

Full-Process Implementation Mechanism for Planning and Building Urban-Level Green Public Spaces

The Case of Shenzhen's "Mountain-Sea-City Linkage Plan"

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Abstract

Based on an analysis of the evolution of Shenzhen's implementation mechanism for planning and building green public spaces, this paper examines the problems that have emerged in the new period, including weak transmission of action-oriented planning, insufficient coordination between sectoral and territorial responsibilities, fragmented construction activities, and inadequate policy support. Drawing on advanced international experience in implementing urban-level green public space systems, the paper argues that implementation mechanisms should pursue the integrated value orientation of positive externalities, systemic integration, collaborative action, and process-based governance. Taking Shenzhen's "Mountain-Sea-City Linkage Plan" as an example, the paper shows how the city has built a society-wide consensus around the goal of creating a "green and beautiful home," formulated an implementation scheme characterized by "system integration plus sustained relay," established a collaborative framework combining "control, guidance, and service," provided policy support throughout the "planning-construction-management-operation" cycle, and created a governance platform for "co-construction, sharing, and co-governance." In less than five years, the Plan has achieved substantial implementation results, demonstrating the effectiveness of a full-process implementation mechanism and offering useful references for transforming the supply mode of planning and design in the new era and for innovating implementation mechanisms for green public space planning and construction.

Keywords: urban-level green public space; full process; implementation mechanism; Mountain-Sea-City Linkage Plan

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Shenzhen's urban planning and construction have long taken green ecology and sustainable development as core value orientations. During the city's development, Shenzhen has adhered to a clustered spatial layout and designated a basic ecological control line, thereby preserving its mountain and coastal resources and forming a green public space foundation interwoven with urban clusters. With regard to "figure" spaces of land development and construction, Shenzhen has developed practices such as short-term construction planning, action planning, and institutional safeguards [1]. With regard to "ground" spaces for the protection and use of green public space, the city has successively explored public space planning, greenway network planning, and related initiatives. In 2016, Shenzhen launched a reform that strengthened district-level authority and delegated powers. Most parks and green spaces were transferred to districts for planning, construction, and management, which greatly mobilized local initiative but also led urban-level green public spaces toward multi-actor construction and management. In the era of full-territory and all-factor governance, the establishment of territorial spatial use control and planning permission that uniformly connects all natural resource elements across the territory [2] has become a key task of municipal planning. Specific implementation, management, and maintenance, however, are undertaken by different

departments and districts. Under previous planning implementation mechanisms, the transition from an overall system to local delivery has faced major challenges, making it even harder to achieve the integrated and high-quality construction requirements of urban-level green public spaces in the new period.

Through recent exploration and practice under the “Mountain-Sea-City Linkage Plan,” Shenzhen has achieved substantial results in creating urban-level green public spaces. The key lies in its development, under the existing governance framework, of a “combined mechanism” for planning implementation that guides public consensus, formulates implementation schemes, promotes departmental collaboration, and forms joint construction capacity. Shenzhen’s exploration of a full-process implementation mechanism through the Plan can provide lessons and references for other cities.

1 Evolution of the Implementation Mechanism for Planning and Building Green Public Spaces in Shenzhen

1.1 Evolutionary process of planning implementation mechanisms

Over the years, the planning and construction of Shenzhen’s urban-level green public spaces have evolved continuously from “protection and control,” to “linear-use exploration,” and then to “diversified transformation of ecological product value.” In terms of implementation mechanisms, the city has shifted from “project-based construction” and “single-department leadership” toward “full-process collaboration.” See Fig. 1.

1.1.1 First stage: project-based construction centered on parks

The 1986 Master Plan of the Shenzhen Special Economic Zone established a clustered structure integrating the city with nature. In 2005, Shenzhen designated the basic ecological control line, pre-controlling the ecological isolation belts between urban clusters, safeguarding the ecological security pattern of “half mountains and waters, half city,” and subsequently developing into a polycentric, clustered ecological city.

The Shenzhen Special Economic Zone Public Space System Plan, prepared in 2006, designated parts of the space within the basic ecological control line as “independent green spaces,” making them part of the public space system. Some coastlines or ecological green spaces near or within built-up areas were planned independently as urban parks, such as Dameisha Seaside Park, the Shenzhen Bay Coastal Leisure Belt, and Meilin Park. Taking the Shenzhen Bay Coastal Leisure Belt as an example, the 13 km section opened in 2011 was incremental space created through land reclamation and was built at one time by the municipal competent department as a major project. By contrast, the 6.6 km westward extension involved issues such as maritime terminals, fishing ports, and land ownership, and was not completed until 2017 through coordinated municipal-district implementation, thereby forming a complete Shenzhen Bay park belt.

1.1.2 Second stage: overall coordination by the greening department and district-level implementation

In 2009, Shenzhen became one of the first cities in China to plan and build a greenway network. Integrating ecological protection with citizens’ leisure activities, the network used the hundred-kilometer-scale regional greenways No. 2 and No. 5 as its main lines, linking major mountain spaces and forest country parks across the city. The plan established a three-level greenway layout covering “regional, urban, and community” scales, enriching the content and value of urban-level green public spaces.

The greenway network combined ecological corridors, transportation functions, and even economic and social functions. Led by the greening department, it was implemented through a “municipal special plan and three-year action plan plus detailed planning” approach that decomposed tasks to districts for rapid delivery. A series of outstanding greenway sections were formed within independent land-occupying spaces such as

agricultural land, country parks, and urban parks, including the Second-Line Customs section of Meilin Mountain, the Yangtai Mountain section, and the Taojinshan section. Yet because unified standards and refined guidance were lacking, some sections suffered from over-construction, insufficient quality, and inadequate supporting facilities. The urban sections also left certain regrets in connectivity, so citizens' leisure experience remained segmented and could not provide a continuous medium- and long-distance natural countryside experience.

1.1.3 Third stage: multi-level planning transmission and decomposed implementation

In 2018, following the unified deployment of Guangdong Province, Shenzhen launched the planning and construction of blueways and the Southern Guangdong Historic Trails, further diversifying the types of urban-level green public spaces. Shenzhen's blueway construction plan and historic-trail plan continued the approach used in the greenway network: a single competent department took the lead and advanced construction tasks according to the transmission sequence of "municipal special plan - district special plan - detailed planning."

Taking the blueway construction plan led by the water affairs department as an example, the first batch of blueway pilots mainly consisted of first-level blueways. These created waterfront corridors along major rivers that combined ecological, safety, cultural, landscape, and leisure values, effectively guiding public space toward the water. As blueway planning and construction deepened, however, most urban rivers were found to intersect with roads and to be tightly surrounded or even occupied by various land uses. The river management line, as the primary implementation area for blueways, involves the authority of multiple management departments responsible for transport, parks, forestry, farmland, and other domains. When implementation is promoted solely by the water affairs department, the space available for adjustment and coordination is extremely limited. As a result, some blueways cannot even achieve basic slow-traffic connectivity, let alone provide high-quality public life along the waterfront.

1.2 Reflections on problems in planning implementation mechanisms in the new period

The Central Urban Work Conference clearly called for "coordinating the three major links of planning, construction, and management and improving the systematic nature of urban work." Traditional mechanisms for planning, building, and implementing urban-level green public spaces, however, have difficulty adapting to the complex realities of urban construction and operation, causing transmission and control in complex areas to fail repeatedly. Faced with Shenzhen's current challenges, including district empowerment, shrinking fiscal expenditure, fragmented and overlapping departmental authority, and complex land use at corridor bottlenecks, it is necessary to identify the problems accurately, apply targeted measures, and respond systemically to key issues between top-level design, planning transmission, and on-the-ground construction.

1.2.1 Insufficient action transmission in traditional planning

The planning and construction of urban-level green public spaces mainly rely on relevant special plans and short-term action plans to provide legal and institutional basis [3]. Yet special plans and near-term plans operate at a citywide scale; the goals, visions, planning strategies, and task transmission they generate are often disconnected from concrete construction needs later on. The fundamental reason is that, as urban development enters a stage of deep urban cultivation, the systemic requirements and strategic arrangements of special plans are inadequate for resolving the key bottlenecks of refined and in-depth place-making. At the same time, task transmission in near-term plans remains relatively coarse. Construction plans and funding arrangements are dispersed across many homogeneous projects, making it difficult to integrate

and allocate resources efficiently. This leads to low comprehensive benefits and constrains the high-quality development of urban-level green public spaces.

1.2.2 Poor connection between sectoral and territorial planning-construction systems

The planning and construction of urban-level green public spaces involve many fields and departments. During implementation, however, different types of spaces often lack systematic linkage, and coordination between sectoral and territorial responsibilities is weak. Taking blueways and greenways as examples, the two are managed by different construction departments and built according to different standards, so the “last hundred meters” of mutual connection often becomes a difficult problem. When any single implementing department attempts to coordinate urban-level green public space planning and construction as a whole, its authority and resources are insufficient to resolve complex construction problems and bottlenecks, still less to form joint implementation capacity.

1.2.3 Fragmented and scattered planning-construction activities

Because planning implementation tends to emphasize short-term visible results, projects of relatively low difficulty are often implemented first, while difficult problems are left unattended. This has led to a long-term problem of “fragmentation” in the planning and construction of urban-level green public spaces, making it hard to form a high-level supply of ecosystem services [4]. Traditional planning emphasizes the structural qualities of corridors and alignments, but has difficulty concretely locating complex boundaries of green spaces and insufficiently identifies bottlenecks and difficulties. As a result, near- and long-term implementation cannot be effectively combined in a systematic manner, while actual construction lacks precise and operable guidance, further intensifying fragmentation.

1.2.4 Weak policy support for planning implementation

The delivery of urban-level green public spaces depends on multi-party coordination mechanisms, but existing institutional safeguards for planning implementation still need strengthening. First, the stages of planning, construction, management, and operation are relatively separated, making it difficult to synchronize and feed back information between early planning intentions and later implementation constraints. Second, as use control under “multiple-plan integration” becomes increasingly refined, green public space construction faces a contradiction between incomplete policies for all types of land elements across the entire territory and strict planning-permission requirements, especially where policy support is absent for complex bottlenecks. Finally, without consistent construction standards and process control, implementing actors at different levels may differ in their understanding and execution strategies, which can easily distort the implementation of planning intentions.

In light of these problems, the implementation mechanism for urban-level green public spaces needs to be reconsidered. From the perspective of the full lifecycle of planning implementation, more effective approaches to planning preparation, plan formulation, coordination mechanisms, and policy support should be explored on the basis of existing municipal- and district-level special plans and detailed planning.

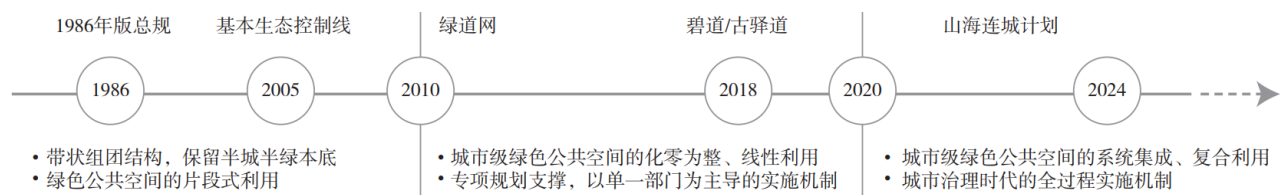


Fig. 1 Evolution of planning and implementation mechanisms

2 Lessons from Domestic and International Implementation Mechanisms for Urban-Level Green Public Spaces

Singapore, Barcelona, Hong Kong, Shanghai, and other cities and regions have carried out active and effective practices in planning and implementing urban-level green public spaces. This paper takes Singapore's "City in Nature" strategy, Barcelona's urban renaturalization plan, Hong Kong's cycle-track system, Shanghai's Outer Ring Greenbelt, and the public-space practices along the Huangpu River and Suzhou Creek as examples. It reviews full-lifecycle experience in urban-level green public space planning and implementation at home and abroad, and distills common trends in top-level design, planning preparation, implementation frameworks, and institutional safeguards.

2.1 Guiding value consensus through top-level design

In urban-level green public space systems, creating a healthy natural ecosystem has become a core concern for global cities. In 2020, Singapore proposed moving toward a "City in Nature," with main strategies including "protecting and expanding natural capital," "enhancing the naturalistic quality of gardens and parks," "restoring nature into the urban landscape," and "strengthening connections between green spaces." At the level of top-level design, Singapore established the National Parks Board as the leading institution, coordinating the full lifecycle of planning, design, construction, maintenance, and operation for various green spaces, including nature reserves, mountains and forests, waterfront areas, parks and gardens, roadside greenery, and greenways.

Shanghai has strengthened planning coordination and steadily advanced the unified planning and construction of "one river and one creek." It issued the Guiding Opinions on Improving Planning and Construction along the Huangpu River and Suzhou Creek, which were approved by the municipal government and distributed to relevant municipal commissions, offices, bureaus, and district governments along the corridors. This document became a citywide consensus program, concentrating administrative resources to coordinate maritime affairs, navigation, industry, ecology, and other fields. On this basis, three-year action plans were formulated in 2013, 2015, and 2018, continuously promoting the public accessibility, connectivity, and landscape quality of waterfront spaces. Chengdu established a dedicated Park City Construction and Management Bureau, which, with support from other departments, coordinates investment, planning, transport, and construction authority related to parks and greenways, linking front-end planning approval with investment, construction, management, and operation.

2.2 Refined coordination of all factors in planning implementation

From the perspective of planning content, cities in China and abroad increasingly emphasize refined spatial use and control during implementation, stressing the coordination and integration of all system elements and the effective connection between systems. Barcelona's Renaturalization Plan 2030 is an implementation action covering the responsibilities of multiple urban management departments. It aims to expand broader natural public spaces and improve the quality of the human settlement environment. For different types of green infrastructure, including forest green spaces, public green spaces, private green spaces, street trees, roof greening, and facade greening, Barcelona has formulated corresponding planning strategies such as sustainable tree maintenance, urban agriculture, crowdsourced gardens, living terraces, and green roofs. These measures involve multiple levels of urban systems and specify concrete planning orientations and actions.

The planning and construction of Hong Kong's cycle-track system offer a model of refined use and control in high-density urban space. By integrating roads, waterfronts, country parks, and other spatial elements

through intensive and smart spatial-use strategies, Hong Kong has established dedicated cycling paths. To achieve the planning goal, the system specifies implementation strategies even in areas with extremely constrained spatial conditions, such as public beaches and piers, fire stations, expressways, railways, power facilities, and river-crossing bridges. Over an implementation period of more than ten years, it has maintained a 2-8 m cycling space with independent right-of-way, fully integrating natural landscapes and connecting urban functional spaces.

2.3 Construction strategies that combine near- and long-term goals with systemic implementation

Urban-level green public spaces in cities at home and abroad place particular emphasis on the systemic integrity of near-term routes. By introducing elements such as “interim green space” and “alternative routes,” they rigidly transmit requirements to urban construction projects along the route. Even projects under construction should not interfere with the connectivity and accessibility of near-term routes.

In Singapore, for example, “control of parks, water bodies, and public spaces” is a core component of its special and detailed control planning system. The control system includes temporary elements such as “interim green,” “interim park connector,” and “interim round island route.” In other words, every specific type of green space, green corridor, and connector reflecting Singapore’s urban-level green public space structure has a corresponding interim legend. This means that whatever stage of construction the projects along the route may be in, and whatever occupation conditions they may encounter, the city-level green corridor system and park connector system remain open to the public and continuously connected, truly achieving the “last kilometer” of everyday cycling.

Singapore’s park connector system closely combines road networks, waterways, and other elements, making full use of low-efficiency land such as drainage channels and buffer zones to form a networked green corridor structure. The Changi Airport Connector, for example, transforms the seawall around the airport runway into a green cycling path connected to East Coast Park. Along the route, catering, bicycle parking, and other facilities are provided, while leisure themes such as the “Jurassic Mile” are incorporated, demonstrating the systematic and high-level service capacity of the park connector system.

2.4 Planning tools and policy safeguards with clear standards

Urban-level green public space planning often needs to transmit three aspects to implementation units: the overall scheme, construction tasks, and construction standards. Hong Kong, Shanghai, and other cities have adopted laws, tools, or guidelines to support implementation.

Hong Kong’s hiking trails, which traverse the entire territory and have repeatedly been ranked among the world’s most beautiful hiking routes, depend on the clear policy safeguards provided by the Country Parks Ordinance in relation to responsibilities, planning, implementation, and maintenance. As a key regulation for protecting and controlling countryside areas, the Ordinance upholds the principle of “authentic wilderness enjoyment and harmonious integration with nature,” and from it derive technical and experiential standards for hiking trails. Taking the MacLehose Trail as an example, its full 100 km is managed and guided by the Agriculture, Fisheries and Conservation Department, which designates relevant institutions to form a stable technical team. Supported by government, foundations, and multiple funding channels, the trail has continuously explored management, maintenance, and use methods, forming a sustainable construction, maintenance, and operation mechanism. To date, sustainable trail management has undergone 45 years of repeated technical-method iteration and upgrading, anchoring a more ecological and authentic mountain-sea route experience.

In the planning and construction of public spaces along both banks of the Huangpu River, Shanghai clarified design schemes through public-space design solicitations and detailed planning for riverfront units, prepared a series of guidelines such as the Design Guidelines for Public Space Construction along Both Banks of the Huangpu River, and appointed a chief planner and section chief designers to ensure unified standards and implementation quality throughout the process. Through cross-departmental regulations and technical standards such as the Shanghai Outer Ring Greenbelt Management Measures (2002) and the Outer Ring Greenbelt Engineering Design Specifications (2012), Shanghai clarified project implementation authority and responsibilities, set construction standards, and comprehensively guaranteed consistency between planning vision and implementation effects.

3 Value Transformation in Shenzhen's Green Public Space Planning and Construction in the New Period

Based on lessons from domestic and international implementation-oriented practices in urban-level green public space planning, and in light of the evolution of the concept and value of green public space, the value orientation of planning and construction should be expressed in four dimensions: positive externalities, systemic integration, collaboration, and process orientation.

3.1 Positive externalities: from “ecological resources” to “ecological products”

Against the background of building a Beautiful China, a high-quality ecological environment supports high-quality development. The positive externalities of urban-level green public spaces have increased significantly, and their development logic has shifted from protecting ecological resources to creating ecological products. On the one hand, more proactive conservation strategies and more refined governance approaches should be applied to ecological spaces, placing strong emphasis on authenticity, restoration of countryside environments, protection of biological habitats, and maintenance of healthy ecosystems, thereby building a resilient and more stable ecological foundation. On the other hand, the construction concept of green public space should shift from “quantity” to “quality” and from “physical space-making” to “people-oriented experiential improvement.” By selecting qualified areas to pilot mechanisms for realizing the value of ecological products, linking commercial, cultural, sports, and tourism districts, creating rich leisure and recreation experiences, and producing diverse ecological products, ecological resources can be transformed into high-value-added ecological products, enriching the ecological, economic, and social value of green public spaces.

3.2 Systemic integration: from “single dimension” to “system integration”

In the new period, urban-level green public spaces involve the systemic integration of multiple spatial elements at different time stages. Against the background of reform in the territorial spatial planning system, Shenzhen has constructed an integrated life community of mountains, waters, forests, farmland, lakes, grasslands, and deserts. Nature and the city are intertwined in a new figure-ground relationship [1]. As an organic living system, the systemic integrity and completeness of urban-level green public space have received increasing attention, requiring systemic thinking to guide planning and construction.

Urban-level green public space is no longer limited to traditional independent public green land. Its concept and content have further expanded. First, a broad, territory-wide green public space system should be built, further integrating existing ecological spaces such as mountains, coasts, rivers, ecological corridors, urban parks, greenways, and blueways, repairing and weaving the ecological framework of complete mountain-sea natural habitats and forming a blue-green public space network that serves citizens. Second, under the conditions of stock-based development and smart construction, negative spaces such as areas

beneath bridges, abandoned railways, and isolation belts have attracted increasing attention. More small-scale, non-traditional green space types, such as three-dimensional ecological corridor bridges and parks built above water plants, have begun to emerge. Their value and potential are gradually being discovered in high-density cities and will become organic components of the urban-level green public space system.

3.3 Collaboration: from “parallel multi-actor management” to “coordinated joint action”

The governance of urban-level green public spaces faces complex and intertwined value demands. Joint action and collaboration among multiple departments are key to achieving consensus on plural values. As an effective governance tool for integrating departmental forces, the implementation action plan translates macro-level consensus into actionable sub-tasks, clarifies the specific tasks and responsibilities of each department in planning and construction, aligns otherwise fragmented directions of work with common goals, and effectively promotes coordination among multiple objectives.

Building a platform for consultation and balancing stakeholder interests provides strong support for collaborative mechanisms. Through such a platform, multi-actor management of urban-level green public spaces can be integrated. Different actors communicate and cooperate under a unified framework, jointly anticipate difficulties and pain points in the construction process, negotiate solutions in advance, and clarify key factors such as resource allocation, time nodes, and quality standards, thereby ensuring high-quality project implementation. See Fig. 2.

3.4 Process orientation: from “action planning” to “full-process planning”

The creation of urban-level green public spaces does not pursue an unchanging final state, but is instead a process-oriented action that requires dynamic adjustment. During phased advancement, each stage should match corresponding goals and needs. While achieving a certain degree of systemic completeness, it is also necessary to ensure high-level implementation of construction projects, upgrade the content and mode of planning supply, and further improve supporting mechanisms.

In terms of planning supply, planning shifts from a static target blueprint to dynamic accompaniment throughout the process. As the creation of urban green public spaces enters a stage more focused on content and quality enhancement, planning no longer merely outputs static documents and drawings, but extends toward continuous, phased process-based services. In practice, planning services include early-stage top-level strategy, multidisciplinary technical consultation, and technical coordination and review during implementation, providing more complete support for the delivery of urban design and planning-construction [5]. The core lies in accurately transmitting planning intentions at every stage and guiding the implementation of high-level design schemes.

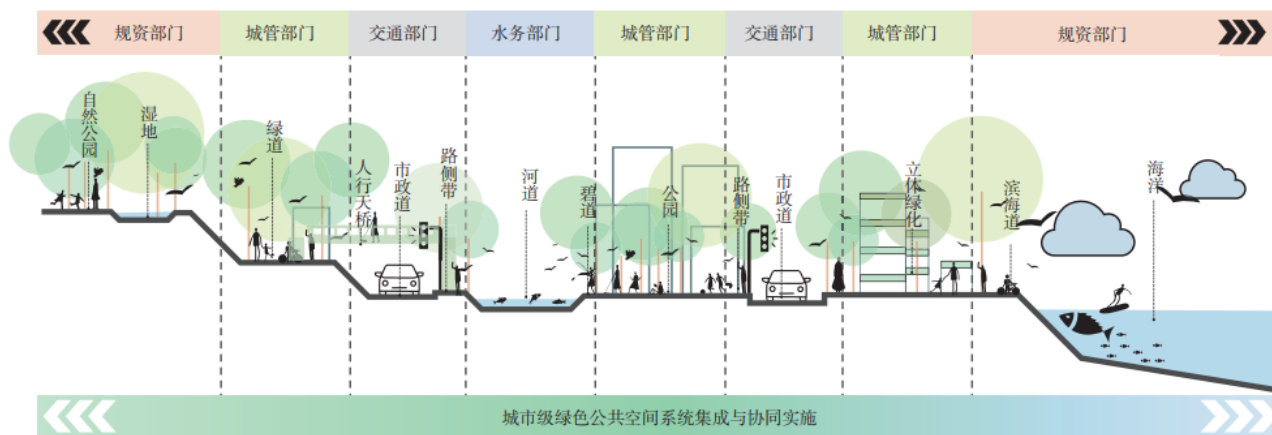


Fig. 2 System integration and collaborative implementation of urban public green space

4 Reflections on the Full-Process Implementation Mechanism of Shenzhen's "Mountain-Sea-City Linkage Plan"

The ecological construction initiative "Mountain-Sea-City Linkage, Green and Beautiful Shenzhen," further developed from the "Mountain-Sea-City Linkage Plan," is Shenzhen's practice in deeply implementing Xi Jinping Thought on Ecological Civilization and accelerating the building of a Beautiful China model characterized by harmonious coexistence between humanity and nature. It is also an innovative exploration by a high-density megacity toward high-quality sustainable development. Through five years of systematic planning and three years of construction and implementation, Shenzhen has advanced in depth the creation and governance of urban-level green public spaces, effectively amplifying the advantages of its natural ecological resources and significantly enhancing the city's livability, reputation, and brand value. This process fully demonstrates the timeliness and effectiveness of the full-process planning implementation mechanism. See Fig. 3.

4.1 Building consensus around the goal of "Mountain-Sea-City Linkage, Green and Beautiful Shenzhen"

Through big-data analysis and 6,000 citizen questionnaires, the "Mountain-Sea-City Linkage Plan" evaluated the use of existing urban-level green public spaces and identified residents' needs for green mountains and clear waters, healthy leisure experiences, and proximity to nature under conditions of high-density space and fast-paced life in Shenzhen [6]. Two problems were particularly evident. First, mountain, river, and sea resources were not closely connected with citizens' everyday lives, resulting in insufficient use and experience. Second, citizens' demand for contact with nature could not be fully satisfied, and the "last kilometer" near their homes was difficult to connect.

To address these issues, Shenzhen treated its most representative bays, mountains, rivers, parks, green spaces, greenways, and blueways as an organic living system. Taking integration as the goal and connection as the means, and through systematic connectivity and habitat restoration, the city constructed an ecological charm-and-vitality framework of "one ridge, one belt, twenty corridors, one thousand parks, and ten thousand paths." This anchored a "continuous, complete, systematic, and visible" ecological pattern and created a public recreation network near residents' homes that "connects mountains, reaches the sea, runs through the city, and links experiences of interest." See Fig. 4.

Based on the appealing vision of the Plan, Shenzhen made mountain-sea-city linkage its "Shenzhen Action" for Green and Beautiful Guangdong. The Shenzhen Municipal Party Committee issued the Opinions on Deeply Advancing the Ecological Construction of Mountain-Sea-City Linkage, Green and Beautiful Shenzhen. The municipal government wrote the Plan into its government work reports for three consecutive years from 2023 to 2025, and incorporated it into the Ten Plans for Promoting High-Quality Development in 2024 and 2025. Under the unified deployment of the municipal government, the Plan is coordinated and promoted by the greening department, while the planning and natural resources department is responsible for policy and technical review. Together with eight municipal departments, they jointly issued the Three-Year Implementation Scheme for Shenzhen's Mountain-Sea-City Linkage Plan (2023-2025), making it a governance program and action guide that unifies citywide consensus.

4.2 Formulating an implementation scheme of "system integration plus sustained relay"

In implementing the planning and construction of the Plan, in addition to the legal support provided by relevant special plans, Shenzhen drew on the concepts and methods of its short-term urban construction planning and explored rolling action schemes as governance tools to ensure effective implementation.

4.2.1 Integrated design of project clusters and task decomposition

The implementation action scheme integrates a complete trail system comprising hiking trails, countryside trails, mid-mountain trails, coastal trails, waterfront trails, and natural urban trails. It coordinates specific connection tasks involving district governments and municipal departments through project clusters. Taking hiking and countryside trails as an example, the “two trails” cross Shenzhen’s mountain ridges and green veins, involve special areas such as ecologically sensitive zones, pass through multiple urban districts, and provide an authentic countryside recreation experience. The implementation action scheme identifies the actual breaks, bottlenecks, construction priorities, and difficulties in this large urban-level system, and clarifies construction sequencing, implementing actors, connection methods, and other content, thereby consolidating tasks and requirements and improving problems such as fragmented construction and difficult-to-open bottlenecks. In addition, implementation goals, project libraries, and series of planning and design guidelines strengthen task decomposition and implementation requirements, guiding “multiple plans in one, multiple paths connected, and a combination of rigidity and flexibility,” and enabling rapid progress by multiple departments.

4.2.2 Sustained relay from near-term form completion to long-term system completion

The implementation action scheme adopts a rolling cycle of three to five years and advances through multiple rounds with long-term commitment. It combines near- and long-term approaches, gradually promoting the delivery and deepening of planning goals while flexibly adjusting according to the actual progress of specific projects. For districts at different development stages, and under different connection conditions and constraints, the scheme seeks to ensure the integrity of the green public space system by phases: in the near term, it aims for preliminary system formation; in the long term, it aims for complete system construction. To this end, planning reserves a certain degree of adaptability through special elements such as interim corridors and green spaces and near-term alternative routes. For example, in the “one belt” coastal cycling route within the mountain-sea-city linkage structure, the airport section, which is difficult to implement in the short term, is connected through a near-term alternative route while long-term alignment options are pre-controlled, ensuring continuity and adaptability in planning implementation.

4.3 Building a collaborative framework of “control plus guidance plus service”

Unlike small-scale green public space systems, implementation of the Plan involves multiple levels and multiple sectors of implementing actors. It therefore requires clear horizontal and vertical channels for transmitting planning intentions, guiding each implementing actor to advance implementation according to unified control principles and design orientations, and providing technical services with targeted opinions for specific scenarios.

4.3.1 Refined control based on low disturbance and light construction

Implementation of the Plan adheres to ecological priority and strictly controls the amount of construction and its ecological impact. First, by comprehensively reviewing the existing ecological space control system, Shenzhen formed a single map of construction-control zoning guidance for the Plan, dividing spaces into ecological maintenance and conservation zones [7], recreation service zones, historical and cultural zones, and agricultural and forestry production zones, and clarifying construction restrictions for each. Second, the Plan sets refined control requirements for different types of urban-level green spaces. For

example, it formulates the “three-zero” principle for hiking trails and countryside trails: zero growth of cement roads, zero impact on the natural environment, and zero harm to living species. The trail system is required to rely mainly on existing paths, while newly built sections should use a light-construction method based on local materials.

4.3.2 Precise guidance through overall guidelines and special guidelines

During implementation, the Plan has formulated a complete and targeted “construction guide” to transmit planning and design intentions. First, the Planning and Design Guidelines for Mountain-Sea-City Linkage, Green and Beautiful Shenzhen were prepared, explaining concepts such as ecological corridor bridges, hiking trails, and mountain viewpoints, and clarifying technical standards and construction requirements for the trail and supporting systems. Second, in response to specific project-construction needs, the guidelines have been extended into special guidance for coastal cycling routes, park connectivity, signage systems, and other subjects. These special guidelines propose targeted construction standards for multiple scenarios, including urban areas, countryside, parks, greenways, and blueways.

4.3.3 Accompanying technical service by the chief designer team

To ensure full-process quality control in planning and construction, Shenzhen drew on the Implementation Measures for the Chief Designer System in Key Areas of Shenzhen and established a chief designer service mechanism for planning and building the Plan. First, according to design guidelines and related guidance systems, the chief designer team provides targeted guidance for specific project conditions, coordinates with planning and design teams, assists competent departments in mediating stakeholder demands, and judges feasible optimal solutions for implementation projects. For example, in one ecological corridor bridge crossing an expressway, with support from the chief designer team, ecological research on the habits of target local animals was strengthened, further optimizing the scale of the bridge and the habitat design of vegetation on it. The construction height of the corridor bridge was controlled appropriately, avoiding negative impacts on the road landscape while greatly reducing construction costs. Second, through continuous testing of the guidance system, and in response to the actual needs of implementation actors, the chief designer team constantly optimizes and refines the guidance content. It also includes exemplary project experience in a case library for reference in subsequent projects, thereby improving the overall quality of citywide project implementation.

4.4 Providing policy support throughout “planning-construction-management-operation”

In the process of planning and building urban green public spaces, policy support plays a crucial role in ensuring smooth project planning and implementation. During the delivery of the Plan, Shenzhen has continuously explored lifecycle policy support integrating planning, construction, management, and operation, responding to practical needs on the construction side and enabling more sustainable management, operation, and maintenance.

4.4.1 Providing policy safeguards for construction and management

Innovative policy mechanisms have effectively supported precise planning delivery. To ensure the smooth advancement of the Plan, Shenzhen introduced a joint conference mechanism, providing district governments and departments with a regular platform for communication and problem-solving. During implementation, policy innovation was explored synchronously, gradually removing policy barriers in construction approval. For example, in construction approvals for parks, greenways, blueways, and supporting facilities, Shenzhen explored policy innovations for unconventional elements such as “ecological covers,” “spaces under expressway bridges,” “interim cycling routes,” and “interim green spaces,” including

the delineation of three-dimensional management boundary lines and three-dimensional land-use attributes, thereby ensuring the feasibility of planning implementation.

4.4.2 Formulating policy guidance for operation and maintenance

Exploring mechanisms for operating and maintaining green public spaces is an important safeguard for sustainable development on the management and maintenance side. Against the background of more compound and refined spatial use, clearly defining operation and maintenance responsibility boundaries is key to ensuring responsibility implementation. In the management and maintenance of hiking trails, Shenzhen issued the Guidelines for Maintenance of Shenzhen Hiking Trails (Trial), further improving the mechanism for trail management and maintenance and providing scientific management tools for long-term maintenance and management.

4.5 Building a governance platform of “co-construction plus sharing plus co-governance”

In the process of planning and building urban-level green public spaces, public participation and the integration of social resources have become crucial factors in improving project quality and sustainability. As a comprehensive development action plan, the Plan covers a broad range of fields and stakeholders, making the establishment of a socially participatory governance platform an important measure for achieving co-construction, sharing, and co-governance.

From the perspective of co-construction, social forces are an important component of green and sustainable development. During implementation, interfaces have been reserved for social capital, guiding social capital to jointly build urban-level green public spaces. This is significant for easing fiscal pressure on the government and improving project operation efficiency. For example, the Beautiful Shenzhen Foundation introduced social forces into tree-planting activities under mountain-sea-city linkage and achieved good results.

From the perspective of sharing, it is also necessary for social organizations, enterprises, and other users to share green public spaces through embedded activities. The establishment of an Outdoor Activities Alliance is an innovative attempt by Shenzhen to build a socially participatory governance platform. The Alliance invites relevant enterprises and professional social organizations to participate voluntarily, uses completed urban-level green spaces, and widely mobilizes all sectors of society to plan and organize outdoor activities. Events such as the Shenzhen Hiking Trail Mountain Running Training Race, the Kunpeng Trail hiking event, and the Five-Park Linkage Fun Run not only provide citizens with experiences through which they can understand and enjoy green public spaces more deeply, but also actively promote the mountain-sea-city linkage brand.

From the perspective of co-governance, the governance of urban-level green public spaces should practice the people-centered city principle. On the basis of the government’s leading and coordinating role, citizens’ needs and willingness to participate should be fully respected, and non-governmental forces should be allowed to participate in supervision and joint governance. Taking the three-level segment-chief system for hiking trails as an example, the system consists of municipal, district, and civil society levels. By appointing citizen segment chiefs, part of the supervision and management responsibility is assigned to specific individuals, effectively reducing the government’s fiscal burden and producing good public service results.

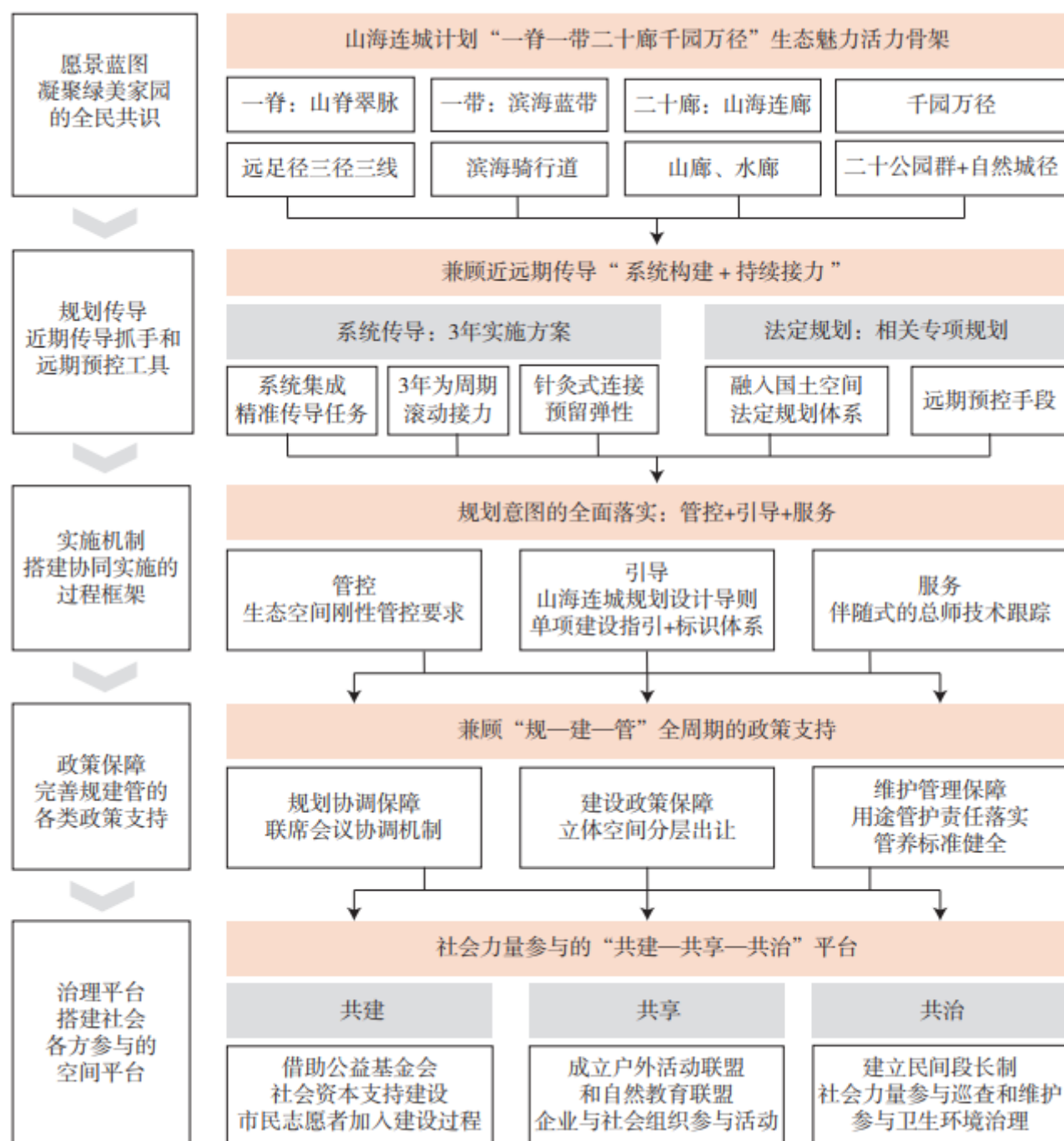


Fig. 3 Full-process implementation mechanism of Shenzhen's Mountain-Sea-City Linkage Plan



Fig. 4 “One Ridge, One Belt and Twenty Corridors” eco-charm and vitality framework

5 Conclusion

In the new era of advancing ecological civilization and building a Beautiful China, urban-level green public spaces are essential for creating a life community in which humanity and nature coexist harmoniously. As a useful attempt to establish an implementation mechanism for urban-level green public space planning, Shenzhen’s “Mountain-Sea-City Linkage Plan” shows that planning and design have moved from being a “front-end baton” to becoming a “full-process escort.” It has broken through the traditional process of “planning-construction-management-operation” and taken an important step toward back-end policy support and quality control for construction, management, and maintenance. This symbolizes the increasingly important coordinating and integrative role of planning and design in the upgrading of urban governance.

The full-process planning and construction practice of the Plan provides a useful planning-governance sample for creating urban-level green public spaces in the new period, and offers practical references for relevant management departments and research institutions. In the new stage of full-territory and all-factor governance of territorial space, the planning and implementation of urban-level green public spaces are characterized by cross-level, cross-departmental, cross-regional, and cross-land-type features. Their implementation mechanisms must adapt to time and place. In particular, implementation pathways and policy exploration concerning cross-regional and cross-land-type planning still require further research.

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