

MINISTRY OF EDUCATION AND TRAINING

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**ORGANIZING LANSCAPE ARCHITECTURAL SPACE
OF WALKING STREETS IN
THE HANOI HISTORICAL INNER CITY**

MAJOR: Regional and Urban Planning

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PhD Thesis Summary

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INTRODUCTION

1. Importance of the study

In Hanoi, pedestrian streets have been formed for a long time, closely associated with the formation and development of the city. Each period has certain fluctuations, but the city government has always paid attention to promoting the development of pedestrian streets, and has always been set out in the Hanoi City Master Plan. However, due to the lack of synchronous development of the public transport system, the main means of transport being motorbikes, tropical climate conditions and people not having the habit of walking, pedestrian streets are not yet effectively exploited. In addition, due to the lack of a system of design regulations and specific instructions in organizing the architectural landscape space of pedestrian streets, pedestrian streets still lack attractiveness, do not ensure convenience and safety. Realizing the urgent problem, the thesis "Organizing landscape architectural space of walking streets in the historic inner city of Hanoi" was researched to propose solutions for organizing landscape architectural space towards building a Green - Cultural - Civilized and Modern Capital, which is very necessary, meaningful in terms of science and practice.

2. Purpose of the study

Purpose: Propose solutions for organizing architectural landscape space of walking streets in the historical inner city of Hanoi to create identity, harmony with natural, cultural, social and human factors, contributing to building a Green - Cultural - Civilized and Modern Capital.

Research objectives: (1) Detect problems in organizing architectural landscape space of walking streets in the historical inner city of Hanoi; (2) Research related scientific basis; (3) Develop a set of criteria for evaluating and identifying potential walking streets; (4) Propose solutions for organizing architectural landscape space of walking streets in the historical inner city; (5) Pilot study on organizing architectural landscape space of walking streets.

3. Research subject and scope of the study

Subject: Architectural landscape space of the walking street in the historical inner city of Hanoi

Scope of the study:

+ **Space:** Walking streets in the historical inner city of Hanoi as approved by the City People's Committee. The walking street is organized full-time during the week and part-time (three days on weekends)/holidays.

+ **Time:** Determined according to Decision No. 1259/QĐ-TTg, Master plan for construction of Hanoi Capital to 2030 and vision to 2050.

4. Research methodologies

The thesis uses the following methods: (1) System approach; (2) Investigation and survey method; (3) Diagram analysis method; (4) Map overlay method; (5) Expert method; (6) Forecasting method.

5. Research contents

- Overview of the organization of architectural landscape space of domestic and international walking streets. Development trends of walking streets.
- Research, survey, investigate and evaluate the current status to determine the identity and characteristics of walking streets in the historical inner city
- Research on scientific basis, systematize theories, normative documents, technical standards, development orientation policies.
- Research and develop a set of criteria to evaluate the architectural landscape value of walking streets to classify streets with similar characteristics.
- Research and propose models and solutions for organizing architectural landscape space of walking streets in the historical inner city of Hanoi.
- Research and propose potential walking streets, forming a network of walking streets in the historical inner city.

6. Scientific and practical value of the study

Contribute to concretizing, supplementing and perfecting the theory on the organization of architectural landscape space of walking streets in Vietnam in general and in the historical inner city area of Hanoi in particular. Solutions for organizing architectural landscape space of walking streets suitable for the characteristics of each walking street in the historical inner city center of Hanoi. Contribute to training, scientific research and consulting on the organization of architectural landscape space of walking streets and the topic of separate Urban Design.

Reference documents for in-depth studies on the organization of architectural landscape space of walking streets in the historical inner city area. Advise the city government on solutions for organizing architectural landscape space suitable for the characteristics of each walking street.

7. Study results

- Identify the characteristics and values of the architectural landscape space of walking streets and the problem of organizing the architectural landscape space of walking streets in the historic inner city of Hanoi.
- Determine the systematization of the scientific basis.
- Propose a set of criteria to evaluate the architectural landscape value of walking streets.
- Propose potential walking streets.
- Propose models and solutions to organize the architectural landscape space of walking streets in the historic inner city of Hanoi.

8. New contributions of the study

- Proposing criteria for evaluating the value of architectural landscape space of pedestrian streets.
 - Attractiveness criteria group

- Convenience criteria group
- Safety criteria group
- Proposing an overall model of pedestrian streets for the historical inner city.
- Proposing solutions for the organization of architectural landscape space of pedestrian streets in the historical inner city.
 - Overall solutions: Proposing the network of walking streets in the historical inner city area; The characteristics of the pedestrian street's network in the historical inner city
 - Detailed solution: Architectural works; Green trees and water surface; Infrastructure system; Urban furnitures.

9. Some key concepts and technical terms

There are 9 concepts and terms in the thesis, including: Walking space; Walking street; Walking street network; Landscape architecture; Public space; Spatial organization; Organization of landscape architectural space of walking streets.

10. Structures of the study

The thesis consists of 3 parts: Introduction, Content, Conclusion - Recommendations and 11 Appendices. The research content is presented in 3 chapters according to the current common thesis structure of the Urban and Regional Planning industry.

CONTENTS OF THE THESIS

CHAPTER I: OVERVIEW OF ORGANIZATION OF LANDSCAPE ARCHITECTURAL SPACE OF WALKING STREET IN THE HISTORICAL INNER CITY OF HANOI CITY

1.1. Organizing architectural landscape space of pedestrian streets in the world and Vietnam

After World War II, European cities were rebuilt for economic development and expansion, bringing with them a large number of motor vehicles. This caused a number of problems such as traffic congestion, environmental pollution and unsafety for pedestrians. The first pedestrian streets built in Torg in Stockholm and Lijnbaan in Rotterdam brought about remarkable innovation, with the goal of reducing the number of cars, improving environmental conditions and enhancing the health of urban residents, pedestrian streets were formed and focused on high-quality public transport systems, technical infrastructure and complete urban facilities to help pedestrians move safely. In addition, the enhancement of pedestrian activities and experiences on the streets was also of interest and expanded. These goals help to organize landscape architectural spaces more attractively.

The trend of developing walking streets in Vietnam has been formed and developed for about 20 years, so most of the walking streets have been converted from motorized traffic routes. This has created certain limitations in the organization of the architectural

landscape space of walking streets. The earliest is the walking street in Hanoi, located in the core area of the historical center, with many valuable heritage works, but simply blocking the road and restricting the circulation of motor vehicles on the three weekends (19:00 Friday to 24:00 Sunday every week), some other walking streets have also paid attention to the organization of landscape space but there is no system so they have not been exploited effectively. Other cities such as Hoi An, Da Nang ... also deploy walking streets in the central area, but most of them are often commercialized, affecting the architectural landscape space of the street. Newly invested pedestrian streets have initially paid attention to landscape design and modern urban amenities, but human activities are still poor, leading to spontaneous free-trade activities that cause loss of aesthetics and security and order on the streets.

1.2. Situation of organizing architectural and landscape space of the walking street in the historic inner city of Hanoi

1.2.1. Brief history of the formation and development of the walking street in the historic inner city

Walking streets have been identified and mentioned in many Capital Planning since 1992, 1994, 1996. And in the upcoming orientation, with the goal of developing a green, cultured, civilized and modern Hanoi Capital, walking streets continue to be set out in Resolution No. 06-NQ/TW, Resolution No. 15-NQ/TW of the Politburo, Decision No. 179/QĐ-TTg, and Decision No. 700/QĐ-TTg (dated June 16, 2023) approving the Adjustment of the General Planning of Hanoi Capital to 2045, with a vision to 2065, mentioning creating unique spaces, developing tourism, services and walking streets, and night economy.

1.2.2. Location and role of walking streets

a. Location of walking streets: Walking streets are formed and developed scattered in the historic inner of city area, mainly concentrated in the historical core. This is where a rich urban heritage fund converges, with a long history of formation and development, bustling commercial services, convenient transportation as well as diverse and attractive intangible values that have contributed to the potential and strengths of the area.

b. Role of walking streets: It is a public space for people to walk conveniently and safely, creating an attractive place to promote communication and community cohesion. Walking streets help connect spaces, attractive locations, valuable works, green spaces, open spaces, squares, contributing to the preservation and promotion of tangible and intangible cultural values, helping to promote and promote tourism development, improving local economic conditions.

1.3. Current status of architectural landscape space of pedestrian streets in the historic inner city of Hanoi

1.3.1. Current status of the transportation system in the historic inner city

a. Public transportation: The public transportation system such as buses, elevated trains, trams, and community bicycles currently does not meet the needs of the people

in terms of both quality and quantity. Due to the lack of synchronous planning, the connection between the public transportation system and pedestrian routes in the historic inner city is still facing many difficulties, not creating comfort, safety and convenience for pedestrians.

b. Static traffic: Always a problem for big cities, especially in the central area, where the population density is high, the number of people using personal vehicles is large, the technical infrastructure and public transportation systems have not met the needs of use.

1.3.2. Current status of walking street space in the historical inner city

The space of the historical inner city is a clear reflection of the development process of the Capital, each area marks each period with policies, development orientations, historical culture and human society. Therefore, the walking street in each area also has different characteristics and spatial values.

1.3.3. Current status of architecture on the walking street in the historical inner city

The architectural works on both sides of the walking street also have characteristics according to each area. While the Old Quarter has long and narrow architectural works (tube houses from 2-6m wide and 20-26m long), the architectural works in the Ba Dinh political center area, the Thang Long Imperial Citadel heritage site; The Old Quarter, Hoan Kiem Lake area and its vicinity, have a grandiose shape and proportion, with townhouses and office architecture. Due to the influence of French planning, the buildings bear the mark of French architecture. The West Lake area and its vicinity and the restricted development area were built during the period when the State opened its doors and promoted the market economy. The construction and architecture sectors have clearly changed in architectural style, form and materials.

1.3.4. Current status of the landscape of the walking street in the historic inner city

a. The natural river and lake system is mainly concentrated in the Hoan Kiem Lake area and vicinity (A5), the West Lake area and vicinity (A6) and scattered in some locations in the restricted development area (A7). Some streets are arranged near the surface space but have not created a connection in space and human activities, so they have not been exploited effectively.

b. Green tree system: The average green ratio in Hanoi's inner city is currently 2.4m² green/person, unevenly distributed in quantity and species composition. Not ensuring coverage density, the walking street is not really attractive, especially in the summer, when the temperature is hot and stuffy.

1.3.5. Current status of urban facilities in the historical inner city area of the city

According to the survey, urban facilities and equipment on the walking street are mainly arranged on streets with large cross-sections combined with open spaces, green spaces, flower gardens, walking gardens and squares. In some special administrative-political areas, the walking street has no or very few seats, no rest stops, public water taps... Or in the Old Quarter area, the street space is narrow so it is impossible to arrange

urban facilities. In general, basic urban facilities and equipment that meet the requirements of function and architectural form have not been invested in and paid attention to, as well as calculated the location, scale and appropriate distance.

1.3.6. Current status of exploitation and use of walking streets in the historical inner city area

1.3.7. The reality of human activities

The activities on the walking street are very diverse, however, depending on the user and the weather conditions, people's activities on the walking street are selected or changed. While in the summer, activities are mainly concentrated in the early morning and from late afternoon to evening, on the contrary, activities tend to move to the middle of the day in the winter.

1.4. Related scientific works

1.5. Issues to be researched and solved

Issue 1: Identifying issues in the organization of architectural landscape space of the pedestrian street in the historic inner city of Hanoi.

Issue 2: Sociological investigation through questionnaires on the organization of architectural landscape space in the special city and synthesizing pedestrians' wishes to propose appropriate solutions.

Issue 3: Developing a set of criteria to evaluate the architectural landscape value of special cities.

Issue 4: Proposing solutions for the organization of architectural landscape space of the pedestrian street in the historic inner city of Hanoi.

CHAPTER II: SCIENTIFIC BASIS FOR ORGANIZING LANDSCAPE ARCHITECTURAL SPACES OF WALKING STREETS IN THE HISTORICAL INNER CITY OF HANOI

2.1. Theoretical basis for organizing architectural landscape space of pedestrian streets in historical inner-city areas

People of all ages want to travel in the best, most comfortable and convenient conditions. Therefore, when organizing the architectural landscape space of the pedestrian street, in addition to ensuring convenient movement for all subjects, it is also necessary to meet the connection requirements between the inside and outside of the area, creating quick, easy and diverse access. This helps to connect the relationships between people and the pedestrian street.

2.2.1. Theory of pedestrian street space organization

Shaping space needs to pay attention to three planes: ground, vertical and ceiling

Determine dimensions to create a harmonious overall space with streetscape techniques and aerial perspective

The aesthetic value of landscape depends on human senses, mainly vision. However, the effectiveness also depends on viewing conditions, including: viewing point, viewing angle. The relationship between object size and distance also contributes

to creating spatial value. When space has no quality stopping point, the force of gravity will disappear and fade towards the end of the axis.

The components of landscape architecture include natural elements (terrain, water surface, trees, people, animals and air) and artificial elements (architecture, traffic, technical finishing equipment, works of art).

Theory of pedestrian street space identification: Each pedestrian street has its own visual characteristics, perceived and expressed under three factors: identity, structure and meaning. The five basic factors include: circulation, border area, node, landmark, do not exist independently but are interwoven with each other in a regular way to form the image of a pedestrian street with identity.

Theory of pedestrian street organization in urban planning: (1) Location selection; (2) Scale; (3) Traffic network organization; (4) Landscape space organization;

Classification of pedestrian streets in many forms: (1) By layout form; (2) By scale; (3) By operating time; (4) By function; (5) By form; (6) By space use function.

Theory of architectural landscape space organization of pedestrian streets: (1) Public transport organization; (2) Landscape architectural space organization; (3) Greenery organization; (4) Safety design.

2.1.2. Theory of walking activities

Correlation between distance and walking time: With the same travel time (10 minutes), pedestrians have the opportunity to access more attractive places than people using motor vehicles such as motorbikes, cars... Based on data and research synthesis, the reasonable and optimal distance for all subjects to be able to walk is 500m, the distance between two stops should not exceed 200m.

Relationship between walking streets and public transport systems: To facilitate users to access walking streets easily, or conveniently connect walking streets with different functional areas of the city, it is necessary to fully plan the public transport system, underground or above-ground parking lots, electric vehicle and community bicycle stops. When organizing parking lots, motorbike and bicycle parking lots, and public transport stops, it is necessary to calculate the length of the walking path to the walking streets based on the conditions of walking time costs and the time costs when using means of transport.

Characteristics of walking streets: A safe walking street is to ensure standard designs, and must forecast the traffic and density of walking, especially during holidays or festivals. With diverse functions, walking streets need to meet the needs of everyone but still ensure the privacy of each individual when walking on the street.

Technical specifications: The main components in the spatial organization of the walking street include: (1) Clearance in front of the constructions: 0.5m - 3.0m; (2) Pedestrian section: $n \times 0.75\text{m}$; (3) Technical clearance: 0.75m - 1.5m; (4) Pedestrian motorized roadway: $n \times 3.75\text{m}$ (because the walking street is converted from a motorized traffic road and can operate full/part-time)

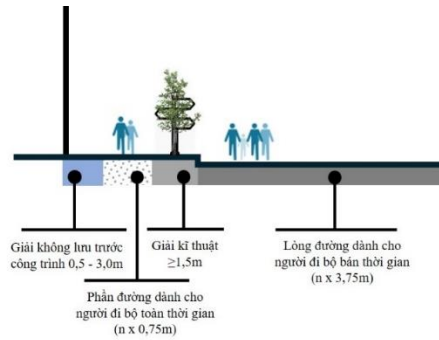


Figure 2.12: Main components on the pedestrian street

Lighting regulations: Street lighting must create the necessary glare for the eyes to recognize small details, at low contrast with high speed, corresponding to the traffic situation. The glare must be uniform on the road surface both vertically and horizontally, limiting the appearance of dark areas, where dangers can be hidden.

Analysis of visual perception: Based on the characteristics of visual perception, it will help to organize the architectural space of the pedestrian street landscape to achieve high efficiency, because the arrangement, planning and design have specific intentions, to orient, guide and create intentional spatial connections. Therefore, it helps pedestrians to be easily attracted to new spaces, full of attraction.

Theory of human activities in the organization of architectural landscape space of walking streets: Walking streets are public spaces, human activities in public spaces are built by Jan Gehl including: Essential activities; Optional activities; Social activities.

Theory of heritage conservation in the organization of architectural landscape space of walking streets: Because walking streets are mostly formed in historic inner-city areas, which contain a rich fund of tangible and intangible heritage. Therefore, the preservation of valuable architectural works not only promotes precious traditional cultural values, creates identity, but also helps revive architectural heritage and increases revenue for local budgets. From there, reinvestment and redevelopment of walking streets are used effectively and sustainably.

2.2. Legal basis for organizing architectural landscape space of the pedestrian street in the historic inner city of Hanoi

2.2.1. System of legal documents of the State

Law on Urban Planning 2009: Article 31 Planning for urban renovation, embellishment, development of new urban areas and new roads in urban areas

Law on the Capital 2024: Chapter III: Construction, development, management and protection of the Capital; Article 21: Development of culture, sports, tourism; Article 30. Development of technical infrastructure, traffic infrastructure

Decision No. 1259/QĐ-TTg approving the adjustment of the Master Plan for construction of the Capital Hanoi to 2030 and vision to 2050: Section VI. Spatial development orientation

Circular 06/2013/TT-BXD guiding on the content of Urban Design: Article 17. The content of the Urban Design project for a street includes the Design of new and old street landscape architecture space.

Decision 1495/QĐ-UBND on approving the Planning of the system of trees, parks, flower gardens and lakes in Hanoi city until 2030, with a vision to 2050

Decision No. 6398/QĐ-UBND approving the Regulation on management of planning and architecture of Hanoi Old Quarter

2.2.2. Related policies, orientations and strategies: Objectives and vision; Regional characteristics; Development orientation; Night-time economic development orientation

2.3. Factors affecting the organization of architectural landscape space of walking streets in historic inner-city areas

2.4. Results of sociological survey on the organization of architectural landscape space of pedestrian streets in the historical inner city

a. Survey purpose: Collect opinions of pedestrians on pedestrian streets in the historical inner city to evaluate the art and quality of the organization of architectural landscape space through the level of user evaluation, in order to grasp the needs and aspirations of pedestrians. From the actual survey information, the thesis will have a more comprehensive and complete view of the architectural landscape space of pedestrian streets in the historical inner city to propose appropriate solutions.

b. Method, scale, sampling and survey area: The above survey results are completely consistent with the current assessment. Therefore, solutions for organizing architectural landscape space of pedestrian streets will focus on solving to create convenience, increase attractiveness and ensure safety for human walking activities.

2.5. Domestic and international lessons learned in organizing architectural landscape space of walking streets

CHAPTER III: SOLUTIONS FOR ORGANIZING LANDSCAPE ARCHITECTURAL SPACE OF WALKING STREETS IN THE HISTORICAL INNER CITY OF HANOI

3.1. Viewpoints, objectives and principles on organizing landscape architectural space of walking streets

3.1.1. Viewpoints

- Development associated with preserving and promoting tangible and intangible cultural values, spatial characteristics, climatic conditions and socio-cultural traditions, and daily life of Hanoians to identify uniqueness and attractiveness.
- Solutions for organizing landscape architectural space of walking streets in harmony between the interests of residents and tourists.
- The solution to organize the architectural landscape space of the walking street is to inherit and promote the effectiveness of the existing walking streets, and to

strengthen the connection with potential streets to form a continuous walking network.

- The solution to organize the architectural landscape space of the walking street focuses on completing and synchronizing the technical infrastructure system to ensure convenience and safety.
- The solution to organize the architectural landscape space of the walking street is associated with digital technology to help visitors look up and quickly access historical and cultural values right on the walking street.

3.1.2. Objectives

- Build convenient, attractive and safe pedestrian streets.
- Increase the efficiency of the landscape environment, quality of life, and sustainable development. Preserve the unique architectural landscape space of each area of Hanoi, reduce environmental pollution, and improve the health of urban residents.
- Create pedestrian streets with diverse activities to enhance community communication and promote local economic development.
- Identify potential pedestrian streets to build a continuous pedestrian street network that is easily connected to the public transport system.

3.1.3. Principles

- *Principle 1:* In accordance with the higher level in planning of the city, comply with legal regulations, standards and norms
- *Principle 2:* Promoting historical and cultural values
- *Principle 3:* In accordance with climatic conditions
- *Principle 4:* Ensuring convenience and safety
- *Principle 5:* Creating attractiveness and identity
- *Principle 6:* Creating conditions for economic development

3.2. Criteria for assessing the architectural and landscape value of pedestrian streets in the historic inner city of Hanoi

- *Criteria group 1:* Attractive
- *Criteria group 2:* Convenient
- *Criteria group 3:* Safe

3.2.1. Developing criteria for evaluating the architectural and landscape value of walking streets in the historic inner city of Hanoi

Purpose: To serve as a basis for assessing the architectural landscape value of pedestrian streets in the historic inner city of Hanoi. From there, classify pedestrian streets with high, medium and low architectural space value to propose appropriate solutions for organizing architectural landscape space. In addition, these criteria also help identify potential streets in the historic inner city in the future.

TT	Nhóm tiêu chí	Tiêu chí đánh giá	Điểm	Tổng điểm	Trọng số
1	Hấp dẫn	Cách thức đánh giá			
		Vị trí	Không cách đến trung tâm thành phố và các điểm tập dân < 500m	10	10
			Không cách đến trung tâm thành phố và các điểm tập dân từ 500 đến dưới 1000m	7	
			Không cách đến trung tâm thành phố và các điểm tập dân > 1000m	1	
		Không gian	TPPB có không gian lớn	5	5
			TPPB có không gian trung bình	3	
			TPPB có không gian nhỏ	1	
		Kiến trúc	CTKT có bản sắc, giá trị VHLS rõ ràng	10	10
			CTKT có bản sắc, giá trị VHLS chưa rõ ràng	7	
			CTKT chưa có bản sắc, không có giá trị VHLS	1	
		Cảnh quan	Bắt mắt và hấp dẫn	5	5
			Tha dạng nhưng chưa hấp dẫn	3	
			Đơn điệu và không hấp dẫn	1	
		Hệ tầng kỹ thuật	Vật liệu hoàn thiện đã được, ứng dụng công nghệ hiện đại	5	5
2	Thoải mái		Vật liệu hoàn thiện đã được, chưa ứng dụng công nghệ hiện đại	3	
			Thuận tiện lưu hoàn thiện, chưa ứng dụng công nghệ hiện đại	1	
		Tôn chỉ đô thị	Có tính thẩm mỹ, đồng bộ và hiện đại	5	5
			Có tính thẩm mỹ, chưa đồng bộ và hiện đại	3	
			Thuận tiện thẩm mỹ, chưa đồng bộ và hiện đại	1	
		Vị trí	Không cách đến bãi đỗ xe, điểm chờ GTCC, nhà ga, bến xe < 500m	10	10
			Không cách đến bãi đỗ xe, điểm chờ GTCC, nhà ga, bến xe từ 500 đến dưới 1000m	7	
			Không cách đến bãi đỗ xe, điểm chờ GTCC, nhà ga, bến xe > 1000m	1	
		Hệ tầng kỹ thuật	Đầy đủ và có độ bền vững > 200m	10	10
			Đầy đủ, và có độ bền vững > 200m	7	
			Chưa đầy đủ và không có độ bền vững	1	
		Tôn chỉ đô thị	Tích hợp đa chức năng, hiện đại và đồng bộ	10	10
			Tích hợp đa chức năng, chưa hiện đại và đồng bộ	7	
			Không tích hợp đa chức năng, chưa hiện đại và đồng bộ	1	
3	An toàn	Hệ tầng kỹ thuật	Vật liệu hoàn thiện đáp ứng tiêu chuẩn kỹ thuật	10	10
			Vật liệu hoàn thiện đáp ứng tiêu chuẩn kỹ thuật ở mức cơ bản	7	
			Vật liệu hoàn thiện chưa đáp ứng tiêu chuẩn kỹ thuật	1	
		Tôn chỉ đô thị	Thiết kế đồng bộ, đồng đều tiêu chuẩn kỹ thuật (Phòng cháy chữa cháy; Cấp điện chiếu sáng; Vệ sinh môi trường...)	10	10
			Thiết kế tương đối đồng bộ, chưa đồng đều tiêu chuẩn kỹ thuật (Phòng cháy chữa cháy; Cấp điện chiếu sáng; Vệ sinh môi trường...)	7	
			Thiết kế không đồng bộ, không đồng đều tiêu chuẩn kỹ thuật (Phòng cháy chữa cháy; Cấp điện chiếu sáng; Vệ sinh môi trường...)	1	
		Không gian	Đảm bảo không gian đầy đủ cho các hoạt động đi bộ	10	10
			Đảm bảo không gian tương đối cho các hoạt động đi bộ	7	
			Không đảm bảo không gian cơ bản cho các hoạt động đi bộ	1	
		Tổng		100	100%

Table 3.1: Criteria for evaluating the architectural landscape value of walking streets

3.2.2. Proposing potential walking streets in the historic inner city of Hanoi

Method of evaluating potential walking streets:

The evaluation method is based on the criteria (Section 3.2.1) to evaluate the architectural landscape space value of streets in the historic inner city of Hanoi, from which to select streets with potential and relatively potential architectural landscape space value corresponding to the proposed scale to orient the development into walking streets in the future (Appendix 8).

The streets selected for scoring to evaluate potential streets are based on their central location, ability to connect with existing walking streets; have large spaces; multi-function; architectural works with clear cultural and historical identity and values; synchronous and complete technical infrastructure and urban utilities systems...

Take Milestone 0 as the central point for walking streets to aim towards. The potential level of walking streets is based on the total score and divided into 3 levels as follows:

- From 80 points and above: Potential walking streets
- From 70 - under 80 points: Relatively potential walking streets
- Under 70 points: Less potential walking streets

Based on the criteria (Section 3.2.1), the thesis has evaluated the potential streets in the historic inner city area as follows:



Figure 3.1: Network of potential streets in the historic inner of city area

3.3. Proposing an overall model of pedestrian streets for the historical inner city

The overall model of pedestrian streets connecting with the public transport system, subway system, green water system... forms a complete block to help pedestrians move more conveniently and safely. In particular, the central core area with many architectural heritage works and diverse commercial and service activities, developed economic activities, high population density creates attractiveness, excitement and attracts pedestrians.

The proposed overall model of pedestrian streets is divided into three main areas: Central core area; Buffer area; Access area

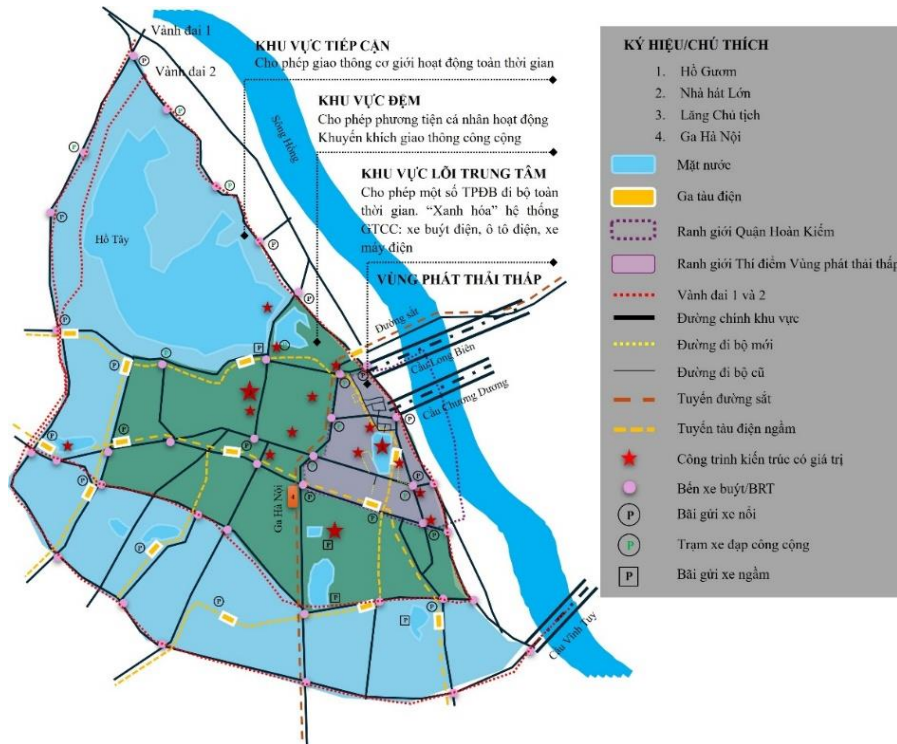


Figure 3.2: Proposed overall model of walking streets in historic inner-city areas

3.4. Proposing solutions for the organization of architectural landscape space of pedestrian streets in the historical inner city

3.4.1. Overall solutions

a. Proposing the network of walking streets in the historical inner city

The overall solution for the network of walking streets in the historical inner city of Hanoi aims to build a continuous, convenient, safe and attractive walking system for pedestrians.

The metro lines and the locations of metro stations are inherited from the Master Plan of the Capital to 2030 and vision to 2050, so the proposed locations of parking lots, public bicycle stations, bus stops, etc. will help complete the transportation network in the historical inner city of Hanoi, and aim to support convenient and safe connections for people's walking activities. The radius at public transport intersections always ensures optimal walking distance for pedestrians. Parking lots will be arranged underground in parks, flower gardens, or under public works to exploit space effectively.

The "Central Core" area is the connection between the old walking streets and the potential walking streets to form a network of walking streets, making walking activities more attractive, more convenient and always safe. The streets are built for people instead of motor vehicles, human activities become more vibrant and bustling instead of the sound of car horns... Pedestrians can easily stop, look, chat and participate in activities on the streets, promote community communication, promote local economic development, improve people's health and improve the quality of the living environment.

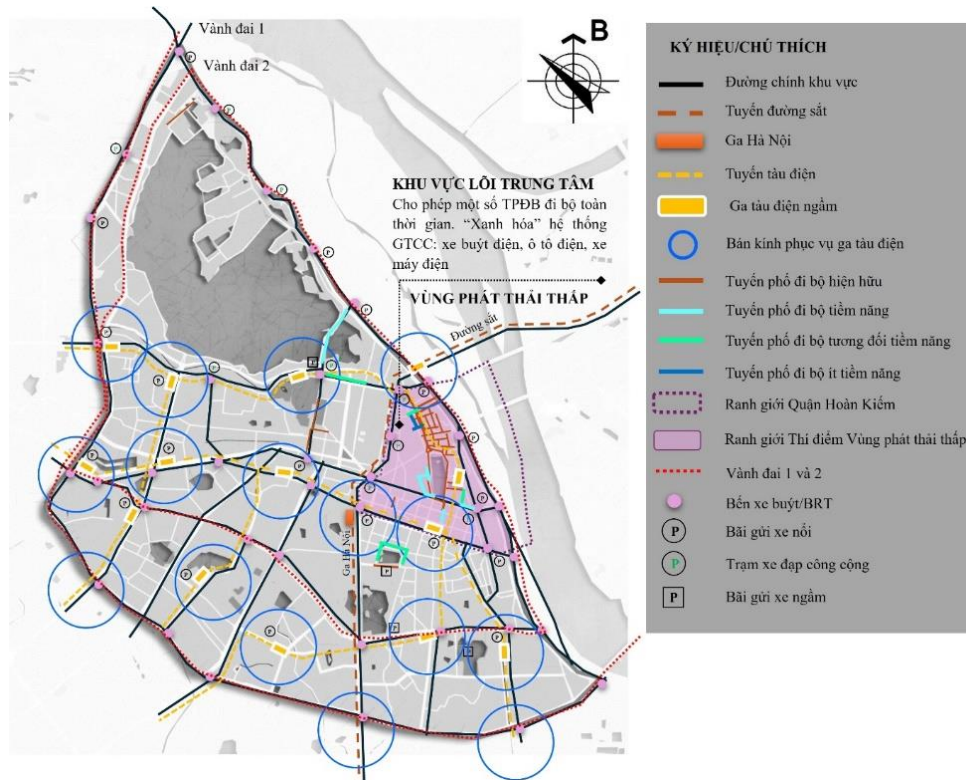


Figure 3.3: Overall solution for the network of walking streets in the historic inner city

From identifying low-emission areas, conducting pilot implementation, periodic assessment and regular reporting to promptly grasp and adjust to the actual situation, bringing the highest benefits to people and tourists. Thus, the overall network of pedestrian streets in the historic inner city will ensure that traffic in each area is always smooth and convenient, with a variety of means of transport for pedestrians to choose from and change to suit their travel schedules; ensuring safety to promote walking culture in the community. The network of pedestrian streets will be the key to building a Green - Cultural - Civilized and Modern Capital.

b. Proposing the characteristics of the pedestrian street's network in the historical inner city

In the overall solution, the thesis proposes specific characteristics for each pedestrian street to build a diverse and rich pedestrian street network in the historical inner city with many attractive activities. People are attracted by these activities, which will contribute to shaping and determining the characteristics of the pedestrian street. This is a reciprocal and two-way relationship.

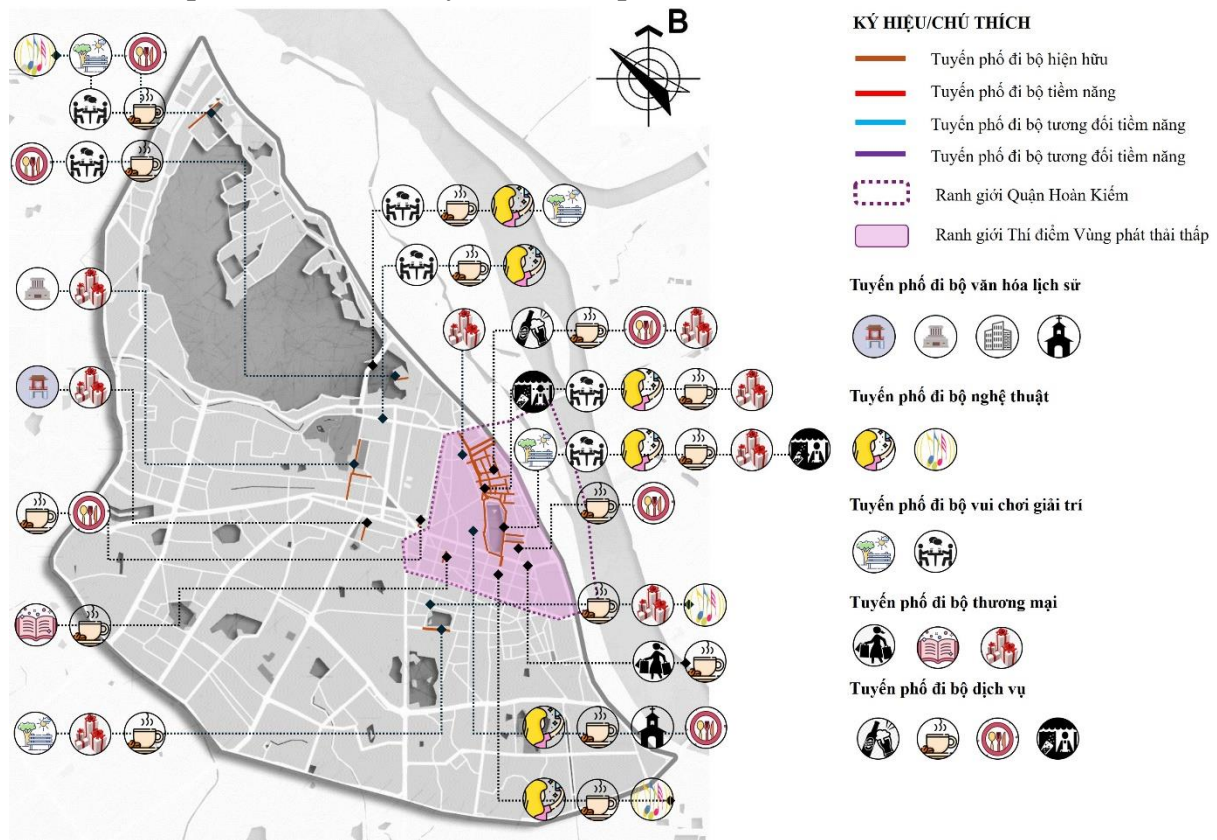


Figure 3.4: Proposed overall characteristics of the pedestrian street network in the historic inner city

Therefore, to successfully organize a pedestrian street, in addition to factors of architectural and landscape space, it is necessary to pay attention to human activities on the pedestrian street, which can be purely commercial, service, cultural and historical, artistic, entertainment... or a combination of multiple characteristics.

3.4.2. Detailed solutions

a. Solutions on architectural works

* Shape and volume

The shape and volume of architectural works contribute to creating the architectural landscape space values of the walking street. The harmonious proportion with people and the surrounding landscape will increase the attractiveness to pedestrians.

For walking streets with average and low architectural landscape space values, it is necessary to encourage the preservation and renovation of existing works of 2 floors or less. Works that are allowed to be renovated or newly built must be based on architectural restoration, or according to typical architectural space and landscape. Promote and replicate the architectural style of houses with special value in the area to create rows of works with unified styles to increase the architectural landscape space value of the street. (Section 2.1.3)

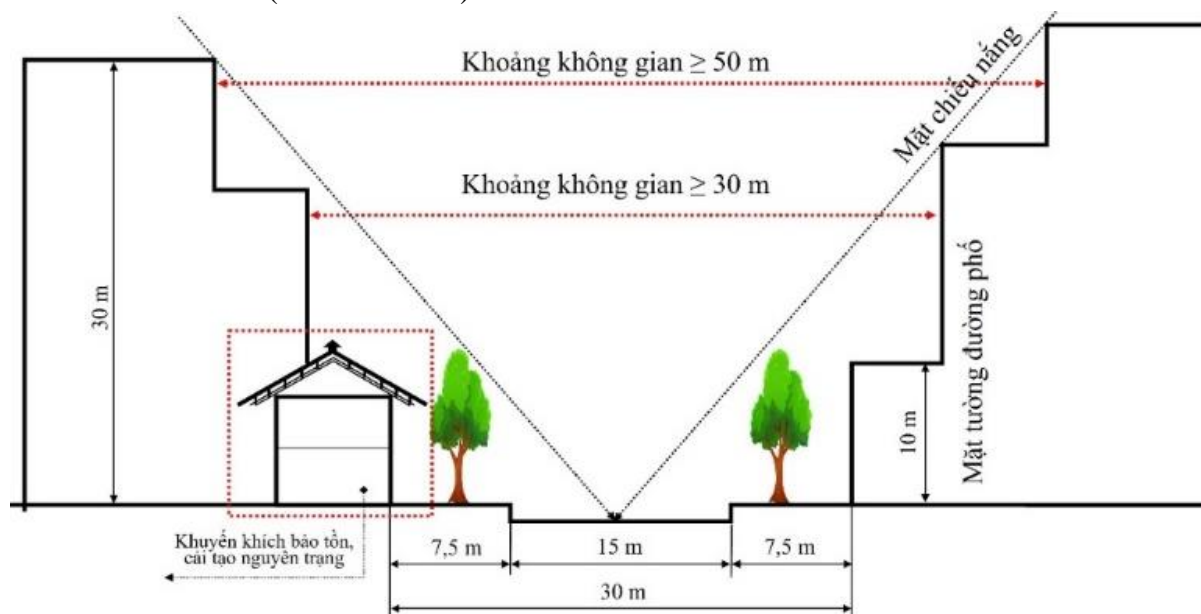


Figure 3.5: Illustration of the volume solution of the building on the walking street

If there is a new construction, it is necessary to exploit the typical features to promote the style, study the overall façade of the street block with typical floor height, the first floor height of the newly built buildings is the same height as the adjacent buildings. The setbacks help the walking street have space to ensure natural lighting and ventilation, increase the attractiveness and create a fresh and comfortable walking environment.

*** Building façade**

The quality of the facade of the building on both sides of the walking street is an extremely important factor for the quality of an area. A beautiful, impressive facade with many interesting details will encourage pedestrians to communicate, visit, shop and linger longer on the walking streets, increasing the opportunity to see, admire, stop, stand next to, touch, meet, and chat between people and people and with the landscape. (Section 2.1)

For pedestrian streets with average or low architectural landscape space value, in addition to preserving and promoting architectural heritage values, it is necessary to enhance the renovation of high-quality, impressive and lively facades to attract and engage pedestrians in activities on the pedestrian street.



Figure 3.6: Illustration of the solution for the facade of the building on the walking street

Next, it is necessary to create a large enough space in front of the building so that pedestrians can feel and create opportunities to promote connection with the walking street. For walking streets with a road section that is not wide enough and allows full-time walking, the sidewalk (including the front air traffic section; Technical infrastructure section; or walking street section - Section 2.1.2) should be arranged on one side, with the same level as the roadway to ensure the experience space. Some other routes that allow part-time walking should design the sidewalk and roadway at an offset level to separate pedestrian traffic and motor vehicles to ensure pedestrian safety.

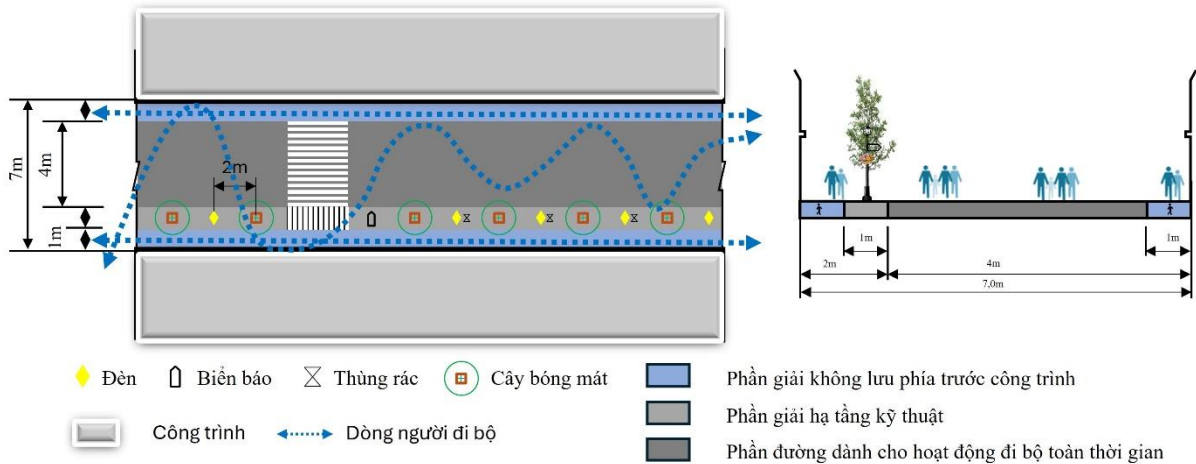


Figure 3.7: Illustration of the plan and cross-section of the full-time pedestrian street

Using artistic lighting and light from the building facade to create a safe, always vibrant walking environment, increasing friendliness and safety at all times.

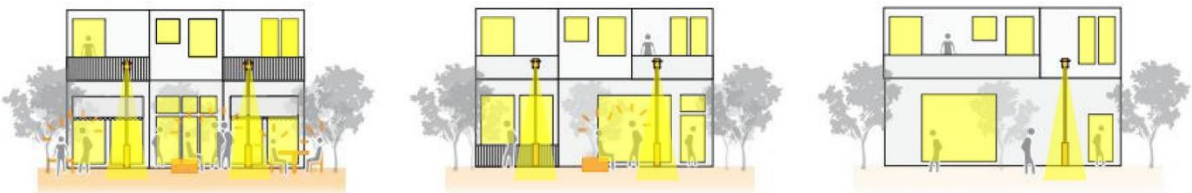


Figure 3.8: Illustration of lighting from buildings and street lights on pedestrian streets

For pedestrian streets with suitable and wide road sections, it is necessary to preserve the open spaces in front of and between buildings to restore the form and

structure of the street space. Increase the arrangement of quality stops, open spaces to promote community communication, commercial and service activities, and promote the image of the pedestrian street. Here, arrange the main components (Section 2.1.2) on the street, combine public transport stops and parking at the convenience and ease of movement for pedestrians.

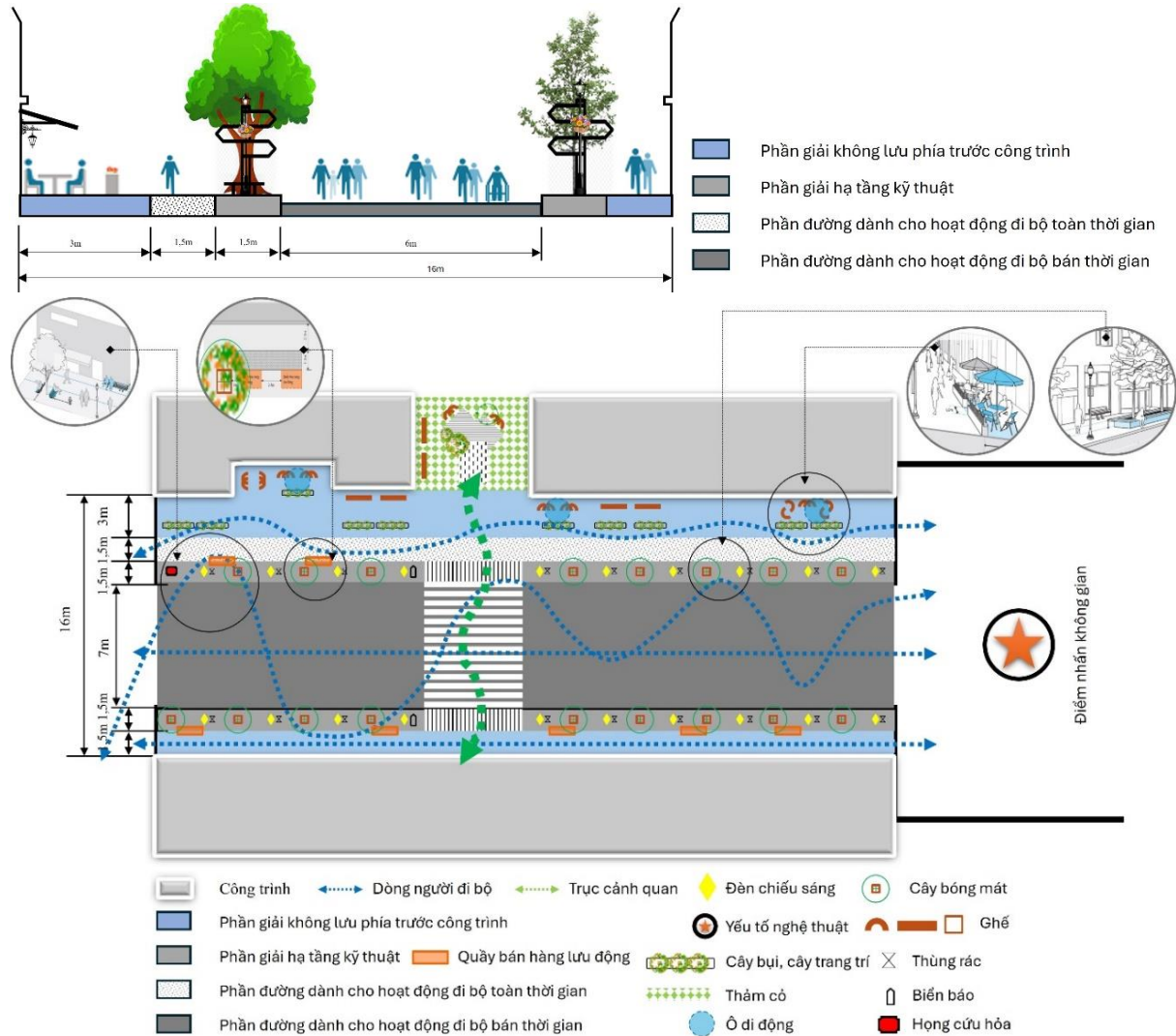


Figure 3.9: Illustration of the floor plan and cross-section of the part-time pedestrian street

* *Architectural colors and materials:* Environmentally friendly colors and materials, in harmony with the surrounding landscape, indigenous and traditional, bring a sense of familiarity and closeness to everyone.

b. Green trees and water surface

* *Green trees*

Choose trees suitable for tropical climate conditions, grow well without too much pruning, wide canopy, colorful flowers and leaves, creating shade and beautiful scenery for the entire pedestrian street. The tree has a straight trunk, tough wood to prevent brittleness, compact canopy, tree trunk without thorns, high branching. The leaves have

wide blades to enhance photosynthesis, increase coverage density for pedestrians. Fruits (or no fruit) do not attract flies, affecting environmental sanitation. The tree's lifespan must be long (50 years or more). The tree has beautiful flowers, with seasonal characteristics to create an attractive landscape, attracting pedestrians.



Figure 3.11: Suggested trees suitable for tropical climate conditions

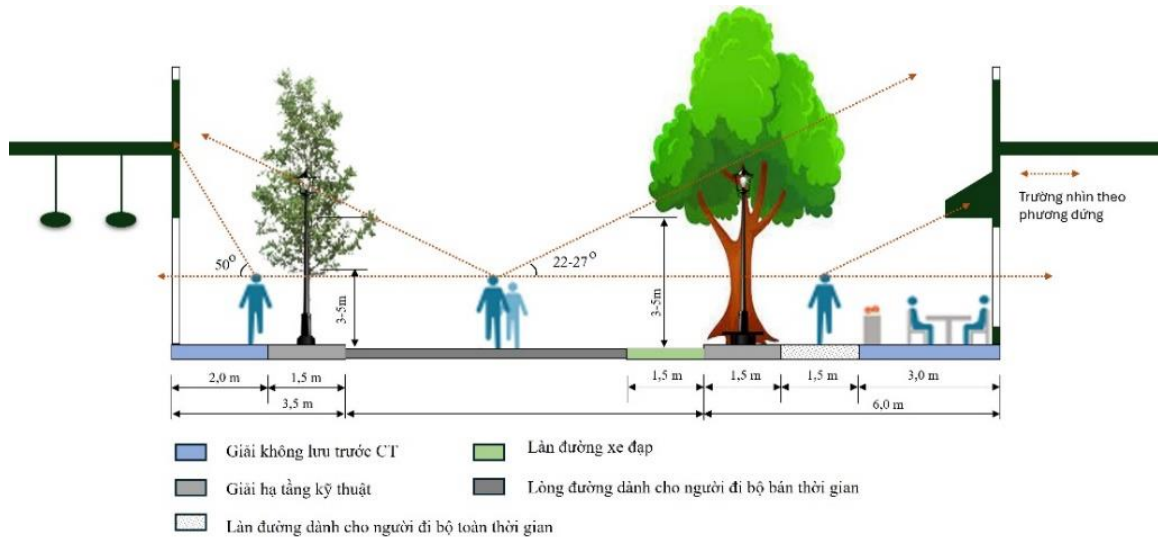


Figure 3.12: Illustration of cross-section of trees planted on walking streets

To ensure that trees do not obscure the view of architectural works on walking streets, it is necessary to note that the canopy height is from 3m to 5m from the road surface. The basis for arranging trees appropriately. For walking streets with high architectural landscape space value,

The distance between trees is determined depending on the characteristics of the trees or by each location or by the hierarchy and nature of the walking street. Plant trees in the area in front of the wall between two houses. Trees are planted 5-8m from the street corner from the nearest intersection, without affecting traffic visibility. Trees are planted 2-3m from fire hydrants on the street; 1-2m from lighting poles and manholes. Trees are planted 1-2m from the network of power lines and technical pipes (water supply and drainage, underground cables).

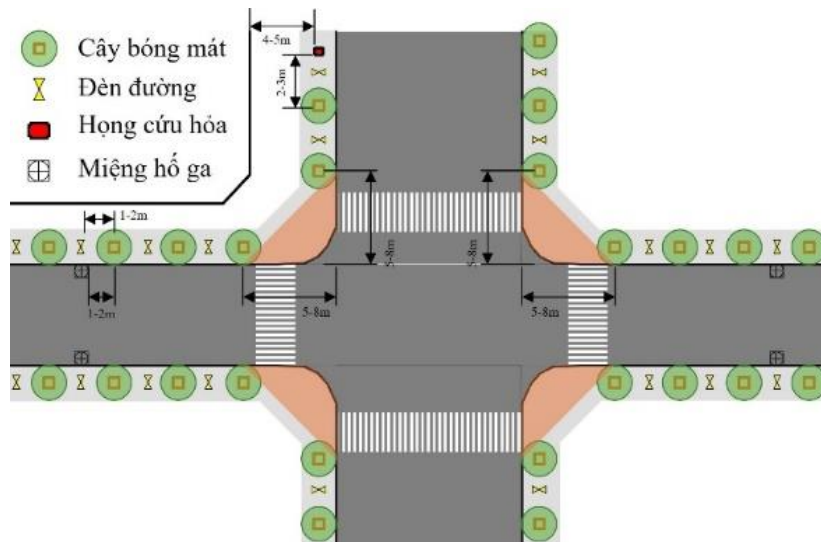


Figure 3.13: Illustration of tree spacing on walking streets

* **Water surface:** Using dynamic and static water surfaces to enhance the experience through the senses of pedestrians from hearing the sound of flowing water, touching the water surface, drinking from fresh public water fountains... thereby increasing the connection between people and spaces on the walking street.

c. Infrastructure system

* **Public transport stops integrating smart technology:** Building a complete public transport system network including buses, BRT, elevated trains, subways, electric cars, community bicycles, cyclos, etc to meet the needs of all users. Special attention should be paid to designing for vulnerable groups such as the elderly, children and people with disabilities.

* **Solutions for power supply and lighting systems:** Should use lamps with suitable heights, light and delicate designs to harmonize with architectural works of heritage value, combine solar street lights on some streets to save electricity costs, protect the environment, reduce the risk of electrical short circuits, fires and other accidents, and ensure safety for pedestrians.

* **Solutions for water supply and drainage systems:** Prioritize the construction of rainwater drainage axes, anti-flood pumping stations connected to regulating lakes... increase open spaces, reduce concreting on sidewalks, use interwoven materials combined with flower beds and grass carpets.

* *Solutions for environmental sanitation:* Improve the quality and maintain the operation of public toilets that meet standards for friendly environmental sanitation and urban landscape. Combine exploitation on phone applications, integrate search information, location and distance of public toilets for residents and visitors when needed.

* *Solutions for communication systems:* Wi-fi waves work best in environments without obstacles, so you should choose a location to place the device with a large space. On average, the wi-fi transmission range of a router ranges from about 30-50m from the wi-

fi transmitter (modem) location, from which the locations of information signal transmitters, wi-fi, phone stations, battery chargers, etc. can be arranged appropriately on the walking street to serve residents and tourists.

Depending on the walking street, choose a suitable advertising sign solution. Walking streets with high architectural landscape space value should choose to use traditional advertising signs or electronic advertising signs to convey information to customers. However, it is necessary to ensure that the size of the sign does not obscure architectural elements (corners, lintels, wall pediments, handrails, etc.). The location is mounted on the wall above the first floor door, with a ratio suitable to the size of the house facade, not overwhelming the building's facade. However, for walking streets with average or low landscape architectural space value, they need to be evaluated and specifically designed, from the form and size of letters, colors, and materials to both create identity and create attractiveness for the street.



Figure 3.23: Illustration of billboards on the walking street

d. Urban furnitures

* *Urban utility solutions:* Designs of urban utility equipment need to pay attention to proportions, colors and materials to create a harmonious and uniform whole. Flexible arrangement according to each location on the walking street to exploit space effectively, creating quality resting points.

* *Fire prevention:* Fire hydrants installed on the sidewalk, next to the traffic road must ensure the minimum distance between the hydrant and the wall of the houses is not less than 5m, from the edge of the sidewalk is not more than 2.5m. The large mouth of the hydrant must face the roadway, the distance from the ground to the top of the hydrant is 700m.

* *Materials:* It is necessary to choose a type of brick that is sturdy enough, has standard thickness and size, has toughness to ensure no cracking, has good friction, is anti-slip, anti-moss and has high durability.

3.5. Pilot study on the organization of architectural landscape space of Nha Tho and Tran Binh Trong walking streets

3.5.1. Organization of architectural landscape space of Nha Tho walking street

* *Design idea:* The street is divided into 4 segments including the first segment is a group of high-end shops or high-quality service restaurants; the second segment is a group of traditional commercial service shops such as iced tea, lemon tea, etc.; the third

segment is the central area, a place for community exchange, entertainment, etc.; the last segment is the square, where people can take pictures, visit, etc.

* *Solution for organizing architectural landscape space of Nha Tho walking street:* It is necessary to continue to preserve and maintain the current architectural form and stature of the street, but at some key works, the height of the works can be increased within the allowable limit to create rhythm. In some key projects, the building height is still within the allowable limit, and it is possible to consider raising the floor to increase the efficiency of exploitation and use. The selected materials have neutral colors, suitable for the color of the building facade to create a harmonious whole.



Figure 3.39: Building's facade solution; Figure 3.39: Water surface green tree solution

3.5.2. Pilot study on organizing architectural landscape space of Tran Binh Trong walking street

* *Design idea of Tran Binh Trong street:* The development orientation of Tran Binh Trong street is part of the overall vision of Thien Quang lake music neighborhood (including Tran Binh Trong; Nguyen Du; Quang Trung; Tran Nhan Tong). Where people have more opportunities to experience and explore the formation and development process of traditional folk music to modern music corresponding to 4 streets. Tran Binh Trong street recreates the early period, divided into 5 rich activity areas.

* *Solution for organizing architectural landscape space of Tran Binh Trong street:* Combination of clusters of buildings, facade architectural blocks to ensure rhythm and vertical or horizontal division of the street. This contributes to creating an attractive facade of the building, unified in architectural form. Complete urban facilities on the streets to create uniformity and unity, design squares to create spaces for performances, music exchanges and art performances on cultural events. Apply lighting art to express design ideas and create a safe walking environment for pedestrians both day and night. Design artistic elements in squares to both highlight the space and convey cultural and musical messages to residents and visitors.



Figure 3.52: Illustration of green tree solutions

3.6. Discussion of the results achieved by the thesis

3.6.1. Discussion of the systematization of the theory of organizing architectural landscape space of pedestrian streets:

The thesis has achieved significant achievements in systematizing and deepening the theory of organizing architectural landscape space of pedestrian streets in urban planning and design, thereby expanding understanding and providing a solid foundation for this field.

Through the construction of solid scientific foundations, the thesis has established a new and effective approach to organizing architectural landscape space of pedestrian streets to ensure attractiveness, convenience and safety towards building a Green - Cultural - Civilized and Modern Capital.

However, the above theoretical basis can be changed according to the nature of each street and the purpose of each area to have appropriate design solutions.

3.6.2. Discussion on criteria for assessing the value of architectural landscape space of walking streets

The criteria for assessing the value of architectural landscape space are criteria built to identify outstanding values of tangible and intangible, using the scale method to quantify and determine the value of architectural landscape space of walking streets. The criteria are built based on the results of sociological surveys, theoretical foundations, practical and legal foundations. This method not only ensures that the evaluation criteria are accurate and comprehensive but also ensures legality, in accordance with international standards. However, these criteria are inevitably affected by the sensory factors of the evaluator, so there are certain limitations.

3.6.3. Discussion on the model and solution for organizing architectural landscape space of walking streets

The model and solution for organizing architectural landscape space of walking streets in Hanoi city poses a complex but extremely necessary and urgent problem. Determining the overall model of walking streets in the historic inner city area divided into 3 areas helps preserve the values of architectural landscape space, creating a unique and attractive space. Gradually establishing physical space to move towards restoration and sustainable exploitation. However, restricting the circulation of motor vehicles in a relatively large area will affect the daily life and travel of people.

3.6.4. Discussion on the possibility of future research development

Research on the organization of walking street landscape is very necessary and needs to be implemented soon, to create identity, harmony with natural, socio-cultural and human factors, contributing to building a Green - Cultural - Civilized and Modern Capital. Along with determining low emission zones according to the Capital Law 2024, it further affirms the urgency and role of the walking street network in the city's transportation system and people's lives. However, current practical conditions do not really meet development requirements, so it is necessary to conduct extensive research soon to contribute to concretization, supplement theory, in-depth reference documents and help advise the government before practical implementation.

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusion: (1) Five viewpoints; (2) Four objectives; (3) Six principles
Synthesizing the research, the thesis gives the following results:

- Identifying the characteristics and problems in the organization of architectural landscape space of walking streets in the historic inner city of Hanoi.
- Building a theoretical basis for the organization of architectural landscape space of walking streets in the conditions of Vietnam.
- Building criteria for evaluating the value of architectural landscape space of walking streets and potential streets.
- Researching and proposing a comprehensive model of walking streets in the historic inner city of Hanoi.
- Researching solutions for organizing architectural landscape space of walking streets and applying research results to pilot the organization of architectural landscape space of walking streets.

2. Recommendations

* *Government, Government agencies:* Review and complete the system of legal documents, regulations, and standards in organizing architectural landscape spaces of pedestrian streets in urban areas of Vietnam and put them into legal basis.

Consider integrating specific urban design into the policy framework to address all aspects of architectural landscape spaces, to ensure that pedestrian streets will be a place, a multifunctional place for everyone, ensuring convenience, identity, attractiveness and safety.

**Hanoi City, City-level management agencies:* Strengthen the renovation, embellishment and organization of architectural landscape spaces of pedestrian streets in the area. The government needs to mobilize various resources to organize architectural landscape spaces of pedestrian streets to achieve high economic, cultural and social efficiency. The above recommendations are not only aimed at improving the theory but also have a great impact on management practices and will be an important contribution to improving the quality of landscape architectural space management of the walking street in the historic inner city of Hanoi, contributing to building the Capital towards a Green - Civilized - Modern city.

LIST OF SCIENTIFIC RESEARCH PUBLISHING

Scientific articles:

1. Luong Tu Quyen, Pham Thi Ngoc Lien (2022), Organization of the space of the central pedestrian street in Hanoi, *Architecture Magazine*, **ISSN: 0866-8617**.
2. Luong Tu Quyen, Pham Thi Ngoc Lien (2022), Organization of the architectural landscape space of the Hanoi pedestrian street suitable for tropical climate conditions, *Construction Magazine - Ministry of Construction*, **ISSN: 2734-9888**.
3. Pham Thi Ngoc Lien (2022), Walking Streets - Smart Solutions for Modern Cities, *Urban Planning Journal*, **ISSN: 1859-3658**

Scientific Seminars:

1. Pham Thi Ngoc Lien (2023), Sidewalk Economics towards Sustainable Goals, *Scientific Seminar "Localizing Sustainable Development Goals"*, **ISBN: 9978-604-979-342-4**
2. Pham Thi Ngoc Lien (2024), Walking Streets - Green Transport towards Sustainable Cities, *Scientific Seminar "Integrated Planning and the Need for Innovation in Human Resource Training"*, **ISBN: 978-604-82-7028-5**
3. Pham Thi Ngoc Lien (2024), *Orientation to organize the landscape architectural space of Hanoi pedestrian streets towards the goals of sustainable development*. Advances in planning, architecture and construction for sustainable development – The 7th International Conference Series on Geotechnics, Civil Engineering and Structures CIGOS 2024, HCMC, VIETNAM, APR 4-5, 2024, Lecture Notes in Civil Engineering, vol 482, Springer, Singapore, 01 June 2024, pp 1152-1162, https://doi.org/10.1007/978-981-97-1972-3_128, **ISSN: 2366-2557** (Scopus index).
4. Pham Thi Ngoc Lien (2023), *Real estate enhancement on pedestrian street at Hanoi*, XII International Scientific and Practical Forum "Environmentally Sustainable Cities and Settlements: Problems and Solutions", **E3S Web Conf eISSN: 2267-1242**, Volume 403, 2023 <https://doi.org/10.1051/e3sconf/202340301003> (Scopus index).