical landscape whilst maintaining their original appearance. At the same time, multilingual information signs, seating areas, public toilets and drinking fountains will be provided at key locations. Regarding the revitalisation of linear catalysts, the Holy Mountain Trail will be restored, with cultural information panels, small prayer rooms and telescopes for viewing the scenery installed at chapels along the route. Along the waterfront walkway, water-access platforms or viewing platforms will be established, equipped with bicycle racks and seating. The sloping commercial street will retain its traditional cobblestone paving, whilst the ground floors of all buildings on either side will be converted into commercial premises.



Figure2-10 Regenerating the point catalyst in the town of Orta

Source: Photograph taken by the author

In terms of revitalising linear catalysts, five themed slow-travel routes have been designed, including the Holy Mountain Pilgrimage Route, the Island Circuit, and the Waterfront Walking Route. The Holy Mountain Pilgrimage Route connects 20 Baroque-style chapels; the Island Circuit integrates the historic architectural ensemble of San Giulio Island; and the Waterfront Walking Route links the natural landscape nodes along the shores of Lake Orta. Together, these form a catalytic network that connects points through lines and expands from points to areas, serving as the narrative backbone through which visitors experience the cultural sequence of the villages. Specifically, this involves restoring the Sacred Mountain trail and installing cultural information panels, small prayer rooms and viewing telescopes at the chapels along the route. Along the waterside walkway, waterfront platforms and viewing platforms will be established, equipped with bicycle racks and seating areas. The sloping commercial street will retain its traditional cobblestone paving, with the ground floors of all buildings on either side converted into retail premises.



Figure2-11 Linear catalytic regeneration of Orta

Source: Photograph taken by the author

In terms of the revitalisation of the planar catalyst, taking Motta Square as a representative, a hierarchical spatial layout has been designed comprising a basic service zone,

a pedestrian circulation zone and a waterside viewing zone, balancing transport functions with the landscape experience. In the basic service zone, the ground floors of buildings surrounding Motta Square have been uniformly converted into commercial premises such as cafés, restaurants and souvenir shops, whilst the upper floors retain their residential function, creating a ‘shops below, homes above’ model. The pedestrian circulation zone ensures the basic functionality of pedestrian traffic, whilst the waterside viewing area creates an experience that encourages visitors to linger through the use of viewing platforms. On weekdays, the square serves as a public space for residents to socialise and for tourists to gather; at weekends and during festivals, it transforms into a venue for concerts, markets and pilgrimage ceremonies, enabling the same space to switch functions at different times.

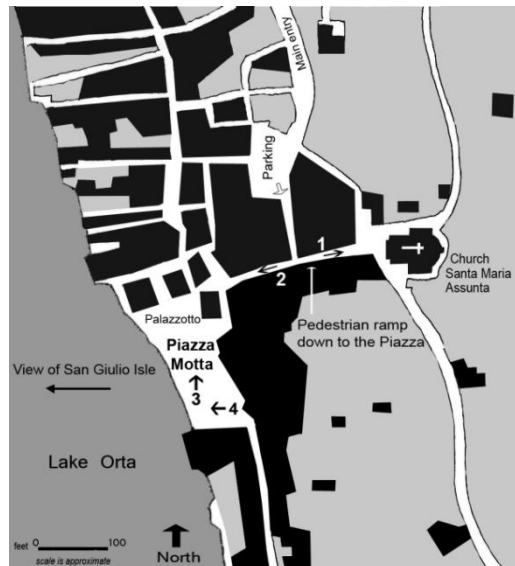


Figure2-12 Plan of Piazza Motta as a Planar catalyst

Source: Reference^[50]

Figure2-13 Reconstruction of Orta' s Piazza Motta as a Planar catalyst

Source: Photograph by the author

In terms of Intangible catalysts, the ‘Holy Mountain Pilgrimage Day’ is held every June, the church regularly hosts Gregorian chant concerts, and traditional craft workshops are open to visitors for hands-on experiences. At the same time, the Holy Mountain route serves as a flexible event space: it functions as a walking tour route on ordinary days, but is transformed into a pilgrimage route during festive periods.



Figure2-14 Map of the walking route at Sacro Monte of Orta

Source: Literature^[51]

(5) Guidance and Control of Catalytic Reactions

The regenerative practice in Orta San Giulio places great emphasis on control and guidance mechanisms, forming a guidance system centred on planning controls, community self-governance and phased implementation.

At the planning control level, the Territorial Landscape Plan (PPTR) clearly defines the conservation boundaries and construction control requirements for the historic core area. In accordance with the PPR Implementation Standards, new construction is prohibited in the historic centre and the buffer zones along the urban fringe; only the renovation and repurposing of existing buildings are permitted. Concurrently, detailed architectural guidelines have been drawn up, stipulating specific parameters such as building height, roof styles, facade materials and window-to-wall ratios, to ensure that the catalytic process does not compromise the overall character of the area. The government also implements a categorised management approach to commercial activities, strictly limiting the entry of large chain

brands into the core area whilst prioritising support for distinctive local businesses such as traditional crafts and cuisine.

At the community self-governance level, a management mechanism has been established involving the joint participation of residents' committees and business associations. Residents' committees are responsible for overseeing building renovations, maintaining public spaces and organising cultural activities; business associations formulate industry codes of conduct to regulate business practices and prevent cut-throat competition and excessive commercialisation. Annual residents' assemblies are convened to discuss and vote on major matters such as tourism development strategies and public space renovation plans, ensuring that the catalytic effect aligns with the overall interests of the community.

In terms of phased implementation, the project is primarily divided into three catalytic phases. Phase One (1990s – 2000) focused on the regeneration of Motta Square and the restoration of the Holy Mountain route, creating a demonstration effect. Phase Two (2000 – 2010) expanded to the waterfront promenade and the island circuit, enhancing the pedestrian and cycle network. Phase Three (2010 to present) deepens cultural operations and brand development. Upon completion of each phase, an impact assessment is conducted, and subsequent strategies are adjusted based on feedback. This phased approach avoids the disruption to the historic environment caused by large-scale renovations.

Regarding the revenue-reinvestment mechanism, a heritage conservation fund is established using income from tourism tickets and commercial rents, earmarked specifically for the restoration of historic buildings, the maintenance of public spaces, and the funding of cultural activities. Between 2000 and 2022, the fund has invested a cumulative total of approximately € 12 million, effectively ensuring the sustained financial requirements for the catalytic process. Concurrently, the government offers tax relief and low-interest loans to private owners participating in restoration projects, incentivising a multi-stakeholder approach to the joint preservation of historical heritage.

2.6 Summary

This chapter focuses on the coupling relationship between Non-motorized Corridors and catalyst theory, constructing a systematic analytical framework for the application of catalyst theory in village Non-motorized Corridors renewal from three dimensions: theoretical research, mechanism of action, and case studies.

In terms of Non-motorized Corridors theory, the chapter systematically reviews the evolution of the field from a “ traffic-efficiency-centered ” paradigm to a “public-life-oriented” approach, and deeply analyzes the core constituent elements in the three dimensions of spatial morphology, functional positioning, and spatial quality. On this basis, and taking into account the common characteristics of village spaces, an analytical framework applicable to village Non-motorized Corridors is established from the three dimensions of spatial connectivity, functional complexity, and cultural legibility, thereby laying a theoretical foundation for the application of catalyst theory.

In terms of catalyst theory research, the chapter systematically analyzes the core concepts, typologies, operational characteristics, and mechanisms of action of catalyst theory, providing theoretical guidance for its application to village Non-motorized Corridors.

At the level of theoretical integration, the chapter focuses on the coupling relationship between Non-motorized Corridors and catalyst theory. Positioning the Non-motorized Corridors as the core carrier of the linear catalyst, it not only assumes the function of traffic connection but also serves as the key medium for triggering chain reactions along the corridor. By aligning the spatial connectivity demand of the Non-motorized Corridors with the systemic hierarchy of catalyst theory, the functional complexity demand with the local gradualism of catalyst theory, and the cultural legibility demand with the contextual continuity of catalyst theory, the necessity and adaptability of applying catalyst theory to the renewal of village Non-motorized Corridors are systematically demonstrated. Furthermore, the three dimensions are further translated into evaluation indicators from a catalyst perspective, constructing an assessment tool for the catalyst potential of village Non-motorized Corridors.

At the level of case validation, two typical cases—Shawan Ancient Town and Orta San

Giulio—are selected and systematically analyzed from four dimensions: selection principles of the original catalyst, identification and determination of catalyst media, reshaping and activation, and guidance and control. Practice shows that using the Non-motorized Corridors as the core catalyst can effectively link scattered cultural tourism resources and form a networked spatial pattern of “linking points with lines, and driving areas with points,” thus validating the applicability and effectiveness of catalyst theory in the spatial renewal of traditional villages.

In summary, this chapter systematically constructs the coupling relationship between Non-motorized Corridors theory and catalyst theory, providing a direct theoretical basis and empirical reference for the design of Non-motorized Corridors using catalyst theory in Guangzhou villages.

Chapter 3 Applications of the Catalyst Theory in Non-motorized Corridors in Guangzhou's Villages

As a key methodological transition from theoretical construction to applied strategies, this chapter primarily integrates the universal theoretical framework established in Chapter 2 with the specific geographical characteristics of Guangzhou's villages. Chapter 2 constructed a basic analytical framework based on three dimensions—spatial connectivity, functional complexity and cultural legibility—and validated the effectiveness of coupling the catalyst theory with Non-motorized Corridors. Building upon this foundation, this chapter integrates the common spatial characteristics of Guangzhou's villages—centred on comb-like layouts, clan culture and watertown features—with the pressing issues of widespread spatial fragmentation, functional isolation and cultural stagnation. It thereby transforms the universal theoretical framework into region-specific operational strategies and implementation pathways.

3.1 Principles for Selecting Original Catalysts in Guangzhou Villages

Guangzhou villages are characterised by typical Lingnan watertown features, with a distinctive clan culture and a comb-like layout. The selection of initial catalysts should be based on targeted considerations of the villages' specific issues. Drawing on the common characteristics of Guangzhou villages, this section systematically elaborates on the principles for selecting initial catalysts from three dimensions: spatial, functional and cultural.

3.1.1 Spatial dimension

Village settlements in Guangzhou are generally characterised by spatial fragmentation, a lack of connectivity and a sense of place. To address these issues, the principles for selecting spatial catalysts focus on identifying spatial elements with structural value and site-specific potential, thereby reshaping the spatial framework of the villages.

(1) The principle of structure

The spatial layout of traditional villages in Guangzhou generally follows the typical 'comb-like' pattern characteristic of the Lingnan region, with a clear distinction between

primary and secondary elements and a well-organised, orderly structure. When selecting catalysts, priority should be given to identifying the elements that serve as the backbone of the village' s spatial structure. These primarily include the main streets and alleys that link the various functional zones, the forecourts of ancestral halls that govern spatial order, and the village entrance areas that connect the interior and exterior of the village.

(2) The principle of continuity

In Guangzhou' s villages, problems such as haphazard parking of motor vehicles, unauthorised structures encroaching on public thoroughfares, and the accumulation of clutter are widespread. These issues result in detours, fragmented nodes and inconsistent quality of public spaces, severely affecting the connectivity of daily travel for villagers and visitors, as well as the quality of pedestrian and cycle routes. When selecting catalysts, priority should be given to identifying elements that can repair spatial fragmentation, such as key path nodes that clear bottlenecks, transitional spaces connecting different functional zones, and boundary spaces that bridge the old and new urban fabric. Through spatial interventions, continuity and the pedestrian experience can be enhanced.

(3) The principle of territoriality

Guangzhou' s villages are characterised by a distinctive clan culture and historical environment. When selecting catalysts, priority should be given to identifying places that embody the collective memories and emotional ties of the villagers. These primarily include resting areas beneath ancient trees, gathering spaces beside old wells, and ceremonial areas in front of ancestral halls. Currently, these spaces generally suffer from poor quality and a significant disparity in the extent to which people congregate there. Through low-intervention, micro-renewal approaches, we aim to revitalise places that foster a sense of cohesion and belonging.

3.1.2 Functional dimension

Villages in Guangzhou generally suffer from a lack of diversity in infrastructure and limited service coverage, making it difficult to meet basic daily needs within the local

community. By identifying key spatial elements with the potential for mixed-use development that meet practical needs, we aim to revitalise existing village spaces.

(1) The principle of comprehensiveness

Villages in Guangzhou generally suffer from a lack of diversity in infrastructure and limited service coverage, making it difficult to meet basic daily needs within the local community. By identifying key spatial elements with the potential for mixed-use development that meet practical needs, existing village spaces can be revitalised.

(2) The principle of demand-driven approach

The primary users of space in Guangzhou's villages are villagers and tourists. The current situation in these villages is characterised by a limited variety of infrastructure and a relative lack of tourism-related support facilities. When selecting catalysts, priority should be given to spatial elements that serve both villagers and tourists, such as the village entrance area, main streets and the square in front of the clan hall; these spaces lie at the intersection of villagers' daily activities and tourists' itineraries. Based on field research, the actual needs of users should be identified, such as basic amenities including fitness equipment and children's play areas; public facilities such as rest areas and toilets; and cultural infrastructure such as cultural exhibitions. Through renovation, the aim is to enhance the quality of life for villagers and improve the visitor experience.

3.1.3 Cultural dimension

With changes in social structure, traditional villages have gradually shifted from a clan-based culture centred on kinship ties to a neighbourhood culture bound by geographical and occupational ties. Villagers are gradually moving away from their original traditional living spheres centred on historic and cultural buildings, and are congregating in living spheres that meet the demands of modern daily life. This has led to widespread issues in villages, such as cultural stagnation and the fragmentation of cultural continuity. By identifying spatial elements with cultural value and potential for transmission, we aim to achieve the continuation of cultural heritage and its living transmission.

(1) The principle of authenticity

The diminishing traditional functions of historic and cultural buildings have led to widespread disuse and neglect, with a lack of effective utilisation and revitalisation; consequently, both the quality and utilisation rates of historic buildings are in decline. When selecting catalysts, priority should be given to identifying cultural elements that possess authentic historical information, such as historical buildings like clan halls and academies, traditional-style dwellings, as well as historical environmental elements such as ancient trees, wells, bridges and gate towers. These elements bear the historical memory and cultural DNA of the village, and their authenticity forms the foundation for maintaining the spirit of place and continuing the cultural lineage.

(2) The principle of dynamism

Intangible cultural heritage forms an integral part of Guangzhou' s village cultural system. When selecting catalysts, priority should be given to identifying elements of intangible cultural heritage with the potential for living transmission, such as traditional crafts, folk activities and festive customs. Through the spatial integration of cultural events, the regular display and experience of intangible cultural heritage can be achieved.

Table3-1 Principles for Selecting Original Catalysts in Guangzhou Villages

Source: Author' s own diagram

Dimen sions	Selection Principles	Problem-orie nted	Spatial Elements	Selection Focus
Spatial Level	Structural Principles	Spatial Fragmentation	The backbone of the village' s spatial structure	Main streets and alleys, the forecourt of the clan hall, and the village entrance area
	Principle of Continuity	Disruptions in connectivity	Elements for repairing spatial discontinuities	Resolve key bottlenecks, transitional spaces linking different functional zones, and boundary spaces that bridge the texture of old and new

Table3-1 Principles for Selecting Original Catalysts in Guangzhou Villages(continued)

Source: Author' s own diagram

Dimen sions	Selection Principles	Problem-orie nted	Spatial Elements	Selection Focus
Spatial Level	Principle of Place	Lack of a sense of place	Elements that embody the collective memory and emotional attachment of the villagers	Spaces that embody collective memory, such as resting areas beneath ancient trees, gathering spaces beside old wells, and ceremonial areas in front of ancestral halls
			Elements with ample space, high accessibility and frequent use	Large squares, strategically located vacant buildings, and busy street junctions
Functiona l Level	Demand-Or iented Principle	Limited infrastructure types and a lack of tourism support services	Spatial elements serving both villagers and tourists	Intersection points for villagers ' and tourists ' activities, such as village entrance areas, main streets and the square in front of the clan hall

Table3-1 Principles for Selecting Original Catalysts in Guangzhou Villages(continued)

Source: Author' s own diagram

Dimensio ns	Selection Principles	Problem-o riented	Spatial Elements	Selection Focus
Cultural Level	Principle of Authenticity	Cultural obscurity, dereliction of historic buildings	Cultural elements bearing authentic historical information	Historic buildings and elements of the historic environment such as ancient trees, wells, bridges and gate towers
	Principle of Living Heritage	Disruption of cultural continuity; disconnection between intangible cultural heritage and public spaces	Intangible cultural elements with potential for living transmission	Intangible cultural elements with potential for living transmission, such as traditional crafts, folk activities and festive customs

3.2 Extraction and Identification of the Original Catalyst in Guangzhou Villages

3.2.1 Basic Types of Original Catalysts

As typical representatives of the Lingnan water towns, the public space types of Guangzhou villages have been systematically studied. Wang Ling et al. categorized the public spaces of Lingnan water villages into four types: village entrance spaces, squares in front of ancestral halls and temples, main streets and lanes, and waterfront spaces along water bodies and facilities^[37]. Zhang Jian, taking Daling Village as a case study, further refined them into four categories: street and lane spaces; public architectural spaces such as ancestral halls, temples, Feng Shui pagodas, and archways; water system forms including water outlets, Jade Belt River, and wells; and nodal spaces such as bridgeheads, under-tree areas, and well platforms^[34]. Mei Ceying, from the perspective of functional attributes, divided traditional settlement public spaces in the Pearl River Delta into three types: political, productive, and domestic^[35]. Liu Qihua, using Xiaozhou Village as a research entry point, classified public spaces based on their morphological characteristics into three types: point spaces formed by wharves, bridges, and ancient trees; linear spaces formed by river channels, streets, and lanes; and planar spaces represented by squares^[36].

Synthesizing the above research findings and incorporating the point-linear-planar-intangible classification framework constructed by catalyst theory, this study summarizes the types of original catalysts in Guangzhou villages as shown in Table 3-2.

Table3-2 Types of Original Catalysts in Guangzhou Villages

Source: Author' s own compilation

Type	Category	Content
Point Catalyst	Public Buildings	Ancestral halls, academies, temples
	Historical Environmental Elements	Ancient trees, ancient wells, ancient bridges, gateways, wharves
	Basic Service Facility	Rest seats, cultural information boards, guide signs, bicycle stations, public restrooms, fitness equipment, chess and card tables, etc.
	Linear Green Spaces	Village-side woodlands, dike-pond ridges
Linear Catalyst	Lanes and alleys	Main streets and alleys in comb-shaped layout
Planar Catalyst	Water-based spaces	Rivers, ponds, canals
	Composite Square Spaces	Ancestral hall front squares, village entrance squares, water mouth spaces
	Traditional Folk Activities	Dragon boat races, Beidi Festival, Shawan Piaose, Guangdong Lion Dance
Intangible Catalyst	Traditional Crafts	Guangdong embroidery, lime sculpture, Shawan buffalo milk product making
	Festival Activities	Master's Day (Lu Ban folk belief), Fish Lantern Parade

(1) Point original catalyst

Point catalysts, serving as key anchors within the public space system of Guangzhou' s villages, primarily comprise three categories: buildings, elements of the historical environment, and public facilities. These catalysts possess unique spatial forms and functional attributes, and are capable of revitalising the public spaces of the villages.

1) Building

Based on the valuation system for historical and cultural buildings, the various structures within the village are categorised into four main types. Specifically, these include: cultural

heritage sites of significant historical and artistic value; historical buildings, primarily comprising ancestral halls and academies; traditional architectural features, predominantly consisting of traditional dwellings; and other relevant structures not falling into the preceding categories.

Historic buildings and protected cultural relics possess significant historical and artistic value, with ancestral halls forming the core. As spatial vessels of clan culture, ancestral halls serve not only as venues for village rituals and gatherings, but also as spiritual centres for maintaining social order, strengthening kinship bonds, and passing down traditional culture. They occupy a central position within traditional villages, exerting a powerful catalytic influence on the surrounding areas. Furthermore, influenced by the value of ‘prioritising culture and promoting education’, cultural and educational institutions such as academies and private schools are often established within or adjacent to clan halls, forming cultural architectural complexes with the potential for functional synergy.

Traditional architectural features are primarily characterised by residential buildings that embody local distinctiveness and living culture. In the case of traditional dwellings in the Lingnan region, these are distinguished by decorative arts such as the ‘wok-ear’ gable and the ‘Three Carvings and Three Sculptures’, as well as building materials such as oyster shell walls, reflecting the region’s distinctive local culture. These dwellings form a vital component of the traditional streetscape, concentrated along the main thoroughfares and offering excellent visibility and accessibility.

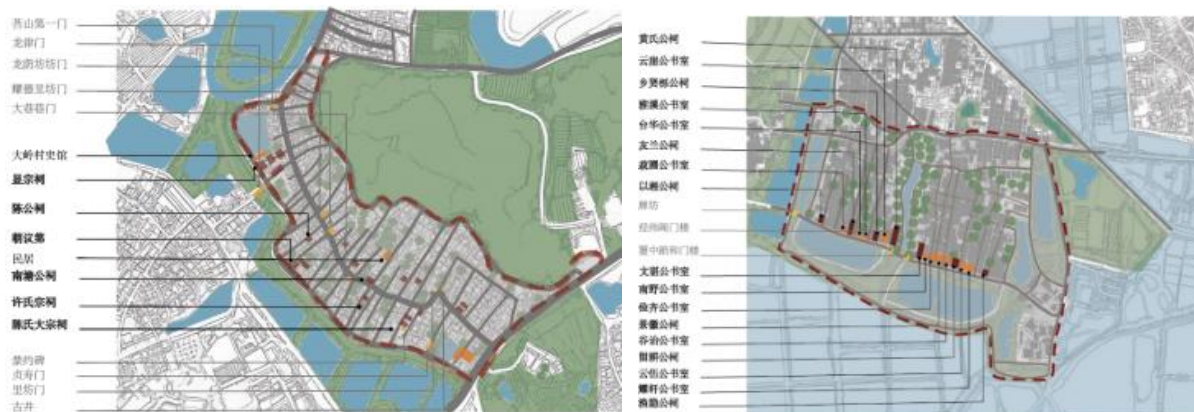


Figure3-1 The distribution of buildings in the traditional villages of Daling and Langtou, Guangzhou

Source: Author’s own illustration

2) Historical Environmental Elements

Guangzhou's villages are quintessential examples of Lingnan water villages, where water serves as the lifeblood of the landscape. These villages blend organically with nature, evolving in harmony with their surroundings, and have ingeniously shaped a series of distinctive cultural landscapes — such as waterways, wharves and small bridges — which together form the uniquely charming character of Lingnan water villages. Historical environmental elements serve as vital vessels for the transmission of Guangzhou's village heritage, embodying a strong sense of place and collective memory.

Ancient trees, serving as key landmarks at village entrances or in public spaces, bear the collective memories of the villagers and possess an irreplaceable sense of place. The spaces beneath these trees primarily serve as venues for daily rest and social conversation, acting as the village's principal areas for leisure and interaction.

Ancient bridges are a direct embodiment of the village's watertown imagery. Often situated at the junctions of waterways and alleyways, they serve as connecting nodes between linear and point catalysts.

Gatehouses and archways, acting as the 'gateways' to traditional spatial sequences, are located at village entrances or key junctions along alleyways. With their prominent geographical positioning and high visibility, they fulfil dual functions of spatial demarcation and cultural identification, serving as exemplary elements in enhancing the village's image.

3) Basic service facility

Basic service facilities are a key category of point catalysts that cater to the daily needs of villagers and the sightseeing requirements of visitors. They are primarily divided into daily living service facilities and public service facilities.

Basic daily living service facilities are primarily designed for villagers, serving as venues for daily activities such as resting, socialising and playing cards. They are typically located in areas with high footfall and offer good accessibility and visibility.

Public service facilities are primarily designed for the general public and include infrastructure such as cultural exhibition spaces, public toilets, waste recycling points and car

parks. They are usually situated near key transport hubs and serve as vital platforms for the development of village tourism.

(2) Linear original catalyst

Linear catalysts, serving as the core framework of the public space system in Guangzhou's traditional villages, are key elements in preserving the historical fabric and enhancing the quality of the environment. These linear catalysts primarily comprise three basic types: streets and alleys, waterways, and linear green spaces. These linear spaces not only serve to link different functional zones within the villages and organise the flow of residents' daily activities, but also showcase the unique geographical features and landscape characteristics of the Lingnan water towns.

1) Lanes and alleys

Based on the typical comb-like spatial layout of Guangzhou's villages, the street and alley structure of these settlements can be divided into main streets, alleys and lanes. This paper classifies them into five types according to their functional characteristics, namely historical and cultural streets, cultural and creative streets, basic living streets, public service streets and transport streets.

Historical and cultural alleys, along with cultural and creative alleys, serve as the main thoroughfares within the transport system of traditional villages, playing a vital role in connecting different areas and functional zones within the village. These alley spaces primarily serve social and public activities, acting as key venues for the daily lives and social interactions of villagers and visitors.

Basic living alleys and public service alleys constitute the secondary roads within the transport system of traditional villages, serving as important hubs linking main streets with inner alley spaces. These alleyways primarily serve as venues for the daily leisure and social activities of villagers and visitors, possessing a strong sense of community life; their vitality can be restored through facade improvements and the installation of facilities.

Transport-oriented alleyways, consisting mainly of narrow lanes, serve as passageways

connecting individual households. Functionally, they are primarily designed for rapid pedestrian transit and are characterised by their inward-facing nature and privacy.

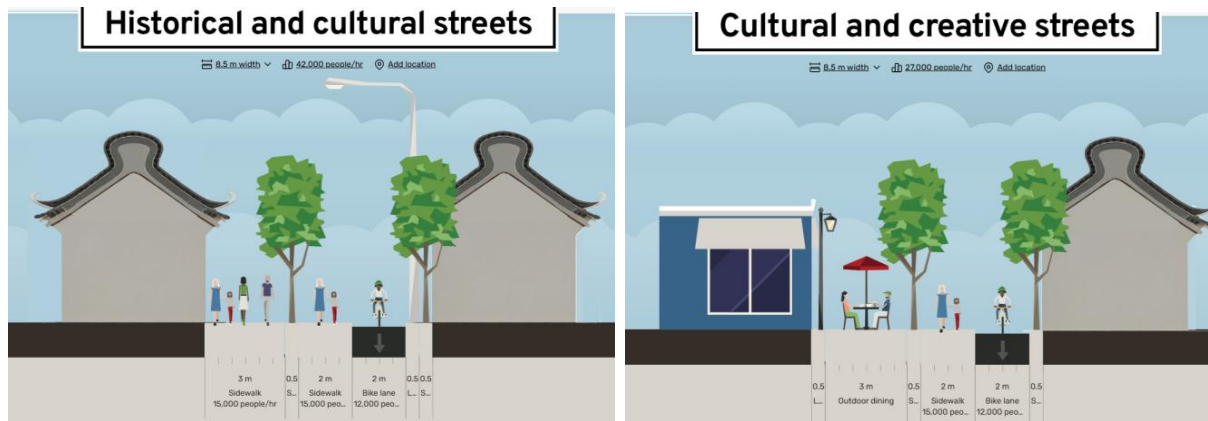


Figure3- 2 Historic and cultural lanes and cultural-creative lanes

Source: Author's own illustration



Figure3-3 Residential alleys and public service alleys

Source: Author's own illustration

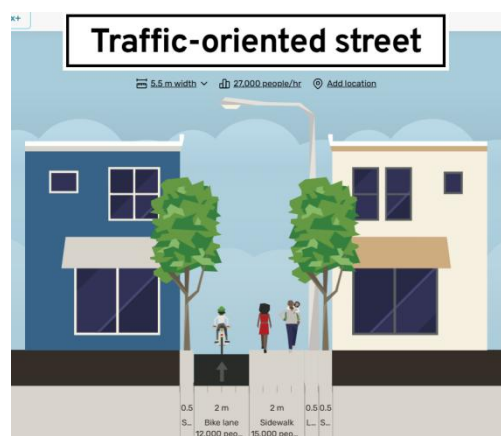


Figure3-4 Traffic-oriented lane

Source: Author's own illustration

2) Water-based spaces

Water-based spaces are primarily composed of two core elements: water bodies and land.

Based on their form and function, they can be divided into natural watercourses and living watercourses.

Natural watercourses are situated on the outskirts of villages, forming the ecological boundary and landscape foundation of the village, and possess ecological value. With unobstructed views along both banks, they establish spatial connections with key points such as village entrances and ancient bridges, and are an important component of the village' s external image.

Lifestyle waterways are the streets and alleys built along watercourses within the village. Primarily situated along the banks of internal waterways and around ponds, they present a rich tapestry of landscape layers and cultural atmosphere, serving as the core vehicle for the village' s watertown character.

Functionally, these serve primarily as mixed-use open spaces that combine transport and recreational functions. Distributed along natural watercourses, they form a continuous linear structure. Through environmental enhancement, a continuous waterside experience for pedestrians and cyclists can be created.

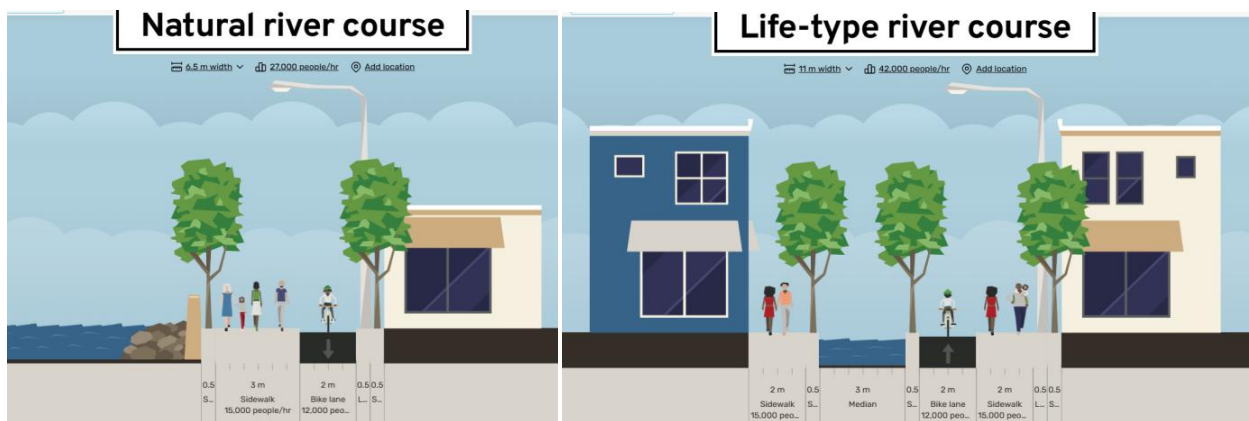


Figure3-5 Natural watercourses and living watercourses

Source: Author' s own illustration

3) Linear green space

Green belts are linear spaces that seamlessly integrate villages with the surrounding natural environment, such as mountains and vegetation. Functionally, they serve a lifestyle purpose, acting as a transitional space between the village and the natural environment. By incorporating landscape features, they can create a continuous ecological experience route.



Figure 3-6 Linear green space

Source: Author's own illustration

(3) Planar original catalyst

Planar catalysts serve as the core venues for the gathering and dispersal of people and for activities within the public space system of Guangzhou's villages, comprising primarily two categories: traditional activity-oriented squares and lifestyle-oriented leisure squares.

Traditional activity-oriented squares are mainly found near historical buildings such as clan halls and ancient temples. Functionally, as the antechamber to the spiritual centre of the village, they serve as vital venues for folk activities, characterised by a strong sense of ritual and public spirit.

Lifestyle and leisure squares are primarily situated at the village entrance. With their prominent location and high visibility, they serve as the primary gateway showcasing the village's character. Functionally, they act as the core transport hub connecting the village with the outside world, primarily facilitating daily activities for villagers and the movement of visitors, and are well-suited for multifunctional use.

(4) Intangible catalysts

Intangible catalysts, which primarily encompass traditional folk culture, festive events, traditional crafts and local specialties, embody the villagers' deep-rooted cultural memories of the region. In terms of their function, they possess significant cultural value and foster a high degree of interactive engagement.

The four types of catalysts described above are not isolated but form an interconnected

and synergistic organic whole. Point catalysts serve as functional anchors, providing nodal support for linear catalysts. Linear catalysts act as spatial frameworks, linking point and planar catalysts while offering narrative pathways for intangible catalysts. Planar catalysts function as activity cores, amplifying the agglomeration effects of point catalysts and providing venues for the performance of intangible cultural heritage. Intangible catalysts, in turn, endow material catalysts with cultural connotations, becoming the value core of spatial vitality.

Table3-3 The four categories of primary catalysts and their synergistic relationships

Source: Author's own illustration

Catalyst type	Primary medium	Role	Relationship with other catalysts
Point catalyst	1) Buildings	Functional anchors	Support for nodes in linear catalysts Functional supplementation for surface catalysts
	2) Historical environmental elements		
	3) Public infrastructure facilities		
Linear catalyst	1) Streets and alleys	Spatial framework	A Comparison of Point-Type and Surface-Type Catalysts The Spatial Narrative of Intangible Catalysts
	2) Waterways		
	3) Linear green spaces		
Planar catalyst	1) Traditional activity-oriented squares	Core of the event	The Amplification and Aggregation of Discrete Catalysts Exhibition Spaces for Intangible Cultural Catalysts
	2) Lifestyle and leisure squares		
Intangible catalyst	Folk culture, festivals and celebrations, traditional crafts	Core Values	The cultural significance of physical catalysts such as point, line and surface catalysts

3.2.2 Selection of Original Catalysts

Based on the four types of catalysts summarized in Table 3-2, this study selects original catalysts from three dimensions: historical and cultural value, spatial potential and practical needs, and public property rights, to ensure the comprehensiveness and feasibility of catalyst selection.

(1) Dimension of Historical and Cultural Value

Priority is given to elements with high historical, artistic, or cultural value. Specifically, these include cultural heritage protection units, historic buildings, traditional vernacular buildings, and historical environmental elements closely associated with cultural nodes. Regardless of their current state of preservation, any element that carries historical information significant to the village's cultural context should be considered a potential core catalyst.

(2) Dimension of Spatial Potential and Practical Needs

Spaces that are currently in a negative state but possess potential for transformation are selected. These mainly include abandoned or dilapidated houses, low-quality buildings encroaching on roads, abandoned courtyards, idle homesteads, and neglected marginal spaces. Taking into account the actual needs of villagers and tourists, the feasibility and functional programming of transforming such spaces into catalyst nodes are evaluated. For example, idle open spaces at busy road intersections or along main streets may be prioritized for the installation of basic service facilities to meet daily activity needs.

(3) Dimension of Public Property Rights

Preference is given to village collectively owned buildings, public facility land, and publicly owned idle land. Such catalysts offer significant advantages in terms of renovation decision-making, funding, and implementation timelines, reducing coordination costs and facilitating the rapid launch of demonstration projects. For historic buildings under private ownership, policy guidance and financial subsidies are used to encourage owner participation, but public property catalysts remain the primary focus in the initial stage.

Through the comprehensive selection based on the three dimensions of historical and cultural value, spatial potential and practical needs, and public property rights, potential objects of the four types of original catalysts — point, linear, planar, and intangible — are systematically identified. This results in an initial list of original catalysts, providing an operational basis for subsequent screening and design practice that accommodates differentiated needs.

3.2.3 Screening Principles for Original Catalysts

Based on the preliminary selection of original catalysts, five screening principles are applied to determine their priorities. These are the principles of holism, locality, hierarchy, diversity, and linkage. The five principles work together to form a systematic screening framework, ensuring the orderly development of catalyst selection and the maximization of overall benefits. The principle of holistic approach starts from the overall development positioning of the village, comprehensively considering the interrelationships and synergies between various catalytic elements to avoid isolated selection. It coordinates the entire catalyst system to ensure the spatial and functional synergy of all catalyst elements, thereby preventing fragmented regeneration.

(1) Principle of Holism

Proceed from the overall development positioning of the village, comprehensively considering the interrelationships and synergies among various catalyst elements to avoid isolated selection. Coordinate the entire catalyst system to ensure spatial and functional synergy among all catalyst elements, preventing fragmented renewal.

(2) Principle of Locality

Focus on the village's existing spatial resources when selecting original catalysts. Prioritize the use of idle buildings and abandoned marginal spaces to improve spatial utilization efficiency. Through low-cost, rapidly implementable demonstration projects, enhance villagers' sense of identification with and participation in the village renewal project.

(3) Principle of Hierarchy

Comprehensively consider the historical and cultural value, spatial radiation range, and implementation feasibility of catalyst elements. Elements that have a significant driving effect on the surrounding environment and a wide coverage range should be designated as core catalysts. Use core catalysts to integrate village space, activate local spatial vitality, and form a gradual renewal process moving from point to area.

(4) Principle of Diversity

Take into account point, linear, planar, and intangible catalysts in a balanced manner to meet the actual needs of different user groups. Through the synergistic effect of multiple types of catalysts, build a functionally complementary, complex, and diverse spatial system.

(5) Principle of Linkage

Construct a networked system to promote linkage effects among various catalyst elements, achieving an overall effect of “ $1+1>2$.” Through mutual support and synergy among catalyst elements, facilitate the transformation of village public spaces from isolated points to networked coordination.

In specific practice, a combined method system of qualitative analysis and quantitative evaluation can be adopted. Through field research and literature study, clarify the current spatial problems and actual usage needs of the village, and preliminarily determine the screening scope of original catalysts. Use the Analytic Hierarchy Process (AHP) to establish an evaluation index system and evaluate the preliminarily screened catalysts. Based on the evaluation results, determine the priority ranking of original catalysts and carry out gradual construction.

3.3 Reformation and Reactivation of the Original Catalyst in Guangzhou Villages

3.3.1 Point catalysts

(1) Buildings

Buildings, primarily comprising listed heritage sites, historic buildings, structures reflecting traditional architectural styles, and other relevant structures. Among these, clan halls, as spatial embodiments of clan culture, occupy a central position within traditional villages. Structures reflecting traditional architectural styles embody the overall character of the local area.

1) Spatial dimension

In terms of spatial renovation, differentiated spatial restoration strategies are adopted according to the different types of buildings. For heritage-protected structures and historic buildings such as clan halls and academies, an ‘restore-as-original’ authenticity-based restoration strategy is employed, preserving and repairing architectural facade elements of historical value, restoring traditional materials to their original appearance, and reinforcing the structure. For buildings with traditional architectural features, such as residential dwellings, maintenance and improvements are carried out in accordance with the principle of authenticity. By clearing unauthorised structures and clutter from the vicinity of buildings, and by repairing damaged walls, doors and windows, the traditional architectural character is restored. For severely damaged, disused and abandoned buildings, selective reconstruction in accordance with the historical layout and architectural style, or conversion into open spaces, may be undertaken. For buildings with sound structures but currently unused, strategies for adaptive reuse are adopted.

2) Functional dimension

In terms of functional positioning, revitalisation should be achieved through functional conversion, taking into account the characteristics of the building type and modern requirements. Clan halls can be converted into village history museums, cultural reception

halls, or specialised exhibition spaces for intangible cultural heritage, thereby continuing their core function of uniting the clan. Academy buildings can be converted into cultural and educational spaces. By incorporating functions such as intangible cultural heritage inheritance and experiential courses, as well as study-tour programmes, their historical emphasis on literature and education can be sustained. Traditional dwellings can be transformed into cultural and creative enterprises such as rural bookshops, study-tour experience centres, intangible cultural heritage craft workshops, and distinctive guesthouses. Other idle buildings can be converted into tourist service facilities such as visitor centres and public toilets.

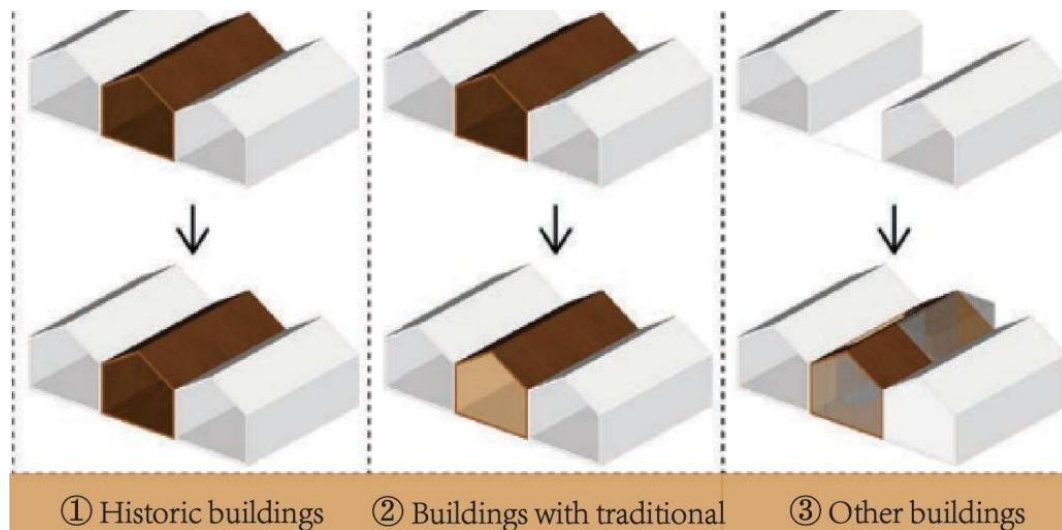


Figure3-7 Schematic diagram of the renovation of a historic building

Source: Literature^[53]

(2) Historical environmental elements

Historical environmental elements serve as vital vehicles for the preservation of Guangzhou's rural heritage, primarily comprising ancient trees, historic bridges, gatehouses and memorial arches, and ancient wells; these possess a strong sense of place and hold significant value in terms of collective memory.

1) Spatial dimension

In terms of spatial redesign, a strategy combining conservation and revitalisation has been adopted. Regarding the areas surrounding the ancient trees, debris and unauthorised structures have been cleared to create a public space centred on the trees, with tree pits and resting platforms installed around them to enhance the sense of place. For ancient bridges,

debris from the bridge structure and its surroundings is cleared, and the bridge deck and railings are repaired to restore the bridge's functionality and scenic value. Rest areas are established at both ends of the bridge to create an integrated 'bridge-water-bank' landscape node. For gate towers and archways, their role as spatial landmarks is restored, and cultural information boards are installed around the gate towers to narrate the history of the village and its spatial sequence. For example, in Langtou Village, Guangzhou, the environment surrounding the ancient banyan tree at the village entrance has been improved with the installation of tree pits and stone benches, transforming it into a central gathering point for villagers. In Daling Village, Guangzhou, ancient bridges such as Kuanglong Bridge and Jielong Bridge have been restored and their surrounding environments enhanced, restoring both the bridges' aesthetic appeal and their function as thoroughfares.

2) Functional dimension

In terms of functional design, historical environmental features are transformed into hubs for cultural display and public interaction. Cultural information boards are installed around elements such as ancient trees, historic bridges and gate towers, detailing their historical evolution and construction techniques, thereby transforming these features into cultural and educational focal points. In the areas surrounding the ancient trees, facilities such as benches and tables for board games are provided to meet the villagers' daily needs for rest, conversation and socialising. Around elements such as ancient bridges and pavilions, viewing platform signage and rest facilities will be installed to guide visitors in admiring the river, ancient bridges and the waterside scenery, thereby establishing these as key hubs for appreciating the village's waterside landscape.

(3) Basic service facilities

Basic service facilities, which are broadly divided into basic daily living facilities and public service facilities, play a vital role in meeting the daily needs of villagers and the requirements of visitors.

1) Spatial dimension

In terms of spatial redevelopment, a modular, phased approach to renewal can be adopted. For busy road junctions, vacant plots and corner sites along major roads, the installation of amenities such as fitness equipment, tables and chairs for board games, and clothes-drying facilities can revitalise these spaces in a modular and cost-effective manner. Furthermore, at the entrances to major attractions and key road junctions, movable and interchangeable modular facilities can be utilised to provide public services such as cultural display boards, wayfinding signage, bicycle stations and public toilets. These can be introduced in phases and dynamically adjusted based on user feedback, creating a progressive development pathway. For example, the ‘Parking Day’ project in Turin, Italy, temporarily repurposes on-street parking bays into micro-public spaces, transforming passive spaces into active ones. In this project, parklets are typically situated in the corners of on-street parking bays, formed by one or more parking spaces, and maintain continuity with the pavement. By using easily replicable and flexible installations and materials such as chairs and wooden planks, a portion of the carriageway is temporarily occupied to increase the space available for pedestrian activity.

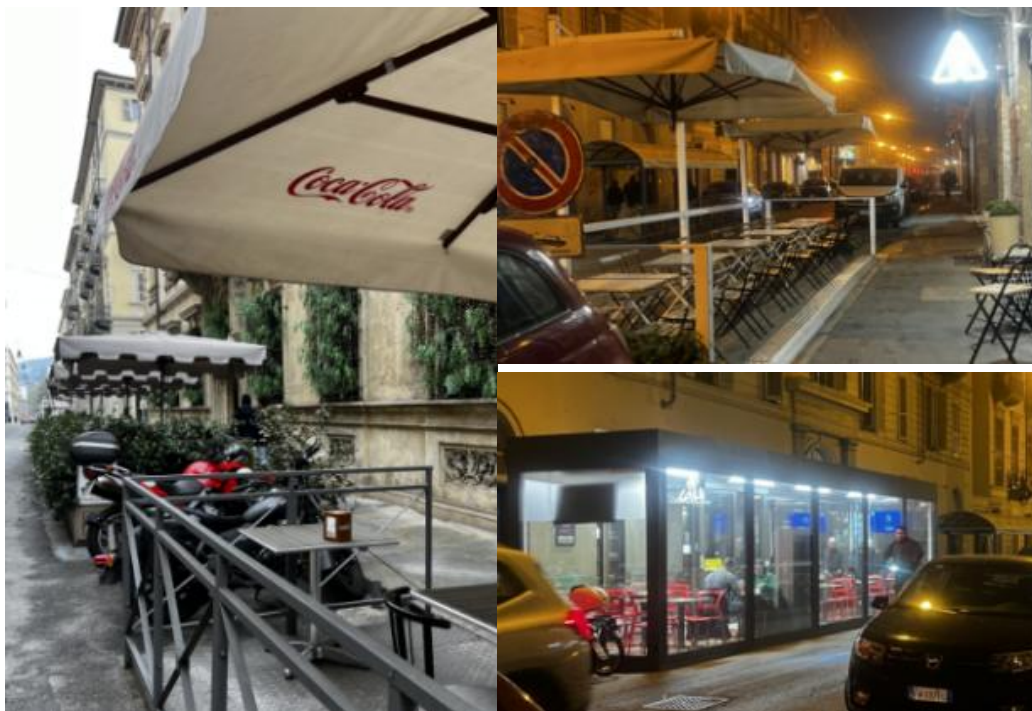


Figure3-8 Public spaces along the streets of Turin

Source: Photograph by the author

2) Functional dimension

In terms of functional design, provisions should be tailored to the diverse needs of different user groups. For instance, basic amenities such as fitness equipment, tables and chairs for board games, seating areas, and clothes-drying facilities should be provided to meet villagers' daily needs for relaxation, socialising and exercise. In areas surrounding nurseries and schools, outdoor play areas for children and waiting areas for parents should be established. At the same time, tourist service facilities such as cultural information boards, wayfinding signage, bicycle stations, seating areas, drinking fountains, charging points and public toilets should be provided near attractions to meet visitors' basic needs for information, rest and refreshments. Furthermore, for spaces with a public function, a multi-functional design should be adopted to accommodate the needs of both villagers and visitors, thereby maximising the efficiency of space utilisation.

3.3.2 Linear catalysts

Linear catalysts form the interconnected framework of a village's public space system, comprising three main types: streets and alleys, linear green spaces, and waterways. Based on the functional roles and spatial characteristics of each type, typical cross-sections for these linear catalysts have been defined to ensure the continuity and comfort of the pedestrian and cycle experience.

(1) Lanes and alleys

Lanes and alleys, as the core elements of the transport system and public life in traditional villages, can be categorised according to their functional types into historical and cultural lanes, cultural and creative lanes, basic living lanes, public service lanes and transport lanes.

1) Spatial dimension

Differentiated regeneration strategies should be adopted according to the different types of lanes. For lanes of historical and cultural significance, the core function is cultural display; a facade improvement strategy should be implemented, involving the removal of obstructions

and unauthorised structures encroaching on the pavement, the standardised refurbishment of building facades along the route, and the restoration of the village's overall traditional character. For lanes serving basic daily needs, the focus is on villagers' daily lives; by clearing unauthorised parking and the accumulation of clutter, the cleanliness and accessibility of the streets should be restored. Transport-oriented streets and alleys, predominantly consisting of narrow lanes, primarily serve the function of rapid transit, the focus should be on clearing obstructions to ensure smooth passage. To ensure the continuity of these streets and alleys, unauthorised structures should be demolished and wall barriers removed to restore physical connectivity. Rest areas should be established at street corners and key nodes where pedestrian traffic converges, creating a rhythmic variation in the spatial layout.

For example, in Milan's "CALMING STREETS" scheme, the planning scope is defined by 15-minute neighbourhood units. By extending and widening pedestrian and cycle routes, and improving existing infrastructure for non-motorized traffic transport, the scheme enhances connectivity and accessibility for pedestrians and cyclists.

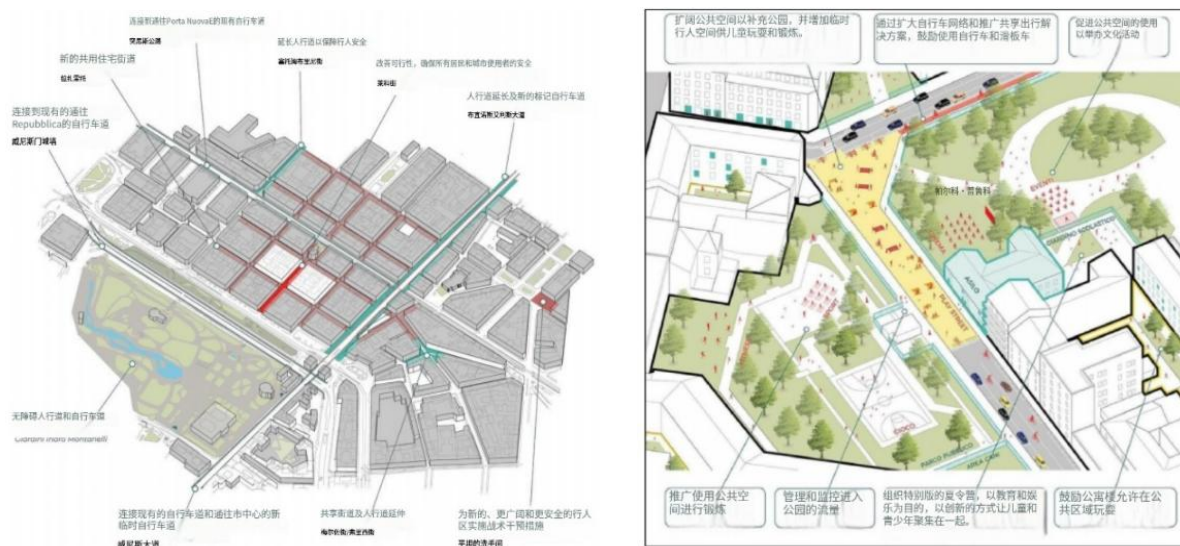


Figure3-9 The calming streets design for the Piazza Aperte project in Milan

Source: Literature^[54]

2) Functional dimension

In terms of functional design, different types of streets and alleys can utilise vacant spaces along their length to incorporate diverse, multi-functional elements. In streets and alleys with a historical and cultural focus, cultural information boards, displays of traditional crafts and spaces for experiencing intangible cultural heritage should be installed along the street to create a coherent cultural narrative. In streets and alleys designed for basic daily living, the installation of benches, fitness equipment and tables and chairs for board games along the street can transform them into neighbourhood living rooms, meeting villagers' daily social and leisure needs. Furthermore, tourist service facilities such as bicycle stations and public toilets should be provided to enable functional sharing between villagers and visitors. For cultural and creative streets, businesses such as cafés and cultural and creative retail outlets can be established to enhance the street's vibrancy. For instance, taking a 400×400 -metre 'super-block' as the planning scope, redundant street space can be transformed into small parks and public spaces, thereby increasing green space and enhancing the sustainability of the area. For instance, in Barcelona's 'Super-blocks' project, redundant street space was transformed into small parks and public spaces, increasing green areas and enhancing the sustainability of the space, thereby transforming the streets from mere corridors of traffic into places where people can relax and enjoy themselves.



Figure3-10 Super-blocks project in Bari

Source: Literature^[54]

(2) Water-based spaces

Water-based spaces are central to the character of Lingnan's water villages and can be categorised into two types based on their form and function: natural watercourses and functional watercourses. Drawing on the linear structure of the waterways, a continuous network of pedestrian and cycle paths has been created to link the various spatial nodes, forming a comprehensive waterfront route for visitors.

1) Natural-style watercourses

Natural-style watercourses serve a dual purpose, combining ecological conservation with landscape enhancement. In terms of spatial redesign, the focus should be on ecological restoration, protecting the natural vegetation and native landscapes along both banks to maintain ecological continuity. In terms of functional design, safety features such as guardrails and green buffer zones should be installed along the waterfront to ensure pedestrian safety. In the waterside areas, by skilfully integrating green landscaping, artistic installations and waterside platforms, we will create waterside spaces rich in layers and diverse in form, meeting the varied needs of villagers and visitors for leisure, sightseeing and recreation.。

2) Lifestyle waterways

Lifestyle waterways focus primarily on cultural display and the daily lives of local residents. Building on the regional advantage of Lingnan's water villages, where 'water is the lifeblood', the traditional transport functions of the waterways are restored. At key points such as ancient bridges, wharves and old trees, cultural information boards are installed to recount the stories of the water villages and the history of the waterways, thereby enhancing the cultural display functions of the riverbanks. Furthermore, facilities such as waterfront viewing platforms, seating areas and riverside cafés can be installed along the river to create a multi-functional waterfront leisure space that meets the recreational needs of both villagers and visitors. For example, in Bijiang Village, Shunde, Foshan, pedestrian bridges and wharves connect historic buildings along the riverbank—such as ancestral halls, traditional dwellings and gardens—to form the central axis of the village's spatial layout.



Figure3-11 Riverside Space in Bijiang Village, Shunde, Foshan

Source: Website

(3) Linear green spaces

Linear green spaces are linear areas that seamlessly integrate villages with natural elements such as surrounding hills and vegetation, serving as transitional spaces between the village and the natural environment.

In terms of spatial redesign, the pedestrian experience is enhanced by optimising walking routes and incorporating rest areas and public facilities along the way. Furthermore, the introduction of landscape nodes can create a continuous ecological experience route. For example, New York's High Line Park centres on the design of road cross-sections. By defining typical cross-sectional forms, the connections between pedestrian spaces, green spaces, rest areas and surrounding buildings are clarified, thereby ensuring the continuity and systematic nature of the space. Ultimately, the abandoned elevated railway was transformed into a linear park.



Figure3-12 Rendering of the High Line Park in New York

Source: Website

3.3.3 Planar catalysts

Planar catalysts serve as the central hubs for the movement and activities of people within the public space system of villages, and are primarily divided into two categories: traditional activity-oriented squares and lifestyle and leisure-oriented squares.

(1) Traditional activity-oriented squares

Traditional activity-oriented squares are primarily found in the vicinity of historical buildings such as clan halls and ancient temples; they serve as the forecourt to the spiritual centre of the village and possess a strong sense of ritual and public character.

In terms of spatial reorganisation, the function of motor vehicle parking currently occupying the square should be relocated to car parks planned on the periphery, thereby restoring the square' s public and open character. Traditional paving materials should be used for ground restoration to reinforce the square ' s sense of enclosure and ceremonial atmosphere.

In terms of functional design, traditional activity-oriented squares can be developed into core venues for cultural exhibitions and ceremonial events. By installing temporary stages or

performance areas, they can host festive ceremonies, cultural performances and similar activities. On weekdays, it can serve as a gathering space for villagers and visitors, equipped with seating and cultural information boards to meet daily needs for rest and information. For example, the ‘Play Streets’ project in Milan, Italy, utilises innovative artistic illustrations and temporary, low-cost materials such as movable tables and chairs to enhance the cultural significance of public spaces, thereby improving the spatial quality and appeal of the neighbourhood.



Figure3-13 The play streets design for the Piazza Aperte project in Milan

Source: Literature^[54]

(2) Lifestyle and leisure-oriented squares

Lifestyle and leisure squares are primarily located at the entrance to the village; they serve as the main gateway and showcase for the village’ s character, and play a central role in facilitating daily activities for villagers and acting as a hub for visitors.

In terms of spatial redesign, indigenous plants should be introduced, and facilities such as cultural feature walls, village entrance signage and landscape wayfinding should be installed to highlight the village’ s historical and cultural characteristics and shape its gateway image.

Functionally, the village entrance square should be developed into a multi-purpose public

space integrating visitor services, transport hubs and community interaction. By installing infrastructure such as bicycle parking facilities and non-motorized traffic rest stops, seamless integration between different modes of transport can be achieved. Furthermore, the area should be divided into distinct functional zones to meet the needs of users of all ages. For example, the ‘A Stare’ project in Bari, Italy, selected a neighbourhood adjacent to schools, parish centres and socio-cultural hubs. By expanding public spaces, it ensures recreational activities for vulnerable groups such as the elderly and people with disabilities, thereby achieving open and equitable use of the space.



Figure3-14 Open Space program in Bari

Source: Literature^[55]

3.3.4 Intangible catalysts

Intangible catalysts serve as the core vehicles for the cultural genes of traditional villages, primarily encompassing traditional folk culture, festive events, traditional crafts and distinctive local produce. Intangible culture is characterised by mobility and rhythmicity, and requires a physical space in which to be revitalised. Through renewal strategies involving the integration of events and the transmission of living traditions, the sustained release of cultural vitality is achieved. Addressing the widespread issues in Guangzhou' s traditional villages—where intangible culture is concentrated in isolated attractions, disconnected from the village’

s public spaces, and lacking in everyday experiences—this paper proposes strategies for the reshaping and revitalisation of intangible catalysts from both spatial and functional perspectives.

(1) Spatial dimension

1) The construction of cultural spaces

For ceremonial performances, select open-plan spaces with a ceremonial atmosphere, such as the square in front of a clan hall or the forecourt of an ancient temple, to serve as permanent venues for traditional folk activities. Flexible arrangements can be made by providing space for temporary stages and seating. For skills transmission, select intimate, point-like spaces such as traditional dwellings and academy buildings to facilitate regular public access. In terms of functionality, these can be converted into workshops for the transmission of intangible cultural heritage crafts and traditional culinary experiences, fulfilling composite functions including teaching, display and hands-on activities. For local produce exhibitions, select key locations such as village entrances, marketplaces and ecological farmlands to establish display and sales points for distinctive local products.

2) Organisation of narrative sequences

Using a cultural narrative sequence as a guide, visitors are led to gradually appreciate the rich layers and profound heritage of the village's culture as they explore. In terms of the narrative of daily life, the focus is on scenes from the villagers' everyday existence. By preserving and artfully presenting authentic fragments of life—such as clothes drying in the alleys, neighbours chatting under the trees, and figures washing clothes at the wharf—visitors are able to immerse themselves in the simple atmosphere and genuine warmth of rural life. The ceremonial narrative centres on clan culture and folk belief traditions. With the clan hall complex and ancient temples as key spatial nodes, it constructs a comprehensive sequence of ceremonial participation and experience, enabling visitors to understand the village's spiritual structure and cultural heritage. The productive narrative focuses on agricultural culture and traditional crafts. Through farmland landscapes and hands-on farming activities, it guides

visitors to immerse themselves in the natural scenery of the countryside.

(2) Functional dimension

1) Mechanisms for the living inheritance of traditions

Transform the static display of culture into an interactive cultural experience. With regard to the system of cultural transmission, appoint bearers of intangible cultural heritage and organise regular demonstrations and hands-on workshops of traditional crafts. In terms of villager participation, utilise training and incentive schemes to empower villagers to become active agents in the dissemination of culture. Regarding educational field trips, collaborate with local schools and educational institutions to incorporate intangible cultural heritage experiences and agricultural practices into the curriculum, thereby achieving a deep integration of cultural transmission and educational objectives.

2) Flexible event system

Establish a layered event system to enable the functional transformation of the same space at different times. During weekdays, maintain basic cultural services. Use cultural anchor spaces as venues for villagers' daily interactions, prioritising services for local residents to preserve the everyday character of the space. At weekends, activate periodic cultural events. Attract visitors from the surrounding area by organising ceremonial performances and craft workshops. During festival periods, create annual cultural highlights. Building on traditional festivals, organise large-scale folk parades, ritual ceremonies, themed markets and other annual events. Through these festive events, strengthen the village's cultural distinctiveness and brand influence. For example, in the design of the Fangzhuang Rural Cultural and Creative Market, demountable shipping containers and temporary stalls are used to provide visitors with a venue for shopping and cultural exchange, establishing it as the village's trendy cultural and creative market.

3) Cultivating Cultural Continuity

The living transmission of village culture is the objective of activating intangible catalysts. In terms of functional design, by creating interactive value-co-creation activities

between villagers and visitors, villagers are transformed from passive subjects of display into cultural narrators. Whilst visitors immerse themselves in the local culture, this simultaneously enhances the villagers' sense of cultural pride, thereby creating a virtuous cycle of cultural continuity.

3.4 Guidance and Control of Catalytic Reactions in Guangzhou Villages

Catalytic reactions are characterised by uncertainty and diffusiveness in their practical implementation. Without effective guidance and control mechanisms, the catalytic effect may deviate from its intended objectives, potentially leading to issues such as spatial imbalance, cultural alienation or excessive commercialisation. Consequently, building upon the selection, screening and revitalisation of catalysts, this chapter further constructs a guidance and control system for catalytic reactions from three dimensions: multi-stakeholder participation, incremental renewal and management system, to ensure that the catalytic effect is continuously released within a controllable range.

3.4.1 Multi-stakeholder participation: Building a governance framework based on joint construction, co-governance and shared benefits

(1) Government guidance

The town government and village committees assume the core functions of providing policy support and coordinating resources. The town government should formulate relevant policies for the construction and operation of Non-motorized Corridors, coordinate with district-level departments such as planning, culture and tourism, and transport to secure their support, and provide institutional safeguards for catalytic initiatives. At the same time, the government should establish a dedicated incentive fund to provide subsidies or rewards for initiatives such as villagers' voluntary renovations and the introduction of new business formats, thereby stimulating their intrinsic motivation. Village committees, for their part, must organise villagers to participate fully in the construction of the corridors, collect and relay villagers' feedback, and coordinate the resolution of conflicts and disputes arising during the construction process.

(2) At the village resident level

As the direct users of the pedestrian and cycle corridor, villagers are also the key driving force behind the catalytic effect. A “village council” mechanism should be established to regularly organise village representatives to discuss and vote on matters such as corridor construction plans, the functional design of key nodes, and the types of businesses to be introduced. For specific renovation projects, villagers may participate in processes such as comparing design proposals, supervising construction, and providing feedback on operations. Furthermore, villagers should be encouraged to utilise their own homes to engage in activities such as running guesthouses, selling agricultural produce, and displaying handicrafts, thereby enhancing their sense of participation and a greater sense of benefit.

(3) Corporate support level

A professional operations team and private sector investors will participate in the construction and operation of the promenade. The scenic area's operating entity may participate in the development of eco-tourism projects, whilst the scenic area may collaborate with village collectives to extend certain intangible cultural heritage performances and cultural exhibitions into the public spaces of the villages, thereby achieving shared visitor flows and functional complementarity between the scenic area and the villages. Local businesses are also encouraged to introduce businesses such as cafés, casual dining outlets and cultural and creative retail shops along the promenade to enrich its service offerings.

3.4.2 Gradual updates: phased implementation and dynamic adjustments

(1) Phase One: Development of a pilot section and activation of the core catalyst

The first phase focuses on the most representative and relatively easy-to-implement core catalyst nodes to create a demonstration effect. Nodes that are easy to implement quickly—such as vacant lots, areas around ancient pavilions, and the forecourts of clan halls—will be selected. Through modular renovations, facilities such as cultural displays, seating areas and fitness equipment will be incorporated to restore public interaction functions and enhance the quality of the traditional street and alleyway environments. Through the development of these

core catalyst demonstration sites, villagers and visitors will be able to directly experience the improved quality of the space, fostering a sense of identification with and willingness to participate in the corridor development. At the same time, the small-scale, low-cost and rapid implementation will validate the feasibility of strategies such as modular facilities and the integration of new functions.

(2) Phase Two: Full-line connectivity and functional enhancement

Building on the demonstration effect achieved in the first phase, we will press ahead with the full completion and functional enhancement of the corridor. We will remove key bottlenecks and construct new pedestrian routes to ensure direct connectivity between different sections. Specifically, this will involve improving safety facilities and rest areas along the waterfront, carrying out facade renovations and developing key public spaces in major streets and alleys, and undertaking multifunctional renovations of key catalytic areas. These measures will ensure the corridor offers comprehensive facilities for leisurely exploration and supporting services. We will dynamically adjust the functional configuration and layout of facilities by collecting operational data and feedback from local residents and visitors on a phased basis.

(3) Phase Three: Deepening of business formats and cultural operations

Building on the completion of the first two phases of construction, we will promote the diversification of business formats and cultural operations. We will encourage the introduction of cultural enterprises — such as rural bookshops and educational experience centres — into buildings with traditional architectural features, whilst supporting villagers in utilising vacant residential properties to develop commercial ventures such as guesthouses, farm-stay establishments and craft workshops. Establish a regular performance and exhibition mechanism for intangible cultural heritage, and bring in professional operational teams to oversee the corridor's daily maintenance, event planning, and vendor management. By establishing a sustainable operational mechanism, the slow-moving corridor will be transformed into a rural public space that integrates cultural experiences, ecological leisure

and community interaction. Through the evolution of business formats and innovative events, the vitality and appeal of the corridor will be enhanced.

3.4.3 Improving management systems: establishing a long-term operational framework and a dynamic evaluation mechanism

(1) Operations Management

Establish a management committee for the pedestrian and cycle corridor to oversee its day-to-day operations and supervision. Develop uniform entry criteria and management guidelines for commercial activities within the corridor to prevent excessive commercialisation from eroding the village's character and cultural atmosphere. Draw up a merchants' code of conduct and a code of conduct for villagers to clarify the rights and obligations regarding the use and maintenance of the corridor.

(2) Maintenance mechanism

Establish a collaborative maintenance system involving villagers and specialist teams. Villagers will take the lead in day-to-day maintenance, with incentives provided to encourage their participation in tasks such as clearing the corridor, maintaining greenery and inspecting facilities, thereby fostering a sense of responsibility and belonging among the villagers. Furthermore, taking advantage of the modular facilities' portability and replaceability, specialist maintenance work—such as resurfacing, replacing facilities and replanting—will be carried out on a regular basis.

(3) Evaluation Feedback

Establish a dynamically adjusted evaluation mechanism. Quantitatively assess the operational effectiveness of the corridor based on factors such as space utilisation, visitor satisfaction, local resident satisfaction, commercial vitality and cultural vibrancy, respond promptly to facility malfunctions and environmental issues, and regularly optimise functional configurations and event schedules. Through continuous evaluation and feedback, implement dynamic optimisations to the corridor to ensure that the catalytic effect consistently evolves in the intended direction.

3.5 Summary

Based on the theoretical framework established in Chapter 2 and targeting the common characteristics of Guangzhou villages, this chapter systematically constructs a complete technical pathway from identification, screening, to reshaping and activation, forming an application strategy framework for the renewal of Non-motorized Corridors in Guangzhou villages.

In terms of selection principles, these mainly include the spatial, functional, and cultural dimensions. The spatial dimension emphasizes the principles of structural integrity, continuity, and sense of place, focusing on spatial framework, connectivity, and genius loci. The functional dimension emphasizes functional complexity and demand orientation. The cultural dimension emphasizes the authentic protection of history and the living transmission of cultural genes. These three principles support each other, forming the theoretical basis for catalyst selection.

In terms of type classification, synthesizing various scholars' research findings on the public spaces of Guangzhou villages and incorporating the four-dimensional classification framework of catalyst theory—point, linear, planar, and intangible—this chapter summarizes the basic types of original catalysts in Guangzhou villages and elucidates the synergistic relationships among the four catalyst types. Specifically, point catalysts serve as functional anchors, providing nodal support for linear catalysts. Linear catalysts act as spatial frameworks, linking point and planar catalysts and offering narrative pathways for intangible catalysts. Planar catalysts function as activity cores, amplifying the agglomeration effects of point catalysts and providing venues for the performance of intangible cultural heritage. Intangible catalysts endow material catalysts with cultural connotations, becoming the value core of spatial vitality.

In terms of selection and screening, a three-dimensional method for selecting original catalysts is proposed, based on historical and cultural value, spatial potential and practical needs, and public property rights. Furthermore, five screening principles are established:

holism, locality, hierarchy, diversity, and linkage. Through the construction of a systematic screening framework, comprehensive catalyst selection is achieved, and their priority order is clarified.

In terms of reshaping and activation, differentiated renewal strategies are proposed for different types of catalysts. For point catalysts, a combination of authenticity conservation, adaptive reuse, and modular micro-intervention is adopted. For linear catalysts, continuous and comfortable non-motorized traffic experiences are created through typical cross-section control, interface renovation, and functional complexity. For planar catalysts, the core task is to restore publicness, creating composite spaces integrating distribution, activities, and cultural exhibition. For intangible catalysts, spatial anchoring and event implantation are employed to achieve the regular release of cultural vitality.

In terms of guidance and control, a guidance and control system for catalyst reactions is constructed from three dimensions: multi-stakeholder participation, gradual renewal, and management systems. Through a collaborative governance pattern of government guidance, villager participation, and enterprise support, a gradual renewal path is adopted, and a long-term operation and dynamic evaluation mechanism is established to ensure the sustained release of catalyst effects within a controllable range.

The catalyst application strategy system constructed in this chapter translates universal theory into localized strategies for Guangzhou villages, providing a systematic theoretical basis and methodological guidance for the design of the Non-motorized Corridors in Zini Village, and offering actionable strategic support for the exploration of gradual renewal and activation pathways for Non-motorized Corridors in cultural tourism villages.

Chapter 4 Field Research on the Basic Situation of Zini Village, Guangzhou

In line with national strategies such as new-type urbanisation and rural revitalisation, as well as the policy directions of Guangdong Province's 'Hundred-Thousand-Million Project' and 'Five Goods and Two Suitabilities' initiatives, Zini Village and Sanshan Village have been designated as part of the second batch of Guangdong Province's Traditional Villages due to their rich historical and cultural heritage and the excellent preservation of their traditional character. Through multiple field surveys and structured interviews, this chapter conducts a systematic analysis of the basic conditions of Zini Village and the current issues facing various types of catalytic elements, thereby providing direct problem-oriented guidance and practical grounds for the subsequent design of catalytic renewal for the village's Non-motorized Corridors.

4.1 Overview of the village

4.1.1 Location and transport

Zini Village is situated in the northern part of Zini Island, bordering Sanshan Village to the east. The village enjoys a prime location with excellent transport links. It lies just 5 kilometres from the Shawan Town Government and approximately 13 kilometres from Shiqiao, the core area of Panyu District, placing it within a one-hour commute of Guangzhou city centre. The village is situated close to major transport hubs. To the south, it borders the Shiliang Highway, a key arterial road linking Shijiao in Panyu with Daliang in Shunde. To the east, it lies adjacent to the Dongxin Expressway, currently under construction, which will directly link Guangzhou and Foshan. Leveraging its superior geographical and transport links, the village effectively accommodates the spillover of functions from the central urban area. It provides vital infrastructure support for advancing the integrated development of the Guangzhou-Foshan metropolitan area and promoting the integrated development of the Guangdong-Hong Kong-Macao Greater Bay Area.



Figure4-1 Location map of Zini Village, Panyu District, Guangzhou

Source: Author's own drawing

4.1.2 Historical Development

The history of Zini Village dates back to the Southern Song Dynasty. According to the “Annals of Panyu County” and the “Annals of Shawan Town”, Zini Island was formerly known as ‘Jiuruwei’. Situated at the confluence of the three rivers in the lower reaches of the Pearl River, Zini Village enjoys excellent water transport conditions and has, since ancient times, served as a vital waterway hub connecting Guangzhou with Shunde, Zhongshan and other regions.

Towards the end of the Southern Song Dynasty, frequent warfare in the Central Plains prompted some clans to migrate southwards and settle in the Pearl River Delta, leading to the gradual formation of settlements in the Zini area. During the Yuan and Ming dynasties, clans bearing surnames such as Zhang, Han, Li, Chen and Liang successively migrated to the area, establishing the multi-clan settlement pattern of Zini Village. By the mid-Ming Dynasty, the village had reached a considerable scale, with clan halls such as the Zhang Clan Grand Hall being constructed in succession, and the clan system gradually becoming more refined.

During the Ming and Qing dynasties, capitalising on its water transport advantages, commerce in Zini Village flourished, transforming it into a distribution centre for agricultural produce and handicrafts from the surrounding areas. The village's streets and alleys were built along the waterways, forming the comb-like layout characteristic of Lingnan water villages.

In the mid-to-late Qing Dynasty, Zini Village boasted a rich cultural atmosphere, with the completion of academies such as the Zhang Clan's Dayatang and Guangyutang. The Guangyu Primary School was established to teach classical texts and practical skills such as farming and carpentry, fostering a strong tradition of valuing education and scholarship. By the late Qing Dynasty and early Republican era, elements such as clan halls, temples, academies, gate towers and wharves had largely defined the village's spatial layout.

In the 1950s, the Guangdong Provincial State-owned Zini Sugar Factory was built on the eastern side of Zini Island, marking the village's transition into a phase of development that balanced industry and agriculture, driving population growth and improvements to infrastructure. By the 1980s, with the transformation of the sugar industry, the sugar factory was converted into the Zini Hall Creative Park, becoming a hub for the film, television and cultural creative industries.

From the 1990s to the present day, Zini Village has gradually transformed from a traditional agricultural settlement into a cultural and tourism-oriented village, driven by the development of tourist attractions such as Baomo Garden and Nanyue Garden. Since 2000, Baomo Garden has been designated a National 4A-level Tourist Attraction, whilst Zini Village has been listed as a Traditional Village of Guangdong Province, marking a new phase in the village's conservation and development. However, the rapid pace of tourism development has led to issues such as spatial fragmentation, the mixing of pedestrians and vehicular traffic, and the absence of a dedicated pedestrian network; consequently, the pedestrian connectivity between the village's key attractions is in urgent need of improvement.

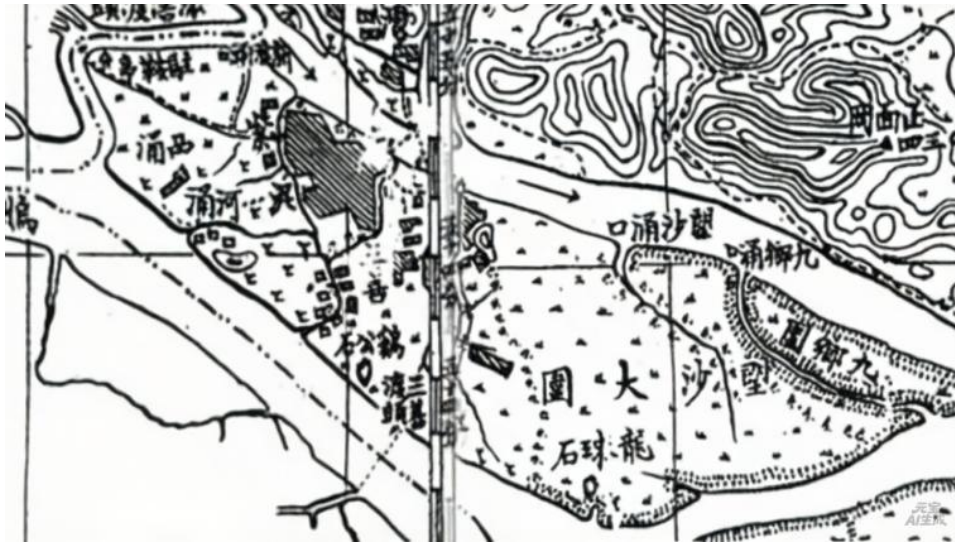


Figure4-2 Map of Zini Island (Jiuruwei) from the late Qing Dynasty and early Republican period

Source: Drawn from “Guangzhou Kou Tu Shang”

4.1.3 Overall layout

The village as a whole adopts a block-like layout, primarily divided into three clusters: north, south and east. The overall layout combines axial and T-shaped elements to form a composite pattern. The buildings are concentrated and arranged in an orderly manner, reflecting the typical comb-like layout characteristic of Guangfu culture. The northern cluster is centred on the Zhang Clan Ancestral Hall and follows an axial layout, with the road in front of the hall serving as the main street. Side alleys run perpendicular to the main street, extending primarily northwards in both directions, with dwellings arranged in orderly rows along these alleys from north to south. The southern building cluster comprises the newly developed part of the village. The arrangement of buildings here is even more orderly, presenting a grid-like layout. The main street is Cun Nan Road, which runs perpendicular to the Zhang Clan Ancestral Hall; side alleys extend westwards from the main street, with further alleys branching out from both sides of these to connect the dwellings on either side. The eastern building cluster centres on the Zini River, adopting an axial layout. The main street runs perpendicular to the Zini River, with side alleys extending in both directions at right angles to it; the ancestral hall and residential buildings are arranged in an orderly fashion along these side alleys.

4.1.4 Functional Zoning and Development Planning

In accordance with the ‘Guangzhou Panyu District Zini Village Traditional Village Protection and Development Plan (2013–2020)’ and subsequent relevant higher-level plans, at the regional level, Zini Village has been incorporated into the comprehensive tourism development framework of Shawan Town, Panyu District. Building on core attractions such as Baomo Garden and Nanyue Garden, and in conjunction with nearby resources including Dishuiyan Forest Park and Zini Hall Creative Park, to create a cultural and tourism destination characterised by Lingnan water village culture, clan culture and industrial heritage experiences.

Regarding the functional layout within the village, the plan divides Zini Island into five functional zones: the Rural Ecological Zone, the Historical and Cultural Zone, the Creative Industry Zone, the Tourism Service Zone and the Ancient Village Scenic Zone. Furthermore, an incremental regeneration approach is adopted: in the near term, the focus will be on improving core tourism service facilities and environmental remediation; in the medium term, the restoration of historic buildings and the enhancement of street and alleyway aesthetics will be advanced; and in the long term, the integration of cultural and creative industries and brand operations will be deepened.



Figure 4-3 Development and Conservation Plan for the Traditional Village of Zini, Panyu District, Guangzhou

Source: Panyu District People's Government

4.1.5 Distribution of cultural and tourism resources

The village currently features distinctive tourist attractions, comprising primarily the landscape and garden architecture of Baomo Garden and Nanyue Garden, the historical and cultural buildings of the Aoshan Ancient Temple complex, and the innovative industrial and artistic town of Zini Hall Creative Park.

Baomo Garden and Nanyue Garden serve as the village ' s landscape and garden architecture. Within the gardens, pavilions, terraces and towers are arranged in a harmonious and varied layout, whilst winding corridors, water pavilions and secluded paths lead to tranquil corners, fully demonstrating the deep integration of natural landscapes and cultural elements, and showcasing the unique refinement and elegance characteristic of typical Lingnan gardens. The Aoshan Ancient Architectural Complex, serving as a key venue for religious activities within the village, embodies local folk customs and traditional religious beliefs, acting as a vital repository of the village ' s historical memory and collective sentiment.

Zini Hall Creative Park, formerly the Guangdong Provincial State-owned Zini Sugar Factory, was China ' s first large-scale sugar production enterprise equipped with an automated sugar-refining production line, bearing witness to Guangdong ' s modern industrial development. Since 2012, it has operated as the Zini Hall Creative Park. Through the minor renovation and revitalisation of the old factory buildings, the park has attracted over 50 enterprises from the film and television industry chain. It has successfully transformed from an industrial site into a comprehensive innovative arts and culture town centred on film and television creativity, and has been designated as a Film and Television Production Workstation under the National Base for Cultural Trade with Foreign Countries.

Table4-1 Summary of Tourist Attractions in Zini Village and Sanshan Village

Source: Author' s own illustration

Village	Name	Value	Degree
Zini Village	Baomo Garden	“Panyu’s First Park”	In 2022, it was designated a National 4A-level Tourist Attraction
	Nanyue Garden	Lingnan Royal Landscape Gardens	Guangzhou Municipal Cultural Heritage Sites
	Zini Hall	Film and Creative Industry Zone	Film and Television Production Station of the National Base for Cultural Trade with Foreign Countries
	Creative Park		
	Aoshan		
Sanshan Village	Ancient Temple complex	The only surviving folk Lu Ban temple in Guangdong	Guangzhou Municipal Cultural Heritage Sites



Figure4-4 Map of Village-Specific Tourist Attractions

Source: Author' s own drawing

4.2 Basic Characteristics of Non-motorized Spaces

4.2.1 Buildings and elements of the historical environment

(1) Historic buildings and buildings of traditional character

Historic and cultural buildings serve as vital mediums through which visitors experience local culture and villagers strengthen their sense of community. Such spaces attract large numbers of visitors, who tend to stay for extended periods and engage in a wide range of activities. They distinctly embody public accessibility and openness.

The existing historical buildings in Zini Village are centred around the Zhang Clan Ancestral Hall, with academy buildings such as the Zhang Clan Dayatang and Zhang Clan Guangyutang arranged in a horizontal row adjacent to the hall, forming a cultural complex. Residential dwellings are neatly aligned in rows behind the ancestral hall, reflecting the clan culture of the Lingnan region—which is bound by blood ties—and its central status.

As the village's principal venue for ancestral worship and communal gatherings, the Zhang Clan Ancestral Hall serves as the spiritual centre for maintaining social order, uniting kinship ties and preserving traditional culture, occupying a central position within the village. Furthermore, influenced by the values of prioritising culture and education, the academy buildings of the Zhang Clan's Dayatang and Guangyutang are arranged in a row alongside the ancestral hall, reinforcing the village's cultural atmosphere of reverence for learning and education. In addition to imparting basic knowledge, they placed particular emphasis on the cultivation of practical skills. They once established the Guangyu Primary School, where practical skills such as farming and carpentry were taught, thereby injecting vitality into the village's educational endeavours and cultural development.

Village	Type	Name	Degree	Address
Zini Village	Temples, shrines and ancestral halls	Zhang Clan Ancestral Hall (Lai Cheng Hall)	Cultural Heritage Preservation Units in Panyu District	7 Dong'an Road, Zini Village
		Han Clan Ancestral Hall	Historic Buildings in Guangzhou	No. 1 Shandou Road, Zini Village
		Liang Clan Ancestral Hall	Registered cultural relics in Panyu District	No. 4 Xiaoyou Street, Zini Village
	Mansion and private residence	Xiaoyou Street Ancestral Hall	Traditional Buildings in Panyu District	No. 2 Xiaoyou Street, Zini Village
		Residence at No. 4 Xiaoyou Street	Traditional Buildings in Panyu District	No. 4 Xiaoyou Street, Zini Village
		Zhang Clan Ancestral Hall	Traditional Buildings in Panyu District	28 Lashan Road, Sanshan Village
		Lao Clan Ancestral Hall	Traditional Buildings in Panyu District	21, Lane 3, Deshan Street, Sanshan Village
	Temples, shrines and ancestral halls	Chen Clan Ancestral Hall	—	4 Deshan North Road, Sanshan Village
		Li Clan Ancestral Hall	—	4 Deshan Street, Sanshan Village
		Jin Clan Ancestral Hall	—	16 Deshan Street, Sanshan Village
Sanshan Village	Other buildings	Gatehouse at No. 11, Fushan Road	Traditional Buildings in Panyu District	Entrance to Lane 11, Fushan Road, Sanshan Village

(2) Historical environmental elements

Owing to the village's distinctive watertown character, a network of waterways criss-crosses the settlement. Numerous waterways, such as Qiaotou Creek, Xin Creek and Sanshan Creek, flow through the area, linking the entire settlement together. Within the village, ancient bridges such as Leshan Bridge, Deshan Bridge and Fushan Bridge, alongside ancient trees and traditional-style pavilions and terraces, create a tranquil, elegant and historically rich atmosphere characteristic of a watertown settlement. Furthermore, historical buildings such as Xietian Palace, Beicheng Hou Temple and the Zini Road Construction Memorial Stele are all relatively well-preserved. 'Huilu Butou' served as the main transport hub for island villagers travelling to and from neighbouring areas during the era of water transport. Today, its role in water transport has diminished, and the surrounding waterfront area is used as a car park for Baomo Garden.

(3) Basic service facilities

In terms of basic community amenities, the range of facilities — including healthcare, cultural, sports and educational buildings — is relatively comprehensive, and is generally sufficient to meet residents' daily needs. The buildings are typically situated close to major transport routes or clustered around historic and cultural structures. For example, the Zini Community Health Centre enjoys a prime location, adjacent to Baomo Garden and Nanyue Garden. Zini Kindergarten is situated in the centre of the village, offering a relatively safe environment and convenient transport links. Zini Primary School was originally housed in the office building opposite Baomo Garden, but was later relocated to the western side of the village and officially renamed Hongji School. The school is close to the main road, Cun Nan Road, with convenient transport links and a relatively spacious site, laying the foundation for diverse, open and highly interactive teaching activities.

In terms of tourism service facilities, the village's public toilet coverage is relatively comprehensive. In addition to those within the various scenic areas, there is one at the village entrance near the Sanshan Village Committee and another in the waterside area between

Baomo Garden and Nanyue Garden, which largely meet the needs of visitors. Furthermore, visitor parking areas are primarily concentrated along both sides of the roads near the attractions, with the main locations being the waterfront area, the San Shan Village Communist Youth League Environmental Protection Park, the north-south Cun Nan Road, and the car park at the south gate of the Zini Hall Creative Park, which generally meet visitors' parking needs.



Figure4-6 Distribution of scattered infrastructure facilities

Source: Author's own drawing

4.2.2 Streets, waterways and green spaces

(1) Lanes and alleys

The internal road network of the village is clearly structured. External transport is provided by the newly constructed 11.2-kilometre ring road, which connects the island's resources via a circular route. The internal transport network of the village is clearly structured, with the main street 6 metres wide and side alleys ranging from 2 to 3 metres in width. The overall spatial layout alternates between open and confined spaces, creating a rich variety. In areas where the alleys are relatively spacious, the width-to-height ratio reaches 0.9,

resulting in a spacious and comfortable environment. In narrower alleys, however, the width-to-height ratio is approximately 0.25, serving only the function of rapid transit and creating a more compact space.



Figure4-7 Analysis of Road Structure Hierarchy

Source: Author' s own drawing



Figure4-8 Cross-sections of main streets and roundabouts

Source: Author' s own drawing



Figure 4-9 Cross-sections of secondary and tertiary roads

Source: Author's own drawing

(2) Water-based spaces and green spaces

The village is situated on the backwater of the Pearl River, at the confluence of three rivers. Since ancient times, it has been a strategic hub in Guangzhou's water transport network and a vital link between Guangzhou and the surrounding towns. The village is surrounded by water on three sides: to the east lies the Zini River, to the south the Shunde Waterway, and to the north the Chen Village Waterway; to the east is the Dishuiyan Forest Park. To the east of the village lies the Sanshan Village Communist Youth League Environmental Protection Park, which boasts a healthy ecological environment and forms a complete spatial layout of 'mountains, water, village and fields'.

Furthermore, the village is situated in an area comprising a mix of paddy fields and enclosed fields. The village is criss-crossed by a dense network of waterways, with extensive farmland and mulberry-fish ponds to the north and south, and the Ruiyuan Farm is also located here. The village's traditional agricultural economy centres on the cultivation of potted flowers, high-quality vegetables and pond-raised fish, embodying the typical characteristics of a water-based settlement where people "live by the water". Furthermore, as the Shunde Waterway to the south of the village is a Class I water source protection zone, the village places great emphasis on safeguarding water quality. Strict conservation and management measures are implemented to prevent water pollution and ensure water quality.

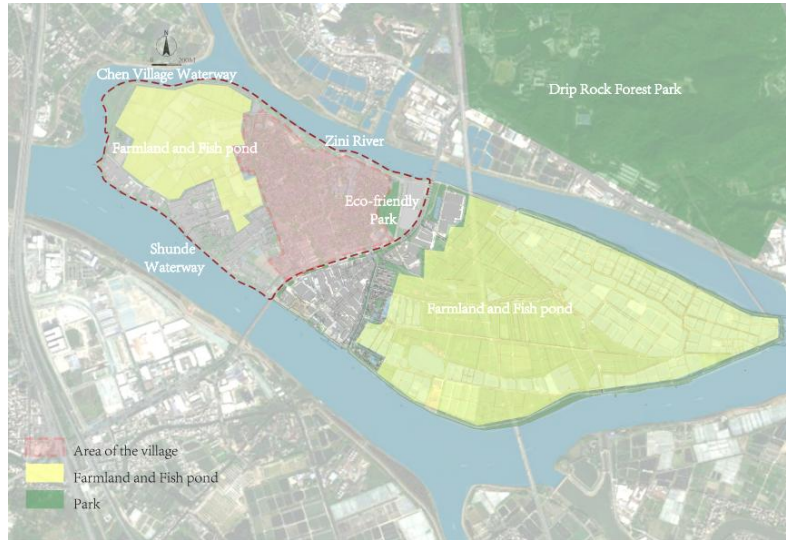


Figure4-10 Distribution of linear waterways and green spaces

Source: Author' s own drawing

4.2.3 Squares

The village' s public squares are primarily located at the junction of the four central roads, at the village entrance, and at the village committee premises. Due to their convenient access and sense of enclosure, these areas form small, relatively independent public spaces that foster a sense of belonging, and are therefore frequently used as the main sites of villagers' self-organised daily activities. These spaces not only fulfil daily recreational functions such as tea breaks, casual conversation and rest, but also foster neighbourly exchange and interaction, serving as vital venues for strengthening village cohesion and a sense of belonging. In terms of spatial distribution, different types of users congregate in distinct locations. For instance, the Zini Village Committee Square, which doubles as a basketball court, is the primary activity venue for young people. The road junctions in the central part of the village, owing to their convenient access, serve as comprehensive venues for daily activities such as resting, chatting and playing cards for middle-aged and elderly villagers.



Figure4-11 Analysis of planar catalyst

Source: Author' s own drawing

4.2.4 Intangible Cultural Heritage

The intangible cultural heritage of Zini Village primarily comprises traditional folk culture, festive events and traditional crafts. The village boasts a rich heritage of Lingnan water village culture, which serves as a vital vehicle for strengthening cultural identity and fostering a sense of community.

In terms of traditional folk culture, Shawan Town is renowned for its Shawan Piao Se (floating lanterns) and Guangdong lion dances as representative regional folk activities. The village utilises Baomu Garden as a key venue for cultural exhibitions. The scenic area regularly hosts cultural events with strong regional characteristics, such as the ‘Spring Festival Lingnan Lion Dance Folk Culture Festival’, the ‘Lingnan Watercolour Tourism Culture Festival’ and the ‘Han Dynasty Charm and Ancient Melody Cherry Blossom Festival’, which possess unique artistic value and rich cultural significance. Furthermore, the Ancient Temple of the Master Craftsman within the Aoshan Ancient Temple Complex in Sanshan Village is one of the few temples in Guangdong Province dedicated exclusively to

Lu Ban, the patron saint of craftsmen. Every year on the 13th day of the sixth lunar month, the ‘Master’ s Birthday’ celebration is held here, serving as a vital platform for construction professionals across the Guangdong-Hong Kong-Macao Greater Bay Area to commemorate and uphold the spirit of craftsmanship.

In terms of traditional crafts and local specialities, Huaji Pueraria, Guanbao Giant Eels, Hejiao Bamboo Shoots and Dexin Shrimp Paste are renowned as Zini’ s ‘Four Treasures’ . Zini Fish Skin Dumplings were selected as one of Panyu’ s ‘Top Ten Speciality Delicacies’ in 2010, fully showcasing the unique local culinary culture.

4.3 Analysis of Current Issues and Catalytic Potential in Pedestrian and Cyclist Spaces

4.3.1 Buildings and elements of the historical environment

The core historical elements within the village 's spatial system primarily comprise historical buildings such as the Zhang Clan Ancestral Hall, the Zhang Clan Dayatang Hall and the Zhang Clan Guangyutang Hall; traditional-style structures including the Ancestral Hall on Xiaoyou Street and the residential building at No. 4 Xiaoyou Street; as well as historical environmental elements such as ancient trees, pavilions, bridges and gate towers; and public facility nodes located along both sides of the roads and at intersections.

(1) Buildings: The abandonment of historic buildings and the deterioration of their character

With shifts in social structure, Zini Village is gradually transitioning from a traditional clan culture centred on kinship ties to a neighbourhood culture bound by geographical and occupational ties. According to field research, the traditional functions of historic buildings such as clan halls and academies have gradually diminished. Coupled with a long-term lack of systematic maintenance and repair, this has led to a marked decline in both the structural quality and utilisation rate of these buildings, resulting in a trend towards their abandonment and disuse.

Regarding historical buildings, the Zhang Clan Ancestral Hall serves as a vital hub for village rituals and gatherings; whilst the structure itself remains relatively well-preserved, the adjacent Zhang Clan Guangyu Hall has suffered severe damage, becoming a derelict, unused plot of land and has been cordoned off. The square in front of the Zhang Clan Dayat Hall has long been occupied by motor vehicles, significantly undermining the public nature and ceremonial atmosphere that an academy building should possess as a space for culture and education.



Figure4-12 Current condition of the Zhang Clan Ancestral Hall and the Zhang Clan Dayat Hall

Source: Photograph taken by the author

In terms of traditional architecture, the ancestral hall on Xiaoyou Street and the residential building at No. 4 Xiaoyou Street are examples of traditional architecture; however, some of the building facades are damaged, and the traditional character of these structures is being eroded. The quality of the surrounding environment is poor, with a significant accumulation of rubbish, which seriously compromises the integrity of the overall traditional architectural character.



Figure4-13 Current situation regarding the accumulation of rubbish at the ancestral hall on Xiaoyou Street and the residential property at No. 4 Xiaoyou Street

Source: Photograph taken by the author

The traditional-style dwellings to the north of the Zhang Clan Ancestral Hall have been severely neglected, with the surrounding area left to become an overgrown, derelict wasteland. Although traditional-style buildings are scattered along Dong'an Street and Xiaoyou Street — which epitomise the character of traditional streets and alleys — the quality of the spatial

environment varies considerably. Some buildings encroach onto the pavement, thereby compromising the continuity and spatial quality of the streets and alleys.



Figure4-14 Current condition of the traditional-style dwellings north of the Zhang Clan Ancestral Hall

Source: Photograph taken by the author

(2) Historical environmental elements: the poor quality of the surrounding space around the ancient trees and pavilions

Based on field research, the areas surrounding historical features such as ancient trees and pavilions have failed to adequately meet villagers' needs for daily activities such as resting and socialising due to a lack of proper planning, resulting in poor spatial quality and low levels of public gathering. Well-preserved historical features along Fushan Road, such as Fushan Pavilion, Leshan Bridge and Fushan Bridge, vividly showcase the village's watertown character and serve as venues for villagers' daily interactions and collective memories. However, the absence of supporting recreational facilities in the surrounding areas has prevented these sites from fully realising their potential as focal points to attract visitors.



Figure4-15 Current layout of the area surrounding Fushan Pavilion and the ancient trees

Source: Photograph taken by the author

(3) Basic service facilities: a lack of both basic amenities and tourist services

Based on field research, the scattered public spaces along both sides of the main roads generally lack basic amenities and public facilities catering to visitors.

With regard to basic amenities, the spaces at road junctions and along the main roads have become the primary gathering places for villagers due to their convenient transport links, serving as venues for activities such as resting, chatting and playing cards. However, the internal spaces of the villages lack basic amenities such as fitness equipment, tables and chairs for board games, and clothes-drying facilities, failing to meet the villagers' daily leisure and social needs.

Regarding public service facilities, according to on-site interviews, the majority of visitors reported a lack of tourism support facilities along the main roads, such as cultural information boards, wayfinding signage and bicycle rest stops. This makes it difficult to access information about the village's history and culture whilst touring, and basic rest requirements remain unmet, significantly impacting the overall visitor experience.



Figure4-16 The phenomenon of residents gathering at the junction of roads in the centre of the village

Source: Photograph taken by the author

4.3.2 Streets, waterways and green spaces

As the core connecting framework within the village's spatial system, the network of streets and alleys comprises significant pathways such as Fuxian Road, Dong'an Straight Street, Cunnan Road and Qiaotou Road, serving to link different functional areas within the spatial structure. However, there are currently significant breaks in connectivity along these roads, with poor connections in some sections, which severely affects the continuity of the overall traffic flow. Furthermore, the current pedestrian experience is substandard, with the condition of road surfaces, environmental facilities and walking comfort all requiring improvement, which severely impacts internal accessibility and the experience of pedestrian and cycle spaces within the village.

(1) Residential lane built alongside the water

Fushan Road serves as the main thoroughfare for the villagers' daily lives. Built alongside the water, it features well-preserved historical elements such as Fushan Pavilion, Leshan Bridge and Fushan Bridge, making it the most distinctive linear landscape resource along the ancient village experience route. However, the current waterfront area lacks pedestrian safety facilities and resting areas, resulting in a poor walking experience. Furthermore, issues such as on-street parking and the accumulation of clutter on certain sections of the road affect the street's continuity and spatial quality. Due to the lack of visitor information displays and supporting tourism facilities, the village's culture cannot be fully

showcased, and visitors' basic needs cannot be effectively met.



Figure4-17 Photos of the current state of the alleys

Source: Photograph taken by the author

(2) Historic and cultural lane

Dong'an Zhijie is lined with traditional buildings such as the Xiaoyou Dajie Ancestral Hall and the residential property at No. 4 Xiaoyou Dajie, serving as a concentrated embodiment of the traditional character of the street. However, the quality of the street's spatial environment is currently uneven, with significant encroachment onto the pavement at street corners and along the frontage of buildings, which severely impacts the comfort and connectivity of the thoroughfare. During school dismissal times, Zini Kindergarten along the route experiences high concentrations of people, yet there is a lack of buffer and dispersal space in the surrounding area, posing a safety hazard.



Figure4-18 Photos of the current state of historic and cultural lane

Source: Photograph taken by the author

Furthermore, there are numerous vacant plots and odd-shaped plots along Xiaoyou Street and in other areas; at present, these are largely neglected spaces overgrown with weeds or cluttered with rubbish. Although these spaces are well-located, they have remained unused for a long time and have not been transformed into functional hubs serving local residents and visitors.



Figure4-19 Vacant land and substandard housing

Source: Photograph taken by the author

(3) Linear green spaces

There is a serious lack of connectivity between Ruiyuan and the Zini Hall dormitories; the barrier formed by the perimeter wall means there is no convenient pedestrian route between the main road and the Zini Hall Creative Park. Visitors and local residents are forced to take a detour through the Zini Hall residential area, which not only increases the walking distance but also disrupts residents' daily lives, diminishing their sense of belonging and security within the residential area. Furthermore, the strip of green space within the perimeter wall, which boasts excellent ecological quality, is not being fully utilised, resulting in low overall spatial efficiency. As this route lacks systematic design of landscape nodes, it fails to create a continuous ecological experience pathway.



Figure4-20 The location of the path and boundary wall leading to Zini Hall

Source: Photograph taken by the author

4.3.3 Squares

- (1) Traditional activity-oriented squares: ceremonial spaces are taken up by parking, limiting their capacity for cultural displays

Based on field research, the square adjacent to the Zhang Clan Ancestral Hall serves as the core space of the village's spiritual centre. As a vital venue for collective activities and cultural heritage, it is characterised by its public nature and openness. However, the square is currently heavily occupied by motor vehicles, resulting in a severe loss of its ceremonial atmosphere and public character. Furthermore, the Zhang Guangyu Hall, situated alongside the Zhang Clan Ancestral Hall, has fallen into severe disrepair and has now become an overgrown, derelict plot. Although the site lies idle, it enjoys an excellent location adjacent to the ancestral hall complex, offering good public accessibility and connectivity. Through renovation and redevelopment, this site could become a key showcase for intangible cultural heritage such as the Sha Wan Floating Colours and Guangdong Lion Dance, hosting a diverse range of functions including cultural exhibitions, folk performances and intangible cultural heritage experiences, thereby restoring its open character as a public cultural space.



Figure4-21 Current view of the front of the Zhang Clan Ancestral Hall

Source: Photograph taken by the author

- (2) Lifestyle and leisure-oriented square: lack of vitality

The spacious square in front of the Baomo Garden office building serves as the central hub linking the Zhang Clan Ancestral Hall and the Baomo Garden scenic area, playing a vital role in facilitating daily village activities and acting as a gathering point for visitors. The

square currently features six ancient trees, offering excellent ecological resources. However, the space is currently heavily occupied by motor vehicles, severely restricting the activity space available to both villagers and visitors. Basic needs such as visitor dispersal, rest and waiting cannot be met, and the function of showcasing folk culture is rendered impossible. As the link between the clan hall culture and the Baomo Garden scenic area, the decline in the square's spatial quality and public nature has a serious impact on the visitor experience and the presentation of village culture.



Figure4-22 Current view of the square in front of the Baomo Garden office building

Source: Photograph taken by the author

The San Shan Village Entrance Square is situated at the village entrance, adjacent to Shiliang Road, and lies directly opposite the Ao Shan Ancient Temple Complex across the road. This space serves as the hub for the village's external transport links; it is a key transition point for visitors moving from the urban environment into the village, as well as the primary gateway and showcase for the village's character.

According to field research, this area was formerly the site of Sanshan Primary School; the disused buildings to the north have now been converted into the Jiangyuan Workshop, which showcases folk crafts, and the Migu Bookshop. However, the surrounding area currently lacks vitality, and the public playground area is underutilised. It currently serves merely as a transitional space for pedestrian traffic, lacking facilities for visitors to linger or rest, resulting in a generally poor spatial quality. Furthermore, there is a lack of effective spatial connection with the Ao Shan Ancient Temple Complex on the opposite side, preventing the formation of a seamless visitor circulation route.



Figure4-23 A photograph of the village entrance square in Sanshan Village

Source: Website

(3) Production spaces: underutilised resources

The area to the east of Zini Tang Creative Park, extending to the main road and adjacent to the park, is currently undeveloped. The site is situated close to a school and a high-density residential area, offering excellent public accessibility. With favourable soil conditions and well-developed irrigation facilities, it possesses the physical infrastructure required for participatory farming experiences; however, it remains undeveloped and has not yet formed synergies with the surrounding agricultural and cultural resources, leaving considerable scope for improvement and potential in the realm of experiential education.

4.3.4 Intangible Cultural Heritage

Intangible cultural heritage serves as the key element that brings the temporal dimension of the village's spatial system to life. These primarily include traditional folk cultures such as the Shawan Piao Se (a provincial-level intangible cultural heritage), the Guangdong Lion Dance (a national-level intangible cultural heritage), and the Shawan Lu Ban Folk Beliefs (a district-level intangible cultural heritage), as well as festive events such as the Master's Birthday; they also encompass traditional crafts and local specialties such as Shawan water buffalo milk, Cantonese-style mudfish, and the Shawan black orchid. Although the village's traditional folk culture and festive activities are rich in content, the current forms of cultural presentation are limited and confined to specific festivals, leading to the gradual decline of traditional culture.

(1) Traditional folk culture: disconnected from public spaces

As provincial and national-level intangible cultural heritage, Shawan Piao Se and Guangdong Lion Dance possess immense cultural value and appeal to visitors. These cultural performances are highly theatrical, visually striking and offer a high degree of audience participation. However, their current displays and performances are largely confined to the Baomo Garden scenic area, with insufficient integration into the public spaces of the village; consequently, they have failed to inject cultural vitality into the wider community on a regular and widespread basis. The village boasts a rich heritage of traditional folk culture and festive activities; however, existing forms of cultural display are limited in variety and confined to specific festivals, lacking regular and diverse promotional and exhibition formats.

(2) Traditional crafts and local specialities: a lack of cultural experiences

Intangible cultural heritage crafts such as the traditional techniques for making Shawan buffalo milk snacks and the Cantonese method of cooking mudfish have not yet been developed into regular experiential activities. The technique of growing Shawan black orchids, which possesses significant cultural value and potential for experiential activities, has similarly not been adapted for such purposes. Villages and the wider region are becoming increasingly homogenised, and no differentiated development has taken shape.

4.4 Analysis of the Survey Questionnaire

This study adopted a combined online and offline approach to conduct a questionnaire survey, with the aim of gaining a comprehensive understanding of the perceptions and actual needs of Zini Village residents and visitors regarding the current state of the village. A total of 200 questionnaires were distributed, with 186 valid responses returned, representing a response rate of 93%. Of these, 128 were returned online and 58 offline. The questionnaire covered key areas including respondents' basic information, satisfaction with the ecological environment, evaluation of infrastructure, expectations for cultural and tourism development, and willingness to participate in community activities. Drawing upon the catalyst theory framework, the questionnaire data was systematically analysed across four dimensions of catalysts: point, line, planer, and intangible.

4.4.1 Basic characteristics of respondents

In terms of the demographic breakdown of respondents, local residents accounted for 25 per cent, shopkeepers and staff for 38 percent, first-time visitors for 11 percent, and repeat visitors for 26 percent. This breakdown indicates that the design of Zini Village' s pedestrian and cycle paths must cater to the dual needs of both villagers' daily use and visitors' experience.

In terms of the age distribution of respondents, those aged 18 – 30 accounted for 22%, those aged 31 – 45 for 35%, those aged 46 – 59 for 28%, and those aged 60 and over for 15%. Whilst young and middle-aged people form the majority of respondents, the elderly also represent a significant proportion; therefore, the design must take into account the needs of users across all age groups.

4.4.2 Spatial Requirements Analysis

(1) Building

Regarding attitudes towards historical and cultural heritage, 40% of respondents opted for 'full protection', 20% for 'moderate development', and 40% stated they 'did not mind either way'. The data indicates that villagers' awareness of the need to protect historical and cultural heritage requires strengthening, and that some respondents lack sufficient understanding of the value of such heritage; this provides a basis for enhancing cultural interpretation and public education in subsequent design work.

Regarding expectations for cultural and tourism facilities, 80% of respondents expressed a desire for the establishment of 'intangible cultural heritage experience centres', whilst 20% looked forward to 'eco-farms'. This indicates a strong demand among visitors for immersive cultural experiences, providing empirical support for the integration of intangible cultural heritage exhibitions and cultural experiences into historical buildings within the cultural section of the traditional village, such as the Zhang Clan Ancestral Hall and the Zhang Clan Guangyu Hall.

(2) Historical environmental elements

In terms of awareness of cultural elements, respondents showed a high level of interest in the historical and environmental features of the village. The survey results indicate that the traditional architectural style is the most distinctive cultural element in the public's perception, which provides guidance for the conservation and revitalisation of historical and environmental features such as the Fushan Pavilion, ancient bridges and ancient trees.

(3) Road

In terms of road requirements, 40% of respondents identified “narrow roads/mixed traffic” as the main shortcoming, which aligns with the field observations of vehicle-pedestrian mixing on South Village Road and on-street parking on Fushan Road. Regarding the ecological environment, 60% of respondents rated it as “average,” with “road dust” accounting for 60% of the reported environmental issues, indicating that the quality of the street environment needs improvement. At the level of walking experience, the questionnaire results show that a lack of resting facilities accounts for 45%, and narrow or discontinuous walking paths account for 24%, providing a direct basis for the design of linear catalysts, including adding rest nodes, optimizing pedestrian spaces, and improving waterfront safety facilities.

(4) Public spaces

Regarding the use of public spaces, 62% of respondents selected ‘squares’ as the type of public space they use most frequently, indicating that squares are the most favoured type of public space among villagers and visitors; therefore, the redevelopment of the area should prioritise the square.

Regarding requirements for activity spaces, 40% of respondents felt there was a ‘lack of space’, whilst 20% would like to see more ‘rest areas’. In terms of specific functional design, 38% of respondents would like to see the addition of children’s play areas, and 30% would like to see the addition of fitness areas for older people. This provides a basis for incorporating facilities such as children’s play areas, activity areas for older people and seating areas into the design of the public space.

4.4.3 Infrastructure Requirements Analysis

In terms of basic community amenities, ‘health clinics’ and ‘cultural activity centres’ each accounted for 60 per cent, whilst ‘rest areas’ accounted for 20 per cent. Villagers have a strong demand for basic healthcare, cultural activities and recreational facilities, providing direct guidance for the allocation of facilities at key locations such as vacant plots along Fushan Road.

In terms of the evaluation of community service facilities, the overall scores, from lowest to highest, are as follows: seating/rest areas, sports and exercise facilities, public toilets, and cultural exhibition facilities. Rest areas received the lowest score, which is consistent with the finding that 45% of respondents considered “rest areas to be insufficient” .

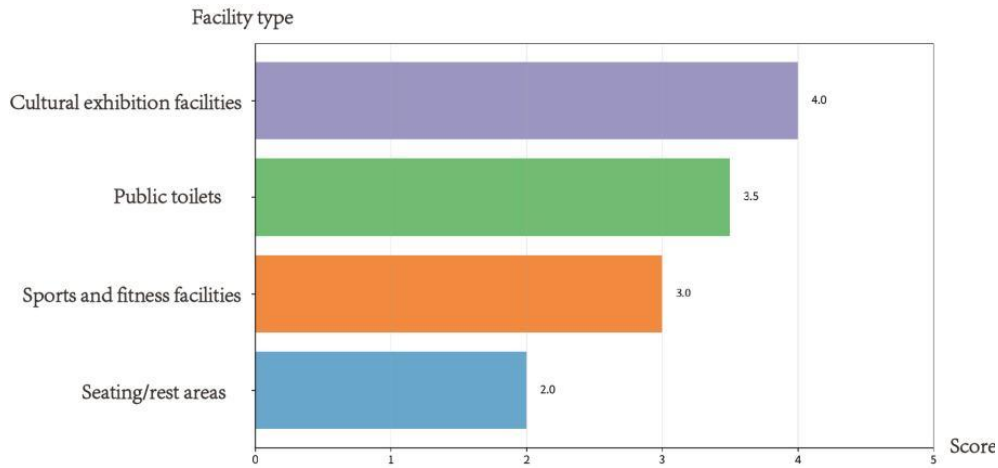


Figure4-24 Analysis of Public Facility Evaluation Scores

Source: Author’ s own illustration

With regard to public service facilities, ‘narrow roads/mixed traffic’ accounted for 40 per cent, ‘insufficient recreational space’ for 40 per cent, ‘insufficient parking spaces’ for 40 per cent, and ‘non-motorized traffic transport stations’ for 20 per cent. The data indicates that road safety and a lack of recreational space are the issues of greatest concern to villagers, which aligns closely with the findings from the field survey regarding issues such as ‘mixed traffic of pedestrians and vehicles’ and ‘parking on the pavement’ . Regarding the ecological facilities they would like to see added, ‘solar street lights’ accounted for 80% and ‘waste sorting and recycling stations’ for 60%. This demonstrates that villagers have an extremely urgent need for energy-efficient lighting and waste management facilities.

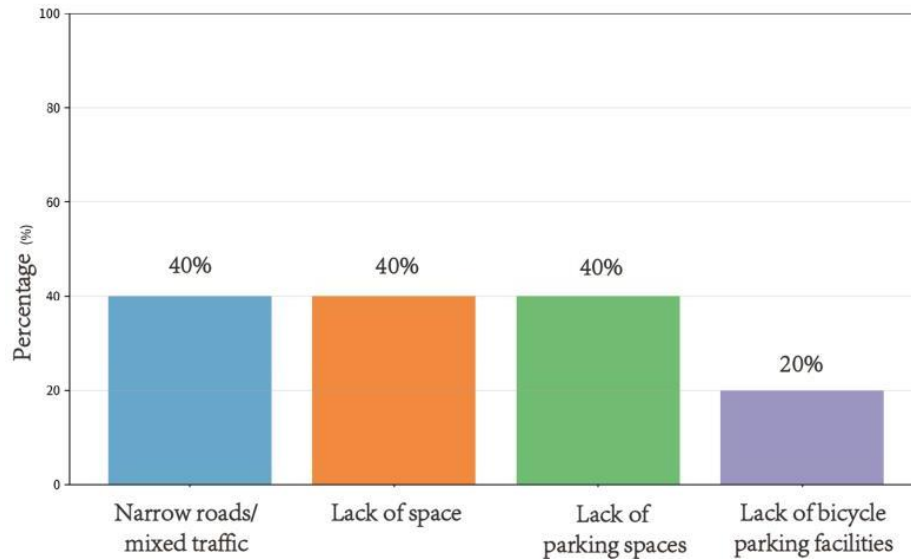


Figure4-25 Analysis of Infrastructure Issues

Source: Author's own illustration

4.4.4 Cultural Experience Needs Analysis

In terms of expectations for cultural tourism facilities, 80% of respondents expressed a desire for the construction of an “intangible cultural heritage experience hall,” while 20% anticipated an “eco-farm.” This demonstrates a strong demand among tourists for immersive cultural experiences, providing data support for integrating intangible cultural heritage functions such as Shawan Piaoase (floating color pageantry) and Guangdong Lion Dance into the traditional village cultural section.

In terms of willingness to participate in cultural experiences, 65% of respondents stated that they were ‘willing to take part in intangible cultural heritage craft workshops’, whilst 55% said they were ‘willing to participate in traditional festivals’. This indicates a high level of public acceptance of participatory cultural experiences, laying the groundwork for the integration of intangible cultural heritage into events and its living transmission.

Regarding support for development models, 80% of respondents endorsed the “eco-agriculture + cultural tourism integration” development model, with only 20% indicating “indifference” and no opposition. This indicates a high level of consensus between villagers and tourists regarding cultural tourism integration.

In terms of expectations for industrial development, 80% of respondents hoped to

develop “rural tourism,” 40% chose “cultural and creative industries,” and 20% selected “eco-agriculture.” Among the main factors constraining economic development, 100% of respondents identified “lack of distinctive industries,” while 40% cited “inadequate infrastructure” and “insufficient policy support.” This provides directional guidance for this design to adopt cultural tourism as its orientation and to construct a differentiated industrial system.

4.5 Summary

Based on multiple field surveys and the analysis of questionnaire data, this chapter conducts a systematic analysis of the basic conditions and current issues in Zini Village from the four dimensions of the catalyst theory—point, line, plane and Intangibility—providing a direct problem-oriented approach and practical basis for the subsequent design of the slow-moving corridor catalyst renewal.

At the level of point catalysts, historic buildings and structures with traditional architectural features are in a state of disuse, dereliction and damage to their appearance. The Zhang Family Guangyu Hall has fallen into disuse and become a derelict site, whilst the facades of traditional-style buildings show signs of damage. The quality of the surrounding spaces for historical environmental elements—such as ancient trees and pavilions—is poor, and there is a lack of supporting recreational facilities. In terms of infrastructure, villagers have an urgent need for basic amenities such as fitness equipment, tables and chairs for board games, and seating areas, whilst visitors have high expectations for tourism-related facilities such as cultural information boards, wayfinding signage and bicycle stations.

Regarding linear catalysts, issues such as on-street parking and the accumulation of clutter are widespread in the streets and alleys, resulting in significant disruptions to road connectivity. The quality of street-facing facades varies considerably and there is a shortage of recreational facilities, leading to a poor experience of the pedestrian and cycle environment. At waterfront interfaces, the lack of pedestrian safety facilities and resting places further degrades the non-motorized traffic experience. Furthermore, the existing linear green space system within the village serves a relatively limited function and has not been effectively integrated or connected with the pedestrian and cycle network.

Regarding planar catalysts, the village's traditional ceremonial squares have been taken over by parking, severely undermining the public nature and ceremonial atmosphere of these spaces. As for the squares used for daily activities, they currently lack vitality and are deficient in facilities for lingering and resting. Additionally, whilst the village's ecological

spaces possess a sound ecological foundation, they remain undeveloped and unused.

Regarding Intangible catalysts, traditional folk cultures such as Shawan Piaose and Guangdong Lion Dance enjoy high public recognition but are currently concentrated within the Baomo Garden scenic area, lacking organic integration with the village' s public spaces. Regarding traditional crafts and distinctive local products, there is a shortage of cultural experience programs, necessitating the introduction of cultural and creative industries and tourism to achieve differentiated development.

In summary, Zini Village faces core contradictions in terms of spatial connectivity, non-motorized traffic system integrity, spatial vitality, utilization of vacant spaces, and activation of cultural resources. This provides a direct problem orientation and quantitative basis for the catalyst identification, determination, reshaping, and activation in the subsequent renewal design of the Non-motorized Corridors. This design will take the Non-motorized Corridors as the carrier and adopt a synergistic strategy of point anchoring, linear linking, planar radiating, and intangible activating to optimize spatial structure and enhance functional vitality.

Chapter 5 Catalyst Renewal Design of Non-motorized Corridors in Zini Village

5.1 Design content and objectives

This design adopts catalyst theory as its core methodology. Drawing on the fundamental logic of urban catalyst theory—namely, that ‘specific project interventions trigger a chain reaction among surrounding elements’—it positions the Non-motorized Corridors as a key catalyst for the regeneration of public spaces in Zini Village. Building upon the existing linear spatial framework of Zini Village, comprising its main street, alleyways and waterfront path. This design undertakes a networked regeneration of the village’s Non-motorized Corridors by removing key bottlenecks, enhancing the quality of the built environment and introducing catalytic nodes.

The design adopts a spatial organisation model comprising one main corridor, three major sections and multiple catalytic nodes, establishing an exemplary main Non-motorized Corridors throughout the village. Drawing primarily on catalyst theory, it emphasises the theoretical underpinnings of the serial effect of linear catalysts and the layered hierarchy of the system. As part of the public space system, the core function of the Non-motorized Corridors lies in leveraging spatial connectivity to integrate scattered point and planar catalyst nodes, thereby forming a hierarchical catalyst network. Themes are defined according to the resource and functional characteristics of different sections of the village, establishing distinct positioning for each section to achieve functional complementarity and synergy. Furthermore, current surveys indicate that Zini Village’s core cultural and tourism resources are dispersed. While the existing street and alley system possesses a basic framework, it suffers from issues such as connectivity gaps and fragmented nodes. By constructing a continuous main corridor, these fragmented resources can be integrated into a coherent tour sequence. Based on the village’s existing functional zoning and resource variations, the southern San Shan Village entrance area and the stretch along Fushan Road constitute a densely populated residential zone with a strong atmosphere of everyday watertown life, making it suitable as the historic village section. The central area, stretching from the Zhang Clan Ancestral Hall to Baomo

Garden, is the core zone with the highest concentration of historical and cultural resources, making it suitable for development as the historic village section. The western section, from Ruiyuan to Zini Hall, is adjacent to farmland and an ecological park, making it suitable for development as the ecological rural scenery section. This sectional division is largely consistent with the functional zoning established in the overarching plan (the ‘Guangzhou Panyu District Zini Village Traditional Village Protection and Development Plan (2013–2020)’).

Guided by the principles of spatial continuity and experiential integrity, the design addresses issues such as circuitous routes, fragmented nodes and disjointed experiences by eliminating key bottlenecks. Through a combination of localised demolition and renovation, alongside the creation of new pathways, it connects previously dispersed and isolated spatial nodes. By treating the pedestrian and cycle corridor as a core catalyst, this design comprehensively revitalises the village’s pedestrian and cycle spaces, thereby enhancing the overall environmental quality and spatial vitality of the village.(See Appendix Figure 1)

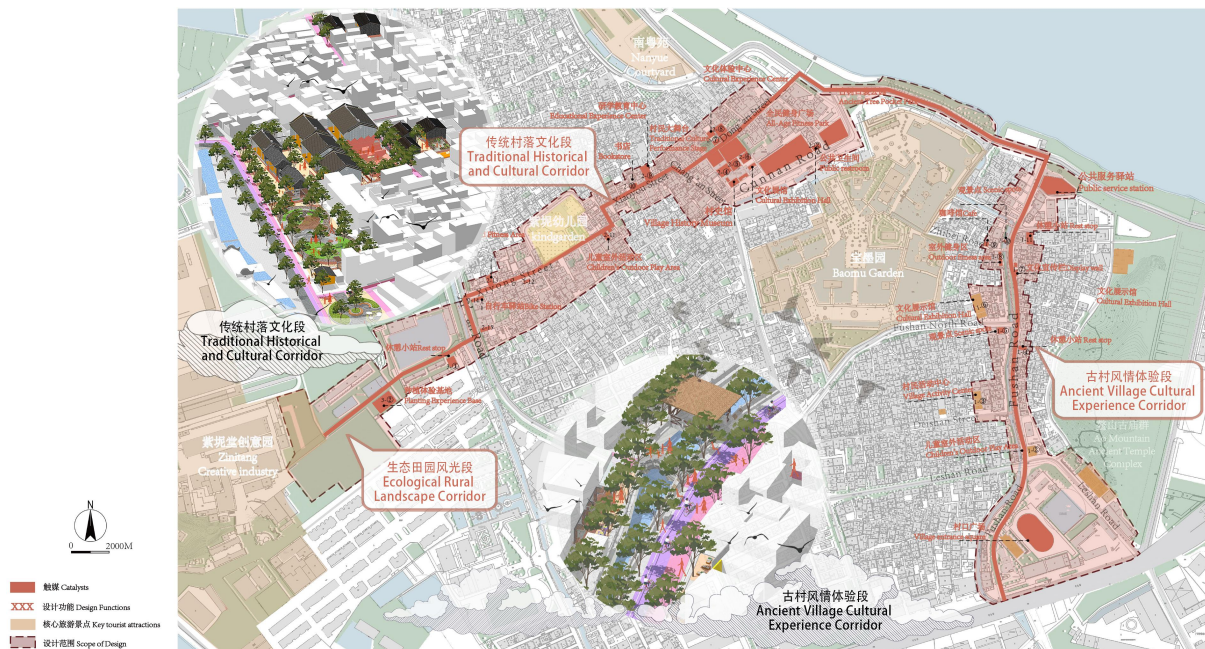


Figure5-1 The master plan of the Zini Village Non-motorized Corridors

Source: Author’s own drawing

5.1.1 Project positioning

This design aims to create a model Non-motorized Corridors in Zini Village, utilising the corridor as a core catalyst. Through the organisation of linear spaces and the introduction of functional nodes, a hierarchical spatial network is established. The main Non-motorized Corridors serves as the core catalyst, fulfilling a structural integration function. The node spaces along the route act as secondary catalysts, serving to revitalise local areas.

Using the non-motorized traffic system as a foundation, the project integrates the village's spatial resources and categorises them into three distinctive themes: traditional culture, countryside landscapes and the historic village atmosphere, thereby creating a rural public space that integrates culture and tourism. With the shared use by diverse stakeholders as the core principle, and positioning visitors and villagers as the primary participants, the project systematically plans the movement patterns of both groups to create shared spaces where visitor experiences and village life interact. This approach facilitates the two-way flow of urban and rural resources and enhances the shared spatial value of the area.

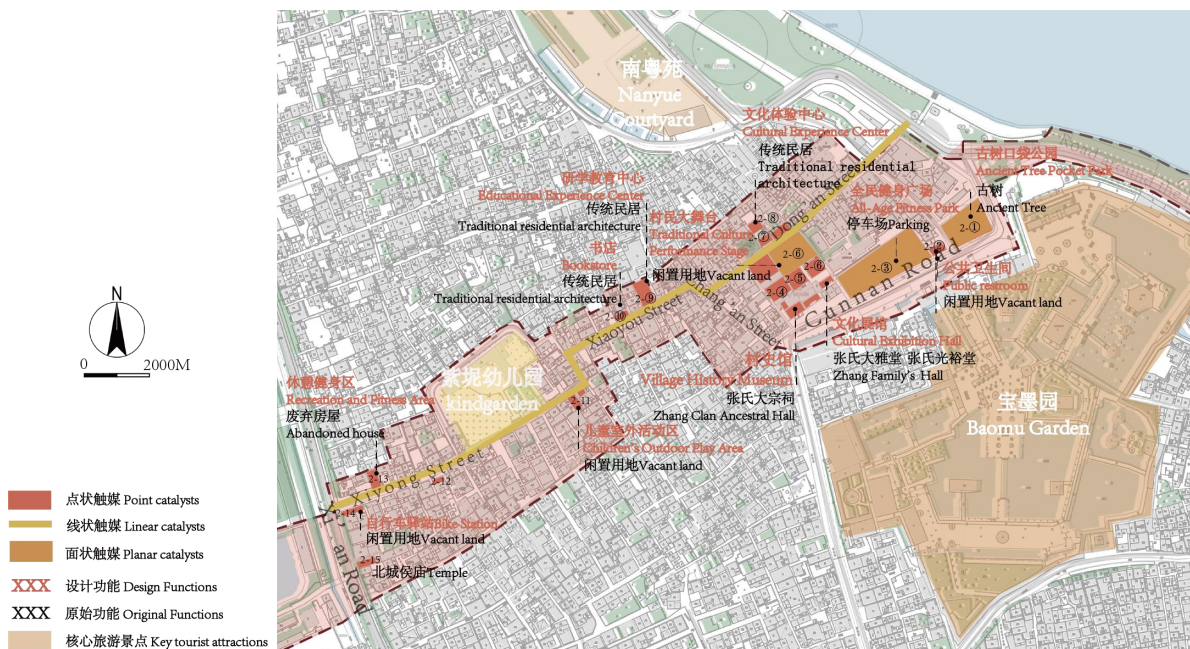


Figure 5-2 Master plan of the cultural section of the traditional culture section

Source: Author's own drawing

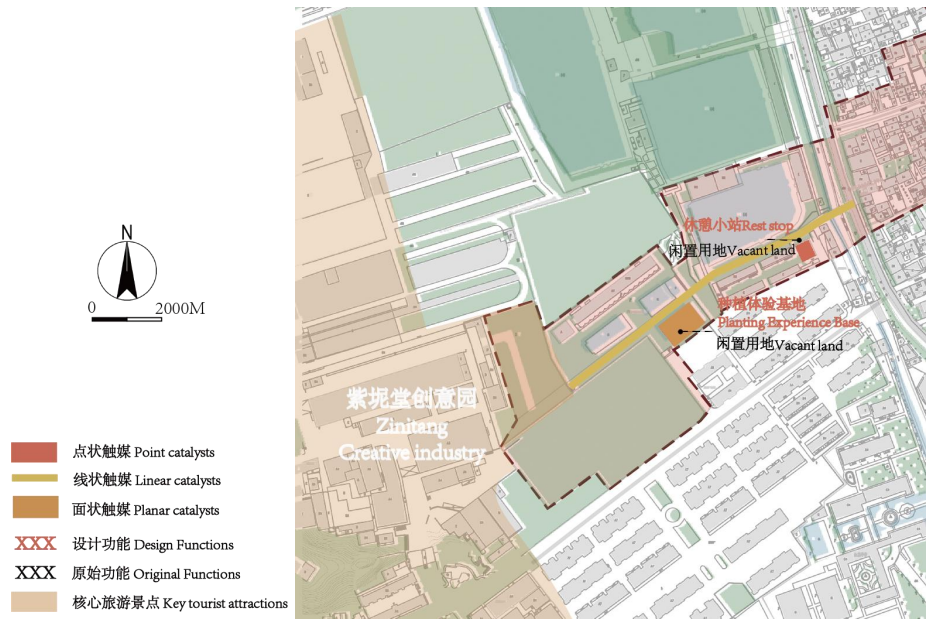


Figure5-3 Master plan of the cultural section of the ecological rural section

Source: Author' s own drawing

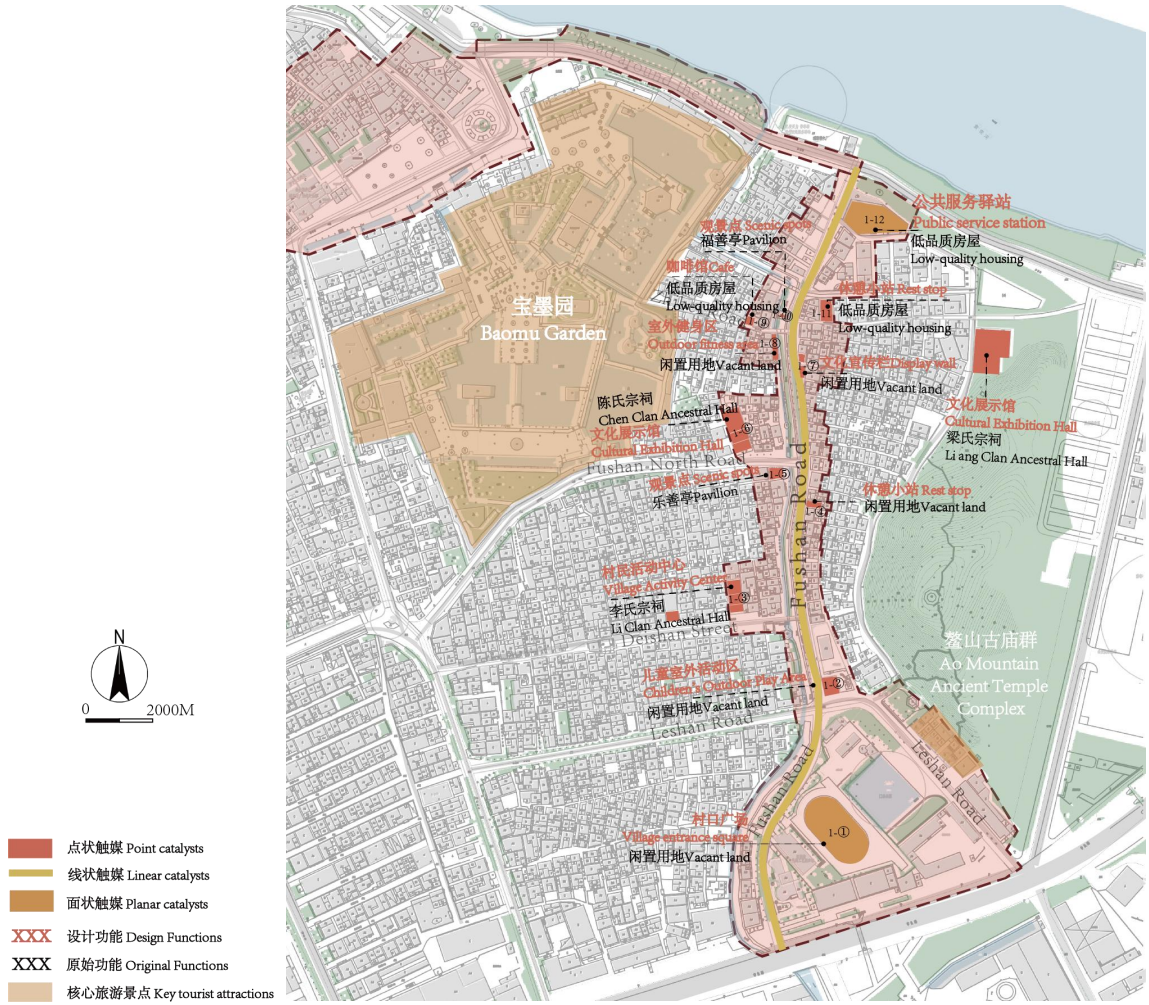


Figure5-4 Master plan of the cultural section of the historical village section

Source: Author' s own drawing

5.1.2 Definition of the Scope of Design

This design focuses on the outdoor public spaces along the Zini Village pedestrian and cycle corridor. The scope of the design extends southwards from the entrance to Sanshan Village and the Ao Mountain Ancient Temple Complex, following Fushan Road southwards to Huan Dao Road. It then proceeds westwards via Huan Dao Road to reach key attractions such as Baomo Garden and Nanyue Garden, before connecting to the Zhang Clan Ancestral Hall and traditional-style buildings via Dong' an Zhijie and Cun Nan Road. Passing by Zini Village Kindergarten, the route extends westwards to the Zini Hall Creative Park, covering a total distance of approximately 2.5 kilometres. The alignment of this corridor aims to link key nodes and alleviate congestion at critical bottlenecks. Through adaptive regeneration of public spaces along the main streets and alleys, the design seeks to integrate core cultural and tourism resources.

5.1.3 Design Objectives

This design focuses on the outdoor public spaces along the Zini Village pedestrian and cycle corridor. The scope of the design extends southwards from the entrance to Sanshan Village and the Ao Mountain Ancient Temple Complex, following Fushan Road southwards to Huan Dao Road. It then heads west along Huan Dao Road to reach key attractions such as Baomo Garden and Nanyue Garden, before connecting to the Zhang Clan Ancestral Hall and traditional-style buildings via Dong' an Zhijie and Cun Nan Road. Passing by Zini Village Kindergarten, the route extends westwards to the Zini Hall Creative Park, covering a total distance of approximately 2.5 kilometres. The design aims to link key nodes and alleviate congestion at critical bottlenecks. By carrying out adaptive renovations to the public spaces along the main streets and alleys, it seeks to integrate the core cultural and tourism resources.

(1) Spatial integration objective: a continuous network for soft mobility

Adopting a spatial structure model of 'one corridor, three sections and multiple nodes', we will establish a clearly defined and logically coherent spatial hierarchy. By addressing structural bottlenecks — such as the narrowing sections of the kindergarten road and the

enclosed section of Baomo Garden — through a combination of local demolition and reconstruction alongside the creation of new pathways, we will achieve dual continuity in both physical form and spatial perception. By integrating key nodes — such as historic buildings, tourist attractions, rural landscapes and traditional village settlements — into the pedestrian and cycle network, we will create a coherent spatial narrative, thereby resolving current issues such as circuitous routes, fragmented nodes and inadequate accessibility.

(2) Functional activation objectives: differentiated segment positioning

The Traditional Village Culture Section focuses on the spatial integration of cultural resources and the reconstruction of narratives. By establishing connections between clan halls and traditional dwellings, and restoring public spaces such as ancient trees and squares, a cultural experience-oriented pedestrian zone is created. The incorporation of cultural commentary, demonstrations of traditional crafts, and ceremonial activities serves to strengthen regional cultural identity and a sense of belonging to the space.

The Ecological Rural Landscape Section focuses on creating ecological experiences. Through catalytic nodes such as ecological planting activities and picturesque photo spots, it establishes a natural, eco-friendly pedestrian zone with visual appeal and potential for promotion.

The Ancient Village Experience Section focuses on authentically presenting villagers' daily lives and providing immersive experiences. Through the display of everyday living scenes, the integration of local craft workshops, and the creation of communal courtyards for villagers, the project aims to enhance the quality of public life for residents. This creates a slow-paced space centred on rural living experiences, achieving the dual objectives of providing a rich visitor experience whilst ensuring a pleasant living environment for the local community.

(3) Catalyst-guided targets: Hierarchical catalyst systems

This design treats the entire pedestrian and cycle corridor as the core catalyst for the area, serving primarily as a structural element that connects spaces, guides pedestrian flow and

activates functions. Secondary catalytic nodes are situated along both sides of the corridor and are categorised into four main types based on their nature: point catalysts comprising buildings, historical environmental elements and infrastructure; linear catalysts centred on streets, waterways and strip-shaped green spaces; planar catalysts centred on squares; and Intangible catalysts such as traditional folk culture.

By establishing a hierarchical system of ‘core catalysts and secondary catalysts’, a progressive regeneration strategy is formed. Through targeted design of each type of catalyst, the corridor’s appeal for lingering and sense of participation are enhanced, thereby achieving the continuous stimulation of pedestrian flow and spatial vitality. Point catalysts focus on the revitalisation of historic buildings, the protection of environmental elements, and the integration of public service facilities. Linear catalysts concentrate on the improvement of street and alleyway interfaces, the ecological optimisation of water systems, and the enhancement of the functionality of linear green spaces. Planar catalysts strive to restore the public nature of square spaces and strengthen their capacity to host activities. Intangible catalysts utilise event-driven approaches to ensure the regular infusion of cultural vitality. Through the synergistic operation of these four types of catalysts, a comprehensive and stable catalyst system is established.

(4) Objective of coordinating circulation routes: shared use of diverse spaces

With pedestrian and cycle corridors as the core framework, the project aims to create visitor routes that seamlessly integrate with the daily life pathways of local residents. Through spatial layering and functional zoning, shared intersecting spaces such as public squares, pocket parks, a stage for intangible cultural heritage performances, and traditional cultural markets will be established, achieving an organic blend and appropriate separation of these two types of traffic flow. This ensures an immersive experience for visitors whilst respecting the privacy and living boundaries of local residents. Furthermore, by connecting to existing vehicular roads, the project facilitates the separation of pedestrian and vehicular traffic. This ensures convenient access for visitors whilst minimising the disruption caused by motor

vehicles to the pedestrian experience, thereby safeguarding pedestrian safety and the quality of the space.

(5) Implementation Guidance Objective: A Gradual Update Path

This design focuses on underutilised land and derelict buildings, employing a strategy that combines partial demolition and renovation with the introduction of new structures. By utilising modular, low-impact interventions and minor renovations, the scheme avoids disrupting the existing village fabric and the daily lives of residents. Furthermore, the project can be implemented in phases according to construction conditions and funding availability, with secondary catalytic nodes introduced incrementally based on user feedback. This incremental approach ensures the scheme's ongoing adaptability and feasibility as it evolves dynamically.

5.2 Principles for selecting original catalysts

This design addresses the current issues of spatial fragmentation, functional isolation and cultural stagnation in Zini Village. It adopts the concept of a 'slow-moving corridor' as a central catalyst, operating across three dimensions: spatial, functional and cultural. Through a systematic framework that integrates spatial structures, stimulates diverse functions and revitalises local culture, the design aims to optimise the village's spatial structure and foster functional synergy, thereby ensuring the preservation and transmission of cultural heritage whilst sustaining the regeneration of the village's vitality.

5.2.1 Spatial dimension

The project focuses on the issue of spatial fragmentation in Zini Village. The village's key cultural and tourism resources are scattered and lack effective spatial connections. Existing pathways suffer from detours, breaks and disconnections, resulting in prolonged walking distances between key nodes, confusing visitor routes and a fragmented spatial experience. This fragmentation of the spatial structure leads to a lack of continuity within the village, significantly diminishing its overall vitality.

Non-motorized Corridors serve as the core catalyst. Through their linear extensibility,

they connect the various dispersed nodes, reshaping the village's spatial framework. This facilitates a structural transformation from isolated points to networked synergy, laying a solid physical foundation for the functional revitalisation of these nodes.

(1) Establishing a spatial structure comprising 'one corridor, three sections and multiple nodes'

The corridor has been designed in three distinct sections, each with its own specified width and functional attributes. A clear road network comprising main corridors and secondary connecting routes has been established for each section, creating a spatial hierarchy that is well-defined and logically coherent. This structure serves not only as a physical organisation of pathways but also as the framework for spatial storytelling, providing a physical foundation for the subsequent integration of functions and cultural expression.

(2) Enhancing the hierarchical mechanism of the catalyst

Define the entire pedestrian corridor as a core catalyst, integrating the village's cultural and tourism resources. The catalyst nodes along both sides of the corridor, with their consistent spatial rhythm and functional positioning, will achieve a progressive spatial revitalisation—from point catalyst activation and linear guidance to area-wide diffusion.



Figure5-5 Structural analysis of the Non-motorized Corridors

Source: Author's own drawing

5.2.2 Functional dimension

The various functional zones within Zini Village are relatively scattered and independent in their layout, lacking effective coordination and interaction between them, which results in insufficient integration of spatial resources. Specifically, traditional cultural areas such as clan halls and traditional dwellings lack interactive cultural and creative facilities. The ecological pastoral area lacks immersive experience facilities. In the residential areas, there is a lack of basic amenities and public service facilities. This fragmentation of functions results in short visitor stays, monotonous environments and low levels of villager engagement, making it difficult to establish a sustainable mechanism for vitality. By integrating multiple functions and introducing new business formats, the pedestrian and cycle corridor will be developed into a functional catalyst. Through segmented, differentiated positioning and a system of catalyst nodes, the spaces along the corridor will be revitalised, providing both economic support and a social foundation for the living transmission of cultural resources.

(1) Achieve functional coordination through segment-specific positioning

Based on the existing functional zoning of the village, the corridor is divided into three distinct thematic sections: Traditional Culture, Ecological Countryside, and Historic Village, with each section serving a specific function. The Traditional Culture section focuses on exploring local culture. By connecting cultural nodes and incorporating features such as cultural commentary, demonstrations of traditional crafts, and ceremonial activities, it creates a cultural experience-oriented pedestrian and cycling space. The Ecological Countryside Scenery Section focuses on creating ecological experiences. Through catalytic nodes such as ecological planting experiences and picturesque photo spots, it constructs a natural, eco-friendly pedestrian space with visual appeal and potential for promotion. The Historic Village Section focuses on authentically presenting villagers' daily lives and providing immersive experiences. By showcasing everyday scenes, incorporating local craft workshops and creating communal courtyards for villagers, it enhances the quality of public life for residents, establishing a slow-paced space centred on rural living experiences. This achieves

the dual objectives of providing a visitor experience whilst ensuring a liveable environment for villagers. Through differentiated functional configurations across each section, the functional potential of spatial nodes is activated.

(2) Achieving functional clustering through a catalytic system

The catalytic nodes along both sides of the main corridor primarily encompass a variety of functional types, including historical and cultural, cultural and creative, public service, basic amenities, and green space and landscape. By leveraging the hierarchical structure of the corridor space, the aim is to enhance the corridor's appeal as a place to linger and foster a sense of engagement, thereby achieving the integration of cultural and tourism resources and functional synergy.

(3) Achieving functional integration through shared circulation routes

Carefully plan the visitor circulation routes to ensure they do not interfere with the daily lives of local residents. Through strategies such as spatial layering and functional zoning, create shared spaces—including public squares, pocket parks, a stage for intangible cultural heritage performances, and traditional cultural markets—to achieve an organic integration and appropriate separation of these two types of circulation. In the historic village experience zone, a strategy of moderately blurred boundaries is adopted. Through interface treatments such as hedges and variations in paving, we ensure an immersive experience for visitors whilst respecting the privacy and living boundaries of the villagers. By connecting to existing vehicular roads, we achieve the separation of pedestrian and vehicular traffic. This ensures convenient access for visitors whilst minimising the disruption caused by motor vehicles to the pedestrian experience, thereby safeguarding pedestrian safety and spatial quality.



Figure5-6 Functional analysis of the Non-motorized Corridors

Source: Author' s own drawing

5.2.3 Cultural dimension

The core issue lies in the underutilisation of Zini Village' s cultural resources. The village possesses cultural assets such as clan halls, traditional dwellings and festive customs; however, these are generally in a state of disuse. These rich cultural resources have yet to be integrated with tourist attractions such as Baomo Garden, Nanyue Garden and the Ancient Temple of Aoshan. In terms of tangible cultural heritage, the village' s historical buildings—such as clan halls and traditional dwellings — lie idle, with low overall utilisation rates and a lack of revitalisation initiatives. Regarding intangible cultural heritage, traditional folk festivals and handicrafts lack public display and dynamic transmission, preventing the village' s cultural value from being effectively transformed into spatial vitality and economic benefits, and consequently leaving the village lacking in core competitiveness.

Consequently, there is a need to utilise cultural narratives and living traditions to transform the slow-moving corridor into a cultural catalyst, thereby revitalising cultural resources and fostering cultural identity and a sense of local belonging.

(1) Constructing a sequence of cultural experiences using a three-part narrative structure

The traditional culture section focuses on the depth of history. Through historical

buildings such as clan halls and traditional dwellings, it showcases the village's historical origins and cultural heritage, reinforcing a sense of regional cultural identity. The Ecological Rural Landscape section focuses on the warmth of nature. Through natural features such as waterways and farmland, it illustrates the harmonious coexistence of the village and nature, conveying the aesthetic appeal of the local countryside. The Ancient Village Life Experience Section focuses on the warmth of daily life. By authentically depicting the lives of the villagers, it showcases the village's contemporary vitality and cultural continuity, allowing visitors to immerse themselves in the authentic daily life of the village.

Through this three-part narrative structure, visitors gradually delve into the cultural heart of the village during a leisurely stroll, transforming their experience from 'cultural sightseeing' to 'cultural understanding' and ultimately to 'cultural empathy'.

(2) Using cultural catalyst nodes to facilitate cultural interpretation and the living transmission of traditions

In the traditional culture section, cultural interpretation points, traditional craft demonstrations and ancestral hall ceremonial spaces have been established along the route to serve as interactive cultural touchpoints, fully showcasing the local culture. In the historic village experience section, measures such as the display of everyday life scenes and the creation of communal courtyards for villagers have transformed cultural heritage from a 'static display' into a 'living presentation', allowing visitors to experience at close quarters the daily lives of the villagers, their neighbourly interactions and seasonal customs and festivals.

(3) Cultivating cultural identity to reinforce the sustainability of the catalytic effect

By optimising the layout of public spaces, adding rest areas and improving public lighting, we aim to enhance the quality of life for local residents. Placing interactive installations at key gathering points where residents congregate on a daily basis will not only meet the experiential needs of visitors but also align with the local community's desire for cultural identity, thereby strengthening community cohesion.

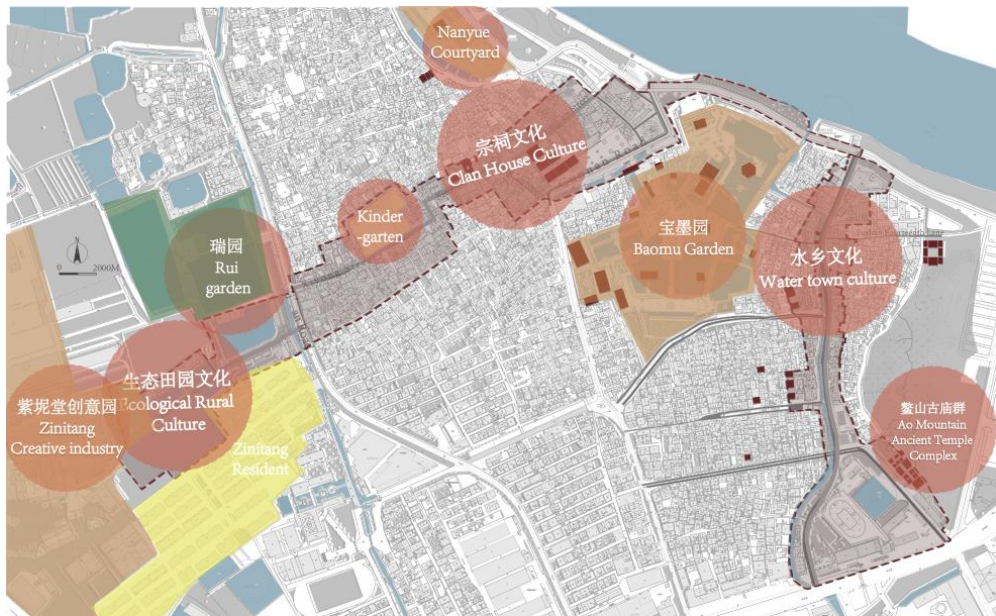


Figure5-7 Cultural analysis of the Non-motorized Corridors

Source: Author' s own drawing

5.3 Extraction and Identification of the Original Catalyst

5.3.1 Extraction of the Original Catalyst

This design explores the original context from three dimensions: historical and cultural value, spatial potential and practical needs, and public ownership.

In terms of historical and cultural value, Zini Village possesses a wealth of tangible and intangible cultural heritage resources. This design primarily focuses on heritage conservation sites, historic buildings and structures reflecting traditional architectural styles, as well as environmental elements such as squares, alleyways, ancient trees and wells that form spatial connections with cultural nodes.

In terms of spatial potential and practical needs, the site currently contains a large number of derelict and abandoned buildings, as well as low-quality structures encroaching on public spaces. The current spatial condition is in a state of decline, yet holds significant potential for spatial regeneration. This design primarily focuses on utilising derelict and abandoned buildings, low-quality structures encroaching on public spaces, as well as abandoned courtyards, idle residential plots and neglected peripheral spaces.

In terms of building ownership, publicly owned buildings offer significant advantages regarding renovation decision-making, capital investment and implementation timelines. This design primarily utilises buildings owned by the village collective, land designated for public facilities, and idle public land.

(1) Point catalysts

Table5-1 Point catalyst excavation in the historic village section
Source: Author’ s own drawing

Point catalyst excavation in the historic village section		
① Historical and cultural buildings	②Idle land and houses	③Public property building
		

Table5-2 Point catalyst excavation in the traditional culture section
Source: Author’ s own drawing

Point catalyst excavation in the traditional culture section		
①Historical buildings	②Idle land and houses	③Public property building
		

Table5-3 Point catalyst excavation in the ecological rural scenery section
Source: Author’ s own drawing

Point catalyst excavation in the ecological rural scenery section	
①Idle land and houses	②Public property building
	

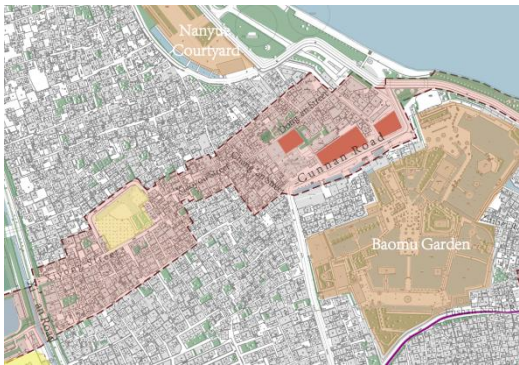
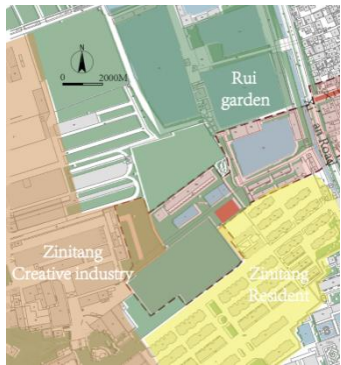
(2) Linear catalysts

Table5-4 Linear catalyst excavation
Source: Author’ s own drawing

Linear catalyst excavation		
①The historic village section	②The traditional culture section	③The ecological rural scenery section
		

(3) Planar catalysts

Table5-5 Planar catalyst excavation
Source: Author’ s own drawing

Planar catalyst excavation		
①The historic village section	②The traditional culture section	③The ecological rural scenery section
		

5.3.2 Identification of the Original Catalyst

(1) Point catalysts

The historic village section comprises 10 point catalysts. These are primarily situated on disused plots and marginal spaces near the gatehouse at Lane 11, Fushan Road; currently, these areas are largely overgrown with weeds or cluttered with rubbish, rendering them underutilised. Located along a busy street, these spaces offer excellent accessibility and visibility. Although the plots are small, the renovation costs are low, and through small-scale interventions, it is possible to achieve mixed-use functionality.

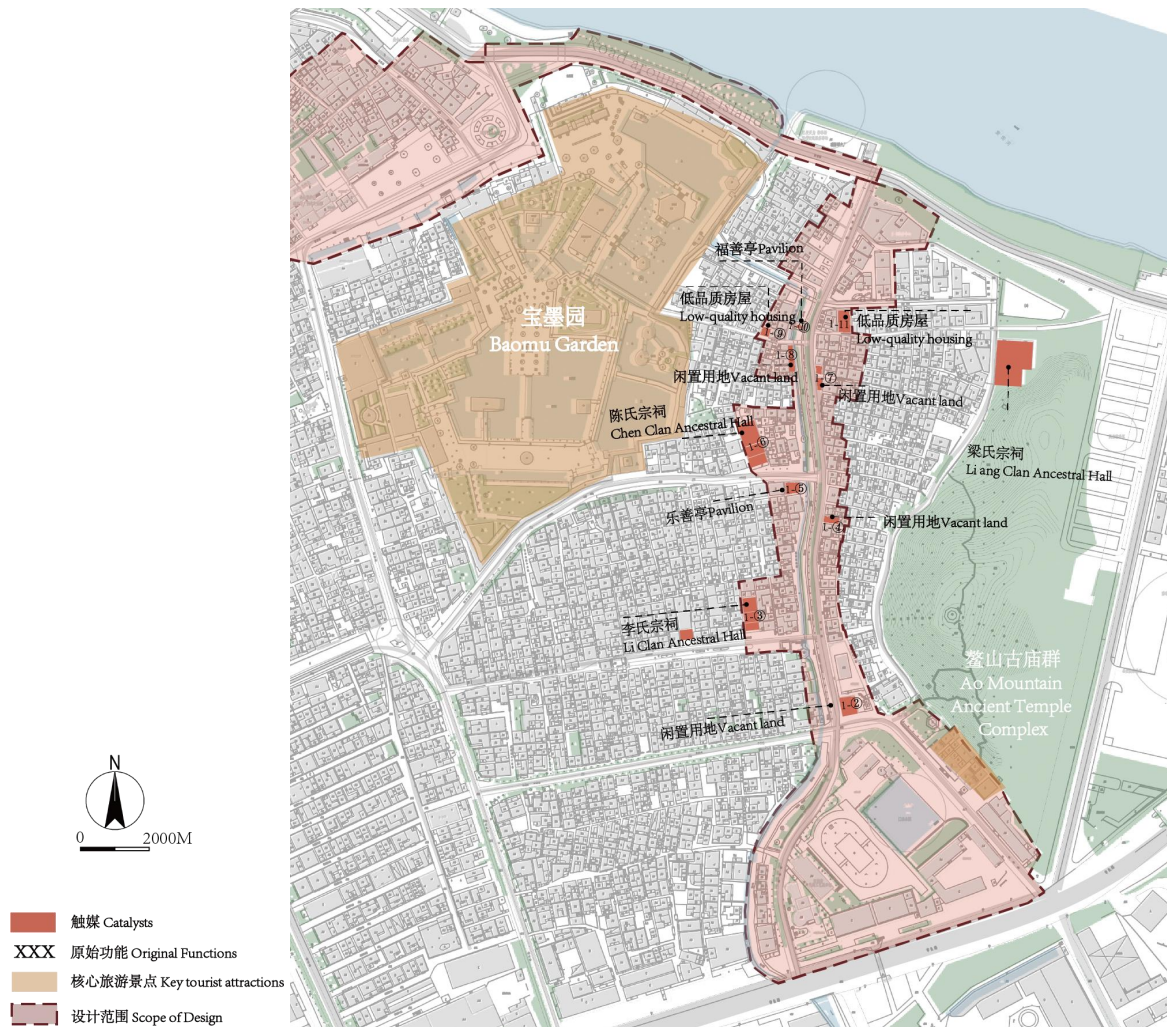


Figure 5-8 Point catalysts for the historic village section

Source: Author's own drawing

The traditional culture section comprises 12 point catalysts. Rooted in clan culture, the ancestral hall serves as a physical embodiment and is the central venue for village rituals and gatherings. These focal catalysts are primarily historical buildings such as the Zhang Clan Grand Ancestral Hall, the Zhang Clan Daya Hall and the Zhang Clan Guangyu Hall, as well as traditional-style structures including the Ancestral Hall on Xiaoyou Street and the residential building at No. 4 Xiaoyou Street. As their traditional functions have gradually diminished, both the quality of the buildings and their utilisation rates have declined significantly, resulting in a state of dereliction. These sites require revitalisation through functional repurposing to serve as positive catalysts for the surrounding area.

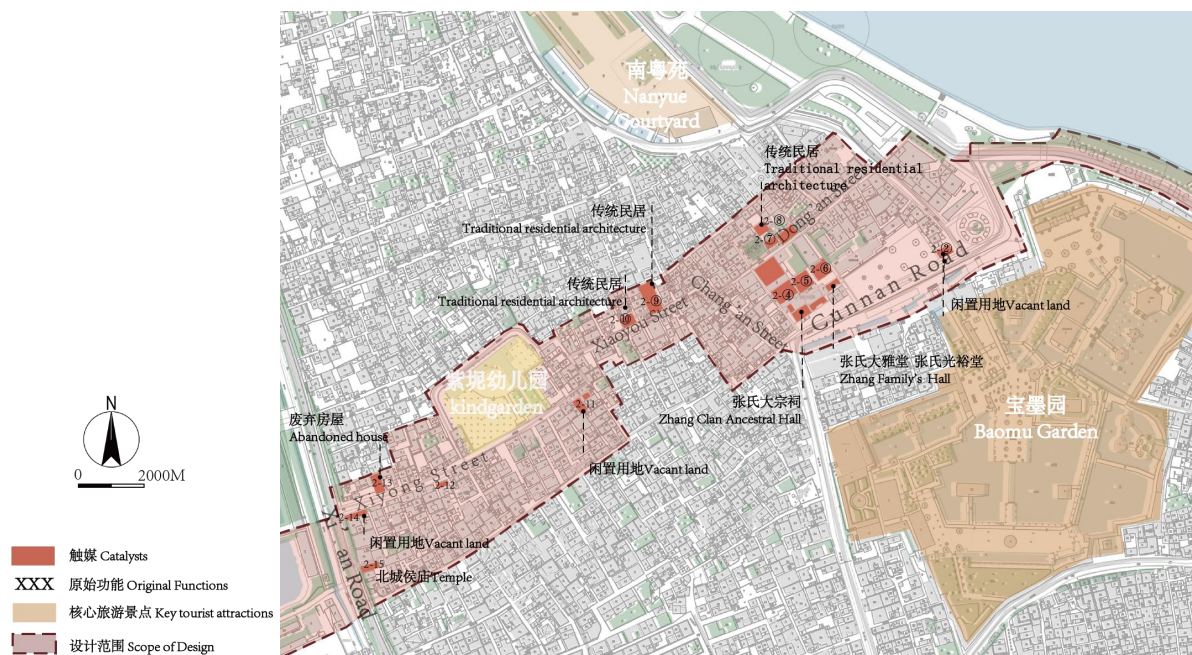


Figure5-9 Point catalysts for the traditional culture section

Source: Author' s own drawing

The ecological rural scenery section features one point catalyst. Situated primarily at the junction of the village' s main thoroughfare and the rural sightseeing trail, it is a must-visit spot for cyclists. Currently, there is a lack of refreshment and rest facilities. Through spatial redevelopment, this area could be transformed into a key hub for public services within the ecological rural scenery section.



Figure5-10 Point catalysts for the ecological rural scenery section

Source: Author' s own drawing

(2) Linear catalysts

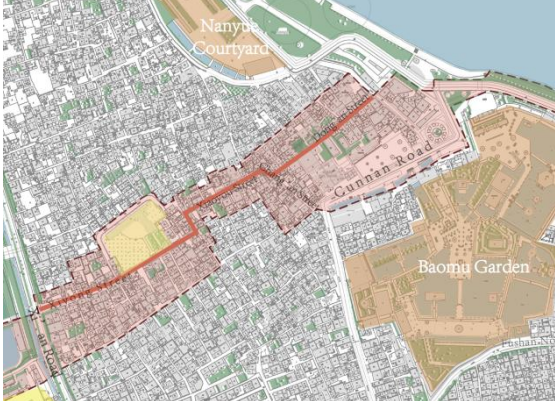
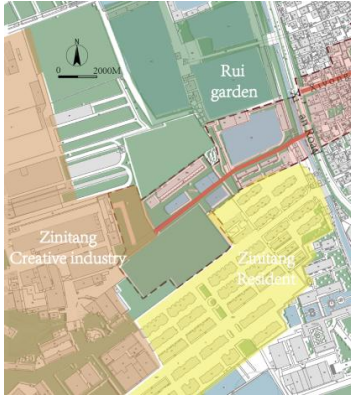
The historic village section features one linear catalyst, centred on Fushan Road and drawing primarily on the village's unique watertown characteristics. Natural waterways run closely alongside the streets and alleys, whilst historical environmental elements along the route — such as Fushan Pavilion and ancient bridges — are well-preserved. The diverse landscape layers vividly showcase the village's watertown character, whilst also serving as a venue for daily interaction and collective memory amongst the villagers. Currently, the waterfront lacks pedestrian safety facilities and resting areas. By integrating landscape resources with practical needs in a systematic manner, a coherent and comfortable pedestrian and cycle network can be created, enhancing the spatial experience for both visitors and residents.

There are two linear catalysts in the traditional culture section, primarily centred on Dong'an Zhijie and Cun Nan Road. The street and alley structure follows the typical comb-like layout of the Guangfu region, possessing significant historical and morphological value. Furthermore, historical buildings and structures with traditional architectural character of conservation value are distributed along this route. However, issues such as the uneven quality of the existing spatial interface necessitate the systematic linking and revitalisation of spatial nodes. Through the spatial expression of cultural narratives, visual connectivity and functional interaction within the neighbourhood can be enhanced, thereby improving the permeability and continuity of public spaces and creating a more comfortable and enriching pedestrian experience and environment for visitors.

The ecological rural scenery section features one linear catalyst, primarily the road between Ruiyuan and the Zini Hall dormitories. The existing road suffers from severe connectivity gaps, resulting in a lack of convenient pedestrian links between the main road and the Zini Hall Creative Park. By removing wall barriers and redesigning pedestrian routes, a direct pedestrian connection between the main road and the Zini Hall Creative Park can be established. This will restore privacy and a sense of security to the residential area, effectively linking ecological and cultural-creative nodes to achieve resource synergy.

Table5-6 Linear catalyst excavation

Source: Author' s own drawing

Linear catalyst excavation		
①The historic village section	②The traditional culture section	③The ecological rural scenery section
		
触媒 Catalysts XXX 原始功能 Original Functions 核心旅游景点 Key tourist attractions 设计范围 Scope of Design		

(3) Planar catalysts

There are two linear catalysts in the historic village section, primarily comprising the disused public playground at the entrance to Sanshan Village and the buildings to the north, which are of poor quality and underutilised. The village entrance square serves as the hub for the village' s external transport links and acts as a spatial node where visitors transition from the urban environment into the village setting; it is the primary gateway and showcase for the village' s character. The current space lacks vitality, serving merely as a transitional passageway for pedestrians, with a dearth of facilities for lingering or resting. Furthermore, it lacks effective spatial connections with key nearby attractions such as the Ao Mountain Ancient Temple Complex and Baomo Garden, failing to form an organic link in the visitor circulation route. Through micro-renewal measures, the area will be transformed into a village gateway 'living room' that integrates visitor services, community interaction and transport hubs, thereby acting as a positive catalyst for the surrounding area.

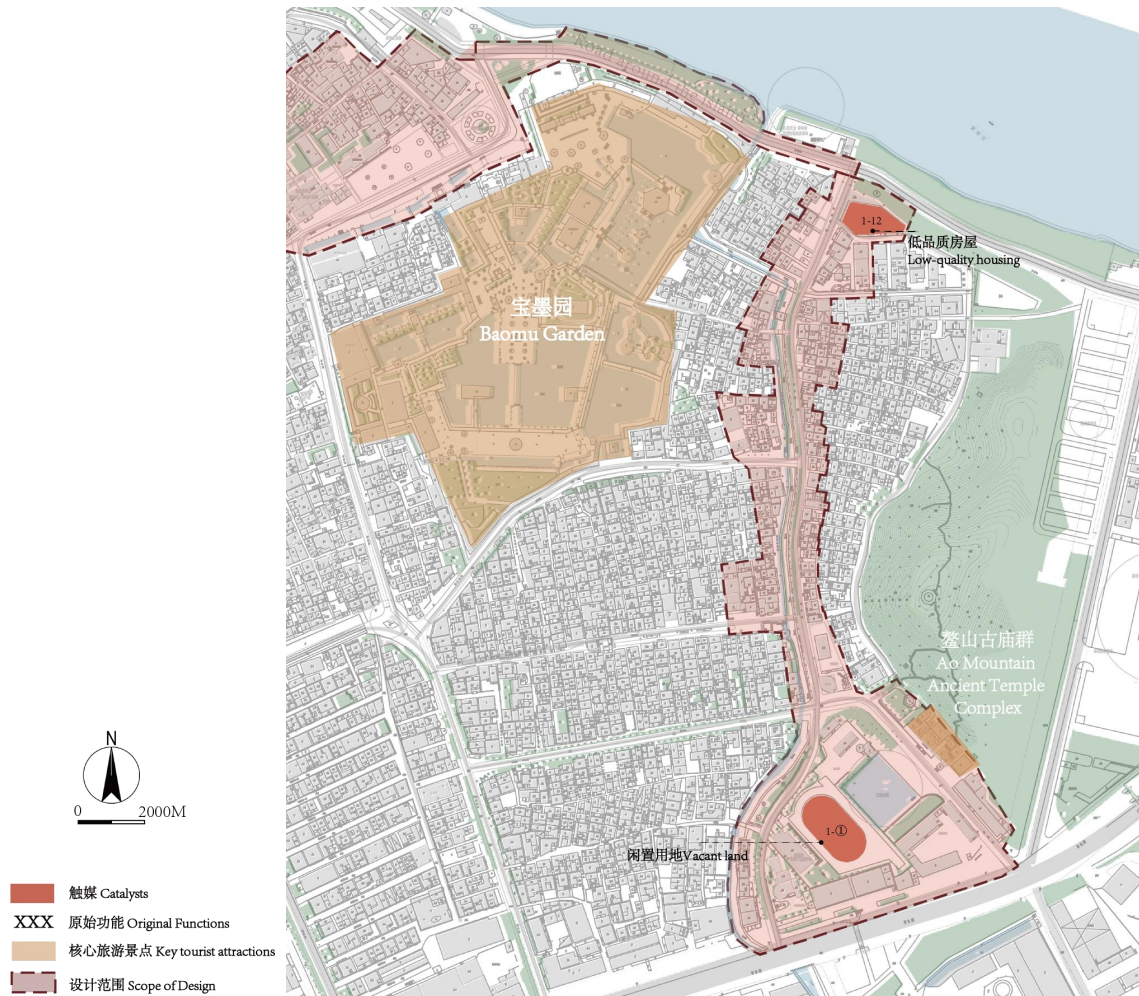


Figure 5-11 Planar catalyst for the historic village section

Source: Author's own drawing

There are three key areas within the traditional culture section, primarily comprising the open space within the Zhang Clan Ancestral Hall, the square in front of the Baomo Garden office building, and the areas surrounding the ancient trees. Currently used as visitor drop-off and pick-up points, these spaces are all occupied by parked vehicles, resulting in poor spatial quality that significantly undermines their ceremonial atmosphere and accessibility. Through spatial redevelopment, these areas could be transformed into venues for cultural displays such as festive ceremonies and cultural performances, as well as comprehensive spaces for daily activities where villagers and visitors can rest, socialise and exercise.

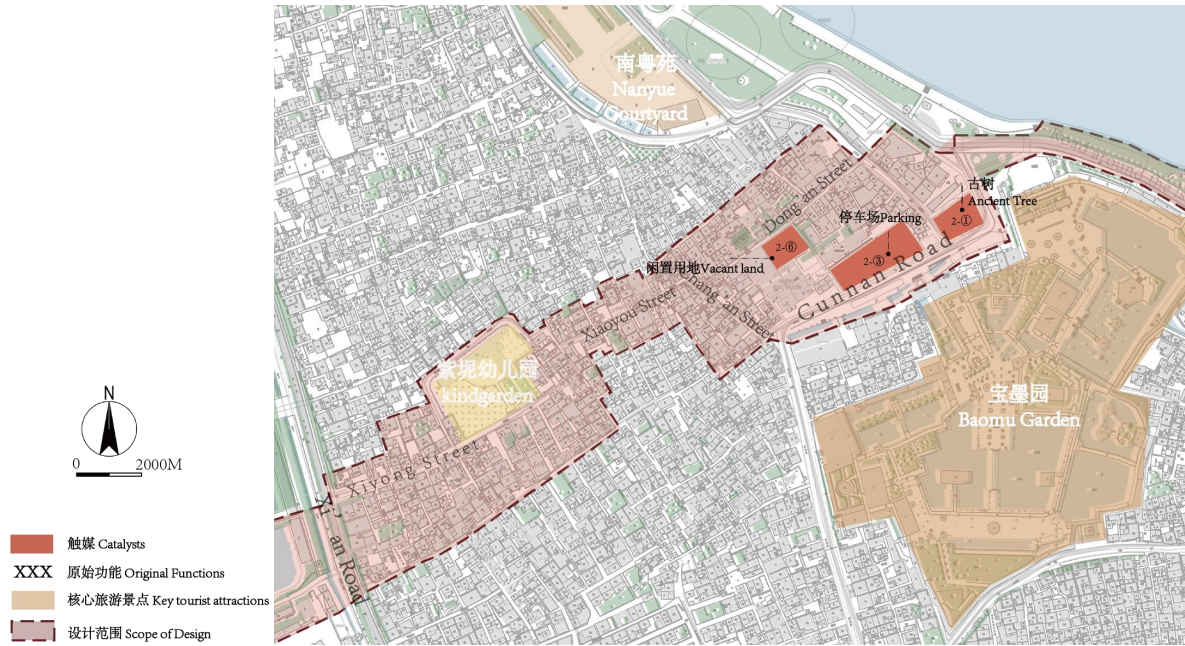


Figure5-12 Planar catalyst for the traditional culture section

Source: Author' s own drawing

In the Ecological Rural Scenery section, there is one plot of land adjacent to the surrounding park, which is currently unused. The site is situated close to a school and a high-density residential area, offering excellent public accessibility. It could be developed into an agricultural experience centre, providing villagers with a direct sales channel for their produce and delivering dual benefits in terms of both economic gain and visitor experience.

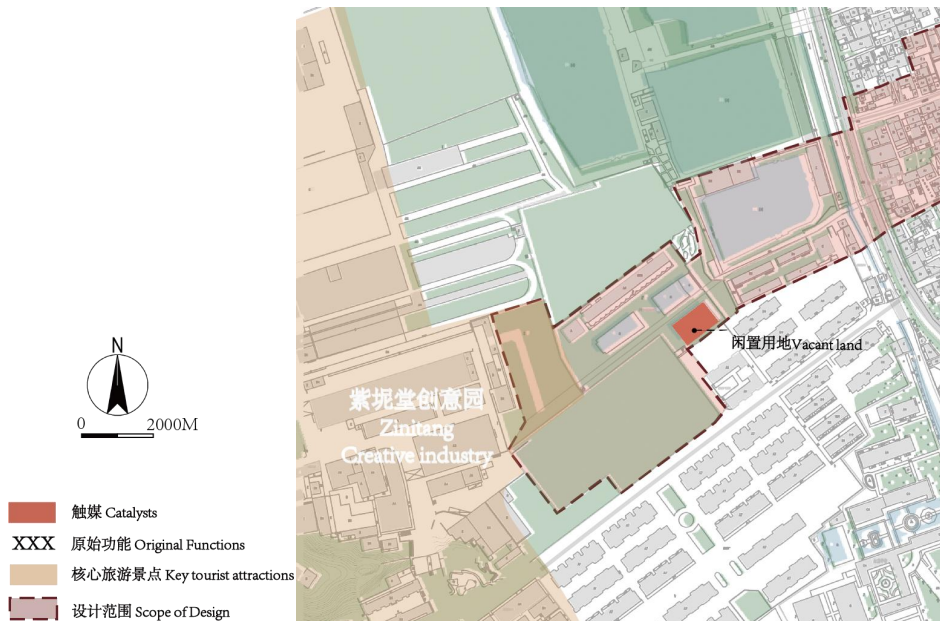


Figure5-13 Planar catalyst for the ecological rural scenery section

Source: Author' s own drawing

(4) Intangible catalysts

The historic village section features two intangible cultural catalysts, centring primarily on the district-level intangible cultural heritage of the Shawan Lu Ban folk beliefs—which is directly linked to the Ao Shan Ancient Temple Complex—and experiential cultural activities such as the fish-lantern procession.

The traditional culture section features four intangible cultural catalysts, centred on traditional cultural expressions such as the provincial-level intangible cultural heritage ‘Sha Wan Piao Se’ (floating tableau performance) and the national-level intangible cultural heritage ‘Guangdong Lion Dance’, as well as hands-on experiences involving traditional crafts such as Sha Wan water buffalo milk traditional snack-making techniques and Cantonese mudfish cooking techniques. These traditional cultural projects are not only highly performative and visually striking, but also offer a high degree of interactive participation, effectively attracting public attention and evoking cultural resonance. Specific performance venues could be arranged in spacious areas such as the open grounds within the Zhang Clan Ancestral Hall and the square in front of the Baomo Garden office building. Through scheduled, captivating live performances at designated times and locations, the essence of local culture will be vividly presented. This will significantly enhance the visibility, influence and emotional connection of the cultural IP, thereby achieving the transmission, promotion and innovative revitalisation of traditional culture.

The ecological rural scenery section features one intangible cultural catalyst, centred on the unique local craft of Shawan orchid cultivation. Through horticultural activities, an immersive cultural atmosphere and sensory experience can be created.

Table5-7 Intangible catalysts
Source: Author' s own drawing

Section	Level	Type	Name
The historic village section	National	Traditional dance (III)	Guangdong Lion Dance (Sha Wan)
	Province	Folk customs (X)	Shawan Piaose (floating tableau performance)
	Province	Traditional crafts (VIII)	Sha Wan Buffalo Milk Traditional techniques for making snacks
			Cantonese cooking techniques for mudfish
The traditional culture section	District	Folk customs (X)	The Lu Ban Folk Beliefs of Shawan
	Local	Folk customs (X)	Fish Lantern Parade
The ecological rural scenery section	Local	Speciality agricultural products	Sha Wan Black Orchid

5.4 Reformation and Reactivation of the Original Catalyst

5.4.1 Point catalysts

(1) The historic village section

The historic village section centres on the residential area, capturing the most authentic scenes of daily life and preserving the village's cultural heritage. Through small-scale, multifunctional spatial interventions, underutilised spaces are transformed into multifunctional hubs serving both villagers and visitors.

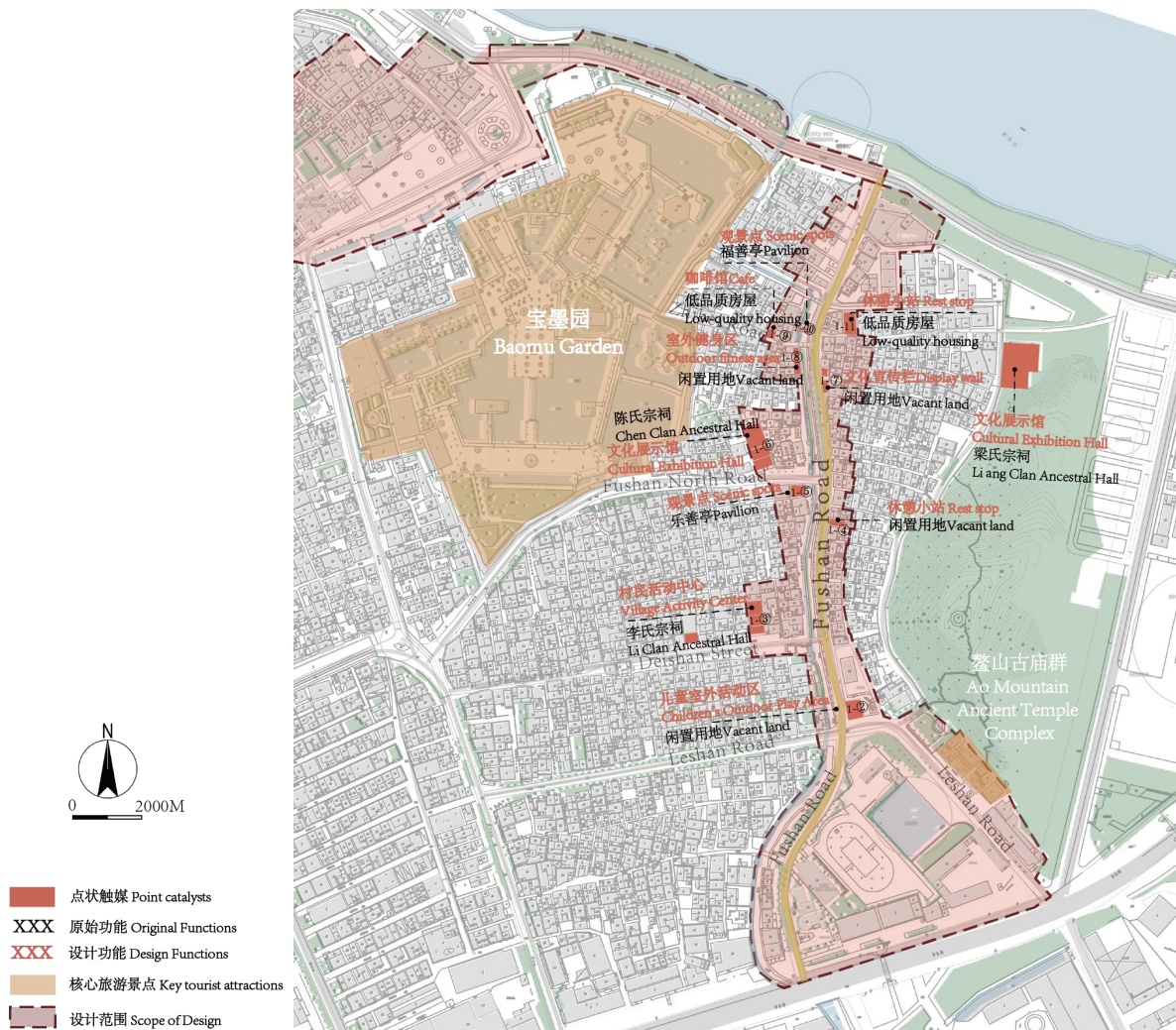


Figure 5-14 Functional Design of the Point Catalyst for the Historic Village Section

Source: Author's own drawing

1) Point catalyst 1: Adaptive modification of historical environmental elements

Point catalyst 1 for the historic village section primarily targets vacant plots and corner spaces near the gatehouse at Lane 11, Fushan Road.

According to field research, these spaces currently serve as neglected areas used for storing clutter. Situated along Fushan Road on both sides of a busy street, they offer good accessibility and visibility but have long remained underutilised, resulting in poor spatial quality. Although the land area is small, the renovation costs are low, offering potential for small-scale interventions.

The selection of these spaces for renovation is due to their location along the routes taken by both villagers in their daily lives and tourists on their visits, they serve as transitional zones connecting public streets with private residential areas. Transforming them into multi-functional nodes can simultaneously meet the dual needs of villagers and tourists for rest and access to information about the attractions.

In terms of spatial reorganisation, clutter within the site will be cleared to restore its tidiness and openness. The installation of pavilions and hedges will create a moderate separation from the surrounding residential areas, ensuring public accessibility whilst respecting residents' privacy. Regarding functional integration, public service facilities such as cultural information boards, seating, drinking fountains and charging points will be installed.

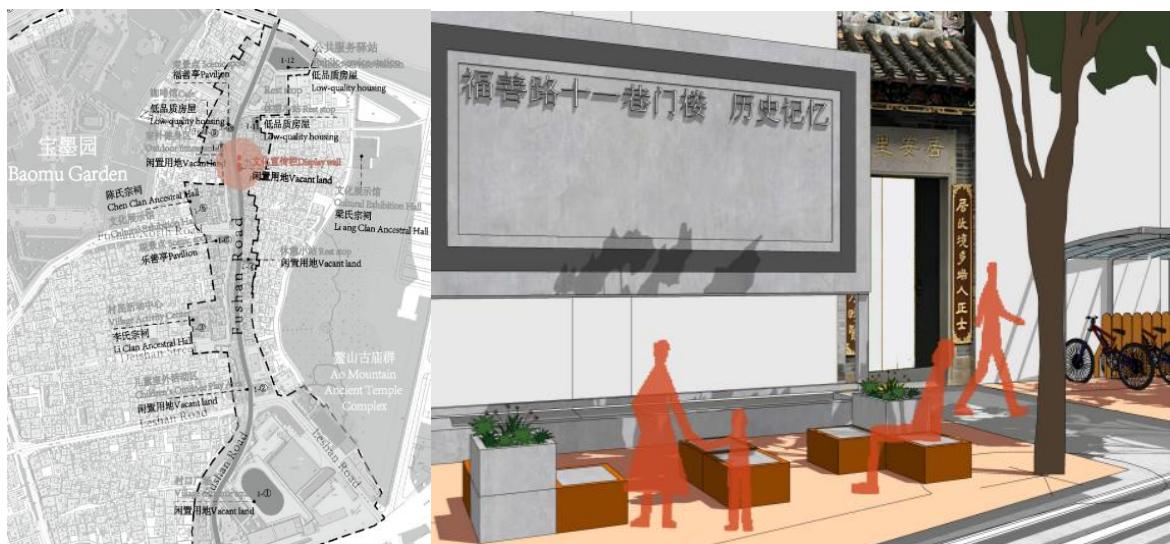


Figure 5-15 Rendering of the Point Catalyst 1 update for the historic village section

Source: Author's own drawing

2) Point catalyst node 2: Environmental coordination of historical environmental elements

Point catalyst 2 of the historic village section primarily covers the Fushan Pavilion and its surrounding area.

Based on field research, the Fushan Pavilion, as a well-preserved historical environmental feature along Fushan Road, serves as a vivid embodiment of the village's watertown character and is a hub for villagers' daily interactions and collective memories. The pavilion itself is in relatively good condition and possesses significant historical value and a strong sense of place. However, the surrounding area currently serves as a neglected space cluttered with rubbish, lacking the environmental quality befitting the pavilion. Although situated along Fushan Road in a densely populated waterfront location with excellent accessibility and visual prominence, it has long remained underutilised. The pavilion lacks seating facilities, and there are no supporting amenities in the vicinity. Consequently, the poor quality of the space has prevented it from fully realising its potential as a public gathering place.

The selection of this space for renovation stems from its position as a central hub for both villagers' daily recreation and tourists' sightseeing, serving as a vital venue for showcasing the village's watertown culture and facilitating public interaction. Transforming it into a multi-functional hub will simultaneously meet the dual needs of villagers for daily socialising and leisure, and tourists for sightseeing, relaxation and cultural experiences.

In terms of spatial reorganisation, clutter around the Fushan Pavilion will be cleared to restore the site's tidiness and openness. The authenticity of the pavilion's structure will be preserved, with only necessary structural reinforcement and surface cleaning carried out, ensuring its historical character remains intact. Resting facilities such as stone benches and wooden seating will be added inside and around the pavilion to provide spaces for lingering and viewing the scenery. Low railings will be installed along the riverside to ensure pedestrian safety whilst enriching the visual layers of the landscape.

In terms of functional layout, basic amenities such as tables and chairs for board games and leisure seating will be provided to meet villagers' daily needs for rest, conversation and

social activities such as playing chess. Cultural information boards will also be erected to recount the historical evolution of the Fushan Pavilion, the construction techniques of the ancient bridge and stories of the water town, thereby transforming historical environmental elements into cultural nodes. Furthermore, signage for viewing platforms has been installed to guide visitors towards the river, the ancient bridge and the waterside scenery, whilst public amenities such as seating, drinking fountains and charging points have been provided to offer convenient visitor services. This transforms the area into a neighbourhood space for villagers to rest, chat and play chess, as well as a venue for visitors to pause and admire the scenery, experience the waterside atmosphere and learn about the village' s culture.



Figure5-16 Rendering of the Point Catalyst 2 update for the historic village section

Source: Author' s own drawing



Figure5-17 The Master Plan of the Point Catalyst for the historic village section

Source: Author' s own drawing

(2) The traditional culture section

The key attractions within the traditional culture section primarily include representative historical and cultural buildings such as the Zhang Clan Ancestral Hall, the Zhang Clan Dayat Hall, the Zhang Clan Guangyu Hall, the Ancestral Hall on Xiaoyou Street, and the residential building at No. 4 Xiaoyou Street. Through the implementation of measures to preserve their authenticity, combined with functional repurposing and renovation to meet modern needs, these historical buildings are being revitalised and put to new use.

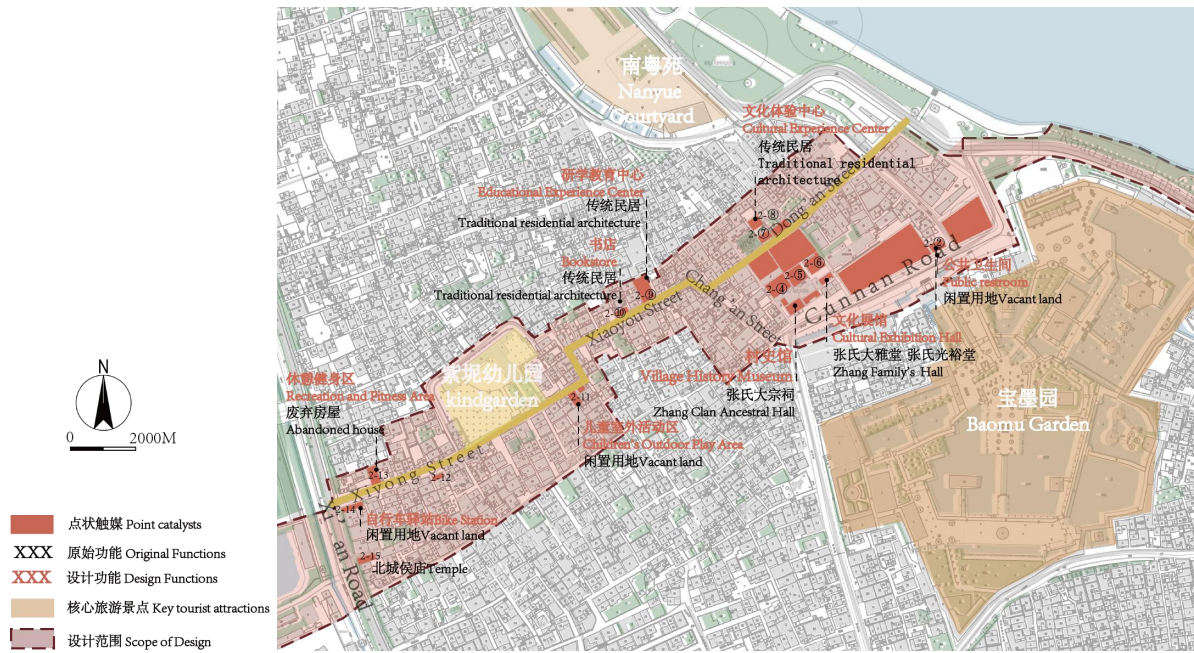


Figure5-18 Functional Design of the Point Catalyst for traditional culture section

Source: Author' s own drawing



Figure5-19 Rendering of the Point Catalyst update for the traditional culture section

Source: Author' s own drawing

1) Point catalyst model: Detailed restoration and adaptive reuse of historic buildings

Point catalyst 1 of the traditional culture section: The main sites selected are the Zhang Clan Ancestral Hall (a district-level protected building), the Zhang Clan Dayatang Hall and the Zhang Clan Guangyutang Hall

Based on field research, the Zhang Clan Ancestral Hall serves as the spiritual centre of the village and occupies a central position within it; however, the square in front of it is currently used for motor vehicle parking, which severely undermines the space's ceremonial atmosphere and public character. The Zhang Daya Hall and Zhang Guangyu Hall are academy buildings; historically, they housed the Guangyu Primary School, where practical skills such as farming and carpentry were taught. Influenced by the values of 'prioritising culture and education', these two structures are arranged side-by-side adjacent to the ancestral hall, reinforcing the village's cultural ethos of reverence for learning and education. However, the Zhang Guangyu Hall is currently severely dilapidated and has fallen into disuse as a derelict site; the forecourt of the Zhang Daya Hall is being used for motor vehicle parking.

In terms of spatial renovation, the principle of 'restoring the old to its original state' will be adopted. Elements of the building facades possessing historical value will be preserved and restored, the original appearance of traditional materials will be reinstated, and the structure will be reinforced. The Zhang Clan Guangyu Hall will be reconstructed in accordance with its historical layout and architectural style. Furthermore, the parking function currently occupying the square will be relocated to a planned car park on the periphery, and unauthorised structures and clutter around the buildings will be cleared to restore the square's public accessibility and ensure an unobstructed visual corridor for the historic buildings.

In terms of functional positioning, the interior spaces possess the potential to be converted into a village history museum and a cultural reception hall. Without compromising the original structure, the interior spaces will undergo appropriate partitioning and functional reorganisation. The Zhang Clan Ancestral Hall will be converted into a village history museum, featuring exhibition areas dedicated to the village's history. The Zhang Clan Dayatang Hall will be transformed into a cultural reception hall, serving as a multifunctional space for

issues such as damaged facades and the accumulation of rubbish, which are eroding their traditional architectural character. Some traditional residential buildings north of the Zhang Clan Ancestral Hall have suffered severe damage and have become derelict, overgrown plots of land.

In terms of spatial renovation, a strategy of maintenance and improvement, alongside the harmonisation of the architectural character, will be adopted. Unauthorised structures and accumulated rubbish around the buildings will be cleared, damaged walls, doors and windows will be repaired, and the traditional character of the dwellings will be restored. The mango trees in the traditional dwellings north of the Zhang Clan Ancestral Hall will be preserved, and the surrounding environment will be improved.

In terms of functional positioning, traditional ancestral hall architecture serves as the spatial catalyst, with the residential buildings on Xiaoyou Street being repurposed to incorporate functions such as a rural bookshop and educational field trips. The cluster of traditional residential buildings to the north of the Zhang Clan Ancestral Hall has been transformed into a composite cultural space for the transmission of intangible cultural heritage and ecological farming experiences, in accordance with the existing site conditions and architectural character. Building upon the existing architectural layout and spatial characteristics, residential spaces are transformed into educational spaces through the integration of new functions. This creates a synergistic effect with the neighbouring kindergarten and the clan hall, combining the transmission of intangible cultural heritage with educational field trips, thereby establishing an interactive experience venue within the traditional culture section.

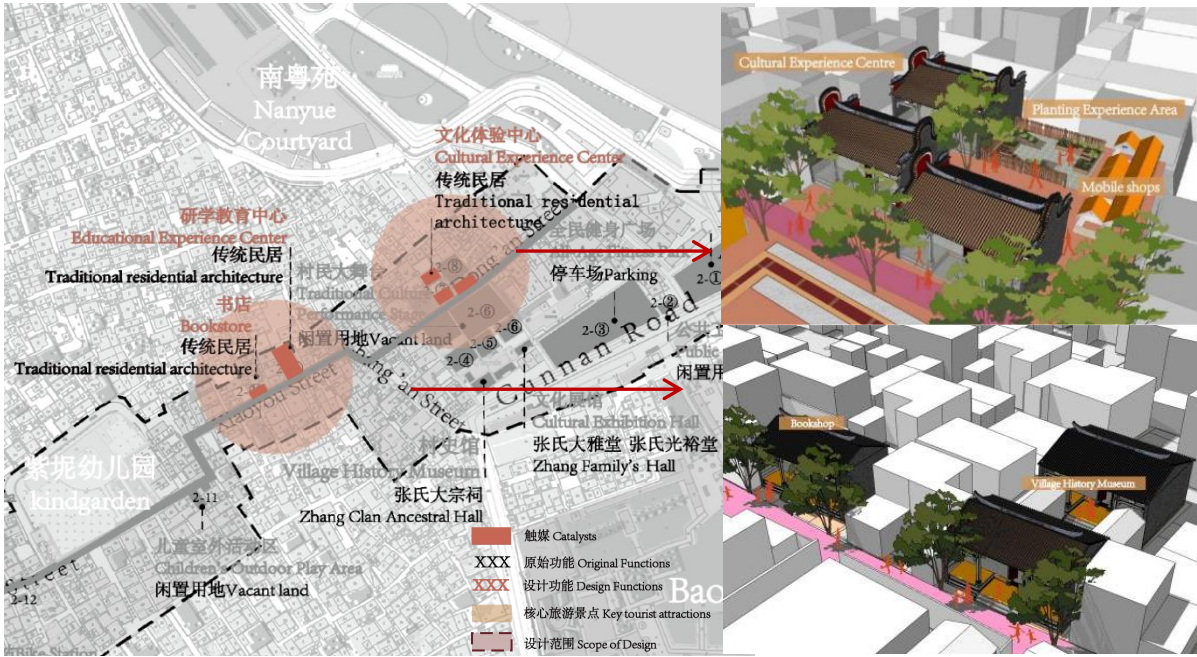


Figure5-22 Rendering of the Point Catalyst 2 update for the traditional culture section
Source: Author' s own drawing

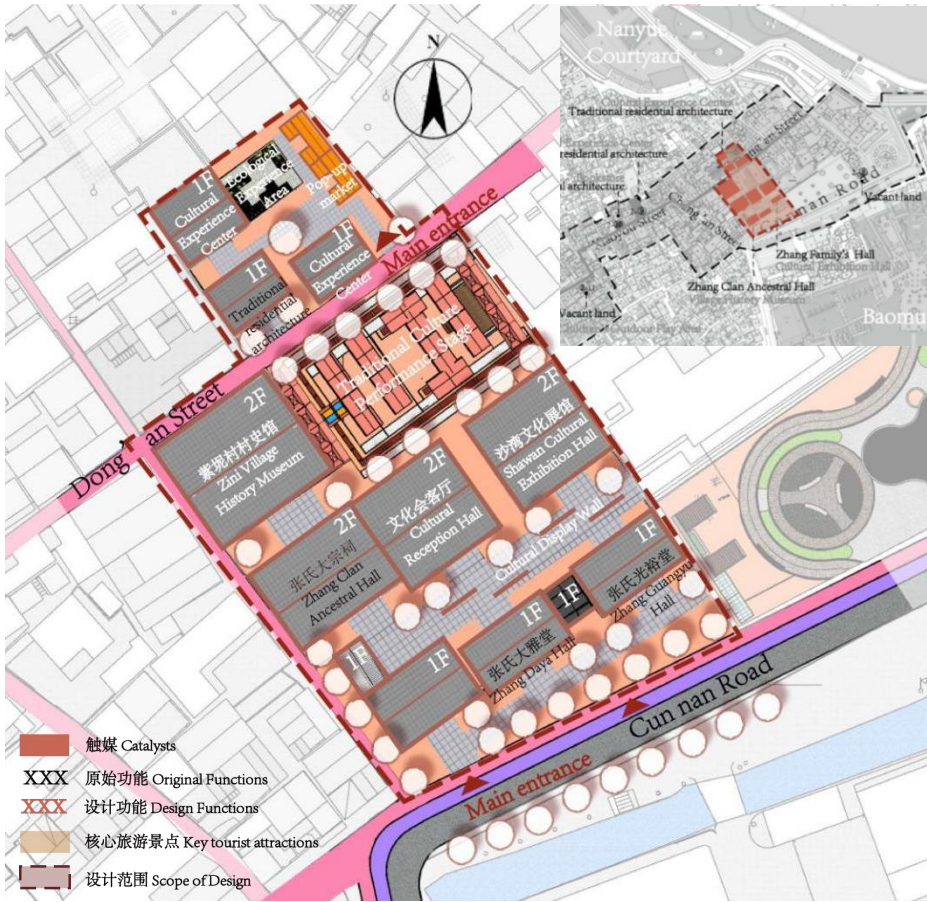


Figure5-23 The Master Plan of the Point Catalyst for the traditional culture section
Source: Author' s own drawing

(3) The ecological rural scenery section

The point catalysts within the ecological rural scenery section are primarily situated at the junctions of village main roads and rural sightseeing trails. These nodes are essential stopovers for cyclists, yet currently lack refreshment and rest facilities. The site is adjacent to a school and a high-density residential area, offering excellent public accessibility and connectivity.

The selection of this space for redevelopment is due to its central location within the ecological rural scenery section; it serves as a key anchor point connecting the agricultural demonstration base with the rural sightseeing trails. By transforming it into a public service hub, it can fulfil the dual functions of meeting cyclists' supply needs and providing a platform for villagers to showcase their agricultural produce.

In terms of spatial redesign, the existing site conditions will be utilised to establish a rest stop and bicycle parking area. Shade structures, such as wooden pavilions, will be added to enhance comfort during the summer months. In terms of functional integration, a rest stop combining café and bicycle station functions will be established, offering services such as cycling provisions and seating. Additionally, it will serve as a display and sales point for local specialities such as Sha Wan orchids, providing villagers with a direct sales channel for their produce. By transforming the site into a rural rest stop, it will become the core area for public service facilities within The ecological rural scenery section.



Figure 5-24 Rendering of the Point Catalyst update for the ecological rural scenery section

Source: Author's own drawing

5.4.2 Linear catalysts

(1) The historic village section

The linear catalyst for the historic village section is the everyday street used by villagers for their daily journeys, as well as a visitor route offering an immersive experience of the water town's charm. Furthermore, by removing structural bottlenecks that previously isolated the village from the enclosed section on the eastern side of Baomo Garden—through a combination of partial demolition, renovation and the construction of new pathways—spatial nodes that were once blocked by walls or fragmented by car parks have been integrated into a unified network for pedestrian and cycle traffic. This achieves dual continuity in both physical form and spatial perception, allowing visitors to transition seamlessly from the historic village section to the traditional culture section, thereby forming a complete and coherent tour sequence.

The linear catalyst primarily focuses on the main thoroughfare of this section: Fushan Road. This street runs alongside the water, closely intertwined with the natural watercourse. Along its length lie well-preserved historical environmental elements such as Fushan Pavilion, Leshan Bridge and Fushan Bridge, which vividly showcase the village's watertown character. These sites serve as venues for daily interaction among villagers and bear the weight of collective memory, constituting the most distinctive linear landscape resources.

Field research has identified several prominent issues with the current state of Fushan Road. The waterfront lacks pedestrian safety facilities and resting areas, resulting in a poor walking experience. In some sections, on-street parking and the accumulation of clutter disrupt the street's continuity and spatial quality. Furthermore, the absence of visitor information displays and supporting tourism facilities hinders the full expression of the village's culture and fails to effectively meet visitors' basic needs.

To address these issues, this section of the street has been selected for renovation. Through systematic spatial optimisation and the removal of bottlenecks, it will be transformed into an immersive, slow-paced route where visitors can 'walk across ancient bridges, admire the water scenery and savour the rural charm', making it the core attraction of the historic

village section.



Figure5-25 Selection of linear catalysts for the historic village section

Source: Author's own drawing

In terms of spatial reorganisation, clutter piled along the street and vehicles parked on the pavement will be cleared to restore the street's tidiness and accessibility. A green buffer strip will be added on the riverside to ensure pedestrian safety whilst enriching the landscape's depth and enhancing the water town's character. Resting facilities such as stone benches and wooden seats will be installed at key locations—including around the ancient pavilion and at both ends of the historic bridge—to provide spaces for visitors to linger and enjoy the views.

In terms of functional provision, cultural information boards will be installed at the gatehouse of Lane 11, Fushan Road, the Fushan Pavilion and the ancient bridge, detailing their historical evolution and construction techniques. Historical environmental elements will be transformed into cultural viewing points, serving as venues for appreciating the waterside scenery. Furthermore, the unused open spaces around the ancient pavilion will be utilised to incorporate multifunctional public services. On the one hand, basic amenities for daily rest,

socialising and playing chess will be added to meet the villagers' daily social and leisure needs. On the other hand, tourist facilities such as bicycle stations, public toilets, seating and drinking fountains will be provided to offer cyclists a place to rest and replenish their supplies. Through this strategy of functional integration, the street-front space will be transformed into a shared venue for interaction between visitors and local residents.



Figure5-26 Rendering of the linear Catalyst 1 update for the historic village section

Source: Author' s own drawing



Figure5-27 Rendering of the linear Catalyst 2 update for the historic village section

Source: Author' s own drawing

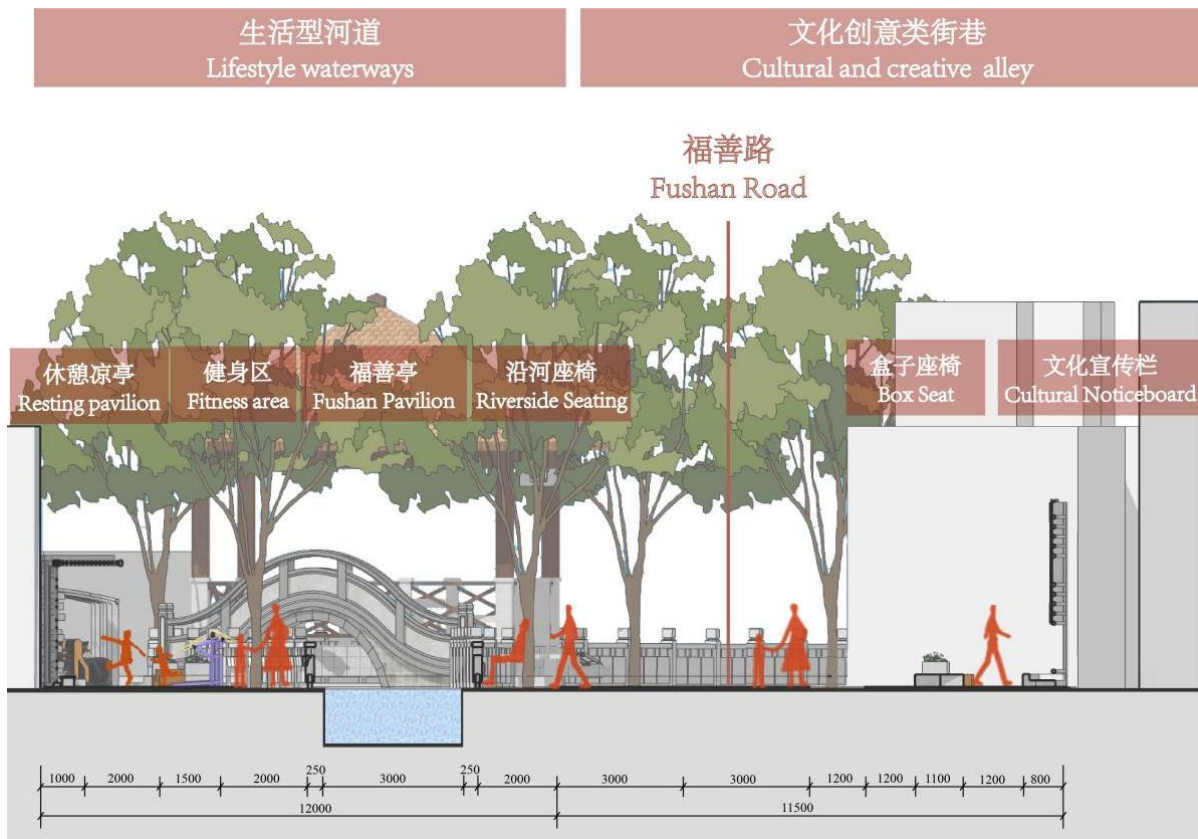


Figure5-28 Section Drawing of a Street Showing Linear Catalytic Regeneration of the historic village section

Source: Author's own drawing

Furthermore, the design of the street-facing spaces adopts a modular approach, based on four types of modules: box-style seating, wooden pavilions, retail outlets and fitness facilities. Through flexible combinations and layouts, these modules achieve a blend of functions. These modular facilities are designed to be dismantled, moved and replaced, allowing for phased implementation and dynamic adjustments based on user feedback, thereby creating a progressive development pathway. By creating a 'neighbourhood living room + service station', Fushan Road will become a neighbourhood space where villagers can exercise, chat and socialise on a daily basis, whilst also serving as a linear space where visitors can take a brief respite and experience the local atmosphere.

improve the quality of the pedestrian environment. Regarding the area surrounding Zini Kindergarten, idle buildings on the east and west sides will be converted into outdoor play areas for children and waiting areas for parents, thereby alleviating crowd congestion during school dismissal times and enhancing safety in the vicinity.

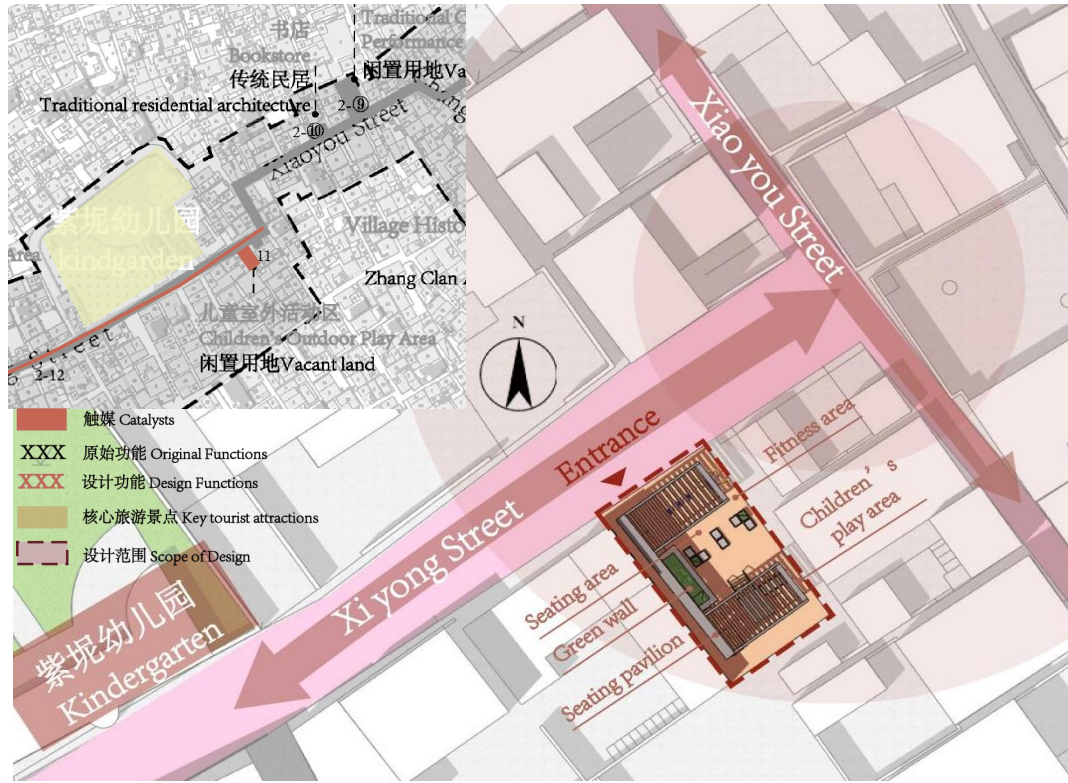


Figure5-32 Plan of Spatial Regeneration Along the Cultural Corridor of Traditional Villages

Source: Author' s own drawing

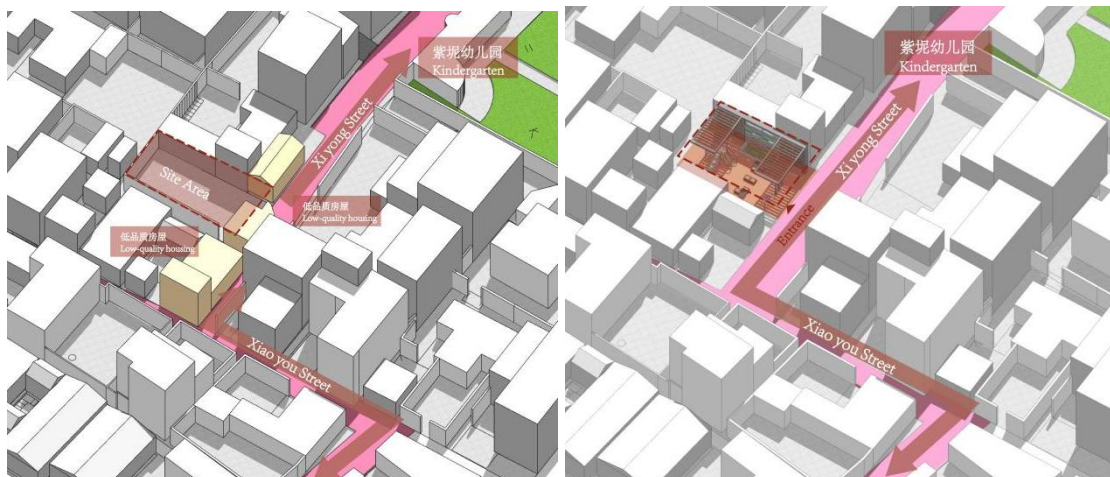


Figure5-33 Spatial Site Analysis Map of the Cultural Corridor of Traditional Villages

Source: Author' s own drawing

In terms of functional design, rest areas and fitness facilities will be installed at street corners and key junctions where foot traffic converges, to meet the daily needs of visitors and

residents. Facilities such as seating, fitness equipment and cultural display boards will be installed to meet the daily needs of visitors and residents for rest, exercise and access to information. By systematically linking and revitalising key spatial nodes, visual connectivity and functional interaction within the neighbourhood will be effectively enhanced, significantly improving the permeability and continuity of the public space. The aim is to transform Dong'an Zhijie into a vibrant, mixed-use street that preserves its traditional character whilst integrating modern amenities, thereby comprehensively enhancing the quality of the visitor experience and the cultural appeal of the area.



Figure 5-34 Rendering of The Linear Catalyst Update for The Traditional Culture Section

Source: Author's own drawing

(3) The ecological rural scenery section

The ecological rural scenery section centres on the village's farmland, creating a natural, eco-friendly pedestrian and cycle route by optimising the landscape interface.

The linear catalyst is primarily the road between Ruiyuan and the Zini Tang dormitory. The existing road suffers from severe connectivity issues; the presence of perimeter walls has

resulted in a lack of convenient pedestrian access between the main road and the Zini Tang Creative Park. Currently, visitors and villagers wishing to reach the Zini Tang Creative Park from the main road are forced to detour through the Zini Tang dormitory area. This not only significantly lengthens the walking distance but also disrupts the daily lives of residents. Furthermore, the lack of a clear passageway prevents effective integration between the Zini Tang Creative Park and the surrounding ecological park, making it difficult for the cultural and creative resources derived from industrial heritage and film production to synergise with the ecological resources of the farmland and water village.

In terms of spatial reorganisation, the plan involves breaking down the barriers created by the perimeter walls, redesigning pedestrian routes, and establishing a direct pedestrian link between the main road and the Zini Tang Creative Park. This will divert external foot traffic from the Zini Tang residential area onto dedicated pedestrian paths, thereby restoring the privacy and sense of security within the residential zone. Rest areas and public amenities will be installed along the route to enhance the pedestrian experience.

In terms of functional design, this linear catalyst primarily serves to connect the ecological park with the Zini Tang Creative Park, establishing an integrated development model combining ‘agriculture and cultural creativity’. Simultaneously, unused plots will be utilised as agricultural planting experience zones, transforming the passageway into a pastoral experience route that is both enjoyable and educational, thereby becoming a key link between the rural ecosystem and industrial heritage.

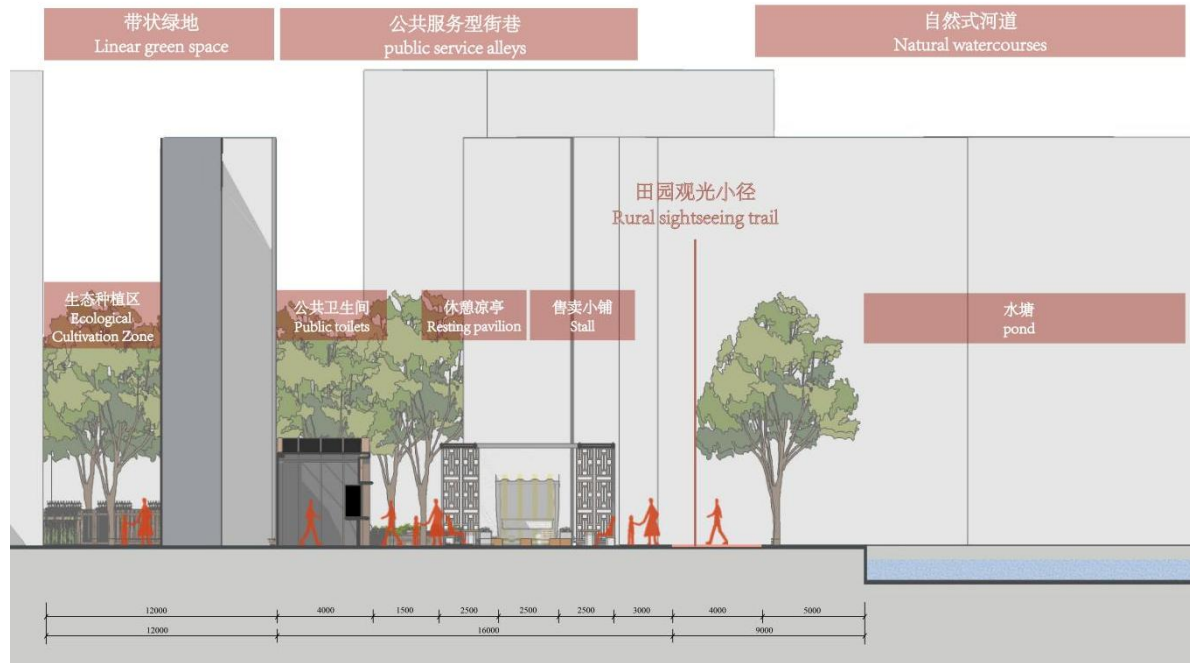


Figure5-35 Section of Linear Catalytic Regeneration of the ecological rural scenery section

Source: Author' s own drawing



Figure5-36 Rendering of the linear catalyst update for the ecological rural scenery section

Source: Author' s own drawing

5.4.3 Planar catalysts

(1) The historic village section

The Planar catalyst in the historic village section serves as the village' s gateway and living room, providing visitors with their first impression of the village whilst also functioning as a public gathering space for local residents. This design transforms it into a multi-functional public space that integrates visitor services, transport hubs and cultural exhibitions.

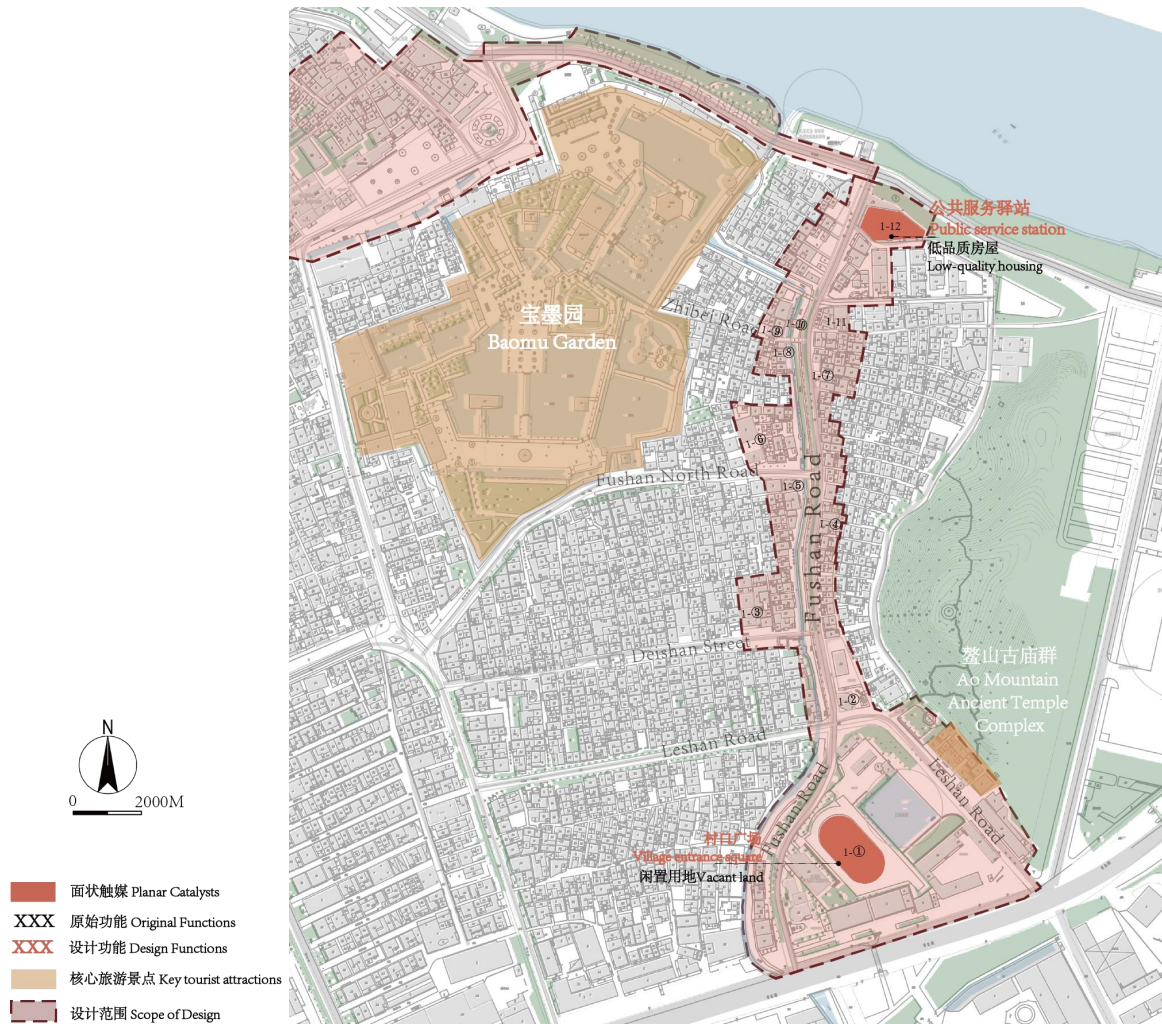


Figure5-37 Functional design of planar catalysts in the ancient village experience section

Source: Drawn by the author

The Planar catalyst project utilises the disused public playground at the entrance to Sanshan Village. The site is situated near the southern entrance to the village, adjacent to the main urban thoroughfare, Shiliang Road, and faces the Aoshan Ancient Temple Complex across the road. The village entrance square serves as the hub for the village's external transport links and is a crucial transitional space for visitors moving from the urban environment into the village.

The current space lacks vitality, serving merely as a transitional passageway for pedestrians, with a dearth of facilities for lingering or resting. It lacks effective spatial connections with the surrounding Aoshan Ancient Temple Complex, failing to form an organic link in the visitor circulation route. The disused building to the north, formerly the site of Sanshan Primary School, has now been converted into 'Jiangyuanfang', a venue for

displaying folk crafts. However, the public playground remains underutilised, with poor spatial quality.

In response to these issues, this particular space has been selected for redevelopment. As the village entrance, it serves as the primary gateway and showcase for the village's character, and its spatial quality directly influences visitors' first impressions. By employing micro-renewal techniques to transform it into a multifunctional, high-quality public space, the overall appeal of the village can be significantly enhanced, whilst also acting as a positive catalyst for the surrounding areas.

In terms of spatial reimagining, the disused public sports ground will be transformed into a multi-functional activity square, utilising traditional paving materials to delineate distinct functional zones. The parking facilities currently occupying the square will be relocated to a planned car park on the periphery, thereby restoring the square's public and open character. Native plants will be introduced along the edges of the square, with tree pits and flower beds installed to soften the hard surfaces. Accessibility will be ensured, meeting the needs of users of all ages.

In terms of functional layout, the central area of the square serves as a hub for visitors to gather and rest, featuring seating and fitness equipment. Small children's play areas are situated on either side of the square to cater to the needs of families with children. Along the perimeter of the square, bicycle parking facilities and a non-motorized traffic rest stop have been provided to ensure seamless integration between different modes of transport. Furthermore, cultural feature walls and a village entrance sign have been installed in prominent, outward-facing areas to enhance the village's image.

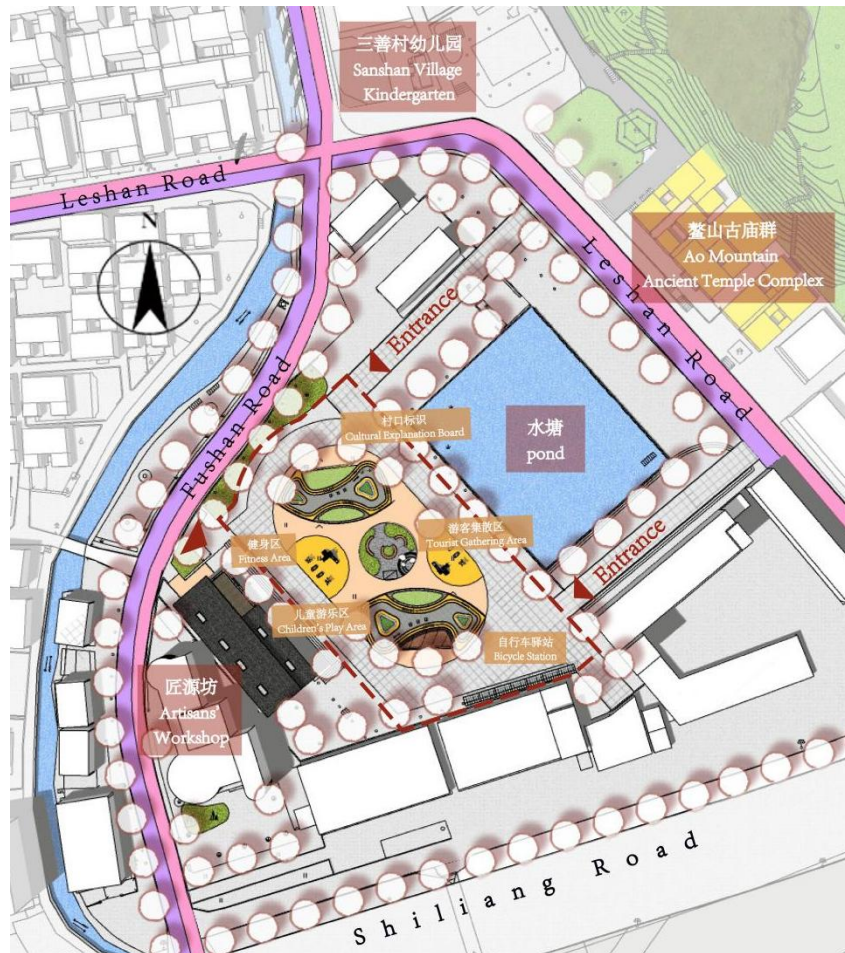


Figure5-38 Master Plan of Planar Catalysts in the Ancient Village Experience Section

Source: Author's own drawing



Figure5-39 Rendering of the Planar catalyst update for the historic village section

Source: Author's own drawing

(2) The traditional culture section

The Planar Catalyst in the traditional culture section serves as the central hub for visitor circulation and community activities, comprising primarily the open space within the Zhang Clan Ancestral Hall, the square in front of the Baomo Garden office building, and the areas surrounding the ancient trees. By restoring the square's public accessibility, it will serve as a key venue for cultural events such as festivals, ceremonies and cultural performances, as well as a multi-functional space offering villagers and visitors opportunities for daily relaxation, socialising and exercise. It will thus become a vital link connecting tradition and modernity, and villagers and visitors.

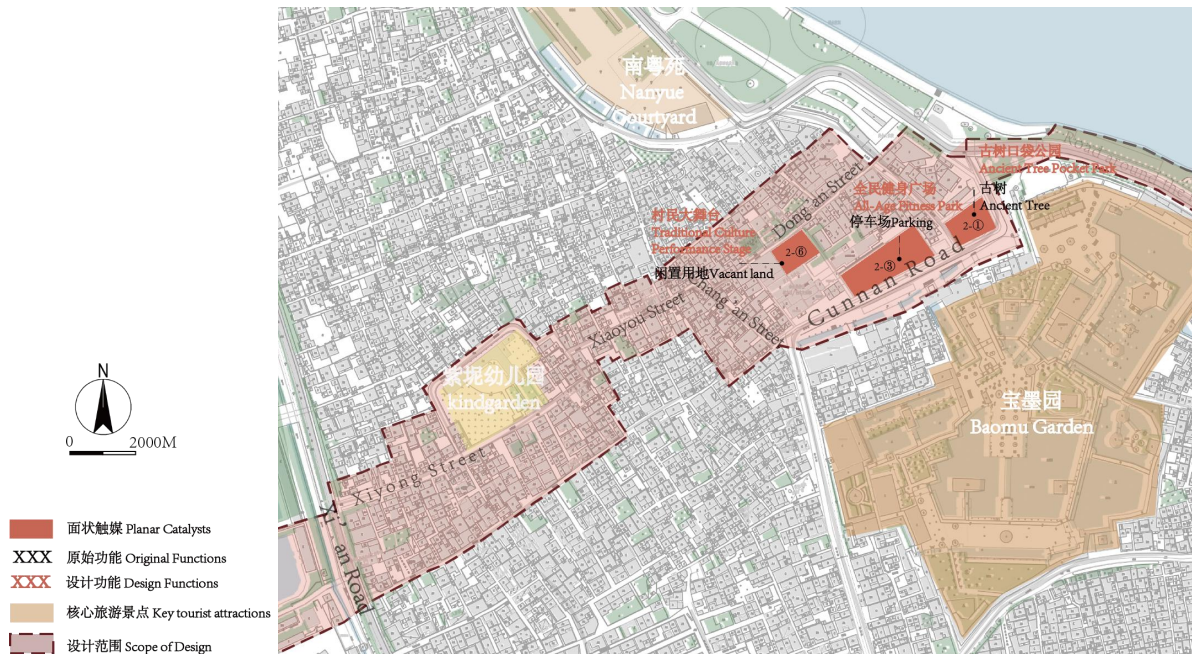


Figure5-40 Design of the planar catalytic function of the traditional culture section

Source: Author's own drawing

The Planar Catalyst is situated at the square in front of the Baomo Garden office building. This site is located midway between Baomo Garden and the Zhang Clan Ancestral Hall, serving as the core area for visitor distribution. Based on field research, the existing space is largely occupied by motor vehicle parking, severely undermining its public nature and openness.

In terms of spatial reorganisation, the parking function currently occupying the square will be relocated to a planned car park on the periphery, thereby restoring the square's public and open character. Functionally, the central area of the square will be equipped with seating

and cultural information boards to serve as a visitor hub. Children's play areas and senior citizens' activity zones will be established on either side of the square, creating a multi-functional activity space that caters to the needs of all age groups. Public toilets and a bicycle station will be situated in the peripheral areas to provide essential public service facilities for visitors. By restoring the square's public and open character, its functions for cultural display and daily activities will be enhanced, thereby reshaping and elevating the village's overall public image and establishing it as the core area of the Traditional Culture Section.

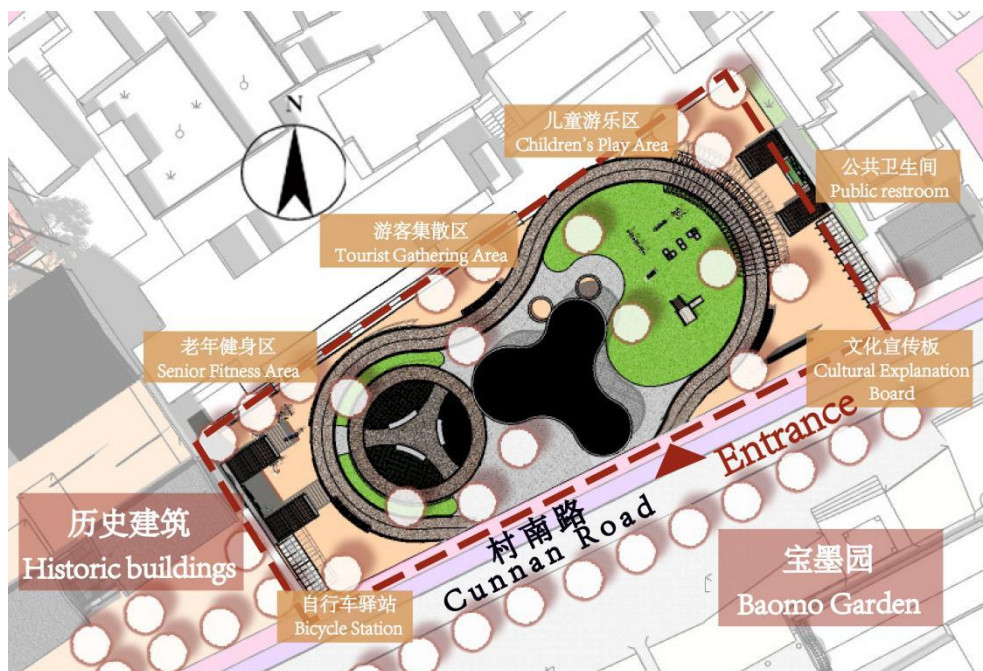


Figure5-41 Master Plan of Planar Catalysts in the Ancient Village Experience Section

Source: Author's own drawing



Figure 5-42 Rendering of the Planar catalyst update for the traditional culture section

Source: Author's own drawing

(3) The ecological rural scenery section

The Planar Catalyst within the ecological rural scenery section serves as the core space for transforming traditional agricultural production areas into participatory, experiential public spaces. The Planar Catalyst utilises a vacant plot of land situated along the roadside. This site is adjacent to a nearby park and currently lies unused. As it is situated close to a school and a high-density residential area, it offers excellent public accessibility and connectivity.

In response to the above issues, this type of space has been selected for redevelopment. Given the favourable soil conditions and well-developed irrigation facilities in the surrounding area, the site possesses the necessary infrastructure to facilitate participatory farming experiences. By transforming it into an agricultural production experience space, it will not only create an immersive experience for visitors but also provide local villagers with a direct sales channel for their produce.

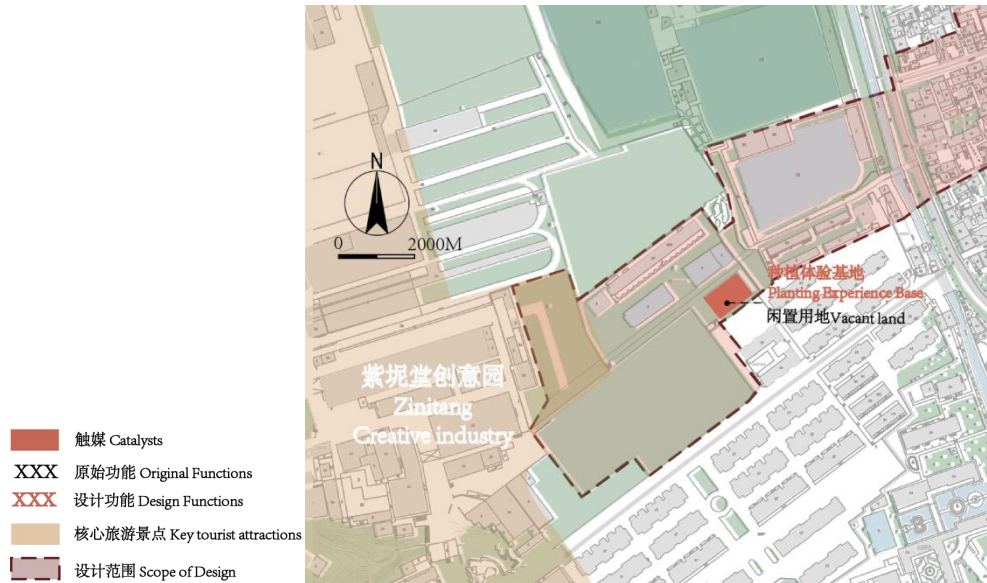


Figure5-43 Design of the planar catalytic function of the ecological rural scenery section

Source: Author' s own drawing

In terms of spatial reorganisation, the site is divided into three functional zones: an educational experience area, a wellness and horticulture area, and a product display area. These zones will interact synergistically with Hongji School and Ruiyuan, forming an integrated ‘agriculture + education’ development model.

In terms of functional layout, a modular design strategy has been adopted, utilising planting modules such as one-metre vegetable plots, raised planting beds and individual planting pools. Through flexible combinations and functional zoning, a composite layout incorporating self-managed, assisted and supported planting has been achieved within the agricultural demonstration base. This meets the diverse needs of student field trips, parent-child interaction, elderly wellness and visitor leisure, creating an immersive experience that brings agriculture to life.

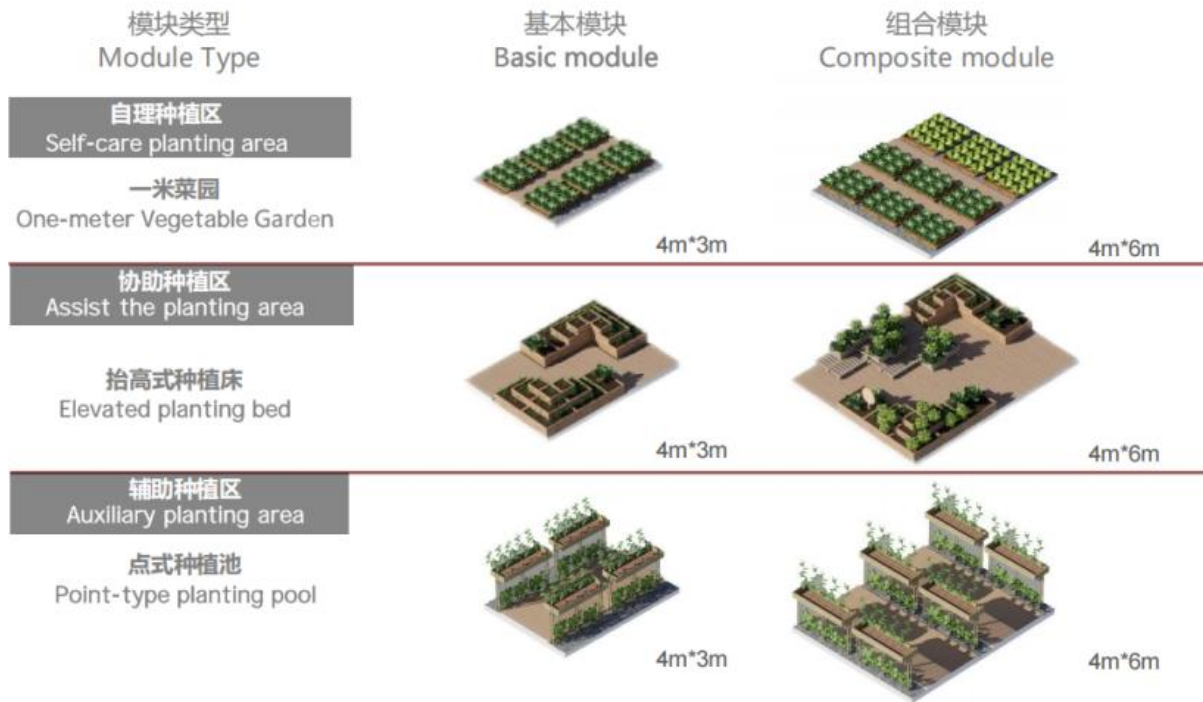


Figure5-44 Modular design of production spaces

Source: Author' s own drawing



Figure5-45 Rendering of the Planar catalyst update for the ecological rural scenery section

Source: Author' s own drawing

5.4.4 Intangible catalysts

Intangible catalysts are the key elements for revitalising the temporal dimension of traditional villages. Selected as the intangible catalyst is the Guangdong Lion Dance, a national-level intangible cultural heritage. Based on field research, the Guangdong Lion Dance, as a national-level intangible cultural heritage, possesses immense cultural value and holds great appeal for visitors. Currently, exhibitions and performances are primarily concentrated within the Baomo Garden scenic area, lacking organic integration with the village's public spaces and failing to generate a dispersed, sustained cultural vitality. Through a dual strategy of spatial anchoring and event integration, the project aims to facilitate functional shifts within the same space at different times, thereby creating a lasting cultural appeal.

The Intangible catalysts selected is the Guangdong Lion Dance, a national-level intangible cultural heritage. Based on field research, the Guangdong Lion Dance, as a national-level intangible cultural heritage, possesses immense cultural value and tourist appeal. Currently, its displays and performances are primarily concentrated within the Baomo Garden scenic area, lacking organic integration with the village's public spaces; consequently, it has failed to generate a dispersed, routine infusion of cultural vitality.

(1) Spatial organisation

In terms of spatial organisation, the inner courtyard of the Zhang Clan Ancestral Hall serves as a flexible event space. During normal hours, it functions as a shared space where villagers and visitors can rest and socialise. Employing a flexible layout, it can be easily reconfigured to host market events and temporary exhibitions. At weekends, modular facilities are used to transform the space into a stage for lion dance performances. During festive periods, it serves as a multi-purpose venue for themed markets and cultural performances, enabling the same physical space to host diverse cultural events at different times. Concurrently, a lion dance cultural experience space has been established within the reconstructed Zhang Clan Guangyu Hall to display lion dance props, costumes and techniques.

Operating as a permanent heritage exhibition hub, it complements the event-based activities in the square.

(2) Event scheduling

In terms of event programming, the schedule can be divided into categories such as weekdays, weekends and public holidays. During weekdays, visitors can explore the Lion Dance Cultural Experience Space to gain an in-depth understanding of the history, cultural significance and artistic expression of the lion dance. Meanwhile, the square area can serve as a regular farmers' market or an outdoor exhibition space, providing local villagers with a platform for direct sales of agricultural produce, as well as offering a rich variety of cultural promotions and interactive experiences, thereby fostering urban-rural exchange and community vitality.

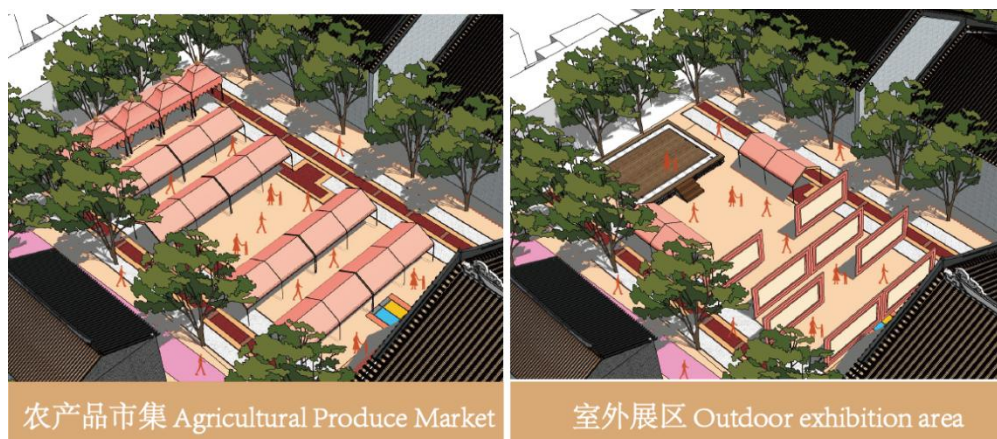


Figure5-46 Intangible Catalyst Reshaping During Weekday Period

Source: Author's own drawing

Table5-8 Integration of Intangible Catalysts During Weekday Period

Source: Author's own drawing

Period Level	Event Type	Specific Content	Spatial Adaptation	Catalytic Effect
Weekday Period	Cultural Exhibition Space	Provide diverse cultural promotion for villagers and visitors	Preserve the open nature of the square by installing movable cultural display boards	Attract a basic flow of people, fostering cultural awareness
		Regular morning market for		Promoting interaction
	Agricultural Market	agricultural produce, with villagers selling their own speciality products directly	Installation of portable stall frames	between locals and visitors, revitalising the local economy

At weekends, professional lion dance performances are held regularly in the square outside the Zhang Clan Ancestral Hall, creating a cultural highlight of the weekend and attracting visitors from the surrounding area to watch the shows. In addition, the square could host introductory lion dance classes, lion head painting workshops and related themed exhibitions. By showcasing the historical origins and artistic characteristics of lion dance culture, these activities enrich the cultural experience for visitors.

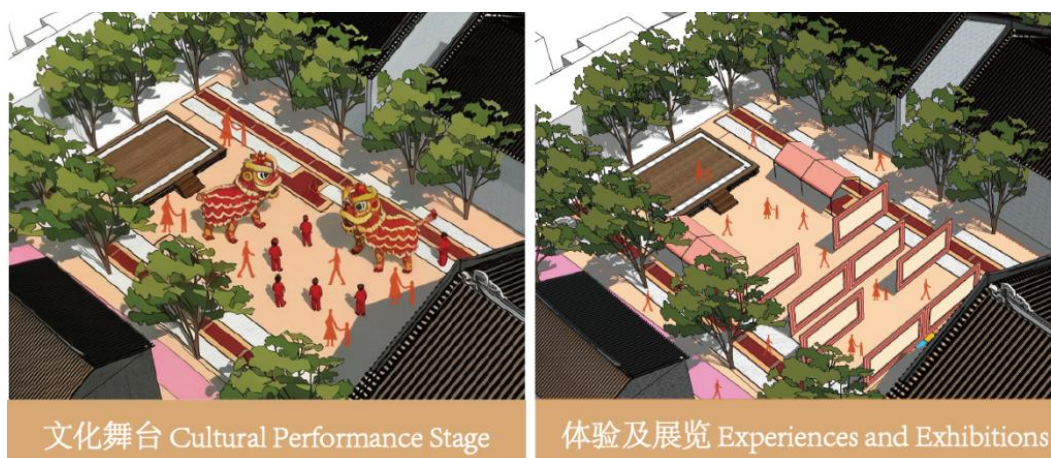


Figure5-47 Intangible Catalyst Reshaping During Weekend Period

Source: Author's own drawing

Table5-9 Intangible Catalyst Reshaping During Weekend Period

Source: Author's own drawing

Period Level	Event Type	Specific Content	Spatial Adaptation	Catalytic Effect
Weekend Period	Guangdong Lion Dance Fixed-Point Performance	Professional lion dance performance	A stage is set up on one side of the square, with designated areas for performers and spectators	Creates a cultural highlight at weekends, attracting residents from neighbouring cities
	Intangible Cultural Heritage Experiences and Exhibitions	Basic lion dance instruction, lion head painting workshops and related themed exhibitions	Set up experience and teaching areas as well as exhibition zones	Create an immersive cultural experience and cultivate a potential community of inheritors

During festive periods, distinctive festive markets and annual lion dance performances will be organised around traditional themes, creating an annual cultural highlight and generating sustained cultural appeal. Through the integration of spatial organisation and Event schedule, the area is transformed from a single-purpose hub into a flexible cultural space, thereby enhancing the village's cultural vitality and distinctiveness.



Figure5-48 Intangible Catalyst Reshaping During Festival Period

Source: Author's own drawing

Table5-10 Intangible Catalyst Reshaping During Festive Period

Source: Author's own drawing

Period Level	Event Type	Specific Content	Spatial Adaptation	Catalytic Effect
Festive Period	Annual Lion Dance Performance	Lion dance performances held during the Lunar New Year	A dedicated performance stage set up in the square	To enhance cultural identity and establish an annual cultural highlight
	Festive Market	Organising a themed cultural and creative market based on traditional festive themes	Setting up mobile stalls in the square, with additional lighting and festive decorations	To create a festive atmosphere and enhance the sense of cultural immersion

(3) Narrative Sequence

A narrative network system will be established based on the thematic characteristics of different sections of Zini Village. By combining elements of time and space, disparate types of cultural catalysts will be linked together to form a sequence of cultural experiences. In this way, as villagers and visitors proceed along the Non-motorized Corridors, they will gradually come to appreciate the cultural essence of the village, thereby strengthening their cultural identity with the community.

The Historic Village Section serves as a transition from urban to rural space, with a focus on everyday life narratives. Centred on Fushan Road, this section primarily showcases scenes of daily life, such as conversations by the ancient pavilion and moments of rest before the gate towers. Combined with cultural information panels, it provides historical explanations of the water town's stories, the construction techniques of Fushan Pavilion and the gate towers, enabling visitors to gradually form their first impression of the village as they transition from the urban to the rural environment, and to experience tangible scenes of everyday life.

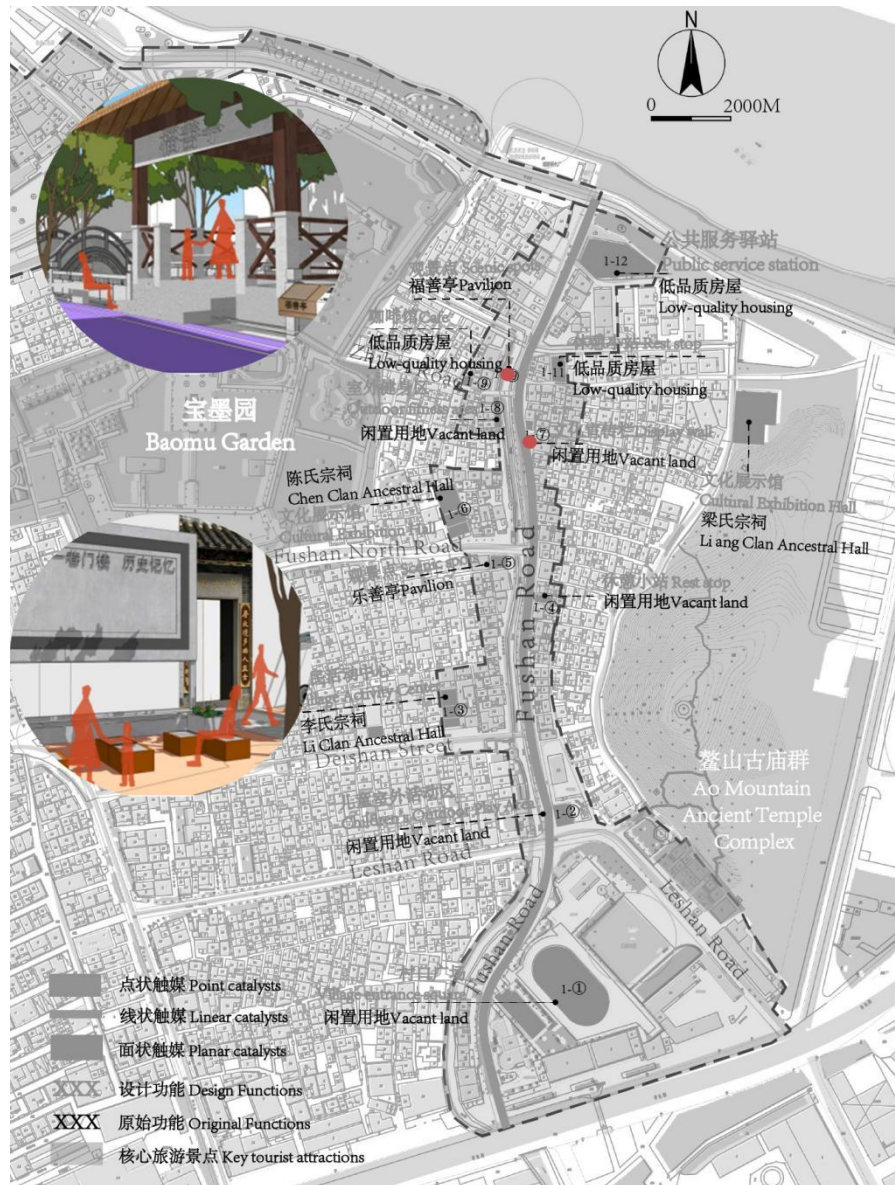


Figure 5-49 Narrative sequence of the historic village section

Source: Author's own drawing

The Traditional Village Culture section employs historic buildings and traditional dwellings as spatial anchors to form a cultural narrative. During weekday periods, a lion dance cultural experience centre is established at the Zhang Clan Guangyu Hall, while an agricultural produce market is set up in the square within the clan hall, showcasing the village's everyday economic vitality. At weekends, lion dance performances and intangible cultural heritage experiences are staged in the square of the Zhang Clan Ancestral Hall to enhance cultural distinctiveness. During festivals, the site serves as the central space for annual lion dance performances and themed festive markets, heightening the sense of cultural immersion.

Furthermore, utilising the traditional dwellings along Dong' an Straight Street as a showcase, the area concentrates on presenting ancestral hall culture, academy culture and folk culture, thereby progressively enriching visitors' cultural experience.

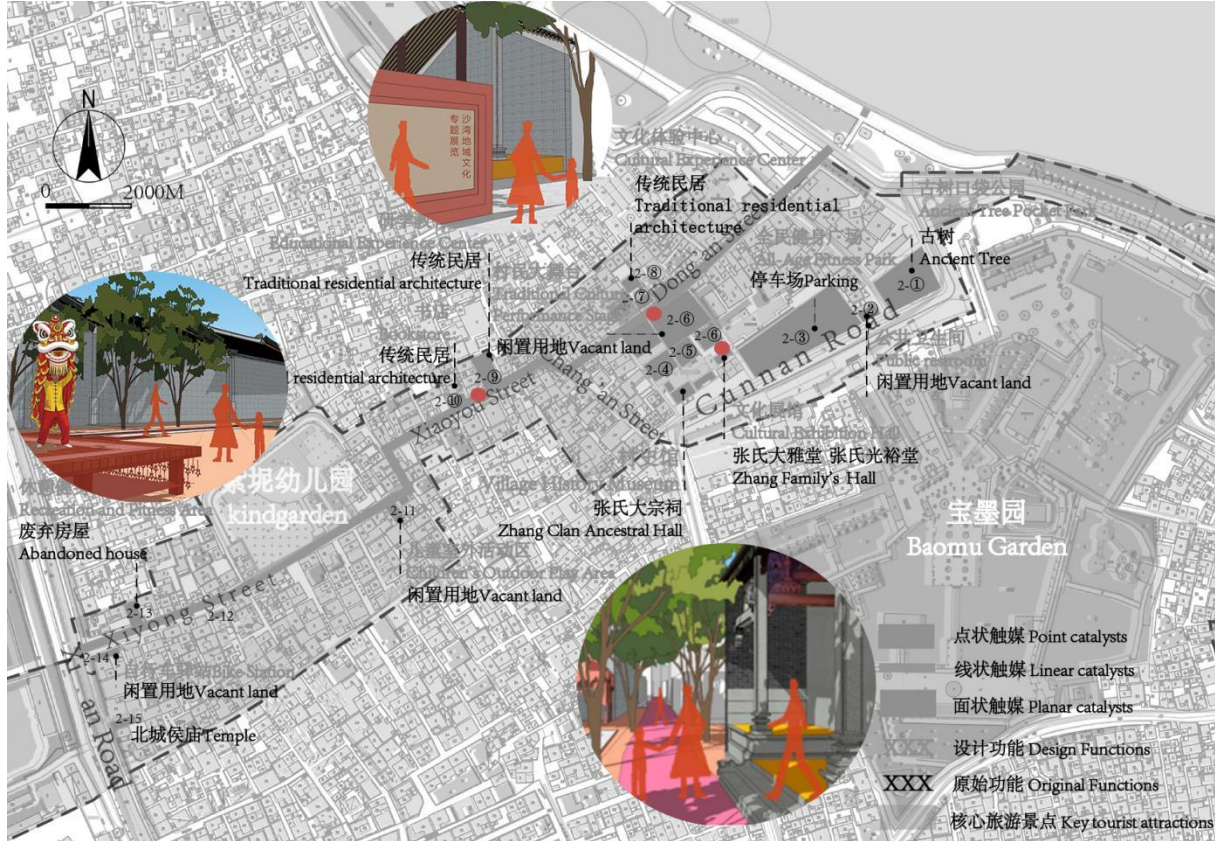


Figure5-50cultural narrative Narrative sequence of the traditional culture section

Source: Author' s own drawing

The ecological rural scenery section centres on natural scenery and farming experiences to create a narrative of agricultural production. Building on this rural setting, a rural rest stop has been established to provide spaces for relaxation and retail. The agricultural demonstration base serves as a venue for showcasing the cultivation of Sha Wan black orchids; horticultural activities are organised here to create interactive experiences, thereby fostering an immersive cultural experience of rural life.

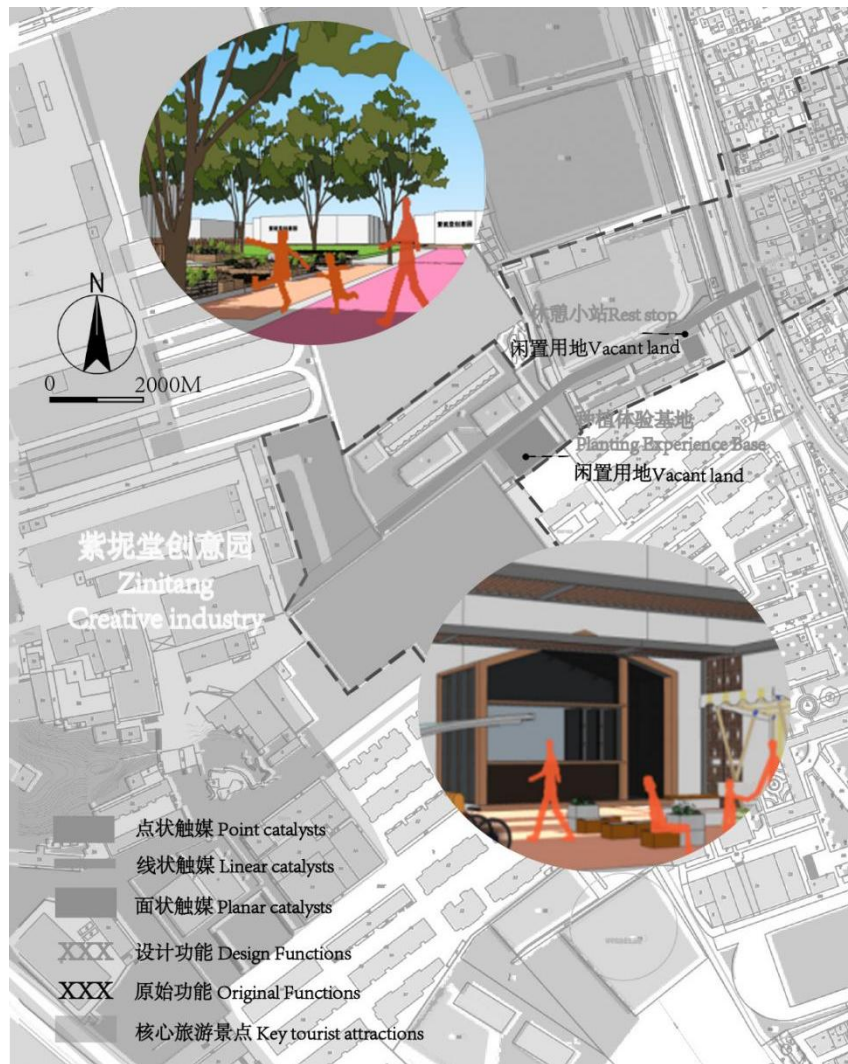


Figure5-51 Narrative sequence of the ecological rural scenery section

Source: Author' s own drawing

5.5 Guidance and Control of Catalytic Reactions

The catalytic effect is characterised by uncertainty and diffusiveness in actual reaction processes. Without effective guidance and control, it may deviate from the intended objectives, potentially leading to spatial imbalance or cultural alienation. This design establishes a guidance and control system for the catalytic reaction of the Zini Village Non-motorized Corridors across three dimensions: multi-stakeholder participation, incremental renewal, and the refinement of management systems. This ensures that the catalytic effect continues to be harnessed within manageable limits, ultimately achieving the sustainable development of the village.

5.5.1 Multi-stakeholder participation

By establishing a collaborative governance system characterised by ‘government guidance, village-led initiatives and corporate support’, the responsibilities of each stakeholder will be clearly defined and the coordinated participation of multiple stakeholders promoted, thereby ensuring the sustainable development of the catalytic effect.

At the government-led level, the town government and village committees assume the core functions of policy support and resource coordination. The town government formulates policies regarding the construction and operation of the Non-motorized Corridors and coordinates support from district-level departments responsible for planning, culture and tourism, and transport. The village committees organise villagers’ participation throughout the entire construction process, gather feedback from villagers, and coordinate the resolution of conflicts and disputes arising during construction. At the same time, the government should establish a dedicated guidance fund to provide subsidies or incentives for villagers’ independent renovations and the introduction of new business formats, thereby stimulating endogenous momentum.

At the villager-led level, villagers are the direct users of the Non-motorized Corridors and the driving force behind the catalytic effect. By establishing a ‘Village Deliberation Council’ mechanism, villager representatives are regularly organised to discuss and vote on

matters such as corridor construction plans, the functional design of key nodes, and the types of businesses to be introduced. For specific projects, such as the conversion of the ancestral hall on Xiaoyou Street into a rural bookshop or the transformation of idle plots along Fushan Road into fitness hubs, villagers may participate in stages including scheme selection, construction supervision and operational feedback. Furthermore, villagers are encouraged to utilise their own homes to engage in activities such as running guesthouses, selling agricultural produce and displaying handicrafts, thereby enhancing their sense of participation and fulfilment.

At the corporate support level, professional operational teams and social capital should be introduced to participate in the construction and operation of the corridor. The operator of the Zini Hall Creative Park may participate in the development of agricultural experience projects within the ‘Ecological Rural Scenery’ section. The Baomo Garden scenic area may collaborate with the village collective to extend certain intangible cultural heritage performances and cultural exhibitions into the village’s public spaces, thereby achieving shared visitor flows and functional complementarity between the scenic area and the village. At the same time, local businesses are encouraged to introduce businesses such as cafés, light dining and cultural and creative retail into street-front spaces to enrich the service functions of the corridor.

5.5.2 Gradual updates

To minimise the impact of large-scale demolition and construction on the village’s fabric and the lives of its residents, this design adopts a phased regeneration approach based on the principles of ‘pilot projects first, phased implementation, and dynamic feedback’. The regeneration process is divided into three stages, with clear priorities and expected outcomes defined for each stage.

(1) Phase One: Model Development and Core Catalyst Activation

Phase One focuses primarily on the most representative and relatively straightforward core catalytic nodes, thereby creating a demonstration effect. Through the modular

redevelopment of the vacant land near the gatehouse at Lane 11, Fushan Road, facilities such as cultural display boards, seating and fitness equipment will be installed to create a demonstration node serving as a ‘neighbourhood living room’. Environmental improvements and functional enhancements around Fushan Pavilion will include the addition of seating and cultural information boards, restoring the ancient pavilion’s role as a hub for public interaction. The relocation of parking facilities and optimisation of paving in the square in front of the Zhang Clan Ancestral Hall will restore the square’s ceremonial atmosphere and public character. The clearance of clutter and facade improvements along Dong’an Zhijie will enhance the visual quality of the traditional streetscape.

Through the development of these core catalytic demonstration sites, villagers and visitors will be able to directly experience the enhanced quality of the space, fostering a sense of identification with and willingness to participate in the corridor development. At the same time, through small-scale, low-cost and rapid implementation, the feasibility of strategies such as modular facilities and the integration of functions will be validated, thereby accumulating experience for subsequent phases.

(2) Phase Two: Full-line Connectivity and Functional Enhancement

Building on the success of the first phase, we will proceed with the full opening of the corridor and the enhancement of its functionality. By removing the wall separating Ruiyuan and Zini Hall dormitories and constructing new footpaths, we will establish a direct link between the ‘Ecological Rural Scenery Section’ and the ‘Traditional Culture Section’. We will complete the installation of safety facilities and rest areas along the waterside section of Fushan Road, creating an axis that showcases the charm of Lingnan’s water towns. Furthermore, the full-length facade renovation and development of key spaces along Dong’an Zhijie will be completed, primarily involving the refurbishment of the children’s play area and parents’ waiting area around Zini Kindergarten. The multi-functional redevelopment of the square in front of the Baomo Garden office building will create a core ‘Planar Catalyst’ integrating visitor distribution, cultural exhibitions and festive events. The construction of

modular planting zones within the agricultural demonstration base will be completed, establishing an ecological planting experience area featuring educational tours, wellness horticulture and landscape displays.

Through the full connectivity of the ‘One Corridor, Three Sections’ layout and the completion of basic infrastructure at key catalytic nodes, the corridor will be equipped with comprehensive facilities for leisurely exploration and supporting services. Concurrently, operational data and feedback from villagers and visitors will be collected on a phased basis to enable dynamic adjustments to functional configurations and facility layouts.

(3) Phase Three: Functional Enhancement and Cultural Management

Building on the completion of the first two phases of construction, we will promote the diversification of business formats and cultural operations. This will be achieved by encouraging traditional buildings along Xiaoyou Street —such as the ancestral hall and the residential property at No. 4 Xiaoyou Street—to introduce cultural enterprises such as rural bookshops and educational experience centres. At the same time, we will support villagers in utilising vacant residential properties to develop commercial ventures such as guesthouses, farm-stay establishments and craft workshops. Furthermore, we will establish a regular performance mechanism for intangible cultural heritage such as the Sha Wan Piao Se parade and Guangdong lion dance, whilst bringing in professional operational teams to oversee the corridor’s daily maintenance, event planning and tenant management. By establishing a sustainable operational framework, we aim to transform Zini Village into a rural corridor space that integrates cultural experiences, ecological leisure and community interaction. Through the evolution of business formats and innovative events, we will enhance the corridor’s vitality and appeal.

5.5.3 Improving management systems: establishing a long-term operational framework and a dynamic evaluation mechanism

In terms of operational management, a Zini Village Non-motorized Corridors Management Committee has been established. Uniform entry criteria and management

regulations have been drawn up for commercial activities within the corridor to prevent excessive commercialisation from eroding the village's character and cultural atmosphere. Furthermore, a merchants' code of conduct and a villagers' code of conduct have been formulated to clarify the rights and obligations regarding the use and maintenance of the corridor.

In terms of maintenance mechanisms, a collaborative maintenance system involving villagers and professional teams will be established. Daily maintenance will be led by the villagers, with incentives provided to encourage their participation in tasks such as cleaning, landscaping and facility inspections, thereby enhancing their sense of responsibility and belonging. At the same time, leveraging the 'demountable, movable and replaceable' characteristics of modular facilities, professional maintenance work—including pavement repairs, facility replacements and plant replanting—will be carried out on a regular basis.

In terms of evaluation and feedback, a dynamically adjusted assessment mechanism is established. The operational effectiveness of the corridor is quantitatively assessed across dimensions such as space utilisation, visitor satisfaction, resident satisfaction, commercial vitality and cultural engagement. An online feedback platform is also set up to collect daily feedback from residents and visitors. This enables immediate responses to facility malfunctions and environmental issues, whilst allowing for the regular optimisation of functional configurations and event schedules. Through continuous evaluation and feedback, a process of dynamic optimisation for the corridor is established.

5.6 Summary

This chapter adopts catalyst theory as its core methodology and selects Zini Village in Panyu District, Guangzhou as an empirical research object to systematically carry out the renewal design practice of a Non-motorized Corridors. Based on the investigation and analysis of the existing problems of the four types of catalysts (point, linear, planar, and immaterial) in Zini Village, this chapter constructs a demonstrative Non-motorized Corridors running through the village from five dimensions: overall design positioning, catalyst selection principles, catalyst identification and determination, reshaping and activation, and guidance and control.

This design established a non-motorized corridors as a public spatial system to integrate various types of catalysts, creating a systematic spatial organization comprising one main corridor, three major sections and multiple catalytic points. According to functional differences, the village is divided into three thematic sections: the Ancient Village Experience Section, the Traditional Village Culture Section, and the Ecological Rural Scenery Section. The design objectives for each section are clarified in terms of spatial integration, functional activation, catalyst guidance, circulation coordination, and implementation guidance.

Regarding the principles of catalyst selection, the original catalyst selection principles are proposed from three dimensions: space, function, and culture. On this basis, the four types of original catalysts—point, linear, planar, and immaterial—are screened and determined, and differentiated reshaping and activation strategies are proposed. For point catalysts, a combination of authenticity conservation, functional replacement, and modular micro-intervention is adopted. For linear catalysts, continuous and comfortable non-motorized traffic experiences are created through interface renovation, the addition of waterfront safety facilities, and the removal of walls. For planar catalysts, composite spaces integrating tourist distribution, cultural exhibition, and festival activities are created to restore the publicness of squares. For immaterial catalysts, spatial anchoring and event implantation are employed to achieve the regular release of cultural vitality. In addition, a guidance and control mechanism

for catalyst reactions is established from the perspectives of multi-stakeholder participation, gradual renewal, and improvement of management systems, ensuring that the catalyst effect continues to be released within a controllable range.

In summary, this chapter takes Zini Village as an empirical case and, through the synergistic strategies of point anchoring, linear connection, planar radiation, and immaterial activation, addresses the core problems of spatial fragmentation, functional isolation, and cultural silence commonly found in cultural tourism villages, thereby providing a methodological reference for the renewal of Non-motorized Corridors in cultural tourism villages in Guangzhou.

Conclusion and Prospect

Conclusion

This study adopts catalyst theory as its framework and takes Zini Village in Panyu District, Guangzhou, as a typical case. Focusing on the core problems in the renewal of Non-motorized Corridors in cultural tourism villages — namely, poor connectivity between key attractions, fragmented tourist routes, lack of slow mobility experience, and insufficient spatial vitality—this research systematically explores the design methods for Non-motorized Corridors guided by catalyst theory. Through literature review and case comparison, a theoretical framework for the application of catalyst theory to village Non-motorized Corridors is established. Based on the common characteristics of Guangzhou villages, a localized strategy system for the renewal of Non-motorized Corridors in cultural tourism villages in Guangzhou is constructed. Furthermore, field investigations, data mapping, and interviews with villagers and tourists were conducted in Zini Village to summarize user demands. Guided by the concept of gradual renewal, catalyst-oriented renewal strategies for different spatial types are proposed to guide the village toward a sustainable cultural tourism development model. The main conclusions are as follows:

(1) Coupling mechanism and evaluation tool of catalyst theory and Non-motorized Corridors. In response to the lack of dynamic renewal perspectives in existing studies on village non-motorized traffic spaces, this research systematically reviews the relevant contents of Non-motorized Corridors theory and catalyst theory, and further establishes a coupling relationship between the two. The spatial connectivity, functional diversity and cultural legibility of non-motorized corridors are correlated with the systemic hierarchy, incremental nature and contextual continuity of catalysts. These dimensions are further translated into evaluation indicators from a catalyst perspective, forming an assessment tool for the catalyst potential of village Non-motorized Corridors. In addition, the effectiveness of the coupling mechanism is verified through typical domestic and international case studies, laying a theoretical foundation and providing practical support for subsequent strategy development.

(2) Localized strategies for the renewal of Non-motorized Corridors in cultural tourism villages in Guangzhou. Given the diverse spatial types and complex renewal demands of cultural tourism villages, differentiated renewal strategies are proposed for four types of catalyst media: point, linear, planar, and intangible. For point catalysts, a combination of authenticity conservation and modular micro-intervention is adopted. For linear catalysts, continuous and comfortable non-motorized traffic experiences are created through typical cross-section control and interface renovation. For planar catalysts, the core task is to restore publicness and create composite spaces. For intangible catalysts, spatial anchoring and event implantation are employed to achieve the regular release of cultural vitality. Through the synergistic effect of these four types of catalysts, a systematic renewal methodology is formed.

Based on the universal framework and the common characteristics of Guangzhou villages, the selection principles of original catalysts are proposed from three dimensions: space, function, and culture. The four types of catalysts—point, linear, planar, and intangible—are summarized, and their synergistic relationships are clarified. From the three dimensions of historical and cultural value, spatial potential and practical needs, and public property rights, a selection method for catalysts is proposed, and five screening principles—holism, locality, hierarchy, diversity, and linkage—are established. Differentiated reshaping and activation strategies are proposed for the four types of catalysts, and a guidance and control system for catalyst reactions is constructed from three dimensions: multi-stakeholder participation, gradual renewal, and management systems.

(3) Investigation and problem diagnosis of the current non-motorized traffic spaces in Zini Village. Through field surveys, data mapping, and interviews with residents and tourists, the existing problems in Zini Village are systematically analyzed from the four dimensions of point, line, plane, and intangible elements. The survey results show that cultural tourism resources in Zini Village are scattered, and key attractions lack effective pedestrian connections. Streets and lanes generally suffer from parking encroachment and uneven interface quality. Public squares are occupied by parked cars, resulting in a severe loss of

publicness. Intangible cultural heritage items such as Shawan Piaose and Guangdong Lion Dance are concentrated within the scenic area and are disconnected from the village's public spaces. Overall, Zini Village exhibits characteristics of spatial fragmentation, functional isolation, and cultural silence, providing a clear problem orientation for the design of village Non-motorized Corridors.

(4) Empirical application of catalyst-based renewal design for Zini Village's Non-motorized Corridors. The catalyst-oriented localized renewal strategies are applied to the specific context of Zini Village. Guided by the core concept of "one main corridor, three thematic sections, and multiple catalysts," a demonstrative Non-motorized Corridors running through the village is constructed. By breaking through key blockages, the effective connection of core cultural tourism resources is achieved. The corridor is divided into three thematic sections: the Ancient Village Experience Section, the Traditional Village Culture Section, and the Ecological Rural Scenery Section, each with a distinct thematic positioning and functional configuration. Furthermore, the synergistic strategies of point anchoring, linear connection, planar radiation, and intangible activation effectively enhance the village's spatial connectivity, functional complexity, and cultural legibility. In addition, a guidance and control mechanism featuring multi-stakeholder participation, gradual renewal, and dynamic evaluation is established, providing a practical reference for the renewal of Non-motorized Corridors in cultural tourism villages.

In summary, this study establishes a coupling mechanism between Non-motorized Corridors and catalyst theory, and, in combination with the regional characteristics of Guangzhou villages, constructs renewal strategies for Non-motorized Corridors in cultural tourism villages in Guangzhou. The feasibility and effectiveness of these strategies are verified through the empirical study of Zini Village, providing a theoretical basis and practical reference for the catalyst-guided renewal of Non-motorized Corridors in cultural tourism villages.

Research Innovations

(1) Application scenario innovation: Catalyst theory is extended from the field of urban renewal to the design of Non-motorized Corridors in cultural tourism villages. This study breaks through the existing boundary of catalyst theory, which has been primarily applied to urban renewal and historic districts, and introduces it into the realm of rural linear public space. It clarifies the mechanism of catalyst theory in village Non-motorized Corridors — specifically the processes of screening and identification, reshaping and activation, and guidance and control — thereby providing a new theoretical tool for the renewal of village non-motorized traffic spaces.

(2) Methodological integration innovation: A universal theoretical framework and localized renewal strategies are established. From the three dimensions of spatial connectivity, functional complexity, and cultural legibility, a universal analytical framework is constructed, which is further translated into nine evaluation indicators from a catalyst perspective. Moreover, based on the common characteristics of Guangzhou villages, a localized strategy system is systematically developed — from selection principles, type classification, identification and screening, to reshaping and activation, as well as guidance and control. This achieves a systematic and innovative progression from theoretical construction to regional translation and then to practical verification.

Shortcoming and Prospect

This design primarily selects idle historical buildings and vacant spaces in Zini Village for planning and design. Considering the future development and changes of the village, flexible control measures should be adopted to reasonably regulate the intensity of development and construction, avoiding damage to the village's living environment caused by excessive pursuit of tourism industry development and facility construction. In addition, this study takes catalyst theory as its core framework, yet the quantitative assessment of catalyst effects remains insufficient. Subsequent research may introduce quantitative methods such as space syntax, behavioral observation, and post-occupancy evaluation to further verify the

implementation effectiveness of catalyst strategies.

In terms of quantitative assessment, this study adopts catalyst theory as its core framework, focusing on qualitative analysis of the mechanisms of catalytic action, without establishing a comprehensive system of impact assessment indicators. The lack of long-term monitoring of key indicators such as enhanced spatial connectivity, increased functional diversity and strengthened cultural legibility makes it difficult to accurately quantify the contribution of different catalytic agents. In future research, quantitative methods such as spatial syntax, behavioural observation and post-occupancy evaluation could be introduced to further validate the effectiveness of catalyst strategies.

At the implementation and promotion level, this study constructs a guidance and control system for catalytic reactions, drawing on aspects such as multi-stakeholder participation, incremental renewal, and management systems. In practical implementation, challenges such as insufficient funding, divergent villager preferences, and complex property rights may arise. Future research could conduct predictive analyses of implementation barriers. By drawing on domestic and international case studies of funding for the renewal of traditional villages, diversified funding mechanisms and property rights coordination strategies could be explored.

In terms of theoretical refinement, further exploration of the coordination mechanisms among different types of catalysts is necessary to establish a refined evaluation system for catalysts. Concurrently, the Non-motorized Corridors strategy proposed in this study could be applied to other cultural and tourism-oriented villages. Through comparative studies, its universality and adaptability could be verified, leading to the formulation of regional design guidelines for village Non-motorized Corridors.

In terms of interdisciplinary integration, future research may introduce perspectives from environmental behavior, landscape ecology, and tourism management to examine the design strategies of village Non-motorized Corridors from a more comprehensive dimension, promoting deeper integration of architecture with related disciplines, and providing more comprehensive theoretical support and practical guidance for the protection and revitalization of traditional villages. With the advancement of digital technology and breakthroughs in

institutional innovation, the catalyst-led renewal of village Non-motorized Corridors will inevitably move towards a more refined and intelligent stage, achieving a win-win outcome for cultural heritage protection and rural revitalization.

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Appendix 1

Survey Questionnaire on the Planning of the Zini Village Non-motorized Corridors in Guangzhou

Dear Villagers and Visitors:

Hello! I am a postgraduate student at the School of Architecture, South China University of Technology, and am currently conducting research into the planning and design of Non-motorized Corridors in Zini Village. This questionnaire aims to gather your views on the environment, facilities and development of Zini Village, to inform the design of the village's regeneration. The questionnaire is anonymous, and the data will be used solely for academic research. Thank you for your support!

I. Basic Information

1. What is your status?

☐ Local resident ☐ Business owner/staff member ☐ Visitor (first-time visitor) ☐

Visitor (repeat visitor)

2. What is your age?

☐ 18 - 30 ☐ 31 - 45 ☐ 46 - 59 ☐ 60 and over

II. Assessment of the Ecological Environment and Infrastructure

3. Are you satisfied with the ecological environment in the village?

☐ Very satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied

4. What do you consider to be the main environmental issues? (Multiple selections allowed)

☐ Improper waste disposal ☐ Direct discharge of sewage ☐ Road dust ☐
Insufficient public greening ☐ Soil pollution in farmland ☐ Other

5. What new ecological facilities would you like to see? (Multiple selections allowed)

☐ Rain gardens/ecological wetlands ☐ Nature trails ☐ Solar-powered street lights
☐ Public charging points ☐ Multi-storey car parks ☐ Waste sorting and recycling points
☐ Other

6. What do you consider to be the main shortcomings of the current infrastructure?

(Multiple answers allowed)

☐ Narrow roads/mixed traffic ☐ Insufficient recreational space ☐ Unstable water supply ☐ Lack of sewage network ☐ Insufficient parking spaces ☐ Bicycle and scooter stations ☐ Insufficient bus stops ☐ Other

7. Which public service facilities do you consider most in need of improvement?

(Multiple selections allowed)

☐ Nursery/primary schools ☐ Health clinics ☐ Care homes ☐ Cultural activity centres ☐ Rest areas ☐ Other

III. Public Spaces and Visitor Experience

8. Which types of public spaces do you use most frequently? (Multiple selections allowed)

☐ Squares ☐ Streets and alleys ☐ Waterfront areas ☐ Cultural venues ☐ Other

9. Which spatial issue do you think most needs to be addressed? (Single selection)

☐ High vacancy rates in buildings ☐ Narrow/disjointed pedestrian pathways ☐ Insufficient seating and rest facilities ☐ Lack of activity areas ☐ Monotonous green spaces ☐ Other

10. Your rating of existing public facilities (1 – 5, where 1 = very dissatisfied, 5 = very satisfied):

Seating/rest facilities: ☐1 ☐2 ☐3 ☐4 ☐5

Public toilets: ☐1 ☐2 ☐3 ☐4 ☐5

Sports and exercise facilities: ☐1 ☐2 ☐3 ☐4 ☐5

Cultural exhibition facilities: ☐1 ☐2 ☐3 ☐4 ☐5

IV. Cultural and Tourism Development

11. Which cultural element do you think most needs to be strengthened? (Single choice)

☐ Architectural style of clan halls ☐ Sha Wan Piao Se / Cantonese lion dance ☐ Cantonese cuisine ☐ Traditional handicrafts (Sha Wan buffalo milk, Cantonese mudfish) ☐ Festival and folk activities (Master's Birthday, fish lantern parade) ☐ Other

12. Which cultural and tourism facilities would you like to see added? (Multiple

selections allowed)

☐ Eco-farms ☐ Intangible Cultural Heritage experience centres ☐ Waterside footpaths ☐ Other

13. Do you support the ‘eco-agriculture + cultural tourism integration’ development model?

☐ Support ☐ Oppose ☐ Indifferent

14. Which industries would you like to see developed in the village? (Multiple selections allowed)

☐ Eco-agriculture ☐ Agricultural product processing ☐ Rural tourism ☐ Cultural and creative industries ☐ Other

15. What do you consider to be the main factors constraining the village’ s economic development? (Multiple selections allowed)

☐ Lack of distinctive industries ☐ Insufficient funding ☐ Outdated infrastructure
☐ Brain drain ☐ Inadequate policy support ☐ Other

V. Community Participation

16. What is your attitude towards the village’ s historical and cultural heritage?

☐ Full protection ☐ Moderate development ☐ Indifferent ☐ Not concerned

17. How willing are you to participate in community affairs?

☐ Frequently ☐ Occasionally ☐ Never

18. Through which channels do you learn about village planning? (Multiple answers allowed)

☐ Village notice board ☐ Village assembly ☐ WeChat group ☐ Door-to-door outreach ☐ Completely unaware

19. What suggestions do you have regarding the construction of the Zini Village Non-motorized Corridors? (Open-ended question)

Appendix: Three sample responses

Sample Response 1

Subject: Local resident, aged 46 – 59, male

- 1 Local resident
- 2 Aged 46 – 59
- 3 Average
- 4 Road dust, insufficient public green spaces
- 5 Solar-powered street lights, waste sorting and recycling points
- 6 Narrow roads/mixed traffic, insufficient space for activities
- 7 Health clinic, cultural activity centre
- 8 Square
- 9 Insufficient recreational facilities
- 10 Seating (2 points), toilets (3 points), sports (2 points), cultural exhibitions (3 points)
- 11 Architectural style of clan halls
- 12 Intangible cultural heritage experience centre
- 13 Support
- 14 Rural tourism
- 15 Lack of distinctive industries, outdated infrastructure
- 16 Full protection
- 17 Occasional participation
- 18 Village affairs noticeboard
- 19 (Open-ended question) I would like to see more places for elderly people to gather; currently, they can only sit by the roadside

Typical Response Sample 2

Respondent: Repeat visitor, aged 31 – 45, female

- 1 Visitor (repeat visitor)
- 2 Aged 31 – 45

- 3 Satisfied
- 4 Insufficient public green spaces
- 5 Eco-trails, solar-powered street lights
- 6 Insufficient activity space, insufficient parking spaces
- 7 Rest areas
- 8 Waterside spaces
- 9 Insufficient rest facilities
- 10 Seating 2 points, toilets 4 points, sports 3 points, cultural displays 2 points
- 11 Sha Wan Floating Colour Parade / Guangdong Lion Dance
- 12 Intangible Cultural Heritage Experience Centre, waterside walkways
- 13 Support
- 14 Rural tourism, cultural and creative industries
- 15 Lack of distinctive industries
- 16 Moderate development
- 17 Occasional participation
- 18 Completely unaware
- 19 (Open-ended question) There are too few signs in the village; I often get lost and would like to see more maps.

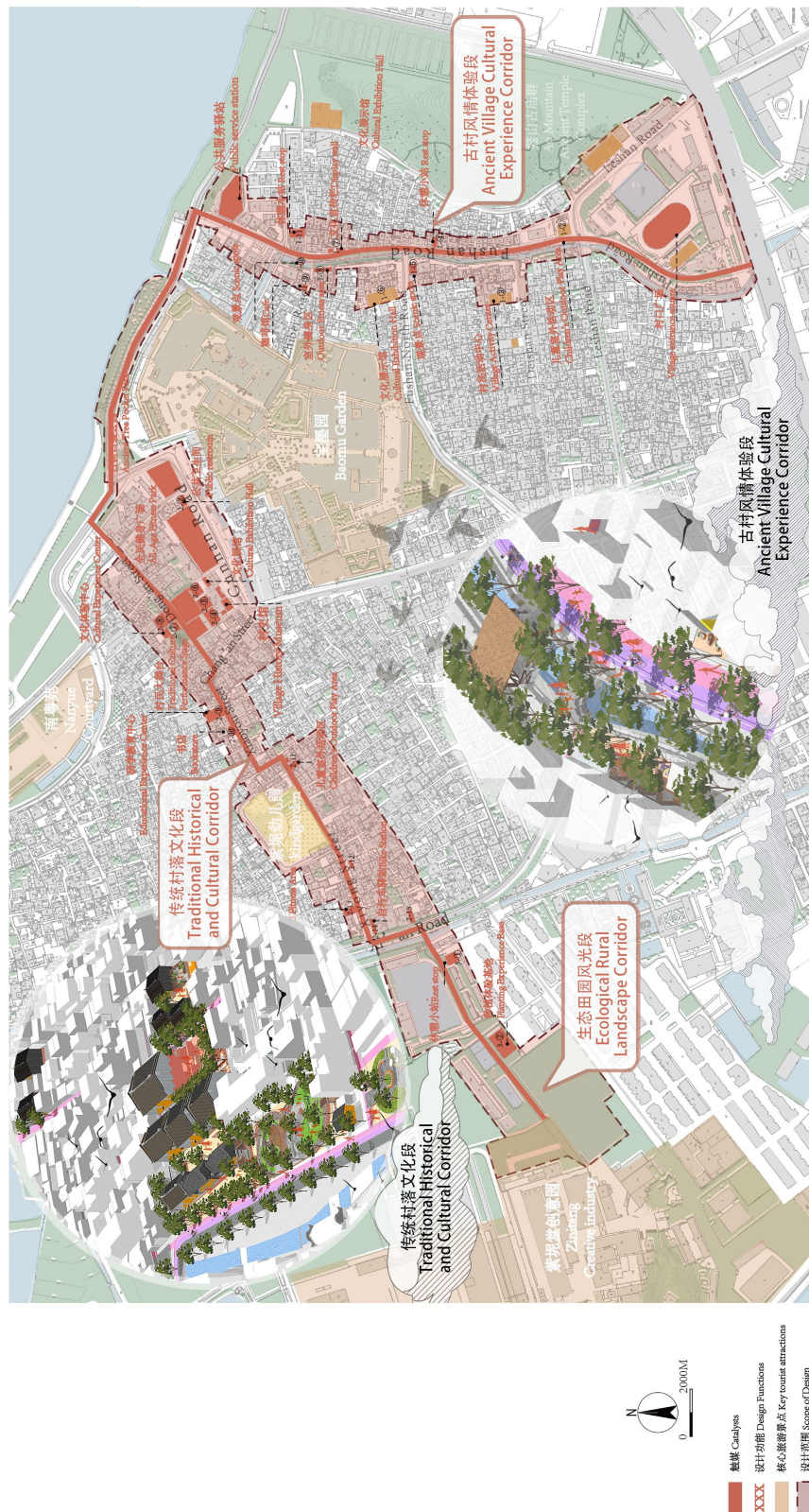
Typical Response Sample 3

Respondent: Shopkeeper/staff member, aged 31 – 45, male

- 1 Shopkeeper/staff member
- 2 31 – 45 years old
- 3 Average
- 4 Road dust
- 5 Public charging points, multi-storey car parks
- 6 Insufficient parking spaces, narrow roads/mixed traffic
- 7 Rest areas

- 8 Street and alley spaces
- 9 Narrow/disconnected pedestrian walkways
- 10 Seating 3 points, toilets 3 points, sports 2 points, cultural displays 2 points
- 11 Cantonese cuisine
- 12 Eco-farms
- 13 Support
- 14 Rural tourism, eco-agriculture
- 15 Outdated infrastructure, insufficient policy support
- 16 Moderate development
- 17 Occasional participation
- 18 WeChat groups
- 19 (Open-ended question) As there are many visitors during public holidays, more cultural activities should be organised to boost the village' s economic development.

Appendix Figure 1: Master Plan for the Zini Village Non-motorized Corridors



Source: Author's own drawing

攻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）

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As I write these words, it is May, and my postgraduate journey is drawing to a close. Looking back on twenty years of educational experience, my postgraduate studies have represented a qualitative leap forward. Moving from reading thousands of books to travelling thousands of miles, I set out on a long journey of learning from Guangzhou to Italy, leaving behind for the first time the protective wings of my family, friends and homeland. Though I felt a touch of anxiety, it was as if the whole city were in bloom. I am grateful for the support and assistance of my teachers, family, friends and fellow students, which enabled me to bravely spread my wings, soar over the fields, and discover my own inner potential.

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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）

论文选题具有较高价值，研究方法较严谨，论证逻辑清晰，研究工作量充分，结论合理。论文撰写认真，较好掌握研究设计方法。

研究包括将触媒理论本土化，通过系统梳理慢行廊道与触媒理论的发展脉络，建立二者的耦合机制，构建村落慢行廊道触媒潜力的评估工具。在此基础上，结合广州村落的共性特征，构建涵盖选取原则、类型归纳、筛选确定、重塑激活与引导控制的完整地域化策略体系。并以紫坭村为实证案例，完成慢行廊道更新设计，为广州乃至珠三角地区文旅型村落的慢行廊道更新，提供理论依据与实践参考。

答辩过程中，作者汇报流畅清楚，对于答辩委员提出的全部问题能详细回应，达到建筑学硕士学位论文要求。

根据投票结果，答辩委员会一致同意韩永馨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：2020 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（ ）票

学位表决票数：通过（5）票；不通过（ ）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	田志峰 (主席) 邱桦	姜明华 王明	Federico Dell'Anna (钟健碑代签)
答辩秘书 签名	钟健碑		