

Article

Sustainability of Historical Heritage: The Conservation of the Xi'an City Wall

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Abstract: This paper studies the Xi'an City Wall (XCW) as a sustainable historical heritage. Based on the conservation process of XCW, the study is focused on four experiences that drive its sustainable development. First, the opening of gates through XCW helped to maximize its preservation while meeting the needs for urban transportation. Second, transforming XCW into an urban public space facilitated the gradual building of its camp into a city-dominated landscape. Furthermore, integrating social activities into the public space carried by XCW brought people closer to the heritage. Moreover, the use of XCW as the benchmark for the modern Xi'an urban space pattern ensured the continuation of its historical coordinates on the basis. In order to maintain the sustainability of XCW, a future sustainable development plan is put forward according to the Historic Urban Landscape (HUL) approach proposed by UNESCO. This plan has a generalization guiding significance for the future policy formulation of XCW. Findings from this study serve as a reference for the planning and conservation of historical heritage in cities.

Keywords: Xi'an City Wall (XCW); maximize conservation; public space-oriented; heritage revitalization; historic urban landscape (HUL)

1. Introduction

The city wall is an ancient military defence structure forming the boundary to enclose the urban area [1,2]. Along with great social changes and urban transformation, city walls have evolved through the process of urban modernization since the mid-19th century. Under the influence of political, military, economic and cultural factors, city walls have undergone several developmental phases such as reconstruction, transformation, demolition and conservation [3,4]. There were over 1400 city walls in ancient China [5]. However, China's modernization overlooked their historical value, whereby most cities were eager to adopt a western style, ignoring the traditional culture. Therefore, in the early 20th century, China's coastal cities gradually demolished their city walls [6]. Since the 1950s, most cities have demolished their city walls, leaving few [7]. Only 14 of the remaining ancient city walls in China are well preserved and have become important historical relics [8,9]. Among them, Xi'an City Wall (XCW) is the most completely retained city wall. Its great historical and cultural values enlist XCW as a candidate of World Cultural Heritage (UNESCO World Heritage Centre 2008).

Since the twentieth century, a series of national charters, conventions, proposals and program documents have been put forward for the sustainability of the historical heritage by UNESCO and ICOMOS. Recent studies indicate that research interests in the field of urban heritage conservation have

extended to historical urban landscapes [10–13]. The concept of “historic urban landscape”(HUL) was first introduced in the Vienna Memorandum [14] in 2005, which proposed that the overall development of a city should focus on the HUL and that we should pay more attention to a wide range of landscape backgrounds in historical context. One year later, the International Declaration of Jerusalem dealt with HUL and refined it in such a way as for the conservation of cultural and natural dimensions to be fused [15]. There was a growing awareness of the significance and importance of the historic urban landscape [16–18]. On this basis, UNESCO adopted the “Recommendation on the historic urban landscape” [19] in 2011, which marks the entry of cultural landscapes into urban areas in the field of heritage conservation and becomes a new way to guide conservation, planning and management with complex urban characters. HUL is based on the development and defined to better tackle the contemporary socio-economic transformations that do not respect the authenticity and integrity of historic cities and their landscapes [20]. The most important goal of historical urban conservation and development is to manage the sustainability of the city and the changes in the tangible and intangible values of the city [10]. Identifying, recording and analyzing the complexity of the HUL is the basis of the continuity value and the spirit of place [21,22]. It should be based on the balance between conservation and transformation, the past and the future of historic urban landscapes. More importantly, the HUL approach aims at preserving the quality of the human environment and the sense of place, which promotes landscape conservation and planning in respect of people’s cultures [20,23,24]. Furthermore, it makes use of a full understanding of cultures in addressing the social needs of city dwellers and their aspirations to a better quality of life in global sustainable development [25,26]. Various countries and regions have tried appropriate methods for the sustainability of historical heritages. French institutions established the “protected areas” and set up a service network to continue the cultural value of heritages represented by Avignon’s city wall [27]. Through the legislation of historical landscape conservation, Kyoto integrated consciousness into historical conservation, and balanced the relationship between historical inheritance and innovation through elaborate management, in order to achieve the sustainable development of historical heritage [28].

Studies on Chinese city walls are burgeoning. In the 1950s, Sicheng Liang was the first to propose conservation and utilization strategies for the city wall, noting that modernizing the functions of a city wall could enrich the lives of the masses and become a valuable environment in the long-term [29]. In 1961, the “Interim Regulations on the Administration of Cultural Relics Conservation” was promulgated in China [30], and the city wall began to be valued. Following this promulgation, the conservation of city walls gradually began to advance, with Xi’an and Nanjing being the most successful [31,32]. In 2005, the ICOMOS Xi’an Declaration [33], as well as the Vienna Memorandum [14] was promulgated, impacting the development of contemporary conservation theory [34]. The conservation of city walls in Europe has been extensively practised [35–37]. However, most studies on the city walls in China focus on the technical level of heritage conservation, the legal system, archaeology, and tourism [38–43], ignoring the research on the sustainable regeneration of historic landscapes with cultural values. The different existence ways of the city walls represent the different development types of the modern urban space. Beijing, Nanjing, and Xi’an all have long histories. Marked differences in the planning of these historic cities in the 20th century underscore their different development directions. Beijing demolished its city wall with only a few towers left and converted the old city centre into the administrative centre of the new city, expanding outward in circles [44]. Conversely, Nanjing built a number of residential leisure squares relying on the fragmented retained walls and transformed its ancient city gate into a modern urban public transport station [45–47]. In the 1980s, Xi’an, with its city wall intact, built a greenbelt park, which has now grown into a complete residential recreation space and the core of the city spirit, helping Xi’an to take the first step toward urban renewal [48,49].

Taking XCW (Figure 1) as an intentionally designed and continuously evolving historical urban landscape, this paper will evoke developments and present a record of the current practices for the conservation of XCW. Additionally, it provides a review of the sustainability experience and puts forward a sustainable development plan. Findings from this study will deepen the understanding of the

sustainability of the Chinese city wall and provide a new perspective on the sustainable development of the historical heritage.

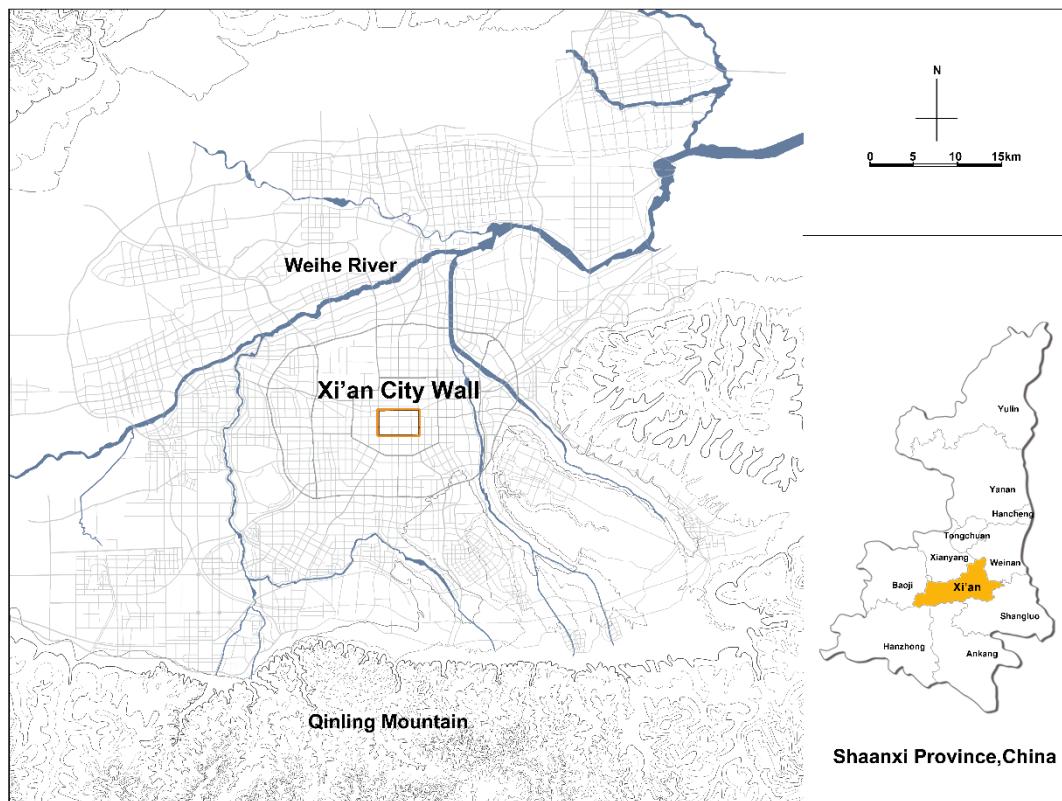


Figure 1. The location of the study area.

2. Materials and Methods

2.1. Case Study

Located in the north-western region of China, Xi'an is near the centre of the Chinese territory. Straddling the banks of the Wei River in the central part of the Guanzhong Plain, the city has evolved over thousands of years. The urban layout of XCW before modernization was formed on the basis of the Sui-Tang imperial capital built in 582 B.C. After the Tang Dynasty (618–907 B.C.), the capital Chang'an was severely destroyed repeatedly. The then military governor, Han Jian, rebuilt the city on the foundation of the original imperial city. In 1370 B.C. (in Ming Dynasty), XCW was extended 1435 meters eastward, and further enlarged 864 meters northward three years later. According to archaeological surveys, the perimeter of XCW reached 13.73 kilometres after the completion of its urban expansion in 1378 B.C. [50]. Since then, the basic structure and scale of XCW were established. During 1781 and 1784 of the Qing Dynasty (A.D. 1636–1912), the then governor, Bi Yuan, comprehensively reinforced and repaired XCW and dredged the adjacent moat [51]. From that time, XCW took its initial shape to constitute a defence fortification with a moat, drawbridges, watchtowers, corner towers, parapet walls, gate towers, and inner loops, i.e., the present site of XCW (Figure 2).

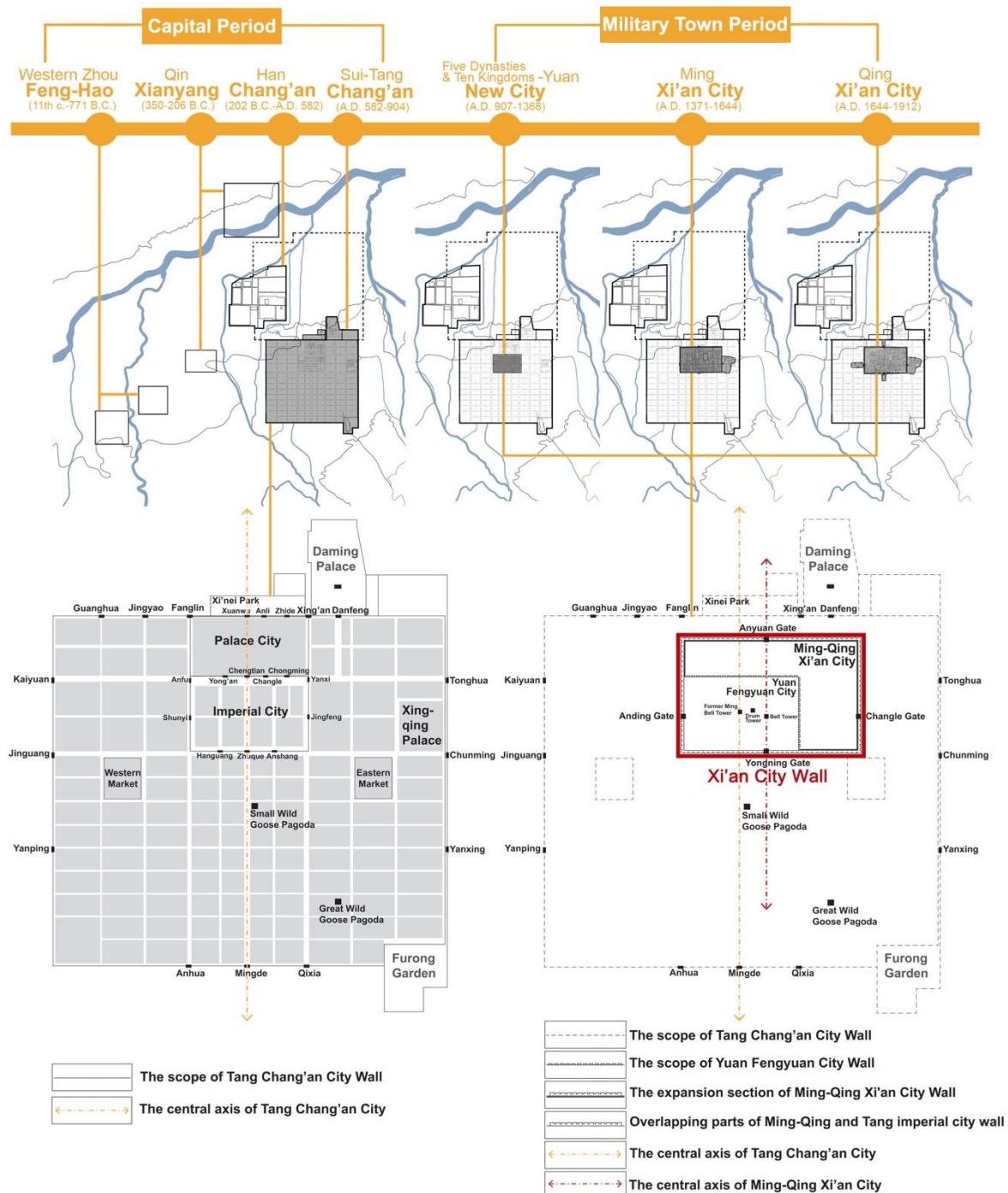


Figure 2. The historical evolution of the Xi'an City Wall.

2.2. Methods

This study combines the methods of historical literature research and field research to demonstrate how the development of XCW is sustainable.

Historical literature research is one of the most commonly used research methods in the fields of history, philosophy, and sociology. It involves searching, collecting, identifying, sorting out and analyzing documents to form scientific knowledge of facts. The main limitation of the literature research method, however, is how to select suitable materials from the vast literature and make an appropriate analysis of these materials to obtain the relevant summaries. Therefore, the literature research method not only refers to data collection but also focuses on the analysis of these data [52]. The historical

literature research method afforded us the opportunity to review the historical developments, assess the present status and reflect on the future of XCW [53]. Historical literature and maps could be used in order to better understand the detailed transition process of the urban historical area morphology [24]. In this study, the historical literature research focuses on collecting documents related to the history of the Xi'an urban historical and cultural heritage conservation and development, including archives, local chronicles, yearbooks, publications, memoirs, news materials, maps, conference records, historical photos, a construction project data set, as well as the fourth edition of Xi'an City Master Plan and Land Use Status Map. Through a comprehensive review of these materials, the conservation course of XCW was determined. Its geographical features, such as city wall gates and the urban road system, plane of XCW, space composition, and axis relationship are analyzed [54].

In the field research, data is collected via the observation of subjects in a natural environment. This method of field research is widely used in a public setting or environment [55]. It explores how people use public spaces to carry out social activities in urban spaces and identifies the common elements for success [56]. We began to concentrate on the XCW in 2014 by visiting and experiencing at first hand, whereby we experienced the atmosphere on-site, examined the relationship between the social activities and the public space in XCW (including the city wall, squares, parks, roads), and analyzed the process that transformed the XCW from a historical heritage to an urban public space.

3. Results and Discussion

3.1. The Previous Sustainable Progress of XCW

The review of the historical documents on the conservation process of the XCW indicates that it has been reinforced and repaired in the ancient times as described in the case study. Since modern times, it has gone through three stages of developments as described below.

In the first stage (1840–1949), XCW had hindered the further development of the urban expansion, and so sections of it continued to be demolished. In the beginning, XCW survived for the needs of the military and antiaircraft defence. Nonetheless, at its 13th Congress in March 1935, the Xijing Construction Committee proposed the renovation of XCW to preserve its heritage and maintain the magnificent landscapes [57]. Thus, people began to realize its historical and cultural significance. The proposal first connected historical conservation with urban landscape construction, showing the emerging awareness of protecting the cultural value of XCW.

In the second stage (1949–1980), in 1953, the “1953–1972 Xi'an City Master Plan” was based on the conservation of XCW, which was regarded as the inherent pattern of the city to protect the complete pattern of the Xi'an ancient city. During the 1950s, XCW suffered serious damages through “demolition disturbances,” but people's awareness of the conservation was growing. Hence, the State Council issued a “Notice on the conservation of the City Wall of Xi'an” on 22 July 1959. So far, the conservation policy of the XCW had been determined from the national level. This was the first detailed exposition of the value of the XCW from the national level since modern times, which is of milestone significance.

In the third stage (1980–present), since the 1980s, the Xi'an Round-the-city Construction Project has actively endeavoured to integrate XCW into the contemporary historic urban landscape, while also integrating social activities, highlighting the historical and cultural connotation of the city (Figure 3).

Looking back on the progress, XCW survived because of the complex interaction between urban development, historical landscape, culture, geography and so on. On the one hand, its “abolition” lies in economic factors such as urban development, road traffic demand and so on. On the other hand, its “conservation” lies in the cognition and conservation consciousness of the historical and cultural value of the city wall. Behind each dispute is the collision between the realistic function demand and the potential cultural value of XCW. Due to the unique historical and cultural background of Xi'an and the role of various forces, each dispute on the conservation and abolition of XCW further strengthens the cognition of the value of XCW step by step.

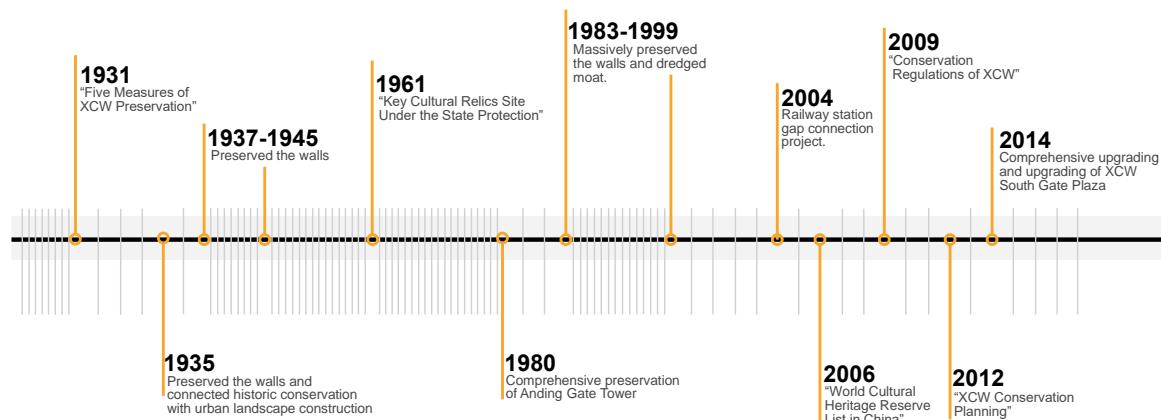


Figure 3. The timeline of the conservation progress of the Xi'an City Wall since modern times.

3.2. How to Solve the Conflict between Conservation and Development

In the early 20th century, Xi'an was faced with increasing pressure to demolish large portions of the city wall. The rapid development of Xi'an city brought in its urgent need to control the mounting pressure from traffic while retaining the XCW. Therefore, the Xi'an Municipal Construction Bureau proposed to open more gates through the walls to strike a balance between historic conservation and economic progress. For the purpose of preserving the original four gates in the four directions, it also suggested the roads could be built along both sides of gate towers [51]. This way eased the traffic pressure and completely preserved the gates of significant historic value. It was a wise choice for urban planners to build more gates instead of demolishing original city walls, and it was the first time to connect historical conservation with urban landscapes.

The widespread industrialization of Xi'an began after the Longhai Railway opened to Xi'an in 1934. The degree of development of transportation systems stipulates the spatial structure of a society. In each period, changes made to both the inner and outer passages (including gates and door openings) of XCW was the most important factor affecting the change of its form, as shown in the chart (Figure 4).

In the early Qing Dynasty, the national contradiction was very intense. They attached great importance to military defence and, consequently, to the construction of XCW. Because the military defence requirements for the gates were to strengthen the firmness of the walls, the shape of XCW remained unchanged during this period.

Due to a long-term war between 1912 and 1949, following the 1911 Revolution, Xi'an had broken the pattern of the Ming and Qing Dynasties. Furthermore, during the Counter-Japanese War, the XCW was riddled with more than 1000 holes. After liberation, it entered a period of peace. The destruction of XCW was mainly caused by the guiding ideology of urban development, the direct consequence of which increased the traffic demand into and out of the old city. Due to the above reasons, XCW was conserved with some destruction in this period.

After the founding of the People's Republic of China (PRC) in 1949, changes to the shape of XCW was reflected in the number of passageways. During this period, urban construction area was developing rapidly, and the building of urban roads began to increase considerably. As a result, traffic channels inside and outside of the city wall began to increase or widen accordingly, leaving a series of breaches and gates for vehicles and pedestrians.

In conclusion, it is a valuable choice for urban builders to adopt more gates rather than demolishing the city wall to alleviate traffic problems in the process of the rapid development of the city. Under the pressure for traffic relief, while maintaining the integrity of XCW as much as possible, the opening of the gates provided a sustainable solution.

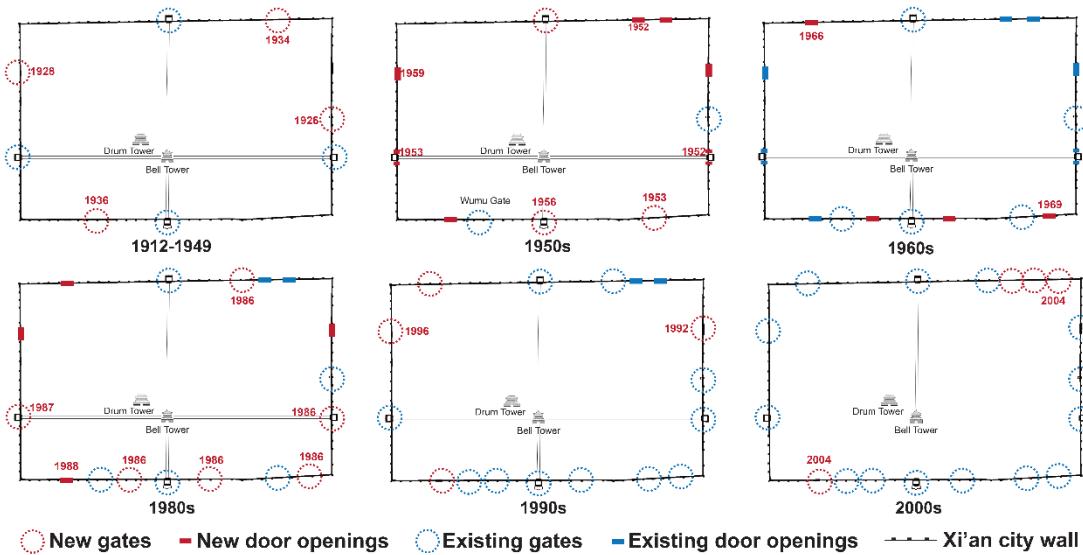


Figure 4. The evolution of the Xi'an City Wall gates.

3.3. The Transformation from a Historical Heritage to a Public Space

Since the 1980s, the exterior space of XCW has been transformed into a linear greenway space and moat project by combining it with the Round-the-XCW Conservation Project (Figure 5). The project lasted nearly 30 years. It separates XCW from urban construction, enhances the impact of the landscape, strengthens the conservation of natural and cultural heritage, and provides leisure space. A series of greening and city moat constructions around the XCW plays a vital role in Xi'an urban air quality and climate regulation. It is widely accepted by city governments, planners, ecologists and the public.

In February 1983, XCW was severely damaged by natural weathering and war destruction, and the moat became a source of pollution to the Xi'an city, which directly affected the safety. In addition, the impassability of the outer road caused traffic jams. Therefore, the maintenance of XCW, the renovation of the moat, the construction of round-the-city greenway and road has an inevitable link and influence. An innovative idea of the XCW Park was put forward in the "Master Plan of Xi'an City (1952–1972)." On 1 April 1983, the Round-the-XCW Conservation Project was initiated with the participation of the whole populace in Xi'an. By 1999, a greenbelt of 607,800 square meters had been built. In 2001, the completion of the Heihe diversion project provided a possibility for the moat to store water. In 2004, the emergency repair of the Anding Gate project and the repair of the gap between the railway station and the city wall were completed. Subsequently, the construction of the west park of XCW and the comprehensive upgrading of the South Gate Square improved the overall appearance of XCW. In sum, XCW is surrounded by a moat and a ring road lined with trees and dotted with pavilions and kiosks to form a huge greenbelt. Moreover, XCW has become a cultural centre displaying the historical and cultural features of the ancient capital of Xi'an, and a public space for residents to live in.

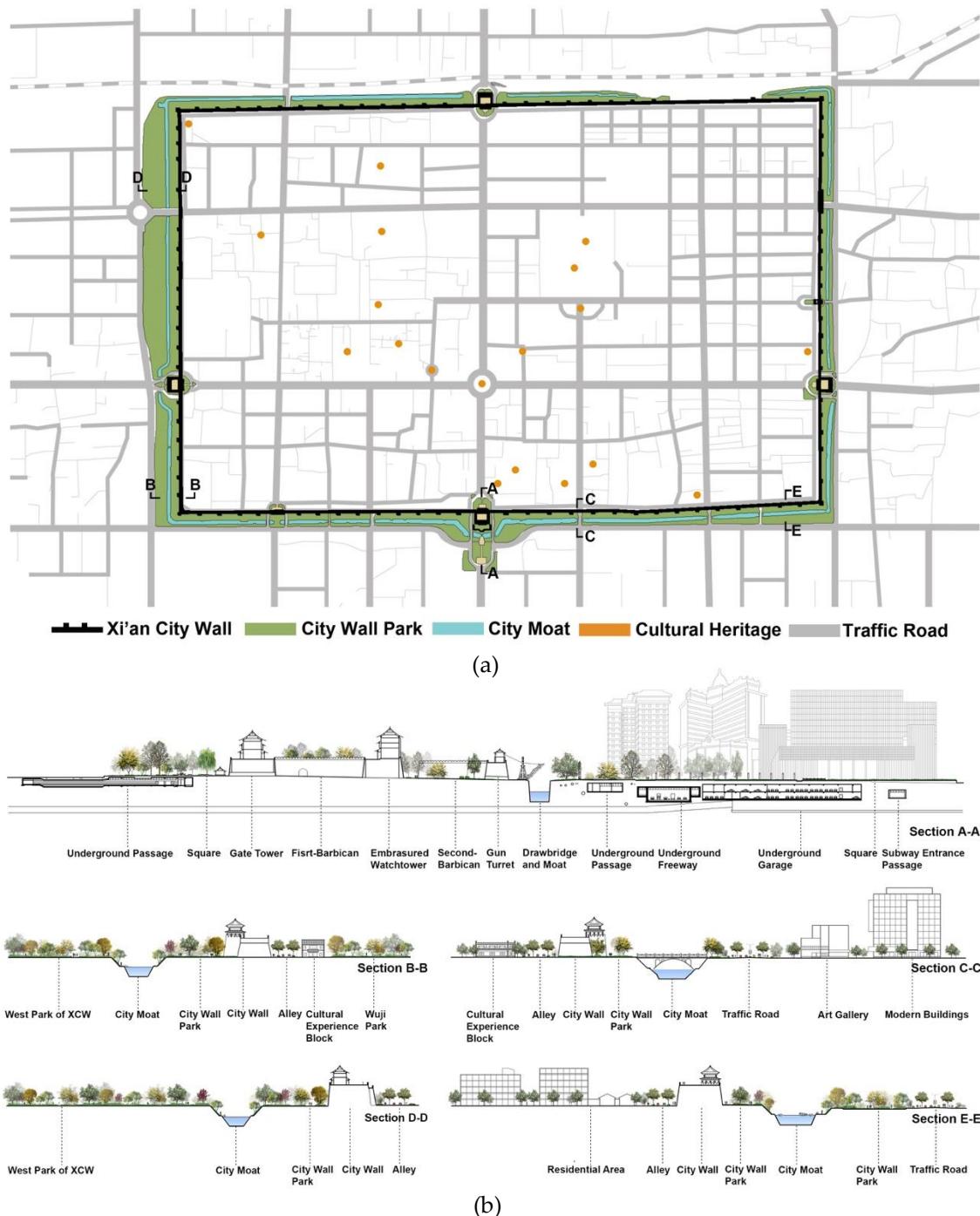


Figure 5. (a) The plan diagram of the Xi'an City Wall; (b) the section diagram of the Xi'an City Wall.

In addition, the landmark of XCW is a strategic point that can be entered by the observer in the city. It is the focus of people's intercourse. As the dominant landscape feature, the huge city wall has a distinct image which attracts people and gives prominence to the city. In order to highlight the landscape, sight line control planning of XCW was carried out. According to the planning requirements, it was divided into two parts: the priority sight line control area and secondary sight line control area (Figure 6, Table 1). In the priority sight line control area, all occupancy and construction were prohibited. The original appearance of the ancient city wall was maintained. Except for garden buildings, no other buildings or underground works that affect the safety of the walls were to be constructed. The height of the buildings in the area would not be allowed to exceed 12 m. In the

secondary sight line control area, the height of the buildings in the area would not be allowed to exceed 25 meters. In addition, the height, volume and shape of the building near the four gates and the main road entrance connecting with the city wall were restricted more strictly according to the angle of view. Thus, the landscape of XCW was better highlighted.



Figure 6. The diagram of the Xi'an City Wall Conservation and Planning Control Area.

Table 1. The Xi'an City Wall Conservation and Planning Area Control Table.

	Name of Area	The Measure of Area (Hectare)	Proportion (%)
	Xi'an City Wall	34.78	6.05%
Priority Sight Line Control Area	Within 20 meters inside the city wall	32.27	5.61%
	Outside the city wall to the outer edge of the moat	105.4	18.33%
Secondary Sight Line Control Area	First type of construction control area	111.4	19.38%
	Second type of construction control area	291.1	50.63%
	Total	574.95	100%

3.4. Integrating Social Activities to XCW

The unique sustainable experience of XCW also lies in the cultural sustainability, which is reflected in three aspects: witnessing history, inheriting culture and carrying collective memory. Its connotation with the historical concept and memory content is the most humane part [58]. Kevin Lynch agrees that urban historical landscapes contain historical and emotional implications [59]. As the symbol of Xi'an's urban culture, XCW is the carrier of innovation and responsible spirit, and is also the witness of urban development history, the inheritor of historical information, and the bearer of the collective memory of urban residents. Heritage revitalization is presented as a method to continue the historical environment in the context of conservation and promotion concerning the cultural values of historical heritages [60].

It is the core embodiment of sustainability that XCW is preserved and integrated into a series of social activities in the historical space to link people closely with heritage. These activities include world-class sports events, cultural activities and other spontaneous activities (Table 2, Figure 7). In the modern society with the rapid development of the economy, politics, and culture, XCW has been endowed with various spiritual and cultural orientations by diverse means of activities, which meets the role of heritages in people's education, influence, and enrichment of spiritual feelings.

Table 2. The social activities of the Xi'an City Wall.

Dimension	Items
Sports Events	<ul style="list-style-type: none"> • Xi'an City Wall International Marathon • Riding on the city wall • Night running around the city wall
Cultural Activities	<ul style="list-style-type: none"> • Xi'an City Wall Lantern Festival • Creative bazaar, Special Temple Fair • Xi'an City Wall International Music Festival • Urn City concert, drama, theatrical entertainments • Cultural performance: Ancient Entry Ceremony • City wall thematic souvenirs interactive marketing activities • International exchange and exhibition activities • The Kite Festival
Spontaneous Activities	<ul style="list-style-type: none"> • Fitness Activities: Walking, Square dancing, Singing • Visiting • Boating in the Moat • Basking in the Sun • Photography • Social Intercourse



Figure 7. The current state of the Xi'an City Wall: (a) Xi'an City Wall International Marathon; (b) Urn City performance; (c) Boating in the moat; (d) Xi'an City Wall Lantern Festival; (e) Aerial photograph of the southwest corner of Xi'an City Wall. Source: Taken by Weidong Lei from Xi'an Daily, and Ke Liu from the Xi'an Evening News (<http://epaper.xiancn.com>).

3.5. The Benchmark for Xi'an Urban Space Structure

XCW is the core area of Xi'an urban space and has an important impact on the overall space development of Xi'an. Starting with the "Master Plan of Xi'an City (1952–1972)," the conservation strategy of the historical space of XCW has determined the structure changes to the urban space in the past 60 years.

Xi'an city had begun its modernization development since the early 20th century, and the form of the urban space has undergone corresponding changes. However, the existence of XCW forms an important benchmark for the Xi'an city space structure, thus maintaining and supporting the traditional urban pattern to differentiate Xi'an from other historic cities. The conservation of XCW is the material basis for the grand pattern of modern Xi'an, according to the "Master Plan of Xi'an City (1952–1972)." On the basis of the data about the Urban Construction Bureau Archives, the spatial pattern of Xi'an City under the leading factors of XCW was drawn (Figure 8). It can be seen that in 1949, the scope of urban development land was also subject to the XCW. Since then, when modern construction began, the scope of urban development land up to 1995 shows that with the continuous growth of the economy through the urban construction in Xi'an has expanded to the periphery of the city. From 1995 to 2017, the urban built-up area of Xi'an has expanded even more rapidly. Since then, it has been a period of functional evacuation and cultural revival in the inner-city wall. Following the planning of the city wall as the core and the development of the axis, the overall urban space still maintains the unique urban style of Xi'an.

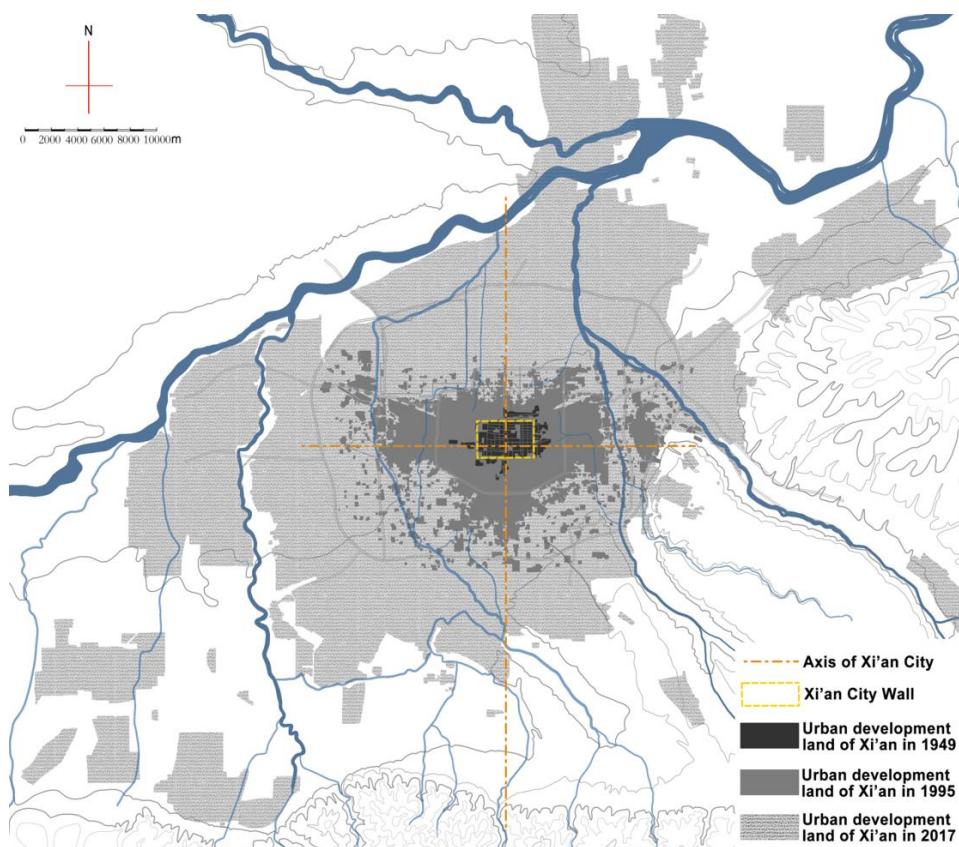


Figure 8. The urban spatial expansion diagram of Xi'an.

3.6. Further Plan According to HUL

Nowadays, XCW is considered a typical HUL. Previous practices on XCW coincided with HUL, such as the safety census and legislation. At the beginning of 2006, the Legal Affairs Bureau formulated the "Conservation Regulations of XCW," which was officially implemented on 1 November 2009.

The regulations put forward a set of management indicators. The regulations also encouraged all sectors of society, domestic and foreign organizations, and individuals to support the establishment of an XCW Conservation Fund which was announced in September 2011. This is an attempt to explore a new model of city wall conservation in Xi'an.

On this basis, the HUL approach could be combined to promote the revival and sustainable development of XCW in the future. Steps to embody the approach for XCW are applied to the target places of this study as follows:

First, to preserve XCW as a historic urban landscape, it is necessary to have a new understanding of the values accumulated over time. Research should target the complex layering of XCW, in order to identify values, understand their meaning for the heritage, and present the findings to the visitors integrally. It is essential to document the state of XCW and its evolution, to facilitate the evaluation of proposals for change, and to improve protective and managerial skills and procedures.

Second, integrating XCW and its surrounding areas into a broader framework for urban development. The dynamic integration of heritage protection and social development should be emphasized. Its significance lies in restoring the complete historical chain of the city, endowing the XCW area with new intrinsic value, and glowing the vitality of XCW in the new period.

Third, priority protection and development concept change. Policies on the conservation of XCW need to be defined according to the values of the new era to ensure that these policies can protect their absolute value when competing with other types of policies. Appropriate value education, training, and perception to influence value decision-making should be guaranteed. Culture is an important factor that cannot be ignored. As a leisure space and a place where local festivals are held, the city wall has become a part of the life of popular cultural activities. The use of XCW for these activities is the result of the recognition of its historical value as cultural attributes by present and past generations. Therefore, it is necessary to continue the cultural development.

Fourth, formulating policy guidance combined with civic engagement. Civic engagement tools should involve a diverse cross-section of stakeholders, develop visions that reflect their diversity, set goals, and agree on actions to safeguard their heritage and promote sustainable development.

The HUL approach is not designed to replace existing doctrines or conservation approaches but is envisaged as a tool to integrate policies and practices of conservation of the built environment, as well as to further promote the sustainable development of XCW historical landscape protection.

4. Conclusions

In conclusion, this paper demonstrates that the long and difficult conservation process of XCW reflects the interdependence and support of traditional cultural development and economic sustainability. According to the analysis, four aspects of sustainable development experiences were identified. First, opening the gates of XCW helped to maximize its retention while meeting the needs for urban transportation. Second, transforming XCW into an urban public space facilitated the gradual building of its camp into a city-dominated landscape. Furthermore, integrating social activities into the public space carried by XCW brought people closer to the heritage. Moreover, the use of XCW as the benchmark for the modern Xi'an urban space pattern ensured the continuation of its historical coordinates.

The sustainability of XCW is to integrate social activities into the historical space and to bring people closer to the heritage, which is the core content of its sustainable conservation. What constitutes a city's unique self-identity is precisely its unique history and culture, and the character of the city formed on this basis. Taking XCW as an example, the important historical landscape makes it a bridge between the public and the urban spirit. In some respects, XCW has given Xi'an the self-identity power. The unique history of XCW and the HUL approach proposed by UNESCO from a combined basis to formulate a future sustainable development plan. This method can be borrowed from the heritage of other cities and has a generalization and guiding significance for the future policy formulation of XCW.

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