Landscape architecture spatial management for urban construction implementation of main streets, case study in Bacgiang city

Nguyen Thi Lan Phuong
Faculty of Urban Management of Hanoi Architectural University, Vietnam

Abstract. In the process of development, management of urban space is always a key task to ensure the urban face and identity of each urban area; it is always expressed through urban accents, the main roads and route of the urban area, which is also the landscape architecture on both sides of the main urban transport route. The transport system attached to the efficient use of land on both sides of the road is a product of urban space management to express the urban image and increase urban attractiveness and competitiveness index of the city. This paper adopts a pilot study on a number of major roads in Bac Giang city – a type II urban area and an administrative and political center of Bac Giang province to introduce and propose suitable management tools for managers to control the construction and development process of urban area in Bac Giang city in particular and in big cities in Vietnam in general.

1. Overview

1.1. Urban management and development in Vietnam
About three quarters of Viet Nam is covered by mountains and plateaus; flatlands are limited in Hong River and Mekong Deltas. Total surface area is 329,241 km² with total population of about 96.21 million (1/4/2019, National Population and Housing Census). Viet Nam is divided into three regions (northern, central, and southern) with six socio-economic sub-regions.

Urban population is projected to be 37 million in 2020, 42 million in 2025, and 47 million in 2030. Urbanization levels are estimated to be over 30% in 2019, 40% in 2020, 45% in 2025, and 50-52% in 2030. This high rate has contributed to the socio-economic transformation of the country. Viet Nam is also faced with acute urban challenges including climate change, urban infrastructure shortage, serious flood risks, and weak institutional capacity.

The overall urban spatial development strategy of the whole country is rationally developed in important urbanized areas in association with 6 national socio-economic regions. There are connections among the North, the Central and the South; between the East and the West; in accordance with the development of nationally primary and secondary growth poles, and at the same time ensuring the whole network development with hierarchy by grade and type. From 2009 to 2015, priority will be given to the development of key economic regions, major urban areas and general economic zones, which play a key role as the national key growth pole. From 2016 to 2025, Viet Nam will prioritize the development of basic urbanized areas and minimize scattered and spontaneous development. Later, from 2026 to 2050, the nation will gradually shift to develop according to the network model.
Presently, urban areas in Viet Nam are classified into 6 categories according to Resolution No. 1210/2016/UBTVQH13 dated 25th May 2016 as follows: special grade, grade I, grade II, grade III, grade IV and grade V: Special-grade: Mega cities which are crucial at the national level; Grade-I and grade-II: Large cities which are crucial at the regional level, Many are provincial capitals; Grade-III: Big and medium cities and towns; Grade-IV: Towns and townlets; Grade-V: Administrative and forestry or agricultural townlets. As of June 2019, the total number of cities, towns and townlets across the country was 833, including two special-grade cities (Hanoi and Ho Chi Minh City), 19 first-grade, 29 second-grade, 45 third-grade cities, 80 fourth-grade towns, and 658 fifth-grade townlets.¹

Large cities such as Hanoi, Ho Chi Minh City, Da Nang and Hai Phong have a solid economic development foundation; the amount of industrial production and commercial service establishments have also increased. Economic structure has undergone a crucial change, new development dynamics are shifting strongly to the fields of education, financial services, banking, real estates, telecommunications and media, and so on. Urban areas with beautiful natural landscapes, especially Ha Long, Nha Trang, Da Lat, Sa Pa, Phu Quoc, or with (inter)national cultural and historical heritages such as Hue, Hoi An, Ha Long, Con Dao, have tourism to be a key economic driver. Thanks to domestic and foreign investment, the social and technical infrastructure system in second-grade cities and above have been strengthened, fourth-grade towns and above have also been upgraded and improved (electricity, transport, healthcare, sanitary and hygiene, water supply, drainage and solid waste).

Nonetheless, there is still unequal development among urban areas. In many cases, urban infrastructure could not follow up with their own demand especially in energy and transportation. Management mechanism remains insufficient. Urban resources and finance are limited.

In order to ensure urban management and development in accordance with urban development orientations, strategies and planning, urban management in general and management of landscape architecture space in particular are initially concerned, many urban areas have approved urban management planning and urban design management regulations; landscape architecture space is changed, urban infrastructure is increasingly expanded and synchronized. The State has paid much attention to this field, issued mane relevant legal documents such as the Law on Planning, the Law on Architecture, the Law on Environmental Protection, and Decree No.38/ND-CP on management of space, architecture, landscape, etc. However, many urban areas still have limited issues such as lack of highlights in urban sacpe, unorganized construction still exists; many public spaces, green spaces of the city have not been focused on development, urban faces lack of control, lack of identity; the effective exploitation of land use under the approved planning is still mimited and has not fully promoted the role of the administration at all levels.

1.2. Overview of construction situation and landscape architecture spatial management of Bacgiang city.

The planning os the city is concerned; in particular, after the expansion of the administrative boundaries, the city has completed the adjustment of the general city plan to 2030 with a vision to 2050, and at the same time implemented the planning of subdivision planning and construction detailed planning, ensuring synchronous connection of urban infrastructure in association with scoio-economic development, thereby the coverage of subdivision planning and detailed planning is also increasing, some areas have beautiful architectural constructions that contribute to creating a spacious face of the urban area, the construction management according to the plan gradually goes into order and by 2014 is recognized by the Prime Minister as Urban area II. The city has issued a “Regulation on management of urban planning and architecture”; adjust and expand the administrative boundaries of 5 communes to the city and raise 3 suburban communes (Da Mai, Dinh Ke and Xuong Giang) into inner-city wards. Urban infrastructure is also interested in investment, from 2012-2015 has deployed construction investment on more than 300 works, has issued more than 3500 construction permits for

¹ Urban Development Agency, Ministry of Construction
individual houses. Many key projects have been completed, creating new focal points for urban landscape architecture space such as: Muong Thanh hotel, inter-agency work area, BigC supermarket, Media Mart, Tran Anh, Co.op Mart, etc., Residential area No.2, No.3; Cong Ngoc area – bus station; Southern Dinh Ke residential area; Hoang Hoa Tham park and monument, provincial road 398. With the implementation of Decision No. 44/2014 / QD-UBND dated January 30, 2015 of the People's Committee of Bac Giang province, stipulating a number of contents on construction inspection in Bac Giang province, the inspection work has been strengthened, the handling of violations of urban order is carried out more and more effectively, with deterrence and high education, thereby contributing to raising the awareness of the people in observing the provisions of state of construction order guarantee.

2. Landscape architecture spatial management situation of main roads of Bacgiang city, case study for 5 main roads

2.1. Spatial situation of 5 main roads

Based on the study of theoretical systematization and general survey of the landscape architecture reality of Bac Giang city, the sample of the base file for each work on both sides of the street to survey and assess the status of routes. The city aims to propose solutions for Bac Giang’s urban development control, including the following specific contents:

- About architectural constructions: Images/facade of works; ground of the construction plot;
- Regarding the current situation date, the work is divided into data groups:
  + Group on land parcel registration (1) Land parcel (number of land parcel; address of land parcel; area of land parcel; land user, owner of land-attached assets, land manager); (2) Land use rights / land management (Form of use; Type of land; Land use term); (3) Origin of use;
  + Group of constructions on land: (1) Name of construction owner; The owner name of the work user; (2) Name of project; (3) Type of building; (4) Red-line boundaries, construction boundaries, setbacks (m); (5) Construction density (%); (6) Coefficient of land use; (7) construction area of the 1 floor (m2); (8) Number of floors of the work (floors); (9) Maximum height of the whole building (m); (10) The color of the building facade; (11) Main materials covering the work / scale; (12) Building construction materials; (13) Construction structure.

Survey results of 5 streets survey are as follow:

+ **Tran Nguyen Han route**: about 2 km in length, 21 - 24m in width (road bed 9-12m, sidewalk 4.5-6m), there are about 380 survey works on the route. Mostly are housing projects (self-built by the population) with the rate of 93.4%; 3.2% is public works, the main highlight is Ha Vi market; 3.4% are industrial production works (13 works) and mechanical and small constructions. The maximum height of a work construction is 5 floors, the land use coefficient is 0.5-5 times, the residential buildings are built close to the red line with the maximum construction density of 100%. Including many types of trees such as crocodile, milk flower, phoenix, acacia, corn, sesame buds, lagerstroemia, acne, etc. A total of 359 trees of which crocodile accounted for a large proportion (37%).

+ **Hoang Van Thu route**: about 2.5 km in length, 27m in width (road bed 15m, sidewalk 5-6m), there are about 129 surveyed constructions on the route. The constructions are mainly head quarters offices (Department of Science and Technology, State Treasury, Bac Giang Tax Department, Bac Giang Police Department, Propaganda Department, Bac Giang People's Court, etc), public spaces (cultural and sports center, city center square), housing, service combination housing. The maximum height of constructions is 8 floors, the land use coefficient is 2.5-3 times, all residential buildings are built close to the red line with a maximum construction density of 100%. Headquarters buildings have different setbacks. Including a variety of plants such as crocodile, milk flower, phoenix, eagle, longan, copper corn, sesame buds, purple Lagerstroemia, eggs, cau landscape, mango, birth, etc. Total 366

---

2 Based on the survey of all building, spatial area on the both sides along the 5 main road by the author, 2018
trees in which wild incense accounts for great 33%; crocodile accounted for 26%; Lagerstroemia purple accounts for 20%.

+ Nguyen Van Cu route: about 1.4 km in length, 21 - 24m in width (two-way roads, driveways widths from 9-12m, sidewalks 4.5-6m. (Residential area is about 2-3m ) There are about 261 surveyed works, most of which are housing construction (self-built) with the rate of 96%, 05 public constructions accounting for 4%. The highlight os the project is Coop mart Supermarket, children's cultural houses, people's bookstores, Bac Ninh VNPT. The maximum height of construction works is 6 floors, the coefficient of land use 1-4 times, the residential buildings are built close to the road boundary, red with a maximum building density of 100%, including many tree species such as crocodile, milk flower, phoenix, nacre, sesame bud, lagerstroemia, caviar, oval apple, multi-stem, rose, etc. 280 trees of which milk flower accounts for a large proportion of 29%; accounting for 22.8%; nacre accounting for 12.8%.

+ Le Loi route: about 4.2 km in length, with a width of 20-24m and about 190 surveyed works on the route. The constructions include housing and housing combined with service about 168 works (88%), public works, office buildings, trade and services accounted for 12% (mainly concentrated in the middle of Le Loi route from Nguyen Van Cu Street to Nguyen Thi Minh Khai). A number of public buildings and offices with large volumes such as the Center for Reproductive Health Care; Provincial general hospital; Bac Giang Department of Health; Social insurance; Vietnam Development Investment Bank; Bank for Agriculture and Rural Development; Maternity Hospital. The maximum height of construction works is 9 floors, the coefficient of land use 1-4 times, the residential buildings are built close to the red line with the maximum construction density of 100%. Including many tree species such as crocodile, milk flower, phoenix, conch, sesame buds, lagerstroemia, caviar, longan, banyan, lemongrass, betel nut, fairy peach, etc. Total 389 trees of which crocodile accounts for a large proportion 35%; eagle accounted for 18%; milk flower accounted for 17%.

+ Hung Vuong route: about 1.7km in length; width of 36-48m wide (sidewalk: 6m; median: 3-6m; road bed 21-30m) with about 197 surveyed constructions on the route. In which, housing and housing services account for 85%, commercial and service works account for 10% and office buildings account for 5% (PPC, Department of Construction, Department of Health, Hoang Van Park.)

Figure 1. Five main streets of Bacgiang city
Thu, Women’s Union, Provincial Inspectorate, Monument of Martyrs, Provincial Post Office, etc. The maximum height of construction works is 7 floors, the land use coefficient is 0.4-5 times, all residential buildings are built close to the red line with the maximum construction density of 100%. Including many types of plants such as crocodile, milk flower, phoenix, conch, sesame buds, purple lagerstrokes, acme, star fruit, pine, palm. A total of 274 trees of which crocodile accounted for a large proportion of 25.5%; milk flowers accounted for 20.8%; lagerstroemia purple accounted for 16.4%.

2.2. The situation and challenges for spatial management

a) Regarding the adjustment of urban construction planning/urban design

The management and control of landscape architecture space is carried out on the basis of detailed planning projects approved by the City People’s Committee. However, in the process of implementing the construction investment according to the planning, a number of indicators on land, technical infrastructure and functional areas in the city have changed, no longer suitable with zoning. Therefore, it is necessary to study the local adjustment of some planning areas to suit the current situation of urban development.

In addition, urban design projects are not really interested and conducting research in the city is also one of the basic causes of difficulties for control and management of urban space.

b) Regarding the regulations of planning and architecture management.

Although the Regulation on management of planning architecture has been promulgated by the city, the concretization into the control of landscape architecture in general and the management of landscape architectural space of roads, important landscape areas of the city are limited and there are still many shortcomings: It is spontaneous in architecture, without cohesion with the overall space. There is no harmonious rhythm between works in the same area or intermittent articulation between old buildings with new works, with surrounding projects; Residential buildings, villas, adjoining houses dotted with many architectural forms and colors; lack of open space, parks, trees, urban amenities, etc; Besides, the environmental sanitation of the urban area is also an issue of concern.

c) About organizational structure and community participation

- Need to renovate the current organizational management model, which enhances the role of mobilizing community participation in urban landscape architecture space management.
- Review and strengthen the organization of streamlined management, avoid overlap to ensure effective implementation.

There are many factors that affect the urban landscape architecture space, but the most important factor is still the lifestyle and urban population under the impact of urban socio-economic development. The demand for construction architecture is diversified due to economic pressure (occupation, living standard), and also affected by lifestyle and style; Designs, amenities, utilities will also have to be changed to suit people. Luxurious residential areas with all architectural styles, aesthetic tastes can be seen everywhere; The diversity and colors have not been harmonious in an overall architectural planning space.

d) Regarding policy mechanisms and management capacity

- Inadequacies in the system of documents, state regulations in the field of management of landscape architecture space, limitations on conditions, capacity and commercial purposes of many investors when being heavy on factors profit.
- Investment funding for urban development, planning and management of landscape architecture space is not commensurate with development demand.
- The other important issue is the role of urban authorities at all levels in investment policy, identification and evaluation of the role of planning and management of urban landscape architecture space, control work and supervision of implementation, inter-sectoral cooperation is still loose, not closely coordinated, often left to investors in urban development projects, etc.
3. Landscape architecture spatial management solution for main streets

3.1. Criteria for architecture and landscape management of main streets
In order to strictly control urban space, especially the street space, it is necessary to set specific criteria as a tool for the development control management. The proposed set of criteria and targets is based on analysis and integration of requirements for renewing the criteria and targets in the planning and construction permits to meet the appropriate investment incentive needs in line with urban development orientation. At the same time, ensure the requirements of management and control of urban landscape architectural space according to landscape architecture zoning, specifically as follows: (1) Landscape architecture management zoning; (2) Function of land use, name of works, classification of works; (3) Norms of land use; (4) Maximum land use (net - netto) coefficient (FARnet); (5) Preferential land use (net - netto) coefficient (if any); (6) Total floor area; (7) Total preferred floor area (if any); (8) Maximum and minimum height of floors; (9) Minimum height; (10) Construction density; (11) Construction elevation, building foundation; (12) Underground / Technical floors; (13) Setback space, construction boundaries, red line boundaries; (14) Backspace on the first floor (ground floor); (15) Total construction area of 1st floor / Preferential construction area of 1st floor (if any); (16) Building distance from the land boundary; (17) Foundation and basement / Technical floor; (18) Information about other space and landscape architecture; (19) Information on technical infrastructure and environment

3.2. Application of GIS to develop software guidance for management of urban governments at all levels in landscape architecture control of 5 main streets of Bac Giang city
* Process of building database

* Data collection
To build GIS database for 5 main streets of Bac Giang city, we carry out the following tasks: Collecting documents and data; Consult with experts; Field survey and investigation; Modeling in GIS: Conducting data modeling in GIS environment.
* Software selection: In this study, we chose ArcGIS software because this is a leading GIS software system today, providing a comprehensive solution from data collection / input / editing, analyzing, displaying and distributing information on the Internet with different levels such as personal geographic database or enterprise database.

* Data processing: Processing spatial data; Data processing properties; Connection attribute data and spatial data
  * Database user guide for Bac Giang city streets
    - The problem of querying objects by space:
      + Problem 1. Find houses within a radius of 100m around a specific project.
      + Problem 2. Classification of air pollution, noise ... of residents located near roads, with a rating scale of: less than 20m, from 20 to 50m and over 50m (equivalent to the level of hitting High, medium and low impact prices (the further away the road is, the lower the pollution level), classified by corresponding colors
        + Problem 3. Find houses on the road with a height of over 10m
        + Problem 4. Find houses on the road with a floor area of over 100m
      - The problem of combining object queries by space and attributes
        + Problem 5. Finding houses to survey on the road located at least 20m from electric poles and having a height of over 10m
  * The plan of using the Database for the streets of Bac Giang city
    - Use management object
      + Bac Giang Construction Department: is the advisory body for the province on construction issues in the whole province and grants construction permits for works as decentralized as well as manages urban planning issues and carry out construction implementation in the area. GIS management software will be regularly updated management of planning fluctuations as well as framework regulations on the management of landscape architectural space for streets, not only of Bac Giang city but also on roads of other urban centers in the provincial urban system to ensure the digitization of management information as well as the use of information for space control - construction permits for works on the streets.
        + Urban Management Division, Bac Giang City People's Committee: Is the direct management agency for planning and managing landscape architectural space in the city. GIS software should be transferred to this unit and the data needs to be updated regularly on the current status of housing and on-line facilities, changes in landscape requirements as well as level-related indicators of construction permits for building approved by competent agencies.

3.3. Some solution to management of landscape architecture space of Bac Giang city's streets

* Solution of organizational structure and management
One of the measures to enhance the management of landscape architecture of street spaces in particular and urban landscape architecture space in general is the need to assign and clearly decentralize responsibilities of the involved parties in the process of implementing the management of residential areas in the city (Figure 2). Proposing to build a model of "Autonomous Community", to ensure the management of landscape architecture construction activities in accordance with the approved detailed planning and urban design and enhance the management role of the community. At the same time, it will improve the effectiveness of the implementation of landscape architecture management activities on the street.

"Autonomous community" has functions and duties
  + Supervision of construction activities and implementation of the planning as well as other activities related to landscape and environment architecture along the street;
  + Organizing and calling for activities, mobilizing and calling for investment of the population community according to the target programs and plans on urban development and renovation and embellishment and construction of clean and green streets of the city or proposed by the community;
+ Mobilizing to call for investment in construction and development of public areas and open spaces on streets, etc.

Members of the "Autonomous community" include:
+ Representatives of People's Committees of wards on the route.
+ Representatives of residential communities, neighborhoods.
+ Representative organization of City Professional Association (if any).

The "autonomous community" will operate independently and directly by the City, in coordination with the activities of the ward People's Committees, with thematic guidance and advice from the functional departments of the City Department of Construction.

The funding for the operation is mainly contributed by the community and directly benefits from the effective supervision activities on landscape architecture in the streets.

---

**Figure 2.** Organizational structure of landscape architecture management

* Proposing some measures to improve management capacity

- Selection of urban management staff to ensure professional and urban competence in the field of urban management and to regularly train, retrain and foster urban management knowledge for the officials of urban management at all levels.
- Strengthening the coordination among agencies and urban management units such as Department of Construction, Division of Planning Architecture, Department of Infrastructure and Infrastructure of Department of Construction; Urban management office; Environmental resource room.
- Enhancing the capacity of individuals and planning consultancy units
- Improve the quality of appraisal
* Solutions about policy mechanisms
- Policies to attract investment and mobilize resources, build a mechanism of reward points in management.
- Preferential policies for investors to develop public infrastructure in the region. Investors with financial capacity, experience and large-scale registration are preferred.
- Stipulating responsibilities for investment in public welfare works for profitable commercial projects.
* Policy supporting and encouraging the management of landscape architecture
- Encourage cultural preservation activities of the community (tangible, intangible cultural values and festivals, etc), especially activities of "Autonomous Community". Promote community activities to perform social work (sanitation, traffic safety, security, etc).
- There are guidelines for commercial activities such as type of business, wastewater and sanitation, use of sidewalks, advertising; Implementing campaign to improve environmental sanitation.
- Promote tourism programs, create more tourism products with support for accommodation establishments to increase the revenue for landscape architecture management.
- Educating and disseminating special local cultural traits associated with embellishing and restoring local historical and cultural relics.
* Solutions to mobilize community participation
- Mobilize the participation of the community in the adjustment of planning
- Mobilizing community participation in construction investment, exploitation and use
- Mobilize community participation in the inspection and supervision of implementation
- Propagating to raise people's awareness in managing urban landscape architecture
+ Enhancing propaganda to raise people's awareness about the significance and importance of landscape architecture space for residential areas; Thereby, arousing awareness, responsibility and self-discipline, actively participate in the formulation, approval and management of urban planning in general and preserve and promote the value of urban landscape architecture space in particular.
+ Supporting investment in communication infrastructure such as public loudspeaker system, television, internet so that people can easily access and explore information.
+ Propagating images on the protection of landscape, environment and urban civilized lifestyle associated with the cultural practices of the nation in public places and residential areas.

4. Conclusion
Urban management is integrated from many different industries, so each city, big or small, has all management activities in all areas. Landscape architecture space management is only approached in one aspect of urban construction management, an area of urban management but it plays an important role in creating urban landscape space, individual identity of each municipality in the process of construction and development. Management of architectural landscape space of the main streets of the city in Bac Giang, studied from issues of the current landscape architecture of types of constructions on both sides of the route, to issues of organizational structure government organization and propose a number of synchronous solutions for the management of landscape architecture space with management tools applied science and technology on the software interface of GIS information system can be lessons for cities of the same type in building a framework for urban development in general and control of spatial development of landscape architecture in particular.

References
[1] Ministry of Construction (2016), Circular No. 15/2016 / TT-BXD, June 30, 2016 on Guidelines for construction permits
[2] Ministry of Construction (2010), Circular No. 19/2010 / TT-BXD of January 22, 2010, guiding the formulation of urban architecture and planning management regulations

[3] Government (2010), Decree No. 38/2010 / ND-CP dated 7/4/2010 on spatial management of urban landscape and architecture

[4] Government (2012), Decree No. 64 // 2012 / ND-CP dated September 4, 2012 (64 / CP) of the Government on granting construction permits.

[5] Bac Giang Department of Construction (2015), Report on planning management, construction order, landscape architecture in Bac Giang city.

[6] People's Committee of Bac Giang Province (2013), Decision No. 652 / QD-UBND, December 6, 2013, of Bac Giang Provincial People's Committee, approving the adjustment of the general planning of Bac Giang city till 2030, reaching look to 2050 (1 / 10,000 scale);

[7] People's Committee of Bac Giang Province (2013), Decision No. 318/2013 / QD-UBND dated July 18, 2013 of Bac Giang People's Committee on promulgating the Regulation on planning management in Bac Giang province;

[8] Nguyen Thi Lan Phuong (2018), “Researching, surveying and assessing the situation of landscape architecture and proposing control solutions to spatial management of main streets in Bac Giang city to 2030 with a vision 2050 ”, a provincial scientific research project