

Building Public Open Space Design and Management Strategy in Urban Waterfront Areas—A Case Study of New York Water Street POPS

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Abstract. The construction of building public open space in urban waterfront areas is one of the important issues for future development. Based on the study of the development history of the private public space (POPS) design guidance and control of New York City's Water Street, we analyze the identify approval and incentive zoning programme, design guidelines and quantitative standards, and post-build operation and supervision of POPS. Analyzing the guidance and control strategies of the design guidance and control system in different periods of time and in different social contexts. Combined with China's waterfront design regulations and public open space guidelines, the article propose a framework for waterfront public open space design and control strategies that are suitable for China.

Keywords: New York Water Street, POPS, Waterfront Area.

1. Building Public Open Space in Urban Waterfront Areas

1.1 Building Public Open Space

Building public open space is a type of urban public open space that is not independently occupied(Figure 1). With the development of times, urban public space is not only limited to parks and open squares, but also can be provided within the developer's development site to assume urban functions[1].

New York was the first city in the world to implement the policy of POPS, which the category contains plaza, arcade, or other outdoor or indoor space provided for public use by a private office or residential building owner in return for a zoning concession. POPS is a type of public space characterized by the combination of private ownership and zoning-specified public use. In 1916, New York created the first comprehensive zoning law, marking the governmentalization of land management[2].

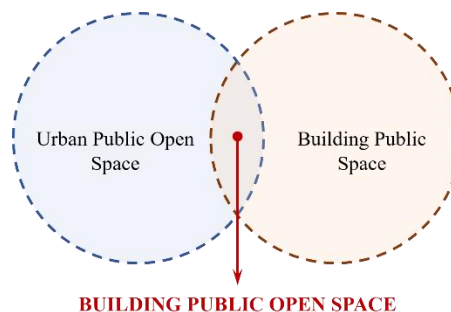


Fig. 1 Schematic of Building Public Open Space (Source: Self-drawn by the author)

1.2 Building Public Open Space in Urban Waterfront Areas

Urban waterfront district refers to a specific type of spatial section in the city. There are riverfront, riverside, lakeside and seaside waterfront areas adjacent to different waterfront areas. The urban waterfront area has become a unique type of urban public open space due to its multiple geographical location peculiarities such as special landscape, special traffic, special function and the attraction of specific people. In the planning guidelines and urban design guidelines, there are

relevant provisions for waterfront landscape and waterfront public space. The design of waterfront projects also mostly follows the principles of high publicness, high openness and accessibility[3]

With the process of creating high-quality waterfront spaces in full swing around the world, there are many excellent examples of waterfront planning that deserve attention. Such as Yokohama 21st Century Future Port in Japan, Port of London in the UK, Marina Bay in Singapore, and Lower Manhattan in New York in the US, etc. Numerous cities around the world have enacted bills for waterfront planning enhancements.

2. Key Elements of the POPS Design Guide for Water Street

2.1 Water Street Overview

Water Street is located in the eastern part of the seaport and financial core of Lower Manhattan's South Street. The Water Street Pier was once the center of New York City's maritime activities, and its economic activities, urban planning, and regional functions were once the wind vane of the city's development[1].

Since 1660, Water Street has become an important waterborne business district in the eastern section of Lower Manhattan due to its convenient location. In the 1950's, the freight terminal function of Water Street was replaced by administrative and financial needs, and the original industrial warehousing buildings on Water Street were replaced by high-rise office buildings and townhouses. 21st Century, along with the development of the city and Internet of Things technology, the function of Water Street was transformed from an office for financial services into a technological media office, and the office buildings were converted into office buildings. In the 21st century, with the development of urban and IoT technologies, the function of Water Street changed from financial offices to technological media offices. The office buildings were converted into hotels and residences. (Figure 2) [4].

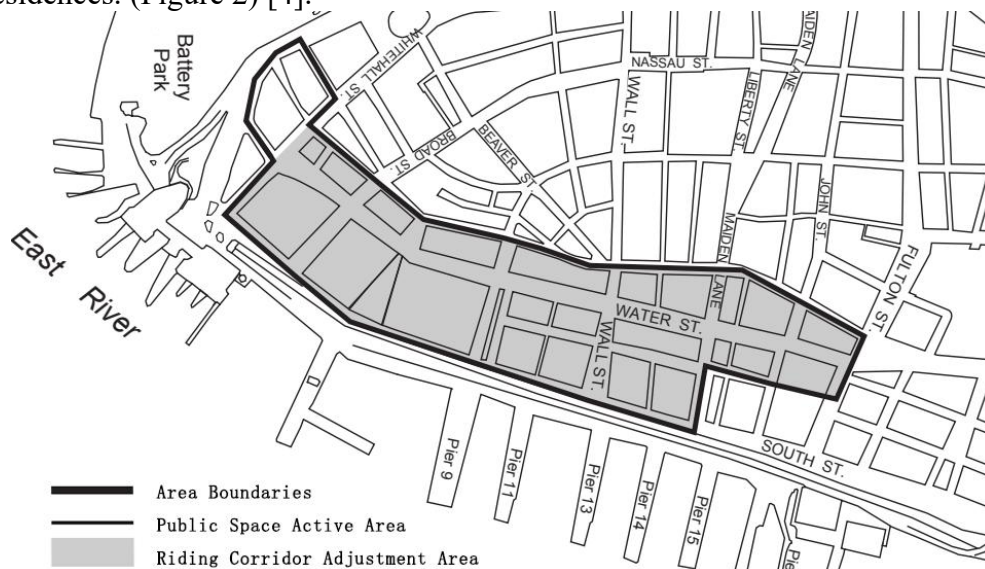


Fig. 2 Water Street Study Area (Source: NYCDPC, re-drawn by the author)

2.2 1916-2007 Early Exploration Period

In the late 19th and early 20th centuries, the rapid industrial and economic development of the United States and the dramatic increase in the number of high-rise buildings led to the deterioration of the urban spatial environment, and the public appealed for their own right to sunlight and ventilation. 1916, in the face of the complexity of the urban problems, the New York City government resolved to put forward a systematic incentive to the zoning ordinance, New York City Zoning Ordinance 1916. Due to the construction level and developers' aesthetics at that time, the

dense construction of buildings led to few public spaces in the city, which made it difficult for residents to move around and made the urban space depressing, and the residents began to call for the enhancement of light and environment in the city.

2.2.1 Identify Approval and Incentive Zoning Programme

The POPS recognition incentive system is jointly approved by the New York City Planning Commission, the City Building Commission, the Community Board and other city building departments, which greatly guarantees a reasonable and regulated approval system. POPS is granted a construction permit after a series of approval processes, and the developer receives a corresponding floor area ratio or floor area incentive[5].

Since New York's 1916 Zoning Ordinance, developers were driven by the huge benefits of the POPS construction incentive mechanism to build POPS in large numbers, and New York City soon built a large number of POPS. In 1973, plazas and ride corridors were required to be built mandatorily with building plans, and developers were given floor area incentives of up to 20% of the total area after building POPS. In 1975 there were 13 POPS on Water Street and 6 POPS types. In 2007, the number of POPS types increased to 12, and the New York City Department of Planning created a dedicated POPS department to deal with the increasingly complex approval and administration process. Developers have been over-whelmed by the complexity of the application process and have called for a streamlined POPS approval process[1].

2.2.2 Design Guidelines and Quantitative Standards

Since 1961, the New York City Zoning has defined 12 categories of POPS, including plazas, urban plazas, residential plazas, public plazas, elevated plazas, arcades, through block arcades, through block gallerias, through block connections, covered pedestrian spaces, sidewalk widenings, open air concourses. After several revisions by the planning committee, it was basically determined after 2007 that the design guidelines needed to specify 18 quantitative criteria. Most of the POPS in Water Street were built in that period(Table 1).

Table 1. Early POPS in Water Street (Source: NYCCPC, compiled by author)

District	Name of POPS	Type of POPS	Construct ion Year
FULTON STREET GATEWAY	200 Water Street	Arcade, Plaza	1971
	180 Water Street	Arcade, Plaza	1969
	160 Water Street	Arcade, Plaza	1970
	175 Water Street	Open Pedestrian Area, Special Permit Arcade	1984
WILLIAM-WATER-W ALL STREET GATEWAY	88 Pine Street	Special Permit Plaza	1971
	100 Wall Street	Arcade, Plaza	1969
	110 Wall Street	Arcade	1964
	75 Wall Street	Arcade, Non-Bounced Public Open Space, Urban Plaza	1987
	95 Wall Street	Arcade, Plaza	1969
	111 Wall Street	Arcade, Plaza	1967
	10 Hanover Square	Plaza	1971
	77 Water Street	Arcade, Plaza	1970
	32 Old Slip Financial Square	Arcade, Urban Plaza, sidewalk widenings	1987
	7 Hanover Square	Arcade, through block connections	1983
55 Water Street	Arcade, Plaza	1970	
BATTERY GATEWAY	1 New York Plaza	Arcade, Plaza	1967
	2 New York Plaza	Arcade, Plaza	1970
	4 New York Plaza	Arcade, Plaza	1968

2.2.3 Post-Build Operation and Supervision

Early supervision conditions were not good, and post-construction supervision could only be carried out through the government sending personnel to visit from time to time. And POPS are widely distributed in large numbers, with limited statistical and data collection methods, poor management and overall low quality. The part of zoning regulations for building POPS is not detailed and sufficient, POPS space is in quantity but not quality, and there are many cases of crude space(Figure 3).

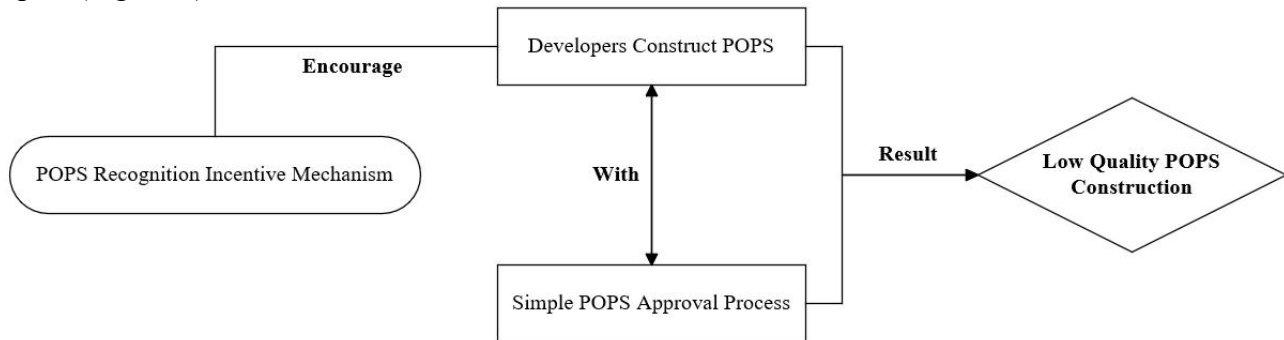


Fig. 3 Reasons for Low Quality of Early POPS Construction (Source: Self-drawn by the author)

2.3 2007-2021 Period of High-speed Construction

The old POPS revision period refers to the period from 2007 to 2021, with POPS in the category of public plazas added in 2007. This period provides a unified design revision and management of POPS built in the 20th century, and some new high-quality POPS were built. Compared with the old POPS, the new plan is more holistic. In terms of spatial quality improvement, the new zoning ordinance improves the efficiency of POPS use by increasing the pedestrians and ensuring the integrity of plaza connectivity on Water Street. In terms of incentive program, although POPS that are newly included in the designation are not eligible for incentive benefits, the owners still provide POPS voluntarily.

2.3.1 Identify Approval and Incentive Zoning Programme

The 2007 version of the Zoning Ordinance simplified the approval management and quantification criteria (Table 2). 2011 and 2014 editions updated the rules for POPS recognition and set different incentive amounts according to the actual situation of different regions. 2016 and 2019 editions improved the detailed part of POPS recognition and approval.

The 2016 version of the Zoning Ordinance has been amended with respect to publicly accessible open areas: the provision of maintenance facilities in POPS space requires a written application to the Planning Commission for permission to build, with volume ratio compensation in accordance with the incentive ordinance by law. Program applications are required to be submitted to the CPC or the Commission Chair. The 2019 version requires the developer to submit a floor plan with POPS and drawings with furniture details to the Chairman for review and approval; there are no changes to the building massing, permitted floor area, or incentive mechanism for providing POPS.

Table 2. POPS Approval Process Before and After Simplification (Source: compiled by the author, *Zoning Ordinance 2007*)

		Custodial Approval Systems	Certification Approval Systems	Discretionary Approval Systems
Types of POPS	Before	Plaza, Arcade	Urban Plazas, Sidewalk Widening, Residential Plazas	Elevated Plazas, Through Block Gallerias, Covered Pedestrian Spaces,

				Sunken Plaza, Outdoor Piazza
	After	Arcade	Public Plaza (all POPS types except arcades)	
		Included with the architectural plans	Issuance of construction permit → Payment of construction deposit by developer → Signing of O&M contract with CPC	POPS program reported separately and approved as appropriate
Approval Standards		Easy	Moderate	Hard

2.3.2 Design Guidelines and Quantitative Standards

In 2010, the ANDY commissioned Starr Whitehouse Company to design the street and public events on Water Street (Figure 4,5,6). In October 2012, Hurricane Sandy made landfall, causing significant damage to cities and economies along the U.S. coast. In order to revive the Water Street area, the Water Street POPS bill received the attention of many authorities. NYCCPC, NYCEDC, DOT and design firms have proposed a number of proposals to upgrade Water Street. NYCEDC officially issued the Transforming Water Street’s Privately Owned Public Spaces, 2013. The plan proposes a framework of improvement strategies for the form, function, and business format of the Water Street POPS, and works in conjunction with various public sector and private developers to develop feasible design guidelines(Table 3).

As of 2016, the Water Street arcade has reached a total area of 2.6 acres and the plaza has a total area of 3.76 acres. By 2019, when the zoning ordinance is enact-ed, there are 22 POPS on Water Street, including 20 plazas, 19 arcades, 3 side-walk widenings, and 1 covered pedestrian(Figure 6, Figure 7)[6].

Starting in 2021, in addition to the original design specifications, the NYCDOP requires POPS to be designed in accordance with the following principles: first, sidewalks are open and shared with the public; second, accessibility is ensured; third, the space is safe, comfortable, pleasant and reliable; and fourth, it is comfortable, attractive and ensures adequate greenery.

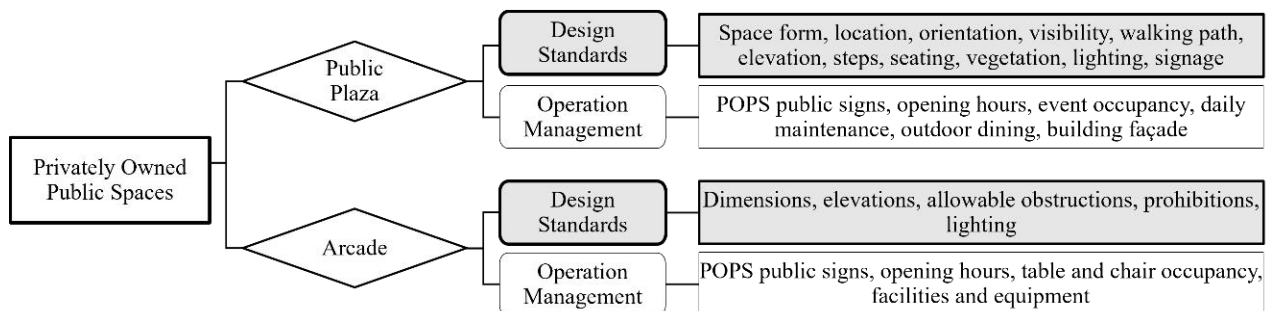


Fig. 4 New York POPS Design Standards and Operations Management (Source: New York City Zoning Ordinance 2019, compiled by the author)

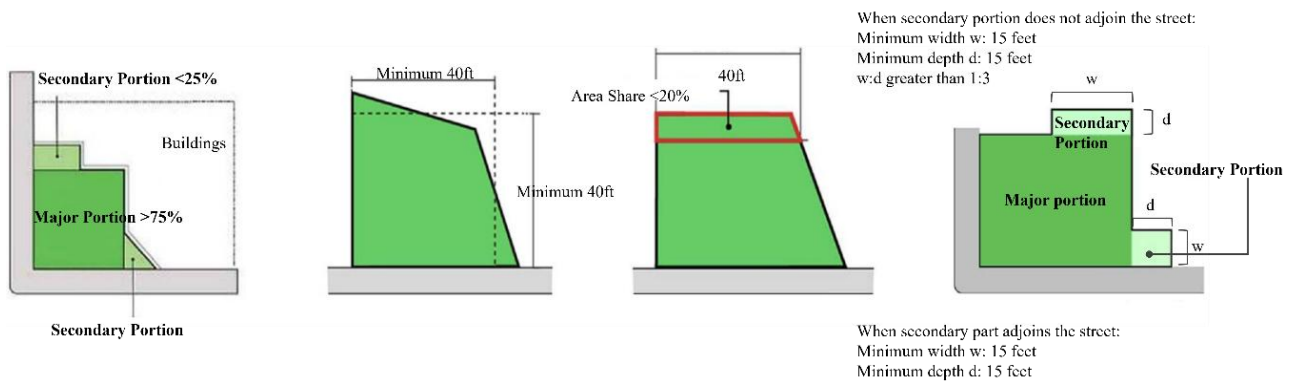


Fig. 5 Schematic diagram of dimensional and spatial form regulations for public plazas (Source: NYC Department of Planning, compiled by the author)

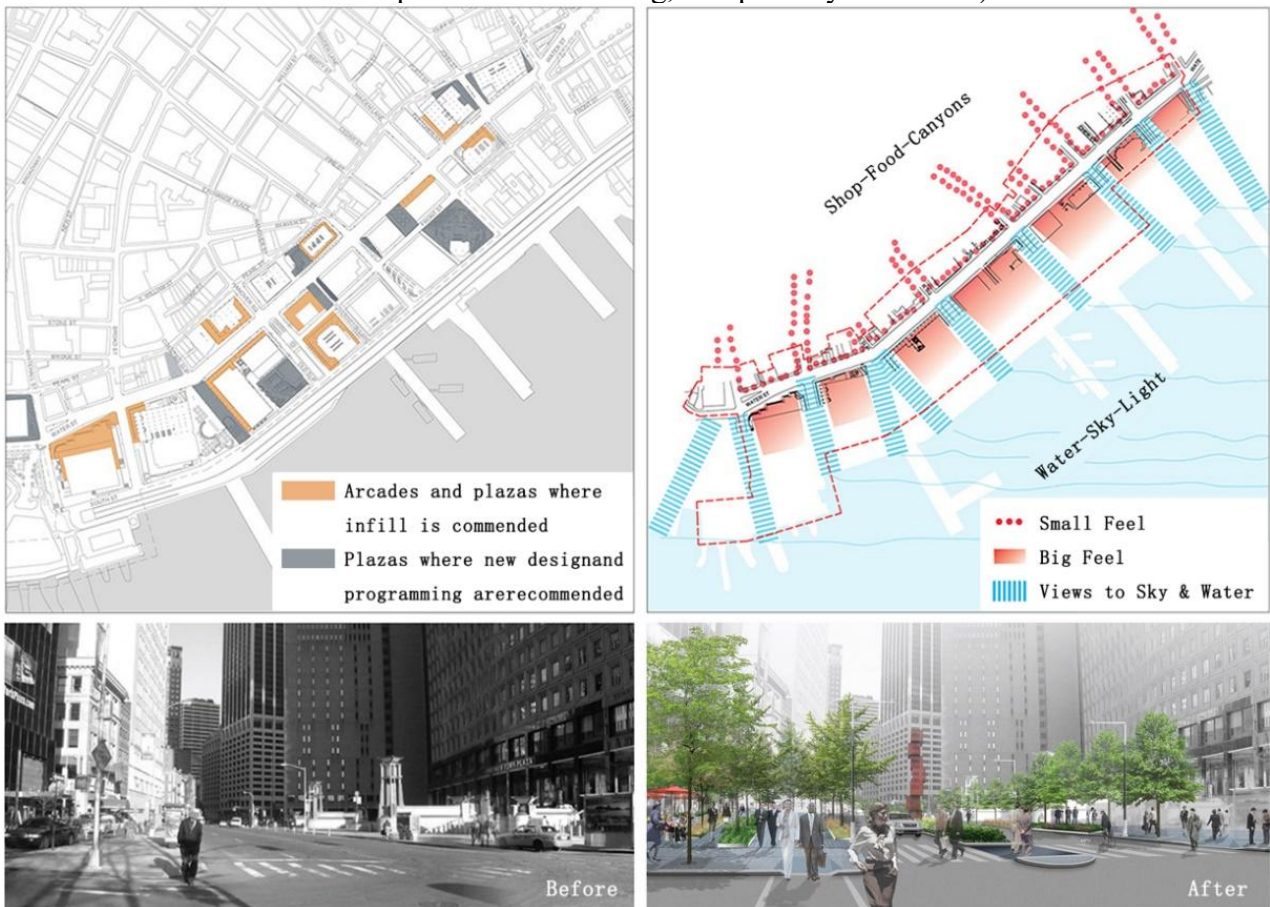


Fig. 5 Schematic diagram of dimensional and spatial form regulations for public plazas (Source: NYC Department of Planning, compiled by the author)

Table 3. Early History of the Water Street POPS Enhancement Program (Source: NYC CPC, compiled by the author)

Year	Departments	Programs	Improvement Contents
2010	Alliance for Downtown New York	Water Street: A New Approach	Increase exposure to enhance competition on Water Street; encourage property owners to renovate POPS
2011	Department of City Planning	Partition Text Amendment	Allow tables and chairs to be placed within the existing riding porch; attracts pedestrians and enhances the vibrancy of the space
2013 Summer	New York City	Water Street Pops!	Increase the variety of activities in POPS space

	Economic Development Corporation		
	DCP	Partition Text Amendment	Allow for planning; increase public events; increase social exposure
	NYC Department of Transportatio	Implement targeted improvements	Expand plazas, close access roads, and improve intersections; expand pedestrian areas and add new sitting benches; and increase pedestrian access
	NYCEDC	Feasibility Study	Conceptual design of public plazas on key streets; increased public amenities
			Improve stormwater system and increase planted greenery
2013	NYCEDC	Integrated Design Service Proposal	Advancing the implementation of the feasibility study from 2014

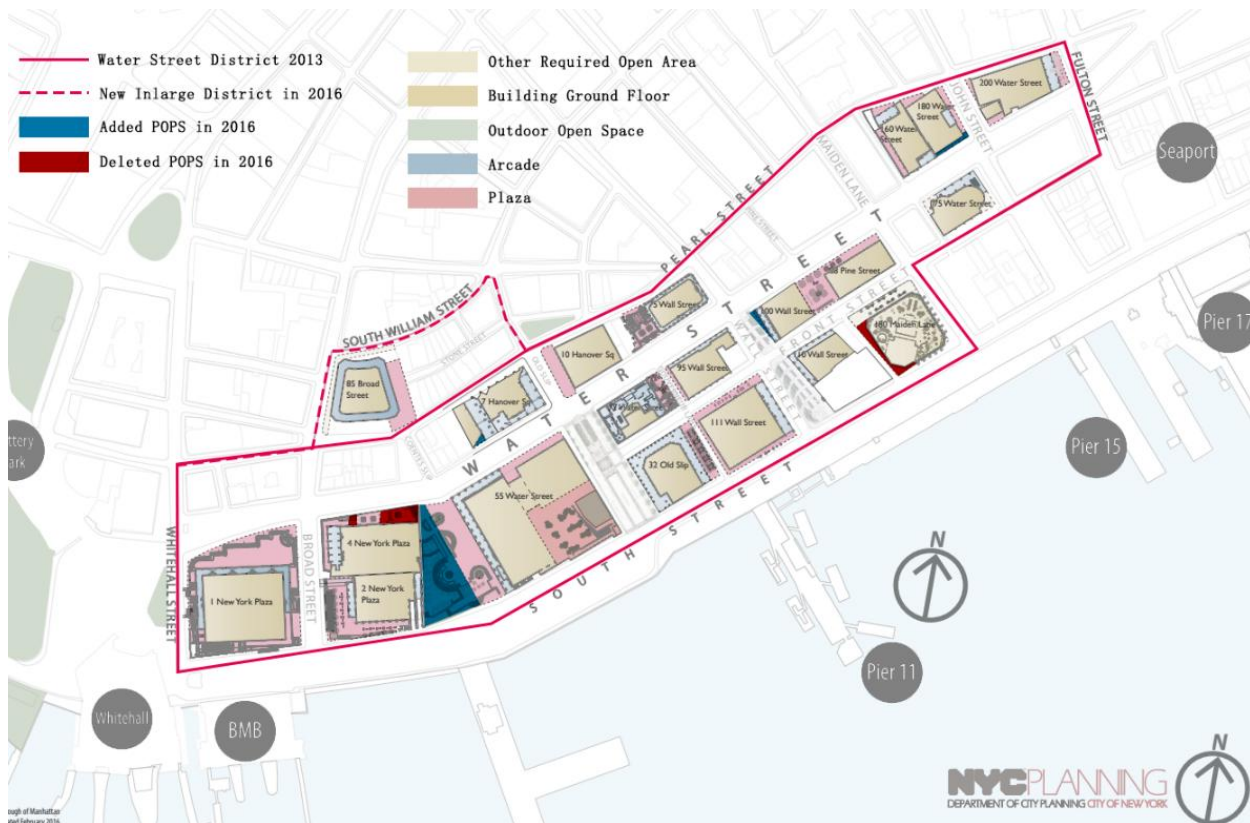


Fig. 6 Comparison of Water Street POPS Distribution 2013& 2016 (Source: drawn by author)

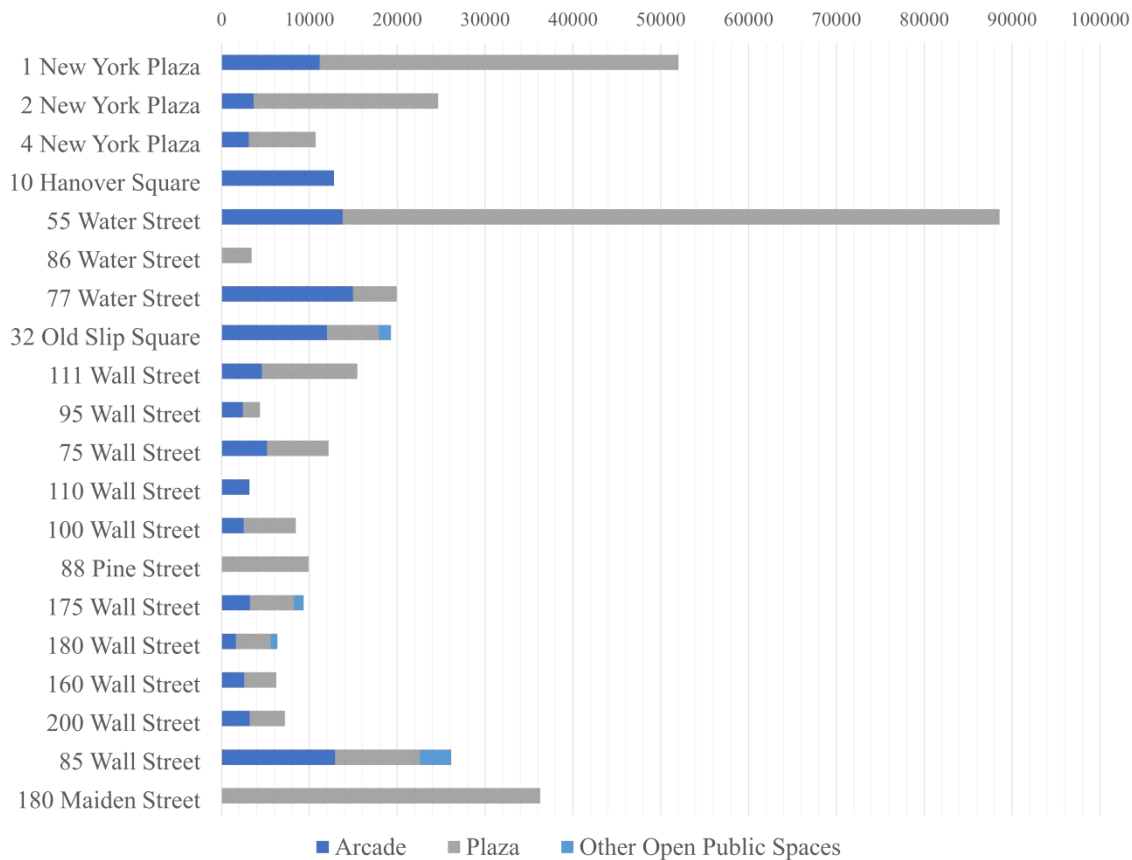


Fig. 7 POPS statistics at 20 locations on Water Street (Source: NYCDP, self-drawn by the author)

2.3.3 Post-Build Operation and Supervision

After the completion of POPS, several social actors such as government departments, judicial authorities, the public and non-profit social organizations will participate in the supervision and control. The initiative of the joint supervision model of administrative supervision and inspection, administrative punishment, owner self-management, cooperative and public supervision.

2.4 Period of New POPS Construction

Water Street 250 for is located in the northern section of Water Street, South Seaport, is a well-known local historic district, the 19th century industrial development, Water Street, South Seaport along the construction of thermometer factories, the environment began to deteriorate. In 2019 the Water Street 250 site began to carry out the planning of the new construction program, and program public notice, the Harbor Alliance. Subsequent programs were publicized in October 2020 and April 2021, and the public participated in program discussions and implementation decisions. The program went through several design revisions, but an injunction was issued against the project in October 2022 due to several objections from local residents.

The 250 Water Street mixed-use development project is an expansion of the historical museum with the construction of a high-rise tower. The high-rise tower is expected to be an 89-story super high-rise complex with commercial, hotel, and residential components. 250 Water Street's proposal to construct the tower was announced in October 2020. The LPC rejected the design due to public opposition to the tower's height of 479 feet, which severely impacted the surrounding neighborhood and building light (Table 4, 5).

Table 4. Early History of the Water Street POPS Enhancement Program (Source: NYC CPC, compiled by the author)

	Before Program Modification	After Program Modification
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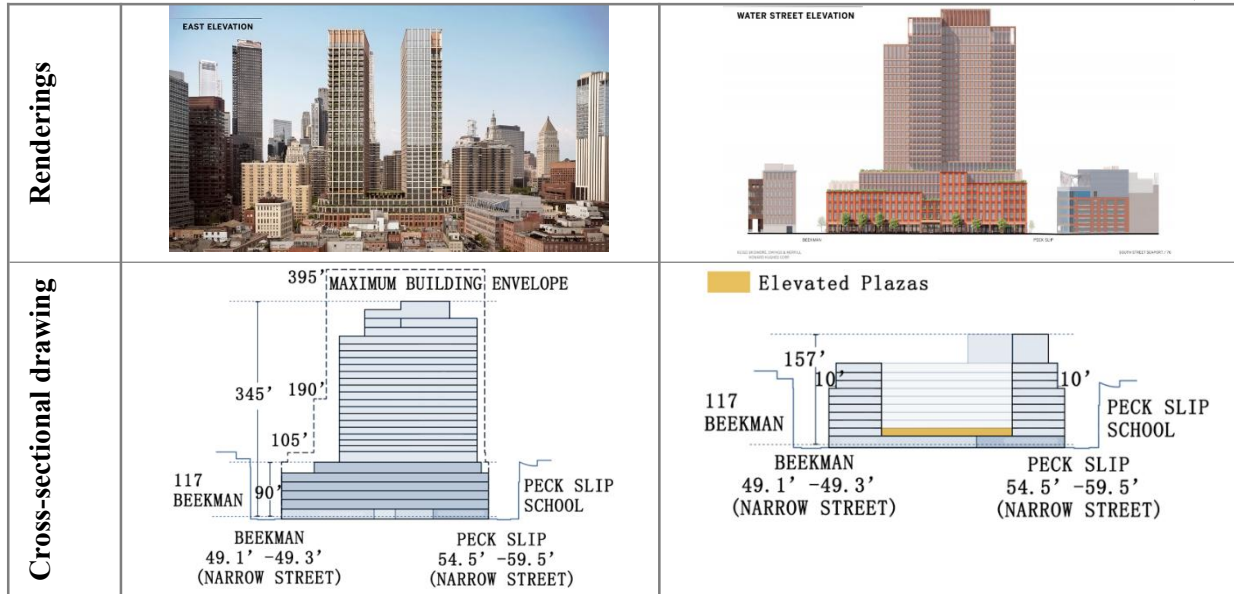


Table 4. 250 Water Street Construction on Neighborhood Impact Assessment (Source: NYC DPC compiled by author)

	Before Program Modification	After Program Modification
Impact assessment of surrounding construction	Direct Impacts	Sunlight blocking, affecting plant growth, noise impact
	Indirect Impact	Neighborhood talent and resident introduction
POPS Type	Sidewalk Widening on North, Arcade, Elevated Plazas	Sidewalk Widening on West-North-East, Arcade, Through Block Connections
Floor Plans		

3. Empirical Suggestions and Their Inspiration

3.1 Guiding Characteristics of Public Space Design for Buildings in Urban Waterfront Areas

The design guidelines for waterfront areas in China are mainly based on guiding design guidelines. First-tier cities such as Shanghai, Shenzhen and Guangzhou have all proposed guidelines for waterfront development in recent years[7]. Shenzhen's Guidelines for Planning and Construction of Leisure and Recreational Spaces in Urban Waterfront Areas of Guangdong Province(2011) emphasize enriching and reshaping the riverfront space, increasing the commercial value of the space, and stimulating the vitality of the area[8]. Shanghai's Design Guidelines for the Construction of Public Space in Areas on Both Sides of the Huangpu River (2017) establishes a systematic design framework for waterfront public space and optimizes the landscape, transportation, and supporting facilities of public places.

When comparing successful waterfront developments around the world, there are similar development dynamics and success factors: a mature development planning process, thorough planning, good transportation planning, distinctive urban design, main building or complex, and top-down management[12].

China's waterfront design guidelines are mostly controlled by urban design level of urban public space, the design guidelines for public open space of buildings are only recommended and lack of legal level control, leading to inactive construction by developers and wasteful and unregulated construction space. The Water Street POPS guidelines have important implications for the urban design guidelines of Chinese waterfront areas, which are worthy of domestic reference after many discussions and modifications, but still need to be adjusted accordingly according to local control regulations[11].

3.2 Sustainable Design and Control Methods for Public Open Spaces in Waterfront Buildings

The purpose of weaving the design guidelines for public open space of buildings in urban waterfront areas is to build a design framework for public open space of buildings based on waterfront planning and design guidelines. In order to propose operable design and implementation guidelines, it is necessary to ensure that the legal status of public open space in waterfront areas needs to be determined at the macro legal level. At the meso level, the approval and reward system for public open space in urban waterfront areas is formulated based on waterfront planning and construction regulations, and corresponding government agencies are set up. At the micro level, the design and management of public open space in waterfront buildings needs to be formulated in an implementable manner. At the micro level, the design and management of public open space of waterfront buildings need to be developed, and information should be made public in the whole process of approval, construction and management, and a public participation system should be implemented to ensure that the quality of public open space of waterfront buildings is more perfect[9].

The purpose of weaving the design guidelines for Public Open Space of Buildings in Urban Waterfront District is to build a design framework for Public Open Space of Buildings in Urban Waterfront District planning and design guidelines. In order to propose operable design and implementation guidelines, it is necessary to ensure that the legal status of Public Open Space of Buildings in Urban Waterfront District is determined at the macro legal level; at the meso level, the approval and reward system for Public Open Space of Buildings in Urban Waterfront District is formulated based on waterfront planning regulations, and corresponding government agencies are set up; at the micro level, the design and management rules for Public Open Space of Buildings in Urban Waterfront District are formulated in an implementable manner. Information should be made public throughout the process of approval, construction and management, and a public participation system should be implemented to ensure better quality of Building Public Open Space in Urban Waterfront Areas. (Figure 9).

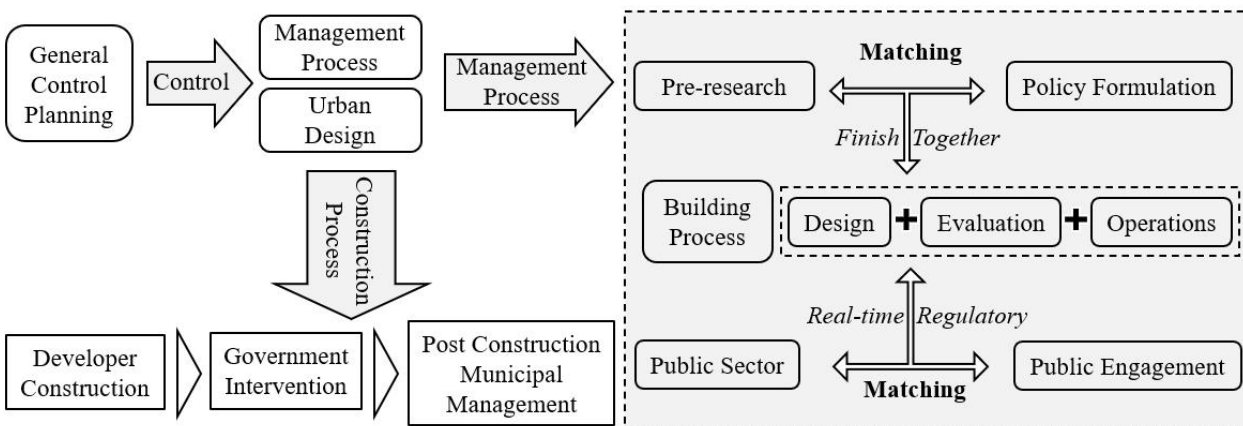


Fig. 8 Waterfront Building Public Open Space Design Guide Control Framework (Source: Self-drawn by the author)

4. Conclusion

The New York Water Street POPS Design Guidelines have been refined over the course of several revisions to New York's Zoning ordinances. The guidelines have been gradually improved from the identify approval and incentive zoning programme, design guidelines and quantitative standards, and post-build operation and supervision. Several problems have been solved through government review, public participation, and the involvement of organizations from all walks of social in the successive revisions. Cities in China can learn from this identification-design-control process and multi-party participation. Combining with local planning policies to promulgate a policy on the design and control of public open space for buildings in urban waterfront areas.

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