# Urban fringe belts: evidence from China

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## Abstract

Research on the fringe-belt concept has grown significantly in the past decade. This is particularly evident in parts of the world in which interest in urban morphology has been slight until recently. The main emphasis continues to be the light that this concept can shed on the historicogeographical grain of urban areas. This paper reports a morphogenetic investigation into fringe belts that gives particular attention to the fixation lines associated with Chinese city walls. Discussion is concentrated on a fringe belt related to one of the world's longest and most massive city walls, that of Nanjing. The formation, consolidation and, in places, alienation of the Ming fringe belt of Nanjing has been influenced by natural and artificial fixation lines and the political economy of an authoritarian society. Understanding the changing spatial structure of fringe-belt landscapes has implications for the management of urban form in ways sensitive to its historico-geographical development.

## **Keywords**

Fringe belts, city walls, fixation lines, morphology, conservation, Nanjing

## Introduction

One of the most striking aspects of the historical development of towns and cities has been their uneven growth. As a result, a record of expansion, standstill, and sometimes contraction is deeply etched in their present physical configurations. In uncovering this historical imprint, use has increasingly been made of the concept of the urban fringe belt (Conzen, 1960; Louis, 1936). Large-scale historical variations in the speed at which urban areas grow are a major underpinning of this concept. Periods of predominantly residential accretion during housebuilding booms have been separated by periods of little residential growth. During the latter, zones of generally lower intensity land use have tended to form at the edge of the built-up area. In some cases the 'fringe belts' thereby created have been

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influenced by natural or man-made limitations on outward growth, termed 'fixation lines' (Carter and Wheatley, 1979; Conzen, 1960), of which city walls are among the most conspicuous. A fringe belt becomes embedded in the urban area during the next period of residential accretion, and in most cases survives in some form throughout the town or city's subsequent history. A concomitant is that the zones of residential accretion separated from one another by a fringe belt generally have distinct period characteristics.

The main emphasis of fringe-belt research from its inception has been the light it can shed on the historico-geographical grain of urban areas. However, recognition of the significance of the fringe-belt concept has come slowly. Nearly a quarter of a century elapsed between the publication of Louis's pioneering work (Louis, 1936) and Conzen's major development of the concept (Conzen, 1960). The growth of research on fringe belts between the mid-1960s and the late-1970s was followed by a hiatus in the 1980s and 1990s. In contrast, there have been roughly as many studies in the period from 2003 to the present (involving over 20 towns or cities) as there had been previously.

A strong tendency for fringe-belt research to be focused on European, especially British, towns and cities (see, for example, Barke, 1974; Conzen, 2009: 36; Slater, 1978; Whitehand, 1967) has been followed, mainly over the last few years, by wider geographical coverage (Conzen, 2007; Gu, 2010; Kukina, 2006; Ünlü, 2013). One of the major parts of the world in which fringe belts have only recently begun to be investigated is Eastern Asia (Whitehand et al., 2011). In view of the historical emphasis of the large majority of fringe-belt research, this tardiness is somewhat paradoxical. For China has a disproportionately large share of the world's largest historical cities. This gap in research does of course reflect primarily the general sparsity of communication between China and the West until recent years. In respect of fringe belts, it is to the filling of this gap that this paper is a contribution.

After summarizing the historico-geographical context within which fringe belts have developed in China, the development of such belts in one of China's principal cities is explored. This provides a basis for drawing conclusions about the historical and presentday significance of these belts and making comparisons with the findings of previous similar studies, mainly in Western cities.

#### **Background to fringe-belt research in China**

The increasing scope for research on Chinese cities with the opening of communications since the early 1980s has been accompanied by opportunities for both broadening and deepening understanding of the historico-geographical structure of urban form. As far as fringe-belt research is concerned, a major attraction lies in the investigation of fixation lines. These have had major significance in this research from its beginnings in Europe, especially where they are city walls. In China the significance of such walls is potentially greater, because of their greater extent and longevity. Chinese city walls have, virtually throughout history, been notable for their length and massiveness. The building and renovation of city walls in China reached a climax during the Ming dynasty (1368–1644) (Wang, 2013: 5–27). Though the walls constructed in that period are substantially intact in only a few cities, even where they have not survived their former presence has generally left a powerful legacy, notably in land-use and street patterns. Because of the sheer extent of the walls and the features associated with them, they have major relevance to urban planning (Chang, 1970; Knapp, 2000). This is especially so in relation to traffic movement, conservation, and the disposition and character of associated open spaces (Liang, 1950; Whitehand et al., 2011; Zhang, 2003).

As with other aspects of urban form, fringe belts need to be viewed within a wider context of cultural, social, economic and political development. Interpretations of fringe belts hitherto have been strongly influenced by chronologies of urban historical development in Europe north of the Alps. Salient among these have been the development of market economies during and since the medieval period, especially their manifestation in centrally-located market places and other aspects of land-use patterns, the powerful effects in the 19th century of the industrial revolution and concomitant major surges of urban expansion, and the subsequent spread of fashions in Western urban development, such as the garden suburb, mainly in the 20th century. In China the different components in the chronology and, where the same components are present, the differences of timing have provided a very different developing environment of influences. Most notably, authoritarian regimes (imperial and most recently communist or quasi-communist) have continued to the present, and there has been a huge delay in the onset of the industrial revolution, which in most parts of China has had a major influence on urban form only since the Communist Revolution in 1949.

The present historico-geographical investigation into fringe belts gives particular attention to the fixation lines associated with Chinese city walls. A logical starting point conceptually and methodologically is the considerable groundwork already undertaken, largely in Europe (Conzen, 1960, 1962; Whitehand, 1967, 1988). Summarizing some basic findings to date, it is evident that fringe belts generally, including those associated with fixation lines, tend to have features in common that distinguish them from the zones they separate: notably fewer road crossings; lower building coverage; smaller amounts of hard surface; and plots that are larger and of less regular shape. Unless a fringe belt is so deeply embedded in the urban area that it abuts the city's commercial core, it tends to provide along a substantial part of its length a zone within the city in which sites containing large amounts of vegetation, such as those occupied by parks and many types of institution, are characteristic (Whitehand and Morton, 2006: 2049).

Previous studies of the form of Chinese cities would suggest that, in investigating certain aspects of their fringe belts, differences from European cities in the development of urban form need to be explored (Whitehand et al., 2011). In the case of city-wall fixation lines, the sheer spaciousness of the area that many city walls initially enclosed is a notable feature when comparison is made with cities that have been investigated in Europe. While at the time of completion of the construction of city walls in Europe there was commonly space within the walled area for extensive land uses, including the cultivation of crops and the grazing of animals, in China such space tended to be on a much larger scale. Indeed in some Chinese cities the amount of land not built on within the walls remained for several centuries greater than that occupied by urban development. In the exceptional case of the city of Pingyao, agricultural land survived within the late-14th century city walls well into the latter part of the 20th century (Whitehand and Gu, 2007: 102). At first sight this would seem to be pertinent to the timing and character of fringe-belt development. Where large amounts of land within the walls remained undeveloped for urban purposes over very long periods, the effects of the presence of city walls on the disposition of land uses, which has been a notable finding of fringe-belt studies in Europe, might be expected to be different.

## The case of Nanjing

The focus of attention in the present investigation is the city of Nanjing which, like so many Chinese cities, has had a succession of city walls and a succession of alternations of rapid growth and hiatus or decline (Su, 2008; Xue, 2008). Prior to the city's major physical expansion in the past half century, its major phases of growth have tended to be during periods when it was capital of China, or a large part of it, notably the Liuchao period

(third to sixth centuries), the Yangwu and Nantang periods (the first half of the 10th century), early in the Ming dynasty, and in the years 1927 to 1937 when it was capital of the Republic of China.

## Sources

A major merit of Nanjing as a subject of Chinese historico-geographical research is its good historical records by Chinese standards, albeit not in comparison with European cities. The fact that Nanjing was a cultural, political and economic centre of regional and national importance to a large extent accounts for the fact that it has better documentation of its historical development than the large majority of Chinese cities. A number of historical gazetteers contain systematic records of the historical development of Nanjing: for example, *Jiankang Shilu (A Portrait of Jiankang)* (Xu, c. Tang dynasty), *Jingding Jiankang Zhi (Jingding Jiankang Gazetteer)* (Zhou, c. 1261), *Hongwu Jingcheng Tuzhi (A Cartographic Gazetteer of the Capital City)* (Ministry of Rites, c. 1396) and *Shoudu Zhi (A Gazetteer of the Capital City)* (Ye et al., 1935). Even so, in comparison with most of the cities that have been the subjects of previous fringe-belt research, Nanjing's records of the spatial configuration of its early physical form are poor. Any systematic detailed tracing of fringe-belt development must necessarily be confined to the 20th and 21st centuries.

Plan de Nankin by P. Louis Gaillard (1898) and Cehui Jinling Chengnei Diming Zuoxiang Hauangji Tu (c. 1902–1905) were the first maps of Nanjing that clearly show street patterns, waterways and lakes. As for a number of large Chinese cities, during the 1920s and 1930s large-scale plans were prepared that covered most of the built-up area. The first that showed streets and plots was prepared between 1928 and 1933, and a second in the same style, comprising 365 sheets, in 1936 (Compiling Committee for Nanjing Gazetteer, 2009: 125, 678). An aerial photograph in six sheets at a scale of 1: 10 550 was compiled by the United States Asiatic Fleet as early as 1929 (Aircraft Squadrons, 1929). Many maps at a scale of 1: 20 000 depicting streets, waterways, and urban built-up areas, and providing the names of key institutions were produced between the 1910s and 1940s by commercial publishers for use by the general public. Plans at a scale of 1:500, showing streets, building block-plans and building heights (number of storeys), began to be prepared in the early 1950s, and there have been regular revisions since (Nanjing Bureau of Urban Planning, 2006: 101-106). Unfortunately, most of these plans lack plot boundaries, but used in conjunction with aerial photographs taken in 1949, 1976, 1989, 1990, 2003, 2004, 2005 and 2009 they provide a useful source (Hai and Liu, 2004; Li, 2005, 2010). A military topographical map in four sheets at a scale of 1:10 000 was prepared by the Army of the Soviet Union in 1974 (Soviet Union Soviet Army General Staff, 1974). It shows streets and building blockplans. Government, military, transportation and industrial structures are particularly highlighted. A plan showing building block-plans, and the plots of the main land users in the central area of the city was prepared in 2007. However, the plot boundaries lack clarity or are absent in congested areas and in some parts of the urban fringe. The boundaries of the smallest plots are lacking in most of the older residential areas, especially in areas of courtyard houses. Communal residential accommodation is not shown consistently. A small number of streets are shown as proposed for future development.

## Fixation lines

There is evidence of the existence of several small settlements during the last 500 years BC within the area occupied by the present city of Nanjing (Su, 2008: 42–61;



**Figure 1.** City walls and topography of Nanjing. Based on Yang and Wang (2008); Great Britain. War Office. General Staff. Geographical Section (1943).

Yang and Wang, 2008: 1–4). However, the original nucleus of the first city, located close to the meander of the River Neiqinhuai (Figure 1), almost certainly developed much later. The city became capital of the Wu Kingdom in 229. Following significant growth during the Eastern Jin period (317–420) and the Southern Dynasties (420–479), it was razed in 589, early in the Sui dynasty (Xue, 2008: 37). The lines of the early city walls are a matter of conjecture (Wu, 2011: 251–285). In light of the later significance of waterways as defensive features, both in Nanjing and elsewhere, it is quite credible that the meander of the River Neiqinhuai acted as an early fixation line along at least part of its length.

The rebuilding of the city in the first half of the 10th century (the Yangwu and Nantang periods) included encompassing by a wall extending over some 15 km (Yang and Wang, 2008: 105–119) (Figure 1). However, even much later, during the Song dynasty (960–1279), the effective northern limit of the urban area remained well south of the northern section of this wall (Compiling Committee for Nanjing Gazetteer, 2008: 74–75; Zhou, c. 1261). In fact a

fringe belt across the centre of the area encompassed by the 10th-century wall had developed either side of the fixation line formed by the east-west flowing River Zhongqinhui. This fringe belt, mainly comprising institutions, included Xinggong (an imperial palace), Jiankangfu (a town hall), Qingxifang (Qingxi Garden), and a series of religious or quasireligious sites (Figure 1).

Apart from hills in its north-west corner, the site of the extensive area encompassed by the 10th-century wall was mostly gently undulating, containing numerous lakes. There was an ill-drained lowland area containing many lakes and ponds to the west, between the wall and the River Yangtze. Waterways were constructed outside the entire length of the wall so that it was protected by what was in effect a massive moat.

Qin (2008: 79) has mapped the distribution of the city's Buddhist temples in 1344. By this time most of them were in the vicinity of waterways and the city wall or in hilly areas beyond the wall.

At the beginning of the Ming dynasty, in the last third of the 14th century, a massive northward extension of the city wall and a lesser eastward extension created a total length of 33.6 km (Yang and Wang, 2008: 192–193), largely constructed of bricks and stone, much of it to a height of 12–15 m (Yang and Wang, 2008: 194–195) (Figure 2). This tripling of the previous walled area accompanied the designation of Nanjing as the capital of China, a status it retained for half a century until in 1421 it was displaced by Beijing. About 21.35 km of this wall were reported as extant in 1983 (Yang and Wang, 2008: 345) and restoration and rebuilding has occurred since. Where the wall no longer survives there is generally clear evidence of its former presence. It dwarfs the walls surrounding cities that have been the subjects of previous fringe-belt investigations. Following the building of the Ming wall, a further wall, mostly of earth and largely symbolic, was constructed much farther out, marking a larger political territory (Yang and Wang, 2008: 228–240).



Figure 2. Part of the eastern section of Nanjing's Ming wall, looking south. Reproduced from Chen and Gazzola (2013: 185).

The Ming city wall encompassed hills to the north and north-west that had been almost entirely outside the 10th-century wall, but most of the walled area between these hills and a very large lake (Lake Xuanwu) was relatively flat and contained numerous ponds (Figure 1). Most importantly, the existing system of channels leading to the River Yangtze was substantially altered so that what was effectively a huge moat was created a short distance from the outer side of the wall, greatly augmenting the channels that had been created in the Yangwu and Nantang periods. To the east the wall ran close to the foothills of Mt Zijin, and over a distance of some 6 km followed the western and southern margins of Lake Xuanwu. To the north it separated the walled area from an extensive marshland. Occupying a substantial part of the newly walled area to the east of the line of the 10th-century city wall, including the floor of Lake Yanque, was a new walled imperial palace and government complex (Steinhards, 1986: 341).

## The fringe belts of the Ming city

It was only in the course of the second half of the 20th century that the built-up area finally occupied all the space encompassed by the Ming city wall, eventually, mainly after the 1970s, extending much farther out in all directions. The combination of wall, man-made waterways and, in places, natural features created an exceptionally strong fixation line. The process of filling in the area within this line was, until latterly, mostly slow and at times punctuated by significant contractions. It can be traced with greater accuracy from the late-1920s onward, following the city's reinstatement as capital of China.

### Formative processes

Following demolition of the northern stretch of the 10th-century wall during the early Ming period there was increasing replacement of rural land use by military and other uses that had survived for centuries in the extensive area north of the line of the northern part of that wall (Yang and Wang, 2008: 153; Xue, 2008: 64). In the late-nineteenth and early-twentieth centuries, a number of institutions, several occupying large sites, were added to the fringe belt that had been developing north of this wall. The institutions included Sanjiang Shifan Xuetang (Sanjiang Normal College), established in 1902; Jinling University (built 1916–1921); Sili Jinling Nuzi Daxue (Jinling Private Girls University, built 1922–1932); and Ma Lin Hospital (built 1892–1920s) (Compiling Committee for Nanjing Gazetteer, 1997). This fringe belt occupies a large area today, especially north of the line of the 10th-century wall. Broadly occupying much of the area bounded by Beijing Donglu and Beijing Xilu to the north and Guangzhou Road to the south, it separates the area encompassed by the Ming wall into northern and southern parts.

Stimuli in the development of the area between this fringe belt and the northern stretch of the Ming wall were the arrival of the Huning railway in the extramural zone north of that wall in 1908 (Su, 2008: 228), the major growth of the port (Xue, 2008: 85), and the completion of the railway in 1909 connecting the port and the inner city (Figure 3) (Compiling Committee for Nanjing Gazetteer, 2009).

Military land uses and the imperial palace complex formed an extensive eastern section of the Ming intramural fringe belt, a large part of the palace area eventually being replaced by an airport in 1927 (Yang, 2009: 147).

This was the beginning of great change in Nanjing, primarily related to the transfer to the city of central government functions of the Republic (Su, 2008: 238–325). This stimulated major growth in not only the direct use of land for government, especially military, purposes



**Figure 3.** Location of the main institutions, gardens and open spaces in Nanjing in the Republican period. Based on Su (1936) and Nanjing Bureau of Land Administration (1943).

but also for a great variety of other institutional uses (Compiling Committee for Nanjing Gazetteer, 2008: 111–134). Several broad boulevards were constructed both within the existing built-up area and through the hitherto still sparsely built-up area between the northern line of the 10th-century wall and the northern stretch of the Ming wall (Compiling Committee for Nanjing Gazetteer, 2009: 187–189) (Figure 3).

Of particular interest in relation to fringe-belt development was the fact that the major increase in the number and size of sites occupied by institutions occurred at much the same time as a major influx of population and expansion of the residential area

(Jin and Ma, 1948). Whereas in previous fringe-belt research considerable attention has been drawn to the acquisition of sites by extensive fringe-belt land uses, notably institutions, when the demand for land for residential building was low, in Nanjing between 1927 and the beginning of the war with Japan in 1937 the acquisition of land was high for both types of land use. The role in this of the rapid transference of national government functions to Nanjing was crucial and there have been no close parallels to such a shift in the other cities that have so far been the subjects of fringe-belt studies. Development of practically all types tended to occupy the more central parts of the previously largely rural northern and north-eastern areas within the Ming wall (Compiling Committee for Nanjing Gazetteer, 2009: 645; Zheng, 2012: 15). Even the most peripheral sites developed for urban purposes within this northern area at this time were mostly well inside the walled area (Figure 3).

## Fringe-belt growth and change

Between the outbreak of the war with Japan and the Communist Revolution in 1949 the city grew little and suffered extensive damage. In contrast, during the early decades of the communist period the built-up area underwent significant growth. Rapid fringe-belt development occurred in the areas within and mostly fairly close to the walls that encompassed the northern reaches of the city. Surviving patches of agricultural or other non-urban land were occupied especially by two forms of land use: shanties and *danweis*. The former were a physical expression of an influx of migrants from the countryside on a scale that significantly exceeded the number of new dwellings being constructed by the transforming building industry. The latter was the introduction of a new physical and social form.

Danweis were walled enclosures each containing a workplace, such as a hospital, school, or factory, residential accommodation for those employed in the workplace, and services, especially social services, often including communal dining arrangements and ablutions. The closest to an earlier equivalent, either in China or in other countries in which fringe-belt studies have been undertaken hitherto, was an institution, such as one with an educational or military function, in which family residential accommodation was included within the same plot as the principal function. As in China more generally, each danwei had a separate identity emphasized by its physically enclosed form and supervised entrance gateway (occasionally more than one supervised gateway). The degree of self-sufficiency of a danwei varied to some extent according to its size.

Figure 4 shows for an extensive area of fringe belt in the south-eastern part of the Ming city a sequence of developments. In the early Ming dynasty a large area on the south-western side of the imperial palace (*gongcheng*) accommodated warehouses serving the palace (*neifu chuku*) (Compiling Committee for Nanjing Gazetteer, 2008: 95). This area was mainly used as a military training ground in the Qing dynasty (1636–1912). Expansion of the military airport built here when Nanjing became capital of the Republic continued until the 1940s, serving both military and civil uses (Yang, 2009: 147–149). Following the establishment of communism in 1949, a factory (first named Kongjun 21 Factory, then renamed Guoying 511 Factory in 1951) began to occupy the site. It initially served the air force, but later supplied a wider market. A large area was used as a farm to serve the factory until the 1960s. Much of the site was occupied by *danweis* by the mid-1970s.

Another type of change in this area was fringe-belt 'absorption' (Conzen, 1960: 81; Whitehand, 1967) or what Conzen later re-termed 'alienation' (Conzen, 1969: 81, 123). This began to occur on a significant scale in the mid-1970s, when a number of fringe-belt sites were redeveloped for housing (Compiling Committee for Nanjing Gazetteer,



**Figure 4.** Morphological change in part of the Minggugong area, Nanjing. Based on Nanjing Bureau of Land Survey. General Staff (1933–1936); People's Liberation Army of the P R China (1962); Soviet Union. Soviet Army General Staff (1974); Nanjing Bureau of Urban Planning (2007).

2008: 680–693). A residential area – Ruijin Xincun – accommodating 2152 households was developed on the southern side of Ruijinlu between 1975 and 1978 (Figure 4) (Compiling Committee for Nanjing Gazetteer, 2008: 680–681). Change of this type accelerated after the late-1980s as the land and property market developed. Along the main thoroughfares – Zhongshang Donglu, Ruijinlu and Longpan Zhonglu – there has been redevelopment of sites for commercial uses since the late-1990s (Figure 4).

Considering more generally the fringe belt associated with the Ming wall, the construction of additional streets through the wall or across its line has had an effect on land use. In the course of time, seventeen breakthrough streets have been constructed through the Ming wall

or across its line, the majority since 1949 (Figure 5). Interruptions in fringe-belt continuity have in several places been associated with the consequent changes in patterns of accessibility. This is particularly evident in changes in the form of the intramural fringe belt. Fringe-belt alienation has occurred in eight places where there have been new or widened arterial road crossings. More importantly, areas outside the encompassing wall and waterways became much more accessible, particularly from the early 1980s onward. The significance of the Ming wall as a physical and psychological barrier was reduced. There was a massive dispersal of many different types of development far beyond the line of the wall. Within the space of 2 decades the city within the Ming wall went from being virtually the entire city to being the core of a large urban sprawl in which incipient fringe-belt features were in most directions overtaken by rapid residential accretion. As a consequence no further fringe belt as such has formed.

## Fringe-belt form and historico-geographical grain

The fringe belts of Nanjing (distinguished in Figure 6 as inner, middle and Ming fringe belts) differ in a wide range of morphological attributes from the areas they separate, notably in their layout, physical texture, and pattern of land use. In this respect the findings of this research confirm those of previous fringe-belt studies, almost all of them undertaken in markedly different cultural regions, mostly in Europe. Figure 7 shows the land use of the greater part of the Ming fringe belt, the dispersed fringe-belt sites beyond it, and the earlier, almost entirely institutional, inner and middle fringe belts. The inner fringe belts include plots close to the probable earlier fixation line of the River Neiqinhuai and the fringe belt located along the northern limits of the city of the Song dynasty, the River Zhongqinhui. The middle fringe belt occupies areas either side of the line of the northern section of the former 10th-century wall. At this necessarily small scale Figure 6 is a simplification. Furthermore, the poor quality of much of the cartographic evidence compared to that for major European cities has in many places precluded detailed mapping of land-use sequences.

There is accord with previous findings in two other respects. Perhaps most obviously, the most pronounced fringe belt is associated with a particularly strong fixation line – in this case the Ming city wall. However, almost the entirety of that fringe belt within the northern part of the city was created well into the 20th century, much of it in the three decades after 1949, long after European cities developed fringe belts in association with defensive walls. The other point of accord with previous findings is the tendency for different parts of the Ming fringe belt to develop distinct functional characteristics. A long green-space, recreational and institutional section developed between the Zhongyang and Guanghua gates; a less pronounced, predominantly industrial and market section between the Hanzhong gate and just north of the Yifeng gate; and a relatively short, mixed use, mainly railway, industrial and warehouse section in the extramural of the northern stretch of the wall line (Figures 5 to 8).

A contrast with practically all the cities that have hitherto been the subject of fringe-belt studies is the large extent to which institutional land use predominates in all the fringe belts, underlining the long-term importance of Nanjing as an administrative centre and provider of a great range of community services. However, the presence of areas of housing within those plots occupied by *danweis*, largely conforming to the east-west building alignments and south-facing frontages customary throughout the city, blurs some of the distinctness of physical form between fringe belts and residential areas that numerous studies of Western cities have recognized.



**Figure 5.** The gates and breakthrough streets of Nanjing's Ming city wall. Based on Nanjing Bureau of Urban Planning (2007) and Chen and Gazzola (2013: 11).

In recent decades the proportion of the city's built-up area occupied by a wide range of institutions, though still high, has lessened. This change is particularly reflected in the increased importance of industrial land use, and to a lesser extent utilities and warehousing, in areas beyond the Ming fringe belt (Figure 7).



Figure 6. The fringe belts of Nanjing.

As revealed in previous studies, in comparison with the areas in which they are embedded, the fringe belts have fewer road crossings and larger and less regular plots. Furthermore, and unsurprisingly in light of Nanjing's major growth and functional change since the early 1980s, there are differences of plot size and intensity of land use between older and



**Figure 7.** Present-day land use of the fringe belts of Nanjing, including dispersed fringe-belt sites. Based on Nanjing Bureau of Urban Planning (2007), Li (2010), Tencent-GS (2015) and authors' field surveys, 2011–2013.



**Figure 8.** Part of the railway, industrial, and warehouse section of Nanjing's Ming fringe belt between the Yifeng and Zhongyang gates. Authors' photograph, 2011.

younger stretches of fringe belt. The inner fringe belts and, to a lesser extent, the middle fringe belt generally have smaller plots and higher intensities of use than the Ming fringe belt. However, the larger plots of the Ming fringe belt are by no means all characterized by lower intensities of use – the residential accommodation within many of those that are *danweis* is generally of high density.

## Fringe-belt conservation

As was widely the case in China, there had been little concern for the heritage value of the city walls during either the Republican period or the early decades following the Communist Revolution (Zhang, 2006). However, little demolition was undertaken before 1954 (Zhang, 2006: 20–22). Many of the mostly narrow greenswards that had remained intact between the Ming wall and its encompassing waterways had by the 1980s become recognized for their value as open spaces. Subsequently, considerable stretches of land between the wall and the moat, and to a lesser extent inside the wall, have become public parks, emphasizing the continuity of the fringe belt. A series of parks has been created along the western stretch of wall, including Shizishan Park, Xiuqiu Park and Xiaotaoyuan Park (Figure 9). The immediately extramural fringe belt on the southern and eastern stretches of the Ming wall from its south-west corner to the middle of its northern stretch, comprising some two-thirds of the original wall length, is now parkland walkway of varying width.

In 1988, the extant city wall of Nanjing was added to the List of Important Historical Sites and Monuments of China under Special Preservation (*Quanguo Zhongdian Wenwu Baohu Danwei*) (Liu, 2001: 65). City planning has, in the past quarter of a century, generally re-emphasized the line of the wall and the continuity of the associated fringe belt. The repair and rebuilding of the wall has become a major objective (Xue, 2008: 151). In 1992, a conservation plan for the Ming wall was adopted, including proposals for protecting the wall, its gates and the moat. A zone 15 m wide on either side of the wall was identified



Figure 9. Xiaotaoyuan Park outside the western stretch of Nanjing's Ming wall. Authors' photograph, 2011.

comprising a number of strict conservation areas. Belts some 50 m wide, again on both sides of the wall, were designated as 'character co-ordination areas' (Compiling Committee for Nanjing Gazetteer, 2009: 472). A Scenic Plan for the Ming city was prepared in 1998, in which the wall was divided into seven sections, with specific proposals for each (Liu, 2001). Since 2003 there has been a policy of building clearance within the defensive zones. Nevertheless, localized 'privatizations' of the glacis – particularly its informal use by immigrants from rural areas – are still evident, especially outside the western stretch of the Ming wall.

# Conclusion

Nanjing's rate of growth and physical transformation in the last three or four decades have been practically unequalled outside China. This has been accompanied by the spread of urban development, much of it linked to industry, far beyond the lines of its city walls. However, consistent with the findings of fringe-belt studies elsewhere, the lines of the city walls have continued to have distinct physical and land-use zones associated with them. But, unlike almost all the previous fringe belts studied, in at least the middle and Ming fringe belts in Nanjing a major part of the primary phase in the development of their distinctness as urban features occurred several centuries after the associated city walls had been constructed.

In relation to the timing of different types of urban development, the information for Nanjing generally lacks the precision of that available for studies in Western countries. It is insufficient to conclude, as has been done in fringe-belt studies in Western countries, that fringe-belt formation has occurred especially during periods of slow outward residential growth. In seeking to view Nanjing within a wider comparative framework, major political and administrative changes, especially in the course of the 20th century, need to be considered. In particular, there was the large increase in fringe-belt forming land uses associated with the reinstatement of Nanjing as the national capital between 1927 and 1937. Many sites were occupied by governmental and associated land uses during this period of significant urban growth, including residential growth.

When this research was begun, the height, length and longevity of Nanjing's Ming city wall were of especial interest from the standpoint of fringe-belt development. Since this wall encompassed large areas of land in the northern part of the city that remained essentially rural well into the 20th century, differences in patterns of fringe-belt development from those found in previous studies elsewhere were anticipated. In fact there are differences between the form taken by the Ming fringe belt in those sections where the Ming wall follows an older wall line and those farther north in which there is no such antecedent. In particular, in the latter the plots are on average larger. This reflects *inter alia* the greater space requirements of the second half of the 20th century. The considerable amount of intramural land still available for development so late in the city's history, combined with the barrier effect of the extramural waterways is also part of the explanation for the fact that over much of its length the Ming fringe belt is predominantly intramural. An exception is the railway, industrial and warehouse section beyond the line of the northern stretch of the wall.

While there are now many more wall- and wall-line crossings than in the Ming period, the wall and major associated stretches of water remain deeply etched into the landscape as physical barriers. However, even more important for the historical and environmental grain of the city is the extensive fringe belt of which they are part. As Nanjing continues its very rapid growth of recent decades, its fringe belts are becoming increasingly deeply embedded within the built-up area. Fringe belts previously studied in other cities have on the whole been notable for the articulacy they have given to the morphogenetic structures of those cities. This characteristic has frequently not been given due recognition by local planners either in Nanjing or elsewhere.

In the case of Nanjing, fringe-belt alienation was a common occurrence between the 1950s and 1970s. Belatedly, the value of city walls and associated spaces, at least from a heritage perspective, has been recognized quite widely in China. In Nanjing over the past 3 decades there have been numerous conversions of sites to green space, many of them previously alienated from the Ming fringe belt. The survival of this fringe belt in the long term seems more assured than that of fringe belts that lack the heritage cachet of a city wall. However, both within and outside China, the wider issue of the resilience of fringe belts in the face of rising pressures for residential development has scarcely begun to be addressed, not least with regard to the role that their green spaces have in contributing to healthy urban environments.

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