

# Urban Green Space in a High-Density City: User Expectations, Accessibility and Experience in Context of Dhaka

Nawrose Fatemi\*

Department of Architecture, University of Asia Pacific (UAP), Dhaka, Bangladesh

## Abstract

*This paper starts from the debate with 'the problem of the simplistic notion that more green spaces are required when density is increased is that it does not consider the characteristics of people living in higher density environments'. In Dhaka, a critical imbalance has been observed between users' need and aspiration of the urban green space use and the available quantity they benefit from. The City possesses only 0.12 acres greeneries and open areas per thousand population, while it needs to devote a range between 6.25 and 10.5 acres of total open space per thousand population, according to NRPA (National Recreation and Park Association recommendation). With the phenomenal rise in the level of urbanization and urban growth, the City suffers the loss of its precious open space for urban infill. And the gap between the amount of open space required for a healthy living and the amount of open space available continues to widen. As the City is densely developed, it leaves little scope to have more open spaces inside. Consequently, concentration should be paid in retaining, up keeping and exploiting the potentials of existing urban open spaces, greeneries, and lakesides and improve their quality for urban life. This paper analyzes the urban green space use and their potentials by a correlational study between DHANMONDI Lake & Lakeside Green Spaces and HATIRJHEEL & Lakeside Green Spaces. And a number of observations, interviews and informal questionnaire survey on the users has been conducted to study the user accessibility, their expectations and the manifestations of these user-perceptions in the day-to-day use.*

**Keywords:** Urban Green Space, High-Dense City, User Perceptions, Accessibility, Physical Use

## Introduction

The world population is expected to increase by 2.3 billion between 2011 and 2050, passing from 7.0 billion to 9.3 billion (United Nations, 2011). Developing regions such as Asia, South America and Africa will have a faster pace of the urbanization process. Large and fast growing cities are expected to emerge in these areas (UN-Habitat, 2010). Globally, more people live in urban areas, with 54% of the world's population residing in urban areas in 2014. In 1950, 30 % of the world's population was urban, and by 2050, 66% of the world's population is projected to be urban (United Nations, 2014). The population living in urban areas is projected to gain 2.6 billion, passing from 3.9 billion in 2014 to 6.3 billion 2050 (United Nations, 2014). Such densification tendencies will also put a lot of pressure to the infrastructures and facilities of the existing big

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\*Corresponding Author: Nawrose Fatemi; E-mail- nawrose@uap-bd.edu

cities. It can be argued that these densification tendencies have negative and positive implications on the physical and social quality of greeneries and open areas (Lau, 2014). The scarcity of buildable land and the demand for other land uses places an immense pressure on land for greeneries and open areas. High building and population densities and incompatible mixing of land use creates crowding, lack of privacy, and poor environmental quality (Coorey, 2007). Existing parks and other green spaces in higher density areas may become so congested with users or attract new 'undesirable' or 'incompatible' uses that they actually deter additional use. This is what is making urban consolidation - without additional green space - highly inequitable (Boone et al., 2009; Pincetl & Gearin, 2005; Randolph, 2006; Sister et al., 2009).

Maat and De Vries (2006) suggest that as density increases, the amount of green space in a locality also should be increased. But one of the key simplifications, and potential shortcomings, of this statement is that people living in high densities are assumed to be homogenous in regards to their need for green space. In this paper, the aim is to investigate the heterogeneity of user preferences on green space use, depending on their characteristics. It also observes their responses in terms of experience and accessibility. A number of past research efforts have focused on open space in the Western cities but few focus on cities from other parts of the world. Critical factors and design considerations for open spaces in some highly dense South Asian cities such as Dhaka will differ greatly from their Western counterparts. Past research significantly focuses on the physical requirements in open spaces while widely neglecting its social requirements. This paper analyzes both the physical and social requirements of urban green space and user response based on literature survey, a number of observations, interviews and informal questionnaire survey on the users.

### **Dhaka City and Its Urban Green Spaces**

Dhaka, being the 11<sup>th</sup> largest megacity comprises a total population of 16.98 million (United Nations 2014). The UN report (2014) also projected that Dhaka would become the 6<sup>th</sup> most crowded city by 2030 with a population of 27.37 million. Rapid and unplanned urbanization, commercial development, along with population pressure have caused the loss of precious open space to urban infill. But the image of past Dhaka is not derived from its concrete parts like building, roads etc.; it is much deeper and more fluid. Parks and open spaces are an integral part of this images out of which Dhaka is emerged (Mowla, 2003). In this context, Halprin's (1979) quote is appropriate: 'Our collective perception of cities depends on the landscape of open spaces. They lace a city with their voids.... City is not so much a construction as a landscape of open spaces'. The British author, James Taylor has stated in his 'Topography of Dacca', after his visit of 1824, which Dhaka looks like the Venice of the orient. The large open spaces with the lushness of nature surrounding the habitation; the water of the DULAI KHAL flowing across the town, and the water boundary by the SHITALAKHYA and the BURIGANGA - all these natural features made the city beautiful (Farida, 1999).

The problems of urbanization in Cities, like Dhaka, in all developing countries are intensified by high population growth and rural-urban migration. For Dhaka, the problem is further aggravated by limited land supply, lower land utilization and lack of proper policy and planning of land use. Obviously the ever-growing urban population is creating an increasing demand for space. This rapid influx of population to the city provides stimulus to construction of built-up areas in huge proportion. Within this junk of concrete, open green spaces acts like its lungs, being used as essential part inside the city for its environmental and ecological balance. Other than this passive need, they have had an evolving role in the life of city residence. This role has ranged from relief the city to the mediator between humans and nature (Sadeghian &

Vardanyan, 2013). Therefore, one of the primary needs of open spaces in urban life is for recreational purposes during the leisure time. The importance of recreation in people's physical, intellectual and emotional development is now undisputed (Farida, 1999).

Indeed, recreational facilities and open spaces, which are accessible to the general public, provide an integral and necessary part of urban living, particularly in areas of high density. According to Jepson (2007), 'Urban open spaces are crucial to city residents because, if done right, these spaces not only provide aesthetically pleasing escapes, but also enhance the emotional well being of the city's residents as well as advance the interests of environmental advocacy, social justice and inclusion'. In the cultural and climatic context of Dhaka, people have the tradition to perform many leisure activities in outdoor spaces in urban life. Such leisure activities are Travel (walking or wandering); Personal Care and Exercise (sports, active play); Social and Institutional Activities (meeting, talking, parties etc.); and Cultural and Communication Activities (hobbies, passive play etc). For passive recreation, open spaces like parks and gardens and for active recreation play fields/ grounds, stadia, open-air theater and similar facilities are essential within a city boundary (Farida, 1999).

Moreover, the globally acknowledged planning standard, National Recreation and Park Association (NRPA, 1990) recommends a range between 6.25 and 10.5 acres of total open space per every 1,000 residents. But Dhaka City possesses only 0.12 acres greeneries and open areas per thousand population. Ideally a city needs to keep its 40%- 50% of land open, or free, but in a compact or dense situation like Dhaka, recommended lower margin is about 25% of urban space (Mowla, 1985; Farida, 1999). Since the environment of the city constitutes sharp physical and social divisions, provisions for preserving existing green spaces and the creation of new green areas have not been considered in any of the Master Plans devised earlier (Siddiqui et al., 2000). Later in the timeline, in recognizing the importance of green spaces to the environment, the Structure Plans of 1995–2015 strongly recommended the construction of new green areas, and also suggested that the present greeneries should be preserved (SDNPBD 2005). In the first master plan of 1959, there were 1338 acres (5%) of open space comprising around 20 notable Open Parks, lakes and recreational spaces. Among those, there is only 853 acre of land for open spaces comprising only 13 notable parks and lakes in all over the city at present. Dhaka structure plan suggests that the open space should be at least 20% for its future generation (DMDP 1995). But in Dhaka urban greenery, park greenery or tree covered spaces constitutes less than 15% of the city landscape (Tabassum & Sharmin, 2009). Now, in old Dhaka only 5% of land and in new Dhaka 12% of land is green and open (DMDP 1995).

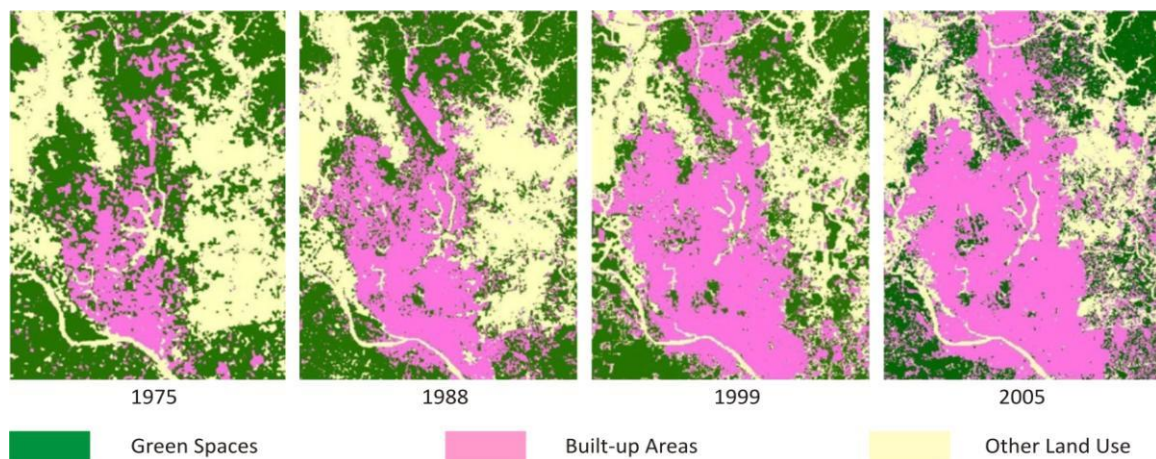


Fig. 1: Spatiotemporal changes in green spaces in Dhaka (Byomkesh et al., 2011; modified by author)

Based on spatiotemporal green space dynamics (Fig. 1), it was found that the green spaces of Greater Dhaka are rapidly decreasing. Estimates of green spaces using satellite images from 1975 to 2005 revealed that the rate of change in green spaces was consistently high, and in the last 30 years a total loss of 8,617 ha was observed in comparison to the base year of 1975. In 1975, green spaces occupied 44.8% of the total area, which dropped to 35.7%, 31.2% and 24.1% in 1988, 1999 and 2005, respectively. On the other hand, the built-up area expanded from 13.4% (5,550 hectares) to 49.4% (20,549 hectares) from 1975 to 2005. In other words, the net increase in urban area was 14,999 hectares over the period (1975–2005), suggesting a huge growth in the human landscape and a subsequent reduction in the natural landscape (Byomkesh et al., 2011).

Therefore, presently, there is a shortage of open space, particularly that of parks and greeneries in Dhaka city. And the gap between the amount of open space required for a healthy living and the amount of open space available continues to widen. At a certain point this paper would attempt to study the user accessibility, their expectations and the manifestations of these user-perceptions in the day-to-day use.

### High Density Developments and Green Space Interactions

Open and green spaces near higher density dwellings must cater to very diverse populations – older people, children, adolescents, parents, wealthy people and the poor – with diverse expectations about the functions that green space should perform (Seeland et al., 2009; Barbosa et al., 2007; Hillsdon et al., 2006). A 'one size fits all' approach to green space design for higher density areas will be prone to failure. Most commonly discussed claims; counter-claims and debate on high density developments and its implications on quality of urban green space are: accessibility, crowding, privacy, safety, social interaction, environmental quality, and the overall provisions for open space and a few other similar topics. These topics are attributed to the physical and social qualities of open space (table 1). Such factors among others will influence the use and user satisfaction of open spaces.

**Table 1: Factors and Variables Influencing Urban Green Space**

Factors	Variables
<b>Physical Qualities</b>	Adequacy of open space provisions Accessibility Climatic comfort Facilities, Amenities and Maintenance Aesthetics
<b>Social Qualities</b>	Crowding Privacy Safety Social interaction
<b>Human Factors</b>	Preferences Socio-cultural differences Lifestyle & habits Demographic background Economic backgrounds

**Provisions of Urban Green Space:** If density increases, it might be one option that people would start living more and more taller buildings; thus freeing up land for parks which are needed in larger numbers to cater the increased population. But the reality is with the increase in population and scarcity of urban land, there is considerable demand for urban capacity. The

demand for residential, commercial, Government, Institutional, and Community land uses, infrastructure and services have consequences on the provisions for urban green space (Coorey, 2007). The opportunities to increase urban density tend to involve the loss and not gain, of surviving green spaces (Breheny, 1992).

**Accessibility:** In high-density cities, the provisions for open and green space is claimed to be less, so it can be hypothesized as having easier and better access to open and green spaces. This also allows accessibility to open and green spaces at any time of day (Coorey, 2007). However, users' accessibility will also depend on the quality of its open and green spaces, the transportation system (distance, cost or time) and the attractiveness of the activity centre (Abubakar & Aina, 2006). Some attributes (comfort and image, access and linkage, uses and activity and sociability) also strengthen the access and responsiveness of open and green spaces (Carmona et al., 2003). Therefore, it can be argued that, even though high density can promote accessibility *prima facie*, it gives no guarantee that density alone would result into more satisfactory use, both qualitatively and quantitatively.

**Privacy:** Higher density can bring together intolerable numbers of people attributing to crowding and lack of privacy. When residential land use are combined with a high ratio of secondary or public land uses, a high number of visiting population is attracted to residential developments, bringing together different social groups. The mixing of different user groups in common public spaces of these developments may have implications on residents' sense of privacy (Coorey, 2007).

**Safety:** Open spaces being located in mixed use settings bring together a variety of user groups in common use of open space. Such conditions may create lack of safety due to unfamiliarity among users and mix of different social groups. Therefore, although a large number and variety of activities in open space creates conducive settings for safety, high intensities of use and mix of user groups may cause unsafe conditions (Coorey, 2007).

**Social interaction:** Research discuss that when high intensities of necessary and optional activity takes place in satisfactory conditions of open spaces, more social activities will be encouraged (Gehl, 1996; Moirongo, 2002). Mixed uses bring residents and visitors together creating a possible lack of privacy and safety but it may have positive implications for better social interaction. In the parks, plazas, markets, waterfronts, and natural areas of our cities, people from different cultural groups can come together in a supportive context of mutual enjoyment. As these experiences are repeated, public spaces become vessels to carry positive communal meanings. (Carr et al., 1993)

**Crowding:** High-density living is identified as affecting both crowding and privacy (Masnavi, 2000). High density as well as incompatible mixing of land uses may have implications on congestion and crowding in open space. It is suggested that high collectivism, a non contact culture and high population density combined with high crime rates may contribute to the experience of crowding in public and semi-public spaces (Iwata, 1992). Crowding is therefore not only related to physical space but also to a social condition (Chan, 1999). The value and contribution of open space being for relaxation, interactions, and creating a sense of community may be questionable in such conditions.

The adaptability and tolerance to crowding, safety, and privacy levels are also influenced by the socio-demographic and economic backgrounds of the users.

## Urban Green Space Use and User Experience: Dhaka Context

The success of urban spaces is associated with its quality - the quality of open space, as mentioned earlier, has both a physical and social dimension. The quality of experience has been often referred to as 'total satisfaction' (Stewart & Cole, 2001). Therefore, 'satisfaction' or 'experience quality' is found to be a credible indicator of the quality of an open and green space. Here, two case of urban green space use and user experience in Dhaka context: DHANMONDI Lake & Lakeside Green Spaces and HATIRJHEEL & Lakeside Green Spaces are studied. The scope of the study is limited to user satisfaction or experience quality.



Fig. 2: DHANMONDI Lake & Lakeside Green Spaces

In 1956, when DHANMONDI was developed as a planned residential area, about 16% of the total area was designated for these green spaces in the development plan. Now, DHANMONDI lakeside open area covers approximately 31 acres and water body is about 54.6 acres. 'DHANMONDI Lake and Lakeside Area Development Project' (Fig. 2) was undertaken by Dhaka City Corporation (DCC) under the Ministry of Local Government and Rural Development (LGRD). Beginning from JGATOLA (DHANMONDI Road - 2) the lake extends up to Road - 27 (New 16A), and bounded by the MOHAMMADPUR-LALMATIA area in the north, SATMASJID Road in the west, BGB (Border Guard Bangladesh) Gate (DHANMONDI Road - 2) in the south and in the east by KALABAGAN residential area. It is 3 km in length, 35-100m in width, with a maximum depth of 4.77m. DHANMONDI Lake and its environment is truly depicted by Islam (2014):

"The trees with rustling leaves and the chirping birds, ripples of the lake and tranquility of the surroundings evoke a sense of serenity to the mind. The combination of heavenly blue sky and green earth is an escape from the chaotic city life. DHANMONDI Lake is much more than a water body surrounding the area. It offers an activity packed package where people can seek refuge from the hustle bustle of the city life. From health to culture, food to fun –

DHANMONDI Lake has it all and Trends will take a stroll along the lake to see what it offers."  
Islam, 2014

**ATIRJHEEL & Lakeside Green Spaces:** This urban green space was developed through the HATIRJHEEL-BEGUNBARI development project (Fig. 3). The prime intention was to preserve the lake and its surrounding areas as retention basin. Afterward, roadway and walkway along the periphery of the lake was constructed. The lake and its surrounding areas were planned for recreational purpose covering an area of 320 acre.

The place is located in a prime location of Dhaka. It is well connected with the road network system of the city. The place was generously designed with walkways, viaducts, and bridges, systematically landscaped with trees and shrubs. The inauguration of the HATIRJHEEL project promised enriching urban living in a densely-built, traffic-congested, and green-starved Dhaka city. Amidst ongoing expansion of lands, legal or illegal, HATIRJHEEL opens up possibilities of re-configuring land within an existing urban fabric. It contributes to land's conservation by value addition; lakes and roads are mere intervening means of land development (Ghafur, 2013).



**Fig. 3:** HATIRJHEEL & Lakeside Green Spaces

HATIRJHEEL and its environment are truly depicted by Ghafur (2013):

"Here urbanity unfolds by modern translation of our primordial relation with water. Newly planted trees will mature while deepening HATIRJHEEL's presence in our collective urban memory. HATIRJHEEL is already a stage set for celebration -fireworks illuminating its night sky and reflecting upon its water is indeed a spectacle unmatched in Dhaka's living memory. HATIRJHEEL, however, is neither a space of spectacle nor a space of utility - a 'lake' linked to a drainage system and 'roads' - despite their visual primacy. HATIRJHEEL appears full of possibilities as it captures collective imagination by pushing our desire of how we might live".

Ghafur, 2013

**Comparative Analysis according to Variables:** A comparative analysis between these two urban green and open areas can clarify their influence on user Accessibility, Expectations and overall satisfaction or experience quality. The variables for the analysis are: Physical qualities (such as Accessibility, Mode of accessibility); Social qualities (such as Activity hours, Safety, Privacy &

Crowding, Social interaction) and Human factors (such as Response Level are followed by gathering of Detailed Information of Studied Urban Green and Open Areas (Table 2).

**Table 2: Detailed Information of Studied Urban Green and Open Areas**

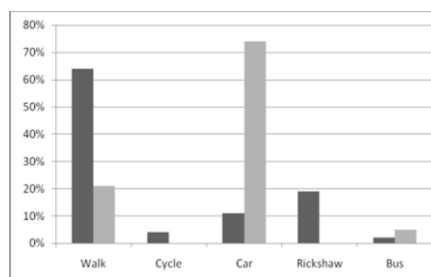
Particulars	DHANMONDI Lake & Lakeside Green Spaces	HATIRJHEEL & Lakeside Green Spaces
Area	85.6 acre	320 acre
Type	District Park like green space	Metropolitan Park like green space
Access	The place is located in the city center well adjacent to the major public transport hub of the capital. Thus, the place is well reachable. it is very accessible from its immediate catchment area mostly the surrounding localities of DHANMONDI area.	The place is located in a prime location of Dhaka. It is well connected with the road network system. But the transport routes of HATIRJHEEL are prohibited for use by Non-Motorized Vehicles (NMV), where in Dhaka city, many people depend on NMVs as their major transportation option.
Physical Features ( within site)	Sitting plaza and kiosk for food and drinks, souvenir shop, skating arena, fast food restaurant, boat club, open amphitheater	Sitting plaza, water courtyard, islet for aviary, water taxi, walkways and deck, viaducts and bridges
Site Surroundings	Mostly Residences with a few commercial development	Mostly Residences with a few commercial development

**Accessibility:** Both The places are located in the prime location of Dhaka and well connected with the road network system. But the transport routes of HATIRJHEEL are prohibited for use by Non-Motorized Vehicles (NMV), where as in case of DHANMONDI, NMVs are allowed. Again, HATIRJHEEL area has become less hospitable for walking as there is little or no consideration for traffic management. Driving in wrong direction, reckless car driving, motorcycle stunts and consequently the increased number of road accidents in recent times are seriously affecting a pedestrian friendly walking environment. Conversely, in case of DHANMONDI lake, it has very pedestrian friendly walking environment as people mostly come from its immediate catchment area.

**Accessibility Mode:** It is observed that in DHANMONDI lake, people from nearby neighborhood use these places mostly. Only a few of these users come from a greater distance due to exercise purpose and due to some for its attractive design features. High dominance of pedestrian user (64%) are observed along with a few NMV users (4% cycle & 19% rickshaw)(table 3).

**Table 3: Daily average use of transportation to access**

Location	Walk	Cycle	Car	Ricks haw	Bus
DHANMONDI Lake	64%	4%	11%	19%	2%
HATIRJHEEL	21%	-	74%	-	5%





Conversely, in case of HATIRJHEEL, as it is a motorized vehicle oriented development, people from a greater distance are found more in number instead of people from nearby neighborhoods. Dominance of motorized vehicle users (74% car & 5% bus) are observed (table 3).

**Activity and Activity hours:** The findings from survey show that in both areas mainly three types of activities are taking place in the lakeside like recreation, social gathering and health related activities. In case of DHANMONDI lake, Morning and evening is highly used for jogging and walking (23% & 41%). Peak hour is 4-6 pm; average stay of people is 2-3 hour and less used during noon (16%). For recreation & social gathering, 29% people pass time by sitting & gossiping, and the rest 6% pass time by eating or boating. Mainly teenagers (39%) enjoy this lake side for free open space (27%), nice environment (65%) and easy access (18%). Designed sitting place, walking, plantation and others help this place to be an effective urban open space both as community and metropolitan level. Conversely, in case of HATIRJHEEL, users come mostly in the evening and night for recreation & social gathering (70%). Mainly teenagers (68%) enjoy this lake side for free open space (58%), nice environment (32%) and easy access (10%).

**Safety:** In case of DHANMONDI, for inadequate lighting facilities a few spaces become crime spot after sunset. Conversely, in recent times, a growing concern of HATIRJHEEL is security and safety. Frequent criminal activities such as open drug dealing, extortion, mugging, stalking and floating illegal prostitution (especially after sundown) have greatly increased in recent times.

**Social interaction:** Overall study shows mostly the presence of health conscious people (64%) in case of DHANMONDI (jogging 23% & walking 41%). Whereas, the scenario of socialization at HATIRJHEEL is comparatively better (70%). But in this case, accessibility problem is a huge barrier for the growth of neighborhood interaction.

**Response Level:** According to the variable analysis DHANMONDI lake and lakeside area works better. Here presence of visitors is observed all day long (though the number varies in different times) due to its better design quality, visual accessibility and easy mode of transport. However, lack of play and recreation facilities, restricted time for visitors and inadequate lighting facilities contribute to the reduction of response level. Alternatively, in case of HATIRJHEEL, it is a very potential space that has promised to enrich our urban living in a densely-built, traffic-congested, and green-starved Dhaka city. But illegal sewage connections and dumping of wastes, Driving in wrong direction, reckless car driving, motorcycle stunts and other similar disturbances restrict the number of desired user group people visiting the place.

## Conclusion

As the city is densely developed, it leaves little scope to have more open spaces inside. Therefore, one major focus should be in retaining, up keeping and exploiting the potentials of existing urban open spaces, greeneries, and lakesides and improve their quality for urban life.

This study concluded with HATIRJHEEL as a prospective urban open space and its comparable intervention, DHANMONDI Lake; both having the potential to effectively transform a neglected backyard into an active recreational open space and busy commercial strip respectively. Here, awareness towards some regular phenomena need to be addressed such as Illegal settlement, anti-social activities, taking drugs, mugging and similar activities. Beside this, the physical use of such open spaces depends on its facilities and amenities (such as landscape, age wise facilities, parking facilities, access facilities, games and sports facilities). Moreover, as a whole, the space should be interacted with great degree of permeability and transparency. Some focal points and

activity centers will be needed to act as activity generators inside these spaces. In conclusion, for the livability of Dhaka City it has become imperative to develop adequate amount of quality urban green spaces especially at the time when rapid urbanization and enormous population growth challenge the public realm of this high-density city.

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