

Comparative Study on the Gated Communities of Suzhou Industrial Park and the Non-gated Communities of Singapore within Their Urban Form

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Abstract: The State Council of the People's Republic of China made an official suggestion for future city planning in 2016 that, on the basic principle, suggests the gradual opening up of residential gated communities. This means that China is facing a new round of urban reform in which non-gated communities will inevitably become the morphological code in future China. Suzhou Industrial Park (SIP) is a new district located on the east side of Suzhou and is the first national development town created through a collaboration between China and Singapore since the early 1990s. The new town planning system and the urban model from Singapore were widely adopted and further adapted into SIP's development from the beginning. Therefore the urban forms look similar, yet they are in essence different owing to their completely different approaches to massive housing compounds: most of the housing compounds in SIP are private gated communities developed by private developers, while over 80% of people in Singapore living in public non-gated communities developed by the government. This paper focuses on the changing urban fabric coming out of the proliferation of gated communities in SIP and non-gated communities in Singapore, and also investigates the social, political and economic forces underlying the gated and opened communities respectively. The comparison between them aims to provide new insights into the housing compound liberalisation reform by gradually integrating existing residential gated communities with the public and developing a new mode of open housing compound.

1. Introduction

In the past three decades, gated communities have stood as the predominant residential settlement in Chinese cities. However, in 2016, the Chinese government suggested that existing gated communities should gradually dismantle their gates while new emerging residential communities should be constructed without gates. According to the government, gradually removing gates can open up the internal transport network, improve the layout of the urban transport network, promote land use, and thus alleviate the burden of urbanisation (The Central Committee of the Communist Party of China and the State Council, 2016). As a result, China will face a new round of urban reform that will make non-gated communities the prevalent residential settlements in Chinese cities.

This paper focuses on Suzhou Industrial Park (SIP) as a representative community to clarify the impact of China's urban reform on the fabric of Chinese cities. Located on the eastern side of the ancient city of Suzhou, SIP is a collaborative project involving the governments of China and Singapore that commenced in 1994. Drawing upon knowledge from Singapore, SIP entailed constructing hardware and software facilities while adapting a Singaporean planning system and model at the primary stages of development. Although the Singaporean model and SIP exhibit comparable urban forms, they differ profoundly in terms of their housing communities. In SIP, gated communities emerged primarily by private developers, whereas 81% of residents in Singapore live in public non-gated communities (HDB, 2018).

In the last few decades, China's gated communities have been discussed quite frequently in the academic realm where researchers have primarily focused on the historical formation and sociological study of these communities as residential settlements. Yao and Wei (2012), Xu and Yang (2009) introduced the history and formation of gated communities in China, while Xu (2009), studied the socio-cultural and political-economic forces which impacted the design of gated communities, and analysed design issues of these settlements from the perspective of neighbourhood public space and urban life. Xu (2013) studied the formation mechanism and operation status of gated communities in China and discussed the development prospect of gated communities. In parallel, the emergence of non-gated communities was also closely analysed. Wu (2018) used both quantitative and qualitative inquiries to investigate the social implications of opening up gated compounds and outlined the positive implications on society as well as in terms of security. Huang (2018) compared a non-gated community, which was previously enclosed with a gated one to propose suggestions for the extensive transformation. Despite those efforts, scholars have rarely examined the relationship of gated and non-gated communities with their forms from a transnational perspective.

This paper presents two districts – in SIP, China and Toa Payoh, SIP Singapore – as representative cases of gated and non-gated communities.

Linglongwan district is a large housing community located in SIP's second-phase development with an area of approximately 465,000 m². The town is built under the *neighbourhood principle* which was adopted from Singapore. In this context, *neighbourhood principle* refers to the urban redevelopment of Europe in the post-war period. Singapore adopted this model in its urban redevelopment after the 1960s to support the public housing policy and to organize the local residential communities (Wong and Guillot, 2005). This three-tier hierarchical principle of 'new town – neighbourhood centre– residential precinct centre' emphasizes the comprehensive infrastructure. The principle aims to ensure residents' use of infrastructure within walking distance.

Linglongwan district is a gated community developed by a private developer. Developed from 2002 to 2014, the town emerged in the context of the official marketisation of housing in China from a land auction held in 2002. Taking 12 years to complete, the project has involved adapting construction patterns from residential communities built in SIP's first-phase development for a more mature housing pattern comprising several housing typologies with relatively comprehensive facilities within their premises. The district consists of nine plots with 57 residential blocks ranging from 10 floors to 36 floors.

On the other hand, construction for Toa Payoh started in 1960. The first government department in charge of housing development is the Singapore Improvement Trust (SIT) established under the colonial administration (Teh, 1975). However, SIT primarily focused on urban construction rather than housing developments. After the planning authorities in Singapore dissolved the SIT, the Housing and Development Board (HDB) was formed to address the urgent

housing shortage in Singapore. Toa Payoh became the first town to be fully planned and built by the HDB. Developed according to the neighbourhood principle, the project's construction emphasised the effective use of land and involved system development stages in improving facilities that support residential areas as well as raise the standard of housing. The area of the district is approximately 340,000 m² and consists of 45 residential blocks ranging from 10 floors to 40 floors.

Despite their differences, the two districts exhibit certain similarities. Firstly, both are under similar urban planning model following the frameworks of New Town principle. Secondly, since the completion of the exploration period of planning and construction, the two towns have remained in the stage of systematic planning, particularly with large planning frameworks for housing and urban developments. The two districts share a relatively similar area, location and land use as they are both residential districts next to a neighbourhood centre.

The districts demonstrate a variety of high-rise mass housing and a growth pattern in time which have developed and adhered to the local context.

2. Methodology

This paper documents and maps the gated communities in Linglongwan district and non-gated communities in Toa Payoh. By compares the residential blocks in Linglongwan with those in Toa Payoh and its surrounding areas in terms of permeability and accessibility, peripheral facilities and public spaces. Further analysis is planned to elucidate how the underlying forces of social, political and economic dynamism have affected urban forms in Singapore and China.

3. Analysis and Results

Located in the second-phase development of SIP, Linglongwan was the first of a series of residential projects in 2002 that were transacted via land auctions launched nationally that year. Referring to Singaporean neighbourhoods as a model, Linglongwan adopted the former's neighbourhood principal with only minor changes – largely due to differences in density, scale, local services and facilities in the Chinese context (Chen, 2006).

The initial developer of Linglongwan was Suzhou Nandu Genway Ltd. Co. (hereafter Nandu Genway), founded on 15 October 2002 before the land auction. Nandu Genway is a corporation involving Zhejiang Nandu Ltd. Co. and the government-affiliated SIP Genway Housing Development Group Co. Ltd. Although Nandu Genway initially owned 70% of the company, Vanke acquired Nandu Genway in 2004 and formally began taking part in the Linglong Bay project the following year. Before its acquisition by Vanke, Nandu Genway independently planned and developed plots 1-3; however, since Vanke began participating in the project, the two firms have partnered in the development of Plots 4-6, and Vanke has independently developed Plots 7-11.

The initial plan for Linglongwan in Nandu Genway's proposal had 11 blocks. Due to the presence of Jinji Lake to the south and high-voltage powerlines to the north, Nandu Genway identified the southern part of the site as a high-grade residential area and the north as mid-grade residential area that could be sold at a lower price. The pattern of development has proceeded from east to west and from north to south. After Vanke's involvement in the initial development of the project, Plots 7-10 were merged to be sold and, in turn, increase housing

prices. No public housing compounds are near Linglongwan, and except for one independent apartment building, residential buildings on the site are clustered in the gated community.

By contrast, Toa Payoh, located in the middle tier of Singapore, is the first new town fully planned and developed by HDB under the neighbourhood principle (Housing & Development Board, 2019). Buildings on the site were constructed mostly between 1960 and 1982, while additional building works and redevelopments remain in progress today. The residential buildings within the two selected Plots are public housing except for one gated community developed by a private developer on the north-western of the plot 1.

4. Accessibility and Permeability

The following paragraphs compare two elements of both communities: *access control* and the *road system*.

4.1. Access control

Access control in Linglongwan has three components: enclosure, a gate system for access to the plot and a security system for access to the building. As for the first component of the enclosure, all nine Plots in Linglongwan are enclosed with a fence of approximately 2 metres high rendered denser with green belts of 2-10 metres wide facing the roads to prevent people from crossing.

The second component is each Plot's gate system, which has two primary types of gates. The first type serves both vehicles and residents and controls access by using an automated system and guards. Residents can swipe their security cards to gain access, whereas internal vehicles can transit automatically by having their license plates scanned. By contrast, non-internal vehicles and individuals need to be registered by the guards before they may gain internal access. The second type is an unguarded pedestrian door with a swipe access control system that may be used only by residents, bicyclists and e-bike users with security cards. As shown in Figure 1, the community does not have a gate open to the main roads (i.e. Linglong Street, Suhong Middle Road, Fengming Street and Modern Avenue); the gate system is placed inside the Plot and affords no direct vehicular access to those roads, which prevents traffic congestion on the roads due to vehicles entering and leaving the community. Doors for residents are generally placed on the far side of the large gates, which reduces the inconvenience caused by the closure. Each Plot is equipped with two large gates and one door for residents depending on its size. For example, Plot 1, with two towers, is equipped with only one door for residents.

The third component is the security system of each building. The entrance of each building has access control that requires residents to swipe their security cards to enter the building. Visitors may access the building by calling occupants who can (digitally) open the door for them. Built-in later stages, Plots 7 and 8 and Buildings 59, 62 and 66 in Plot 11 have access control provided by lift systems that bring residents who swipe their security cards directly to their apartment floors.

Located in Plot 3, Qinying Apartment (i.e. Building 25) is unique among the community's buildings in terms of access control, for it was built during the first phase of Linglongwan's development. Building 25 is located outside the enclosed area of Plot 3 and affords access control on the ground floor, as visible at the entrance, in the lifts and with the presence of guards.

To provide affordable housing, Toa Payoh has no enclosures or gates around the buildings on its two plots except several public car parks. No access control is provided at the entrance of

the buildings, meaning that access to housing units is open. The sole exception is a private gated community with three towers, in the north-west of Plot 1 developed by a private developer. It also comprises an enclosure of approximately 2 metres high with double vehicular and pedestrian entrances, one of which is equipped with a guard booth. Unlike the gated community in Linglongwan, Toa Payoh provides no access control at the entrances of buildings or in lifts.

4.2. Road system

Each community's road system has three components: roads around the district, roads across the district and roads within the plots.

In Linglongwan, the road system narrows as it enters the district, and the shift in road length indicates a soft boundary between the outside and the inside of the district. Given hard boundaries already present around the districts, the width of the main road providing access to the inner areas usually does not change. The flows of residents and vehicles are mostly separated in the Plots. Except for parking for fire trucks, most of the car parks are located in the basement, which brings most of the flow of vehicles underground and, in turn, allows the road network to be a continuous loop. The internal vehicle road on the ground are mostly ring roads and parallel to the external traffic system. Some parts of internal and external roads are next to each other and only separated by fences and green belts.

By contrast, as shown in Figure 2, the road hierarchy in the selected plots of Toa Payoh is highly distinguishable. The roads gradually narrow from main roads to within-plot ones where they are usually directed towards buildings and often terminate in dead ends. The private community on the north-western side of plot 1 consists of an underground carpark. Due to the size of the complex, no road system is accommodated except for a carpark located under the elevated ground floor of the towers.

In conclusion, Linglongwan provides access control to prevent non-residents from entering districts and properties – a situation which has been reinforced in the later plots completely planned and developed by Vanke. Meanwhile, the road system is in the form of a continuous loop. Since some parts of internal vehicle roads run parallel to the external, this situation causes repeated functions within a short perimeter. Conversely, the plots in Toa Payoh have no access control for buildings but instead permit public access. The only private community on-site is gated and has only one form of access control instead of two or three. The lack of such measures is partly supplemented by the road system in the plots, which follows a clear hierarchy that terminates in dead ends and acts as a threshold to deter non-residents from entering the property. Another component that acts as a soft boundary is a series of public housing buildings that are arranged to form an enclosure. In that sense, Linglongwan uses several hard boundaries to control access for non-residents, whereas Toa Payoh uses soft boundaries (e.g. road hierarchy and building forms) to control internal access for non-residents.

5. Services and Facilities

The overall planning of SIP involved adapting a Singaporean model in which facilities are distributed according to the neighbourhood principle. Although a few changes were made to accommodate local habits, population density and housing density, the model framework remained mostly intact. This section discusses the facilities on and near SIP's Linglongwan and Singapore's Toa Payoh.

A narrow strip of land in the central area of the district separates plot 5 and 6 from plot 7-8. The northern part hosts facilities for neighbourhood committees, whereas the southern part includes a park, and between them is an outdoor swimming pool that residents may use for free.

SIP has two commercial buildings: one among Plots 1–4 and another among Plots 6-8. One or two storeys high, the commercial buildings accommodate convenience services (e.g. food courts, snack shops, salons and coffee shops). Meanwhile, Linglong Neighbourhood Centre to the east of the district offers services to both Linglongwan and other districts.

Each of the nine plots is equipped with outdoor fitness equipment and a children's playground. Although Plots 7, 8 and 11 have landscaping involving bodies of water, all space in the other plots are filled with vegetation.

Free basketball courts, volleyball courts, tennis courts and a private gym with an indoor swimming pool are also available on the site.

Compared with Linglongwan, plots in Toa Payoh have more mixed-used facilities. Between them, the two plots have only one park – namely, Toa Payoh Sensory Park – located at the south-east of Plot 2. Comprising a sensory garden, a community garden, a bird viewing area and a space for intergenerational activities, the park is approximately three times as large as Linglongwan's garden.

All of the facilities in the gated community, including a swimming pool, green space and a gym, are private, whereas the rest of the area is publicly accessible. Since the ratio of all services and facilities follows the facilities distribution guideline, the swimming pool, gym and basketball courts shared between the plots are all within walking distance. Ample space for commercial activities is available on the plots, and some ground-floor space of the HDB-affiliated houses is joint commercial-residential space. Moreover, the commercial and residential areas of the plots encompass a church and a petrol station.

Altogether, both communities provide various facilities according to the neighbourhood principle despite the slightly different parameters of their local contexts. Singapore continues its planning principles from the larger urban scale down to the ground floor of the residential complexes, whereas the planning principles of SIP cease at the enclosure of the residential compounds. Compared with gated communities in traditional cities, Linglongwan saves land and facility costs by distributing some facilities across the entire community. However, redundant facilities and landscapes inevitably appear in each plot, and clearly a large, centralised large park would offer more comprehensive services.

6. Building forms

Linglongwan consists of towers and slab buildings ranging from 10 to 36 floors. To make full use of southward sunlight and natural ventilation, the living and major bedrooms in China are suggested facing north-south, while each building is required to keep a certain distance to prevent over shading (Xu, 2009; the PRC Ministry of Construction, 2005). It shows on Linglongwan that all buildings are facing north-south and evenly distributed within the plots.

A void deck is a left open sheltered space on ground floor level and it refers to the ground space for HDB blocks from Singapore (Cairns, 2014). Space was introduced as an idea of shelter for children, and then was used for residents as a gathering space, and retails for the convenience of the surrounding neighbourhoods, event space for parties, weddings, funerals and so forth (Ibid). The void deck in Linglongwan is drawing upon the building form of Singapore. Due to its enclosure and gate system, the void deck in Linglongwan do

not retain the multi-functions from the one in Singapore. Space is often filled with equipment or other devices to support the community. Either keep empty or a ground floor filled with equipment rooms.

Unlike Linglongwan, the district in Singapore does not face similar sunlight orientation requirements for buildings due to its tropical climate. Toa Payoh comprises a variety of urban forms of buildings: towers, multi-oriented slab buildings, L-shape constructions and many others. Instead of serving as living spaces, the ground floor of buildings which built after 1969 has void decks. The layout of the building forms also varies. For example, buildings located in the middle of Plot 1 are arranged to form an enclosure, whereas those of Plot 2 is arranged in a mostly linear fashion. Based on images from the site, the commercial area includes shops, clinics, training institutions, food courts and other establishments, whereas the services area is divided into bicycle parking lots, mailboxes, leisure space with chairs and tables, an area with fitness equipment and a space for ceremonies (e.g. weddings and funerals).

7. Discussion/Conclusion

The previous sections compared access control, road systems, services, facilities and building forms on two selected residential communities in China and Singapore. This section discussed the underpinning forces that produced gated and non-gated communities.

8. Land Ownership and Design Regulations

Residential districts are owned by the central government in Singapore and China. However, land development is managed by the government agency HDB in Singapore (HDB, 2019), and mainly by private developers in China (Chen, 2013). The different modes of residential land development contributed to the shaping of gated and non-gated communities.

Public housing in Singapore is a government-subsidised project. After Singapore gained independence in 1965, the demand for residential units was increased due to the rapid growth of the population. As the only and the sole developer under the national housing scheme, HDB unified the planning and design regulations in developing residential communities. Systematic planning and construction code adopted by HDB from the city level to the building level. Therefore, on plots such as in Toa Payoh, the building styles, accessibility and building services and facilities are uniforms.

Residential land development in China is privatised after central government auctioning the land to real estate developers. Market-driven mechanism played a key role in this stage of development as a response to economic sustainability. Because land sales are the chief source of revenue for the local government (Chen, 2013) and SIP is currently experiencing rapid urbanisation, land auctions will continue to sustain the prosperous local economy. Moreover, the developer of the plot is private, which further reduces the government's financial burden due to urbanisation. Therefore, the means of developing residential plot help to promote urbanisation and economic growth. Because the planning and development inside the plots are managed by various real estate developers, the internal building forms vary in location, design style and price.

9. Welfare Housing and Free-market Housing Schemes

Public housing in Singapore is a government-subsidised project with certain requirements for applicants. Citizens buy flats with government subsidies, and they may not sell the property during the first 5 years of ownership. With such a steep requirement, prices for public housing are two to five times lower than those for private apartments, depending on their location. Public housing residents do not have to pay to use the public spaces, including the ground floor that forms part of the housing's urban form. Therefore, no hard boundary separates the residential area from the public ones; instead, only building enclosures and changes in road width remind people of the boundaries between the areas.

After China ended its welfare housing system in 1998, it officially announced its foray into residential marketisation in 2002. Since then, commercial housing has been traded in the free market, meaning that housing and its services and facilities are not subsidised by the government. After 2002, the floor area will encompass the building area and the shared area, and residents will be required to pay for the public area in the building (i.e. the area affiliated with the owners). Residents are also subject to expensive property fees to cover community security, facilities maintenance and express delivery services. They also consider the internal environment of the community to be owned by the owners of the property, meaning that an enclosure and a security system are needed to protect their rights as residents.

This paper provides new insights into the housing compound liberalisation reform by transnational comparison of gated and non-gated community. Focuses on the residential blocks in Linglonwan and Toa Payoh and its surrounding areas with comparative study in terms of their permeability and accessibility, peripheral facilities and public spaces. And also investigates the social, political and economic forces underlying the gated and opened communities respectively.

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Figure 1. Districts in SIP and Toa Payoh.

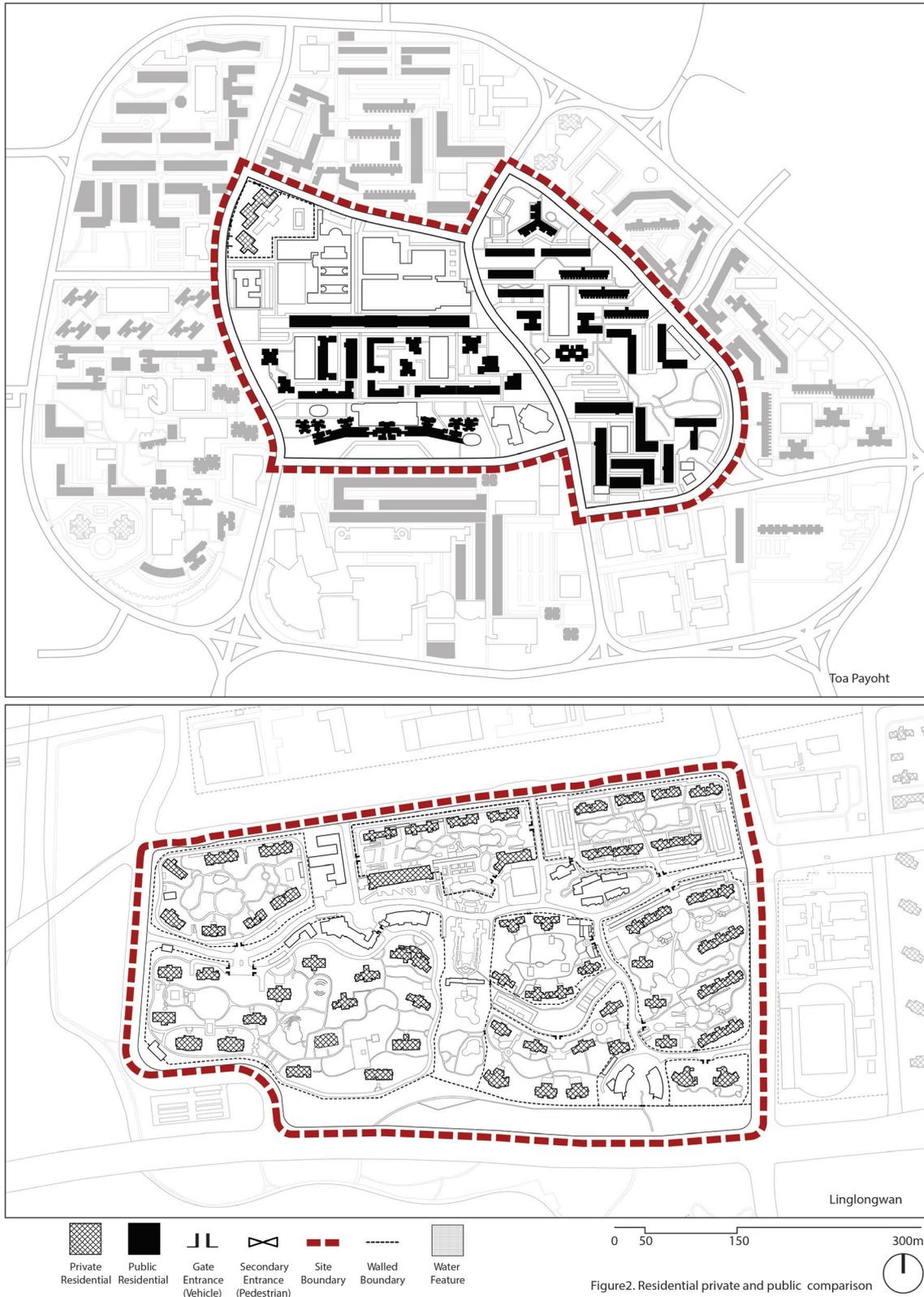


Figure 2. Residential Private and Public Comparison.



Figure 3. Road System Comparison.

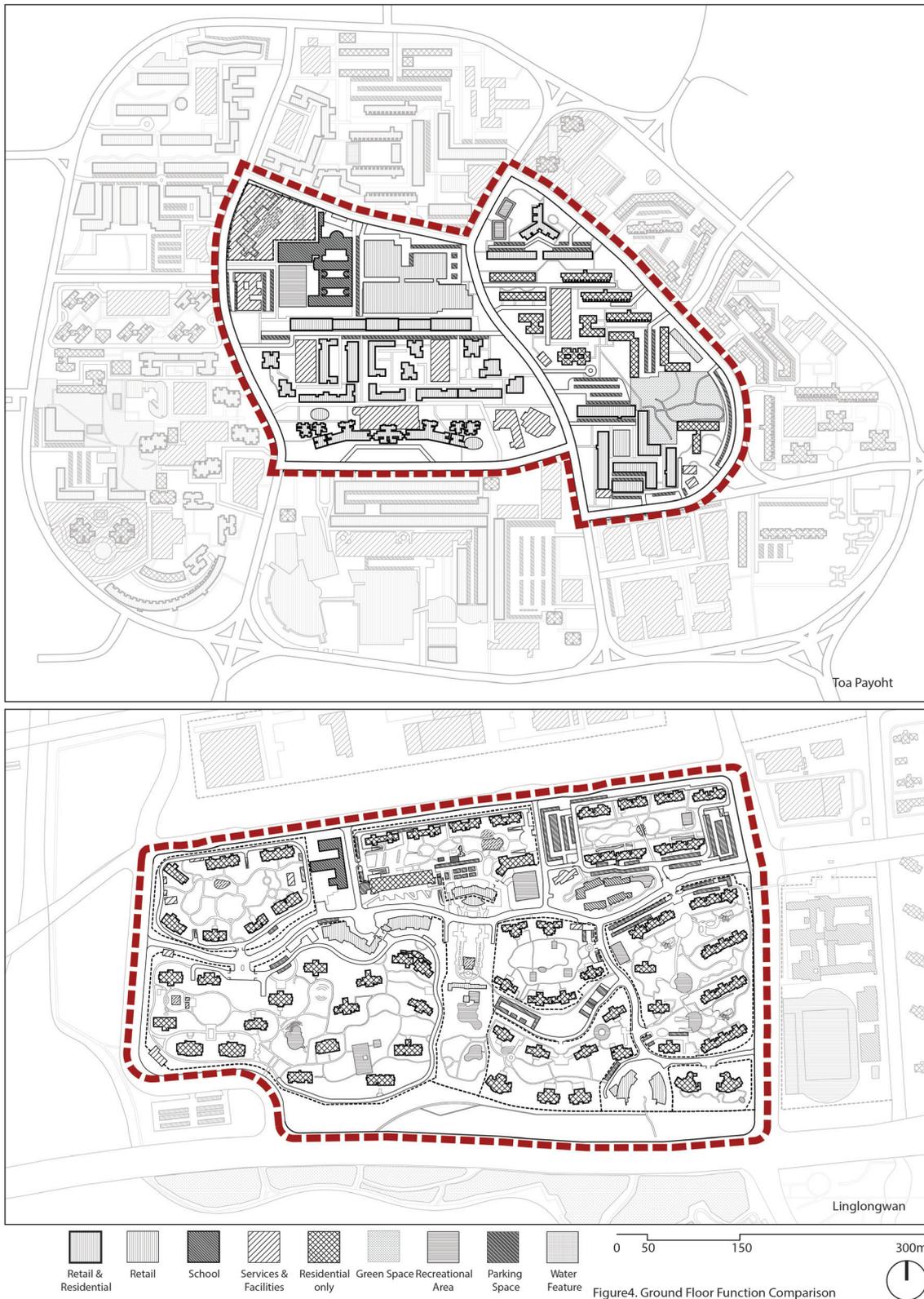


Figure 4. Ground Floor Function Comparison.

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