Sveriges lantbruksuniversitet
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A Stepping Stone of HÀ-NÔi.

-a tri valent design proposal of urban resilient development of Van Chuong

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Abstract

Hanoi, is the capital of the Socialist republic of Vietnam, a developing country in Southeast Asia. Located in the Red river delta, the topography make the city threatened by flooding during the yearly monsoon. Vietnam is close to one of the five typhoon centers in the world and a forecast of climate change in this region, is intensified monsoon precipitation, storms and rising temperatures.

After the implementation of the Doi Moi policy in 1986, a market economy was adopted in Vietnam. This enabled people to own land and use it freely. It also invited foreign countries and enterprises to invest in building and infrastructure projects, which made it possible to break the post-war economic isolation. Hanoi started to grow. The economic growth improved the socio-economical standard to people, boosting the urbanization. During these almost 30 years the structure of the city has dramatically changed and become a densified and sprawling city. This development has put a great pressure on infrastructure, water management and air quality. Further it has resulted in an apparent loss of green-, blue- and public space. In the context of increasing threat of climate change hazards, loss of bio diversity, increased risk of flooding and social inequalities make fostering urban resilience in Hanoi to an urgent matter.

In order to gain a greater understanding of how to foster resilient urban development by green and blue measures and create public places that correspond to the local context, a design proposal of the development of Van Chuong in Dong Da district in central Hanoi was done. Green-, blue and public structures of Hanoi was analysed by using the Tri valent design theory according to Ian Thomson, as a framework.

The questions “What values do green and blue structures add residents of Van Chuong?”, “How can green- and blue structures in Van Chuong be designed in order to foster urban resilience? and “Can green, blue- and public space in Van Chuong be preserved by design? are discussed. The design-process and the choice of methodology are reflected as well, and last research questions for future interests are introduced.

Proposal Linh Quang Lake area.

Sammanfattning

Hanoi, är huvudstaden i den socialistiska republiken Vietnam, ett utvecklingsland i Sydostasien. Stadens topografiska läge i Röda floden deltat, gör att hotet från de årliga översvämningarna är stort. Vietnam ligger nära ett av världens fem tyfoncentrum och i en region där klimatförändringarna förutspås innebära en intensifierad nederbörd, kraftigare stormar och stigande temperaturer.

1986 infördes Doi Moi, en policy som förespråkade ett skifte från planstyrd ekonomi till en marknadsorienterad. Doi Moi innebar en möjlighet för människors att äga och använda land fritt. Policyn medförde även att andra länder och privata företag kunde investera i stadsbyggnadsprojekt, vilket var en möjlighet för Vietnam att häva den ekonomiska isolering som efterkrigstiden hade medfört. Hanoi började växa. Den stärkta ekonomin resulterade i förbättrade levnadsvillkor för den vietnamesiska befolkningen överlag, vilket ytterligare stimulerade urbaniseringen. Sedan dess har den byggda staden brett ut sig mer än själva befolkningsökningen. Denna ”urban sprawling” sker på bekostnad av natur och jordbruksmark, samtidigt som trycket på infrastruktur, vattenhantering och luftkvalitet ökar. Ur ett landskapsekologiskt perspektiv har det visat sig att Hanois grön- och blåytor, har minskat i total yta och ökat i antal, en indikation på en fragmentering av landskapet. Detta gäller i Hanoi stad som helhet, och stadsdelen Van Chuong i Dong Da distriktet, i centrala Hanoi, i synnerhet.

Fragmentering av landskap har visat sig vara ett av de största hoten mot biologisk mångfald. Vidare har det visat sig att heterogena landskap har bättre buffrande kapacitet och motståndskraft mot störningar, än homogena. Argumentationen att öka motståndskraften mot störningar, såsom tilltagande nederbörd, stormar och stigande temperaturer, förstärker behovet av att främja en resilient stadsutveckling. I detta fall är stadsdelen Van Chuong utvald som studieplats för att utvecklas en ekologisk och resilient klivsten i Hanoi. I uppsatsen presenteras olika åtgärder för en resilient stadsbyggnad. Ett förslag har gjorts på hur grön- och blåstrukturer i Van Chuong skulle kunna utvecklas för att utveckla ekosystemtjänster som främjar resiliens. Fokus har varit att förbättra förutsättningarna för biologisk mångfald och hållbar dagvattenhantering. Forskning kring resiliens hävdar att ekosystemtjänster också påverkas av normer, traditioner och sociala värderingar i ett samhälle. Eftersom resiliens handlar om att rusta ett samhälle för eventuella naturkatastrofer, krävs enligt forskning, att människor förstår kopplingen mellan människa och natur. Att skapa gröna-, blå- och offentliga rum som stämmer överens med de värderingar och önskemål som finns i Van Chuong, var ett försök att förstärka denna koppling.

Syftet med denna uppsats var att få en ökad förståelse för resilient stadsbyggnad med hjälp av gröna och blå struckturer. Syftet var också att utveckla offentliga platser som integrerar gröna och blå värden och överensstämmer med den lokala kontexten.

Ian Thomsons teori om ”The Tri valent design”, har använts som ett ramverk för analysen. Delarna ”ecology, community och delight” utgjorde var och en vägledning för val av analysmetod. Landskapsekologiska principer användes för att förstå den gröna och blå strukturen. Stadsbyggnadsmässiga ideal enligt Jan Gehl samt fem intervjuer med lokalbefolkningen i Van Chuong användes som verktyg för att utveckla en närmiljö som människor tycker om och kan relatera till. Avslutningsvis användes Kevin Lynch analysmetod, för att skapa en stadsdel med god visuell kvalitet. Som inspiration till gestaltningen användes principer från Daoism och Shan-shiu kulturen, som är väl förankrade i den vietnamesiska kulturen.

En diskussion kring forskningsfrågorna “vilka mervärden ger grön och blåstrukturer invånarna i Van Chuong?”, “hur kan grön- och blå strukturer i Van Chuong utformas för att främja urban resiliens? och “kan gröna, blå och offentliga rum i Van Chuong skyddas med hjälp av gestaltning? har förts, liksom reflektioner över designprocessen och val av analysmetoder. Genom processen har nya frågor för eventuella framtida arbeten väckts som introduceras i diskussionen.

Table of content

Preface

From the Swedish International Development Cooperation Agency, Sida, I got the opportunity to study the stunning Southeast Asian city Hanoi. During my visit, I experienced Hanoi as a metropolitan city, considering the traffic, modern shopping centers, housing complexes and skyscrapers creating a magnificent skyline. On the other hand the crowded streets of Hanoi, was inhabited by citizens still living close to animals, fish, crops and carefully produced handicrafts. Food markets, boiling mobile kitchens and small bonfires on the sidewalks were mixed by hens, dogs and motorbikes. Public places were visited by people doing sunrise activities like dancing, walking and tai-chi. Family restaurants, stores and workshops along the streets, many times the same as the owners´ house, all in a human scale, close to people, reflected a sense of coherence, giving a feeling of the city actually being an enormous village. Identity of the city is strong and visitors like me are strolling around enjoying this fantastic disorder. In this crowded environment the open spaces, often close to a lake, offered a precious physical and mental break. After several discussions with people, I have got their picture of the city and realized that the life of the street also is a threat to public space, which further is a threat to the city life. My understanding of the process of decreasing public space, which most of the times are related to water and vegetation, subsequently made me certain about the relevance of this project.

During my studies on the Landscape Architecture program, primarily three courses have made impression on me. The first was Ecological Botany which with guidance of inspiring teachers taught me how to read natural habitat, which actually made me enjoy nature in a new way. The second was Ecology, focusing on the importance of preserving natural land for species survival. The third course was urban history and future - structure and planning, which also was an eye opener and emphasized the relationship between the structure of streets, blocks, residential courtyards, public space and social relations. My interest about green-, blue- and public issues, much awaken from these courses and the opportunity I got from Sida, was the reason why I packed my bag, brought my family and headed to Vietnam for two months.

Definitions

Attached green space, greenery at schools, hospitals, industries and enterprises that does not add recreational values, but still ecological and resilient values and is therefore regarded important.

Ecosystem services, functions and services that different ecosystem provide humans with.

Green infrastructure, parks, forests, wetlands, greenbelts, floodways, green streets, green roofs, green walls, green open spaces and permeable surfaces, that produce ecosystem services like water filtration, flood control, regulated temperatures, cleaner air, recreational values and cultural heritage.

Gray infrastructure, impermeable pavements like asphalt, and traditional ways of collecting and treating storm water by water wells, concrete pipes and water treatment plants.

Habitat, favorable living environment to living organisms

Matrix, unfavorable living environments to living organisms

Public space, open spaces that are accessible to anyone without paying entrance fees. Some places are officially public, but are actually not accessible due norms and unofficially occupied land. Whether the place is public is in that cases valued dependent of the personal experience about how strong these norms are.

Stepping Stone, a network of habitat patches enhancing dispersal of species, mitigating the effect of fragmentation of natural land. A Stepping stone in this thesis has also symbolic definition connecting spaces and reinforce urban life.

Urbanization, spatial urban expansion of the built structure, resulting in decrease of vegetation cover, water surface, public space and overloaded infrastructure.

Urban resilience, a city that is able to adapt to, recover from and limiting the negative effects of disasters and climate impacts now and in the future.

Urban sprawl, spatial urban expansion, that is bigger than the population growth, resulting in growing problems of traffic congestion, pollution, social disaggregation and loss of natural land (UN-Habitat).

Limitations

In this thesis the focus of green infrastructure has been on its spatial arrangement, in order to promote biodiversity, ecosystem services and a resilient urban development. Some focus has also been on selection of native plant material. Limitations have been on closer studies of plant material, in terms of appropriate sizes, root systems and tolerance of air pollution. The focus of the blue structures have been on the large scale arrangement of rivers, canals and lakes within and close to the city. I have mentioned the drainage and sewer system, which are degraded and in a need of reconstruction due to the urban growth. This touches the aim of this thesis, but limitations have been made because it is too extensive to cover within this thesis. Another limitation is concerning the soil texture and character, necessary facts in reality in order to determine the capacity of the ground to infiltrate storm water. Also, slope of the terrain, underground construction of infiltration area and groundwater level are examples of necessary information, which are excluded in this thesis. Language and time has been other limitations effecting the outcome of this thesis. For example an internet site about Vietnamese botany and the Hanoi Greenery Plan was available, but in Vietnamese only. Citations from Hanoi Greenery Plan, is therefore done through a secondary source. Time and language also became a limit for comprehensive understanding of Feng-shui principles in the local context.

Target group

This thesis give an example of how to foster small scale resilience, in an urban neighborhood of Hanoi, facing challenges such as high construction density, flooding, loss of biodiversity and public space. Therefore the target group for this thesis is supposed to be urban planners, landscape architects, students, decision makers or others who are dealing with these issues in their practice.

Halong Bay in the Gulf of Tonkin.

Introduction

Hanoi is the capital of the Socialist republic of Vietnam, a developing country in Southeast Asia. Hanoi is situatied in the Red River delta in North Vietnam. Hanoi is strongly interconnected with water, which Ta Quynh Hoa[1] explains not only has given the name of the city, *"the land between water"*, but also evolved the formation of land and shaped the culture of fishing, agriculture, trading, social relations and faith related water.

The rivers of the delta in Hanoi region once flooded freely, filling lowland areas with water every rainy season. The fertile soil due to the sediment of the reddish brown silt laden river water made good conditions for wet rice cultivation. In the early history, Vietnamese people gradually moved from mountainous areas to the delta to cultivate this land. To tame the mighty Red River that caused devastating floods every year, a system of dykes were constructed in the 8th century, during the Chinese imperial era. Estimation has been made that two thirds of the Red River delta would be flooded in the rainy season without dykes and the constructed water reservoirs (Tuan Pham & Shannon 2010). The water supply and tradition of cultivating rice has apparently influenced the landscape and together with the Mekong delta in the south, made Vietnam to the second largest rice producer in the world next to Thailand (Jovanovic 2012).

According to the UN-Habitat, 70 percent of the global population will live in cities and the urban growth will predominantly take place in developing countries by the year 2050 (UN-Habitat 2012). Fatima Shah and Federica Ranghieri present that the urbanization process make cities more exposed to climate change hazards than less inhabited areas, much because the magnitude of the hazards increases where people concentrate, gray infrastructure dominate and productivity is high (Shah & Ranghieri 2012, p. 1). Above this cities in the developing world already face a challenge in providing adequate infrastructure to the general public (2012, p. ix). This is also the case in Hanoi, a strikingly dense seven million people city (Sveriges Ambassad 2015a). Tran Anh Tuan, a researcher at University of Science in Hanoi, claims that this development has put a high pressure on agricultural land, water management and air quality and brought about an apparent loss of green-, blue- and public space (Tran Anh Tuan 2008, p. 131).

Flooding from the rivers used to be the real threat of Hanoi, a city situated in average seven meters above sea level. In dry seasons this equals the river level (Ho Dinh & Mamoru 2009), but actually three to five meters below river level during the monsoon (Nguyen VD., Nguyen HK., Nguyen MS., Nguyen VH. & Huntjens). According to Nguyen[2] the growth and densification of the city, and consequently the increase of impermeable pavements, such as roofs, streets and sidewalks, have decreased the possibility of storm water to naturally infiltrate into the ground. This is the argument of Chi Le Quynh[3], who claims that the former threat of flooding from outside the dyke, now is an issue of inside the dyke (fig 4).

Vietnam short facts

Population: 87,8 millions
Urban population: 31,7 percent
Population density: 274/ km^2 (UNdata 2013a) (Sweden 21/ km^2 UNdata 2013b)
Religions/ philosophies: Confucianism, Daoism, Buddism and Christianity (Natioanlencyclopedin1996, p. 431).
Climate: Tropical monsoon. Yearly precipitation 1676 mm (UNdata 2013a)

Vietnam is located close to one of the five typhoon centers in the world making it to a disaster prone country. Above this, the location of Hanoi city in the Red River delta with a topography make it difficult to naturally drain storm water to the rivers (Shaw 2006). According to the Hanoi Masterplan, the precipitation has increased over the last decades. Big rainfalls in the rainy season in the 1980s usually were of 100 mm per day. In 2008 a historical rain resulted in in average 560 mm rain in Hanoi, with even more in the urban center (The Prime Minister 2011, p. 9). According to the Intergovernmental Panel on Climate Change, the forecast of climate change in Vietnam region is greater contrasts in rainfall between wet and dry seasons, intensified monsoon precipitation and increased temperatures. An earlier monsoon onset and delayed retreat will also result in lengthening of the monsoon season (IPCC 2013, p. 20).

Voskamp & Van der Ven argue that green and blue structures provide cities with ecosystem services such as storing, attenuating, infiltrating water and cool the air. Loss of green and blue structures therefore result not olny in in loss of bio diversity, but also degraded ecosystem functions and an increased risk of flooding (Voskamp & Van der Ven 2014). Associate Professor Nguyen An Thinh[2] agree about the threat of flooding in Hanoi, is not the precipitation itself but the increasing proportion of impermeable surfaces. He also describe that the terrain in Hanoi slopes at a southeast, making Dong Da district in central Hanoi, situated not more than 4-4,5 meter above sea level vulnerable to flooding. Within Dong Da, Van Chuong is the most dense populated ward of Hanoi with a high proportion of impermeable pavements and almost no existing green space. Fostering resilience in this neighbourhood is therefore of a great concern.

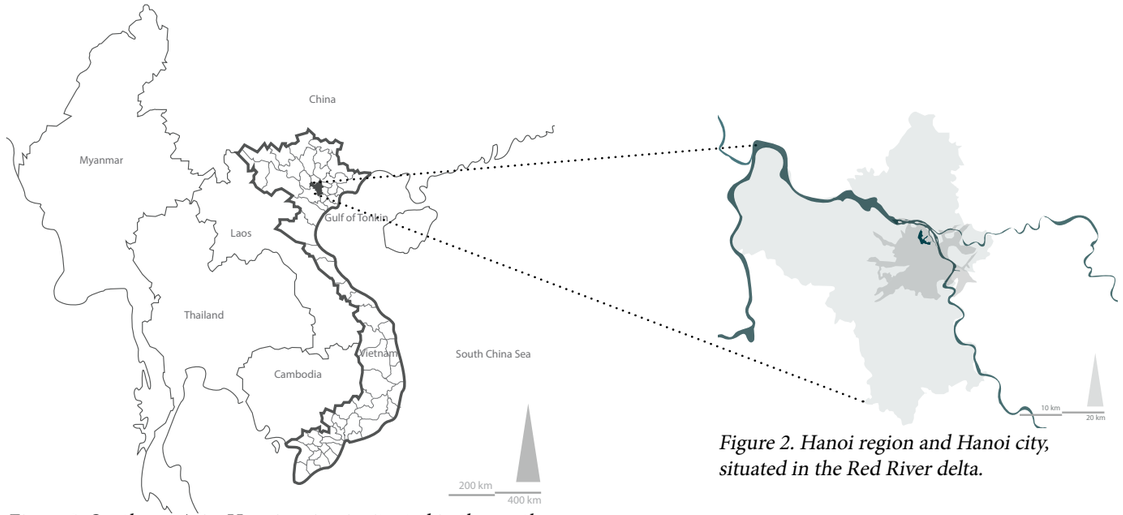


Figure 1. Southeast Asia. Hanoi region is situated in the north of Vietnam.

Figure 2. Hanoi region and Hanoi city, situated in the Red River delta.

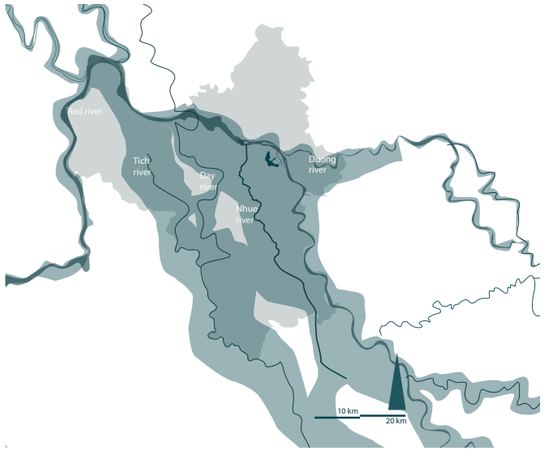


Figure 3. Estimated flooding pattern in the Hanoi region, without the system of dykes (Tuan Pham & Shannon 2010).

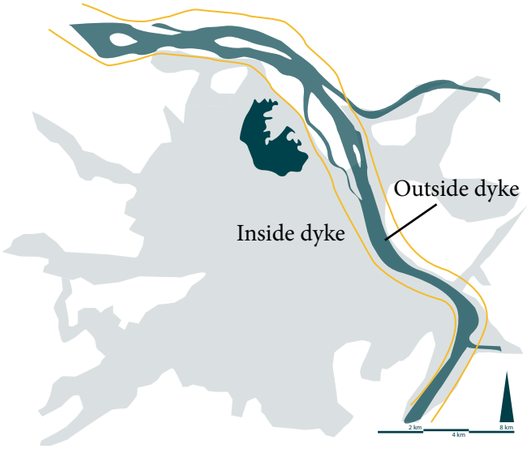


Figure 4. Dykes protecting the city from river flooding. The threat of flooding has instead moved to the urban area inisde the dyke, Chi Le Quynh[2].

[1] Ta Quynh Hoa, PhD candidate and lecturer at National University of Civil Engineering. Interview 10 February 2015.
[2] Nguyen An Thinh, Associate Professor at Department of Landscape Ecology and Environment, Vietnam National University, Hanoi. Interview 3 February 2015.
[3] Chi Le Quynh, PhD and lecturer at Faculty of Architecture-Urban Planning, National University of Civil Engineering. Interview 5 March 2015.

Aim

View from Van Phúc silk village outside Hanoi

The overall aim is to gain a greater understanding of how to foster resilient urban development by green and blue measures in Hanoi. The aim is also to create public places that integrate green and blue values and correspond to the local context. In order to do so the green, blue and public structures of Hanoi are being explored. The thesis will end up in a small scale design proposal of Van Chuong, a ward of the district Dong Da in the central Hanoi.

The proposal will be based on analyses from the perspective of landscape ecology, Jan Gehl and Kevin Lynch. Inspiration for the proposal is found in Feng-shui principels and from local residents of Van Chuong. My intention is to show an example of how to add ecological, social and aesthetic values to a ward with a high construction density, like Van Chuong.

Research questions

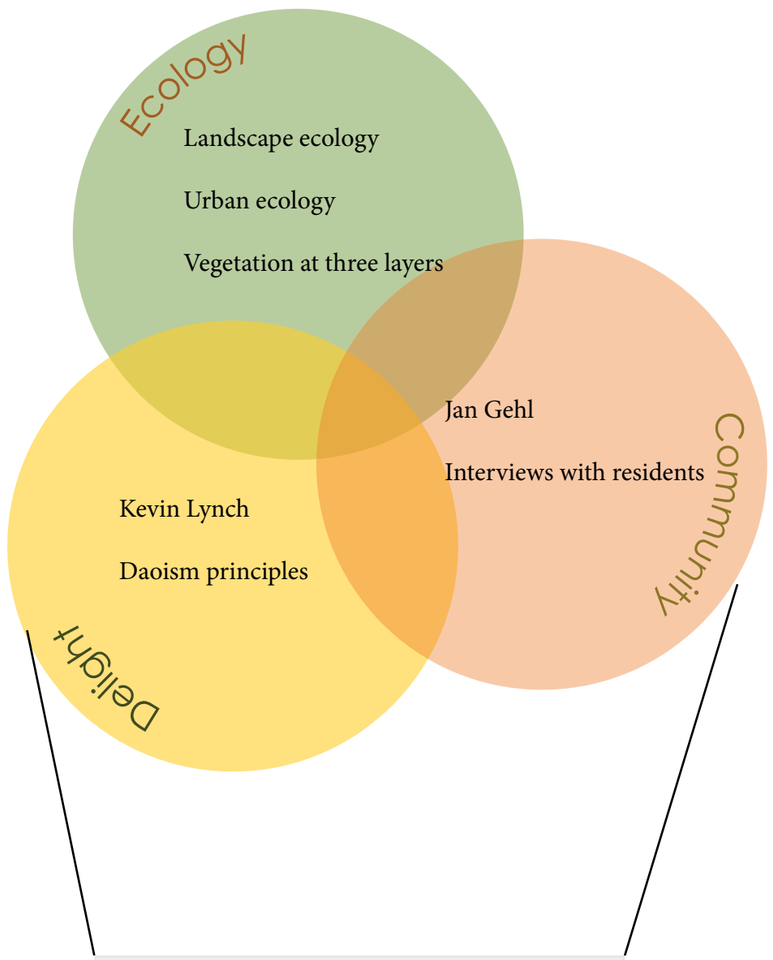
What values do green and blue structures add residents of Van Chuong?

How should green- and blue structures in Van Chuong be designed in order to foster urban resilience?

Can green, blue- and public space in Van Chuong be preserved by design?

Method

New developed areas at the urban fringe



Literature studies

Maps

Site observations

Vegetation at three layers

Interviews

Designprinciples according to Ian Thomson

Design principles according to Daoism

Literature studies

Before leaving, general literature studies about developing countries, climate change, resilience, green infrastructure, landscape ecology, biodiversity, globalization, water management, public spaces and Daoism, were conducted. Web of Science, Scopus and Google Scholar were used as databased for searching literature. During the stay in Hanoi, hard copies about local concerns were collected from the people that were interviewed.

Maps

Satellite images from Google Earth were studied, because they visualize the existing green and blue structure at different scales. An understanding of the physical relationship of forests, rivers, canals, lakes, parks, flower gardens, attached green space and street trees, could be gained through these maps. Satellite images were also used in order to study the built urban structure.

Historical maps were collected, from urban planner Tung Phoduc (Appendix 1). Through these an understanding about the urban transformation was gained. Assoc. Professor Nguyen An Thinh (Appendix 1), provided me with terrain-, groundwater level-, soil- and vegetation maps, however in Vietnamese but still helpful to some extent.

Site observations

During eight weeks, January through March 2015, daily observations, mainly in the central Hanoi, were conducted, in order to gain a greater understanding of the green-, blue- and public structure. Photographs and notes were taken on site, of plant species, the organization of them, vegetation in relation to water, water management, the design and characters of green-, blue and public space and the urban spatial structure. Observations were also conducted of how the streets, sidewalks, squares, parks, canals and lakes were used by the people.

Landscape architect Ta Quynh Hoa (Appendix 1), recommended me to visit Phu Do rice noodle village and Bat Trang pottery village, traditional villages in North Vietnam, where water and vegetation has played a significant role in the everyday life. The villages are also environments where many people in Hanoi recently come from and was therefore regarded relevant to study in order to understand the local context. The villages were visited at 13 of February and 1 of March 2015 respectively. I was especially recommended to study the structure of streets, houses and relation of the village to the Pagoda. Senior urban researcher and freelancer Stephanie Geertman (Appendix 1) had a special interest in public space and recommended me to visit Ba Dinh Square, LeNin Park and Ly Thai To Garden. These were regarded as good examples of public space, since they were fully accessible to the public and frequently used by different people. The idea of using Van Chuong as my study area evolved, as my understanding about the emerging need of developing green-, blue- and public space in this specific neighboruhood, proceeded. Van Chuong was visited at six occations, in a period of three weeks.

Vegetation at three layers

In order to understand the green structure, the vegetation was studied in the city and its surroundings. The species as well as organization of them in parks, flower gardens, lake areas and streets were observed. By classifying the findings from a pre-urban, urban and infrastructural layer point of view, Stephan Pauleit and Ewa Kaliszuk (Pauleit & Kaliszuk 2005, pp. 137), offered a systematic way to look at vegetation. According to Pauleit and Kaliszuk, each city has its own, distinctive green structure which is a result from the interaction of natural and human processes over time. They present three vegetation layers, pre-urban-, the urban- and the infrastructure layers, upon which the urban green structure consist.

The pre-urban layer, describes the vegetation from the natural land that existed before the city, and are many times made up of fragile habitats (Pauleit & Kaliszuk 2005, pp. 137). In order to get a picture of the native vegetation, it was studied in rural areas of Hanoi and in northern Vietnam. Vegetation in rural areas were presumed being representative of what the land of Hanoi looked like before it became urbanized. To get a picture of cultural vegetation or vegetation at the urban-layer, observations of vegetation in streets, parks, public places and lake areas were conducted. The infrastructural layer, was studied by noting what was growing and in what ways mainly along roads and canals in the city.

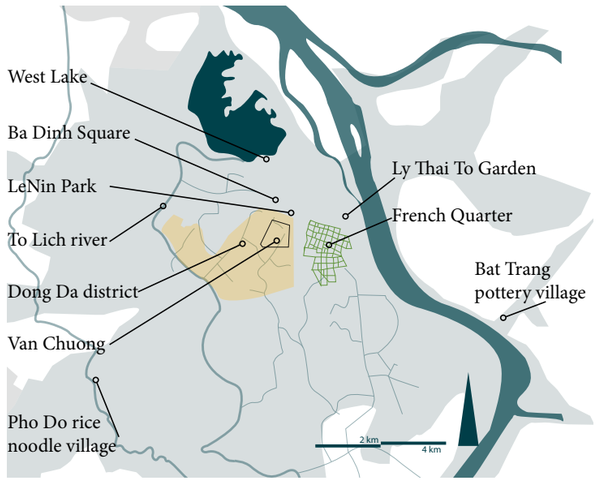


Figure 5. Sites for the field observations. Besides the mentioned places, observations were done continously of life of the streets and the rest of Han as well.

Interviews

Interviewes were conducted with ten professionals within the fields of urban planning, landscape ecology, forest science and climate change. The purpose of the interviews were to gain a greater understanding of the green, blue, public, social, cultural and political context of Hanoi. Another purpose was to get a broader perspective of the context of Hanoi.

The intention was to conduct semi-structured interviews, since this give a chance to guide the responses, but still enables the interviewees to use their own words (Lantz 2013). The people interviewed and which institution they belonged are presented in chronological order (Appendix 1). The four to five written questions that were brought to the interviews were in most of the cases not explicitly answered. The explanations can in some cases be misunderstanding about the knowledge of the professionals and in other cases linguistic barriers or limit of time. Despite this, I received information about: geographically vulnerable areas and reason to flooding in Hanoi, the Hanoi Masterplan 2030 with vision to 2050, relationship between Vietnamese culture and water, structures and elements of traditional Vietnamese villages, the concept public, characters of attractive public space, tree species, the role of sharp edges in the public space, the importance of improving by small means and the context of Van Chuong.

The interviews were guiding to further studies of public places such as LeNin Park, Ly Thai To Garden and Ba Dinh Square. These places were regarded as good examples, since they were fully public and frequently visited by people. Recommendations were to study these places from the perspective of what people do, physical characters and how they promote public life. Through the interviews I got valuable information about different neighborhoods of Hanoi, which further made it possible to choose Van Chuong as my study area.

Interviews with residents of Van Chuong

To gain a deeper understanding of the local context, a focus group of local residents was planned to be undertaken. A permittance from the local authoritiy was mandatory in order to gather people to meetings, but was not possible to obtain due to time limit. Therefore interviews with five residents of Van Chuong were conducted instead.

Selection of respondents were done randomly on the spots of Van Chuong, with the ambition to get mixed representation of residents. These interviews were conducted at two occasions, with seven questions (Appendix 2) and with assistance of two different interpreters. , with the residents of Van Chuong were conducted with the interpreters Tu Phan MSc in urban planning and Vu Jamie student in literature.

Computer aids

Figures were mostly illustrated by Adobe Illustrator CS6, but some drawn manually. Plans and sections were drawn in AutoCAD 2013, which made it possible to select preferable sizes and scales. The images were further illustrated in Adobe Photoshop CS6 and Adobe Illustrator CS6.

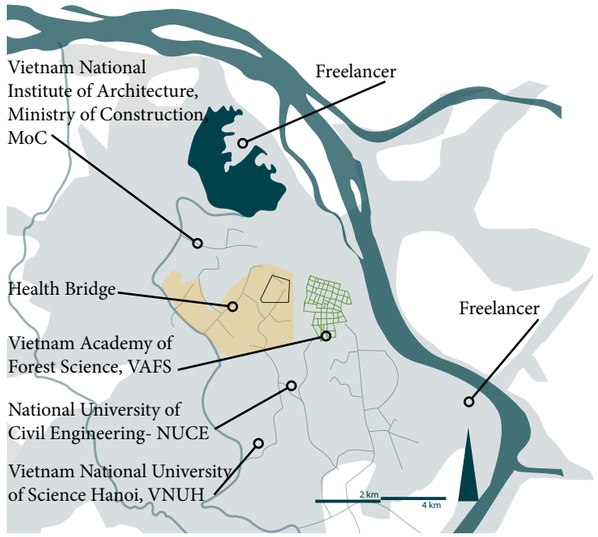


Figure 6. Sites in Hanoi for the interviews with the professionals.

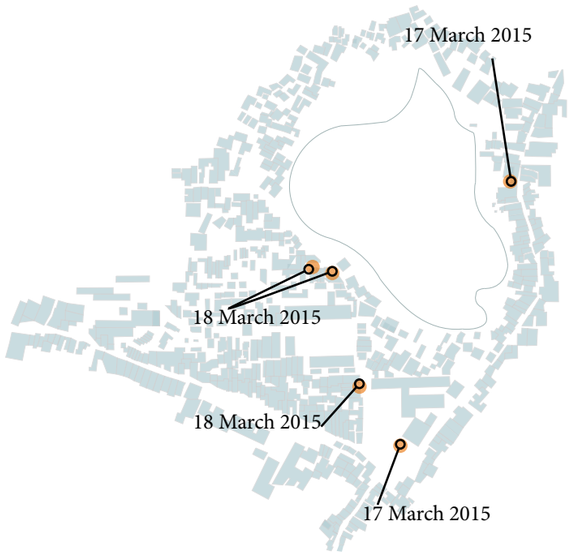


Figure 7. Sites in Van Chuong and the dates for the interviews with the residents.

Design principles according to Ian Thomson

The Tri-valent design theory by Ian Thomson was chosen as a framework for the analysis of Van Chuong. Thomson claims that the three dimensions: ecology, community and delight, are inherent values in landscape architecture (1999, p. 178), and by combining these three dimensions a holistic landscape design can be achieved. Analyzing methodologies according to landscape and urban ecology, Jan Gehl and Kevin Lynch represented each of these three dimensions were selected. A summary of the interviews of the local residents, was also added within the analysis.

Landscape Ecology

To understand the green and blue structures of Hanoi and Van Chuong, a landscape ecology theory was applied. In order to reduce landscape fragmentation caused by urbanization, landscape ecological principles, or how to organize green networks in the landscape to enhance habitat connectivity, were used in accordance with Pham Duc Uy and Nobukazu Nakagoshi. They claim that a landscape ecology approach can be applied in the urban context as well (Pham Duc & Nakagoshi 2007).

Landscape ecology is, according to Wench Dramstad, James Olson and Richard Forman (1996, p. 14) about landscape being a living system, mainly consisting of the characteristics: structure, function and change. Structure is the arrangement of landscape elements, creating spatial patterns of patches, corridors and matrix. The authors claim that the arrangement of patches, corridors and matrix is important since they strongly control the function or movement of species within the landscape. One important landscape ecology principle is connecting patches by corridors to avoid habitat isolation. Dramstad et al. adress the possible conflict between the benefit of the corridors being habitat for some species and the risk of the corridors being barriers or even sinks for others (Dramstad et al. 1996, p. 35-36).

Small rows of patches that connect habitats are known as stepping stones. Increase movement of species does not seem to be as effective as wide and highly connected corridors. Still, stepping stones, especially arranged in clusters, may be important elements in a fragmented landscape (p. 37). Cain, Browman, Hacker and Sinauer, also presents landscape configurations that are favorable with regard to biodiversity, which is best enhanced by large natural connected areas across the landscape that facilitate movements of species (Cain et al. 2011, p. 523).

Urban Ecology

According to Maria Ignatieva, landscape ecology is one of the theoretical backgrounds to urban ecology. She describes that green space have been an essential component of urban planning over the last century as they have provided cities with ecological and social services such as improved climate, hygiene, aesthetics, recreational opportunities, environmental protection and biodiversity (Ignatieva 2011). Sybrand Tjallingii agree about urban ecology is more than spatial green connections in cities. Green structures can also be designed to strengthen natural processes of water and vegetation in the city (Tjallingii 2005).

Jan Niemelä, Sanna-Riikka Saarela, Tarja Söderman, Leena Kopperoinen, Vesa Yli-Pelkonen, Seija Väre & Johan Kotze explain urban ecology as the relationship between human action and biological responses, and their dependence for a functional urban ecosystem (Niemelä et al. 2010).

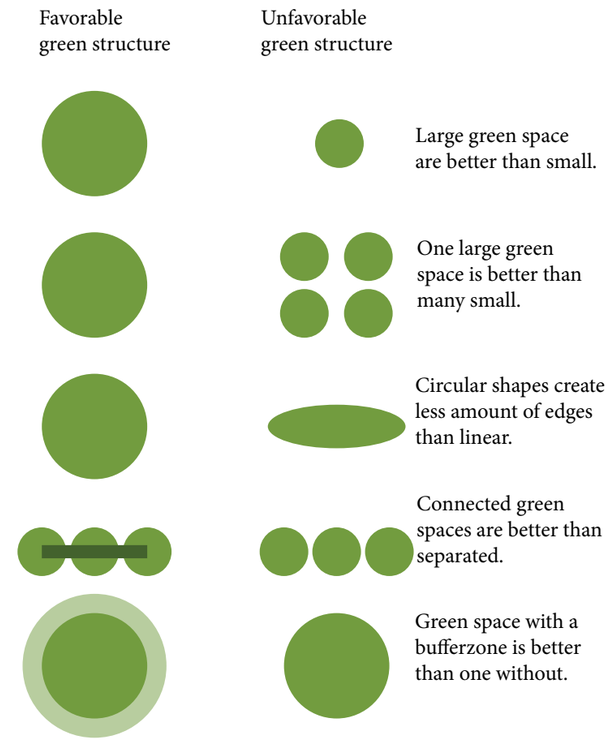


Figure 8. Favorable and unfavorable landscape ecological principels of habitat configurations according to Cain et al. 2011, p. 515.

protection	**Feeling safe** Protection for pedestrians Eliminating fear of traffic	**Feeling secure** Lively public realm Eyes on the street Citylife both day and night Good lighting	**Avoid unpleasant experiences** Wind Rain Cold/Heat Pollution Noise
comfort	**Walking** Room for walking no obstacles good surfaces Accessibility for all Interesting facades	**Standing/staying** Attractive zones for standing and staying	**Sitting** Good places to sit Utilizing advantages: view, shadow, people Benches for resting
	Opportunities to see Good viewing distances Unhindered sightlines Interesting views	**Opportunities to talk** Low noise level Street furnitures on talkable distances	**Opportunities to play and exercise** Invitation for physical activity
delight	**Scale** Spaces designed to human scale	**Opportunities to enjoy climate** Shade Coolness Breeze	**Positive sensory experiences** Interesting details, materials Fine views Trees, plants, water

Figure 9. ”12 quality criteria of the pedestrian landscape” according to Jan Gehl (Gehl 2010, p. 239).

Community

This community dimension was analyzed from the perspective of Jan Gehl. His ”12 quality criteria of the pedestrian landscape” was chosen because Gehl claims that *”the finest and best functioning city spaces throughout the world demonstrates careful overall treatment of all of the quality factors mentioned”* (Gehl 2010, p. 238). According Gehl it´s necessary to ensure reasonable protection from physical risks, insecurity and unpleasant sensory, before qualities of comfort and delight are planned. This method is mostly applied in western cities, many times in a temperate climate. Since climate and behaviors differ between cities, the Gehl theory may not always be suitable. Gehl claims, for example that a pedestrian friendly city should offer seating possibilities such as benches, facing other people. In Hanoi, people seldom just sit and watch people. If they do, they either squat or use portable stools, often placed facing their company. The 12 quality criteria of the pedestrian landscape, was used anyhow, because it offers a systematic methodology how to create environments that are protected, offer comfort and delight, which is appreciate in Hanoi as well. Regarding climate, I have chosen to created places in shadow instead of being exposed to sun. This was also a methodology used among urban planners in Hanoi, why it also was considered useful in Hanoi.

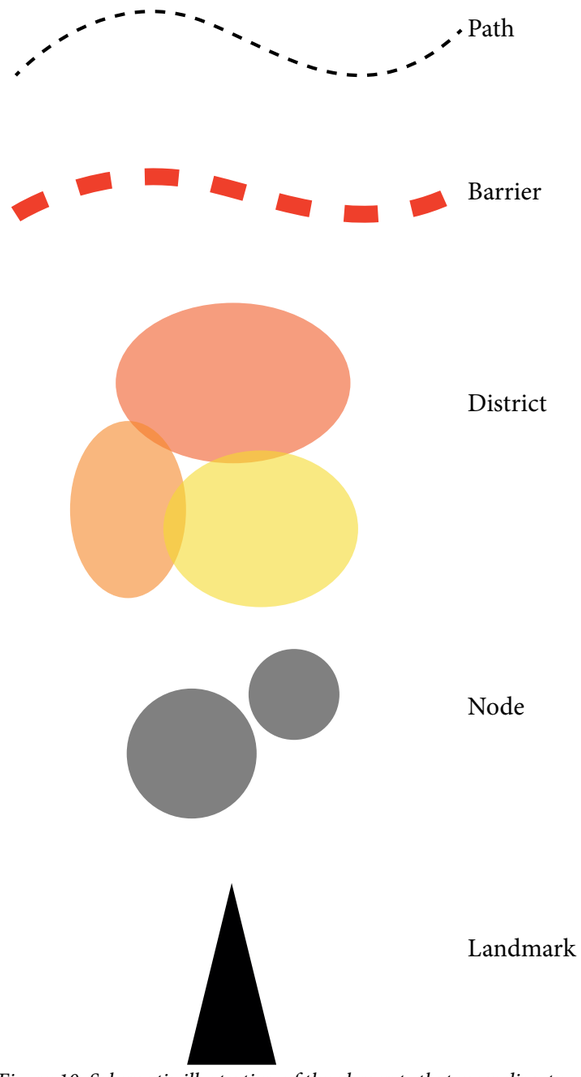


Figure 10. Schematic illustration of the elements that according to Kevin Lynch (1960) is important to the visual quality in a city.

Delight

The physical structure of Van Chuong was analyzed according to Kevin Lynch. By studying paths, barriers, districts, nodes and landmarks, the intention was to understand the visual structure of Van Chuong. Lynch claims that the visual quality of a city is influenced by the readability of it, which in turn is dependent of how these basic elements are oriented towards each other (Lynch 1960). This is a method developed in a western context, with a certain perspective on what´s regarded as a visual quality, why utilization of Lynch method in Hanoi can be questioned. The method is however considered useful in a global perspective, since the mentioned elements exist everywhere. I have consider it necessary though, to try to understand what possible could be valued as visible quality, and what could be valued as for example to be a landmark to the people in Hanoi.

Design principles according to Daoism

In her dissertation landscape architect Chundi Chen claims that the ancient Chinese religions and philosophies Daoism, Confucianism and Buddhism, have influenced values, traditions and been the fundamental principles in Chinese urban planning (Chen 2013, p. 73). Daoism, Confucianism and Buddhism has according to Ta Quynh Hoa[1], influenced urban planning and traditions in Hanoi as well, as a memory of the Chinese imperial era during 111 B.C. until 1000 century AD.

Confucianism is explained by Chen to be a complex socio-political system attempting to seek harmony within the framework of the society and family. In China Confucianism has historically been adopted as the official state principle. The principles have been used in urban planning and conform hierarchy, by using geometrical arrangements (Chen 2013, p. 81). According to Ta Quynh Hoa[1], the administrative center of Hanoi, Ba Dinh square, is an example of hierarchic order of the state, symbolized by a large area covered by symmetrically placed squares.

Buddhism put great emphasis in nature as a refuge for people from the earthly life. According to Buddhism, the nature is constantly in a process of undergoing change. It is also claimed that man and other species can live in harmony, if all species are respected. Old trees, are respected as "lords of the forests" and contemplation in nature is often shared with others (Chen 2013, p. 82). In Hanoi Ta Quynh Hoa[1], describes that the Pagoda, the temple of Buddha, often are surrounded by green environments and related to a pond. She further describe that the structure of traditional northern Vietnamese villages, always relate to the pond and pagoda, also historically important places for social life.

Daoism, Feng-shui and Shan-shui

Along with Buddhism, the Daoism religion and philosophy put a great emphasis on contemplation on nature and is summarized by Xiangqiao Chen and Jianguo Wu as "unity of man with nature". They claim that Daoism is useful in landscape architecture, in order to integrate spatial pattern, ecological processes and create sustainable landscape architecture (Chen & Wu 2009).

Feng-shui, also derived from Daoism, is described by Zhongzhong Zeng, Haishan Xia and Haoxia Chen, as principles guiding spatial development with regard to topography, geology, hydrology, ecology and microclimate (Zeng, Xia & Chen 2013), and is also claimed to be used as a tool to address the relationship between built and natural environ-ments (Chen 2013, p. 75). There are two branches of Feng-shui: the Compass- and Form schools, where the Form school is traditionally used in urban planning to select proper locations for cities or gardens. According to the Form school this process starts by observing landforms and the terrain, to determine the best location and orientation of a city or garden (p. 76). Zeng et al., also consider Feng-shui being a guide in order to find opportunities for sun and shadow, favorable winds and regulated temperatures by facing water (Zeng et al. 2013).

Mountains (Shan) and water (shui), symbolizing nature according to the Daoism philosophy and Feng-shui principles, has become the base for development of the Shan-shui culture, "the mountain and water culture" (Chen 2013, p. 79). According to Chen, Shan-shui culture has influenced Chinese literature, garden design, ancient urban planning and paintings, the so called Shan-shui paintings. Used in urban planning, Shan-shui emphasize the importance of orienting the city in order to bring in the mountain scenic views, serving as a reference when creating the urban axis. Chen has studied the urban structure of Beijing and describe that the surrounding mountains and rivers running through the city provide the city with scenery from the mountains and water, and make an interaction of city and nature possible (p. 77). In the smaller scale, designing with rocks and ponds is a mimic of the natural mountain and water systems according to Shan-shiu culture (p. 78).

Two important elements in the Daoism philosophy are Yin and Yang (Chen 2013, pp. 73-74). Yin and Yang are described as two opposing forces that are constantly moving and striving for harmony by balancing natural and human built elements, sizes, colors, textures and spatial arrangements (Chen & Wu 2009).

Aesthetic inspiration for the proposal of Van Chuong, was taken from the Shan-shui culture and Yin and Yang principles.

Van Chuong Pagoda, surrounded by trees.

Yang	***Yin***
sky	earth
sun	moon
day	night
light	shade
activity	rest
motion	stillness
expansion	contraction
upward	downward
hard	soft
warm	cold
fire	water


Figure 11. Yin and Yang, symbolized by the Taiji diagram. By using opposing forces in landscape architecture, a dynamic can be created and sense of balance can be created (Chen & Wu 2009).

Summary design principles

Shan-shui: rock and water, scenic views reflecting the natural landscape.

Yin and yang: balancing natural and human built elements, sizes, colors, textures and spatial arrangements.


Ba Dinh Square, the administrative center of Hanoi. The system of squares arranged by a strict design, demonstrate hierarchy and order.


Mountain and water reflecting the Shan-shui culture. Hoa Lu ancient capital, northern Vietnam.

[1] Ta Quynh Hoa, PhD candidate and lecturer at National University of Civil Engineering Interview 10 February 2015.

The Context of Hanoi

Early urban structure in North Vietnam

Ta Quynh Hoa[1]and Nguyen Tuan Minh [2] , described the traditional village strucutre in North Vietnam and the significant elements within it. According to them, the village has generally two entrances, both embraced by a village gate. Within the village, gateways are commonly used to the house entrances as well. Except from defining the entrance the village gate is emblematic and ad spirit and character to the village.

Next to the gate a village tree is placed, many times a Banyan. A hedge of bamboo around the village is another important features of a traditional village. The structure of the street network in villages in North Vietnam, is commonly shaped like a fish bone. This is the case in Pho Do, but not as clear in Bat Trang. The main village road is straight and can be visualized as the center of the fish. On both sides of the village road, there are crossing residential streets. The further away from the village road, the narrower the crossing streets become.

Along the village road there are a number of public buildings, where the most important are the Communal house and the Pagoda. The Communal house is to honor the founder of the village, and hold some administrative functions. By the Communal house there is a small square, offering cultural and social possibilities. Next to the Communal house, there is a Pagoda serving the residents with spiritual support. By the Pagoda there is a pond, traditionally used as a place washing clothes and collecting water, also an important meeting place in the village. At the other side of the exit gate, agricultural land begin. Rice are cultivated in the land between the village and the dyke, and vegetables between the dyke and the river.


Narrow, straight resident street.
Part of the fishbone street structure.


Banyan,
common gate tree.


The pond by the Pagoda


Remainder of a bamboo hedge,
surrounding the village

Village gate of Phu Do rice noodle village, and
start of the main village road.

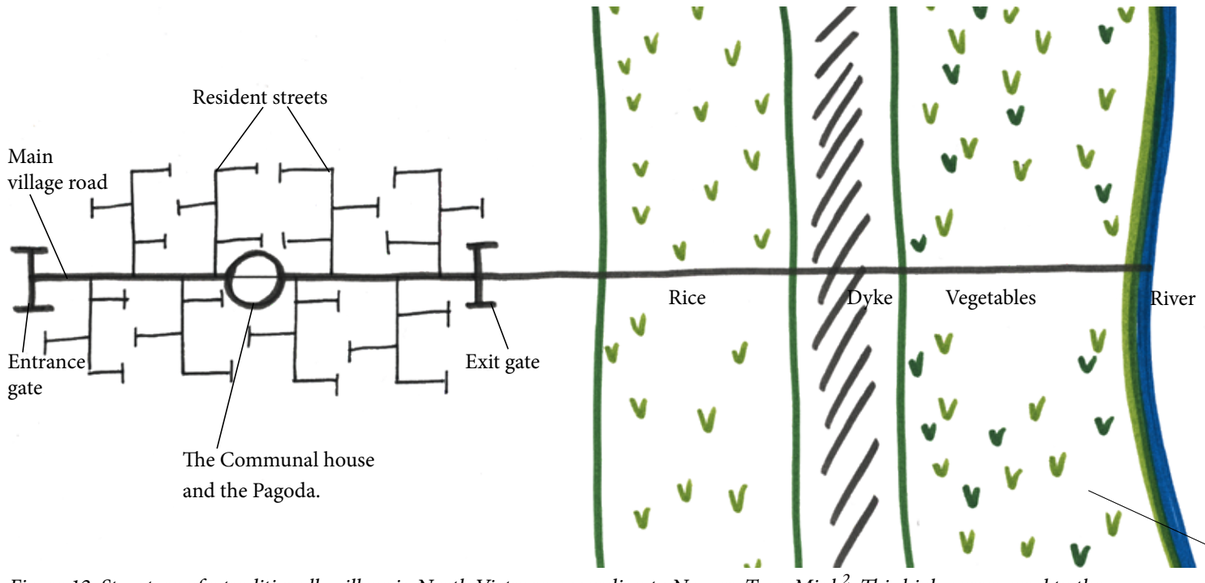


Figure 12. Structure of a traditionally village in North Vietnam, according to Nguyen Tuan Minh[2]. This higly correspond to the structure of Pho Do rice noodle village. Central in the village the Communal house and the Pagoda is located.


Vegetable cultivation,
between the dyke and the river.

[1] Ta Quynh Hoa, PhD candidate and lecturer at National University of Civil Engineering. Interview 10 February 2015.

[2] Nguyen Tuan Minh, MSc Architect. Vietnam National Institute of Architecture, MoC. Interview 12 February 2015.

The urban transformation of Hanoi

Ho Dinh and Mamoru have studied the urban development of Hanoi, starting at the year 1010. The city was first found as Thang Long in 1010, after liberation of 1000 years of Chinese ruling (Ho Dinh & Mamoru 2009). The city at that time included a one square kilometers large citadel, the former residence of the Vietnamese monarchs, and the 36 merchant streets, which surrounding the citadel. During the French colonial period 1888 to 1954, south of the 36 merchant street area were upgraded, streets were straightened and broadened to boulevards and larger square block houses were built. The boundaries of the city was limited by West Lake in north, Red River in east and To Lich River in west. A significant enlargement of the city occurred during the time Soviet Union strongly influenced North Vietnam (Ho Dinh & Mamoru 2009). Tran Anh Tuan has found that during the socialism period, between the years 1954 to 1985 urbanization of Hanoi was based on a priority of industries and apartments housing complexes based on public land ownership. Plenty of open space between buildings was available to the public (Tran Anh 2008).

Between the years 1961 and 1975, the American war went on, a devastating war that followed the first Indochina war 1945 to 1954, against the French colonialists. Additionally, in the late 1970´s Vietnam went through two but shorter battles with Cambodia and China. Due to the invasion in Cambodia, Vietnam became isolated from the rest of the Southeast Asian countries, which froze the economic development (Sveriges ambassad 2015b).

Doi Moi

In order to boost the economy the communist government adopted a series of policies, known as Doi Moi. The economy was shifted from centrally planned to market oriented. This is mentioned in the dissertation by Danielle Labbé (2011, p. 6), as an important decision that strongly influenced the urban transition of Hanoi. Doi Moi enabled people to own land and use it freely, which improved the living conditions and reduced poverty (IMF 2014, p. 4). It also invited foreign countries and enterprises to invest in building and infrastructure projects, which made it possible to break the post-war economic isolation (Sveriges Ambassad 2015). Hanoi started to grow. The economic growth further improved the socio-economical standard to people, boosting the urbanization. On the other hand, the new economy increased social inequalities with labors away from agriculture, and from low- to high skill work (IMF 2014, p. 4).

An effect of the increased freedom for the people to use public space, was however that it bit by bit became occupied. Unregistered construction works and insufficient governmental regulations made the city grow continuously and uncontrollable. According to Hoang Vinh Hung, Rajib Shaw and-Masami Kobayashi (2007), squatting and illegal constructions has been spreading across the city and become a persistent problem since then. Between the years 2000 and 2003 the city expansion crossed the earlier natural barriers. Since then the city has continuously been growing, following transportation axis mostly in southwest and west directions (Ho Dinh & Mamoru 2009).

Sprawling of cities is according to UN-Habitat caused by absence of urban planning strategies, frameworks and coordination, since residents tend to move from the city center and occupy undeveloped land (UN-Habitat 2012). According to Professor Kunihiro Narum, doctoral student Daisuke Kato and Professor Nguyen Cao Huan (Narumi, Kato & Nguyen. 2008), control of urban development is considered a prerequisite for appropriate conservation of natural land and possibility to create favorable human environments in the future.

Nguyen Thi Hien describe the development of the built structure and the corresponding open space available to the public (Nguyen 2015). Between the years 1960-1980 a large number of state owned housing complexes were built, with inspiration from the Soviet Union. With regard to open space, Nguyen claim that this typology offered plenty of open space for public life, between the buildings. In 1980-1990s, the housing construction were booming. As the government management was loose, informal urban development transformed neighborhoods into areas with high construction densities and high proportion of private land. Nguyen estimates that 90 percent of the former open space, now is occupied by houses. This urban structure is especially apparent in Van Chuong, a neighbourhood of Dong Da district in central Hanoi. The population density there reach 54000 people per square kilometer, which is the highest in Hanoi (Nguyen 2015).

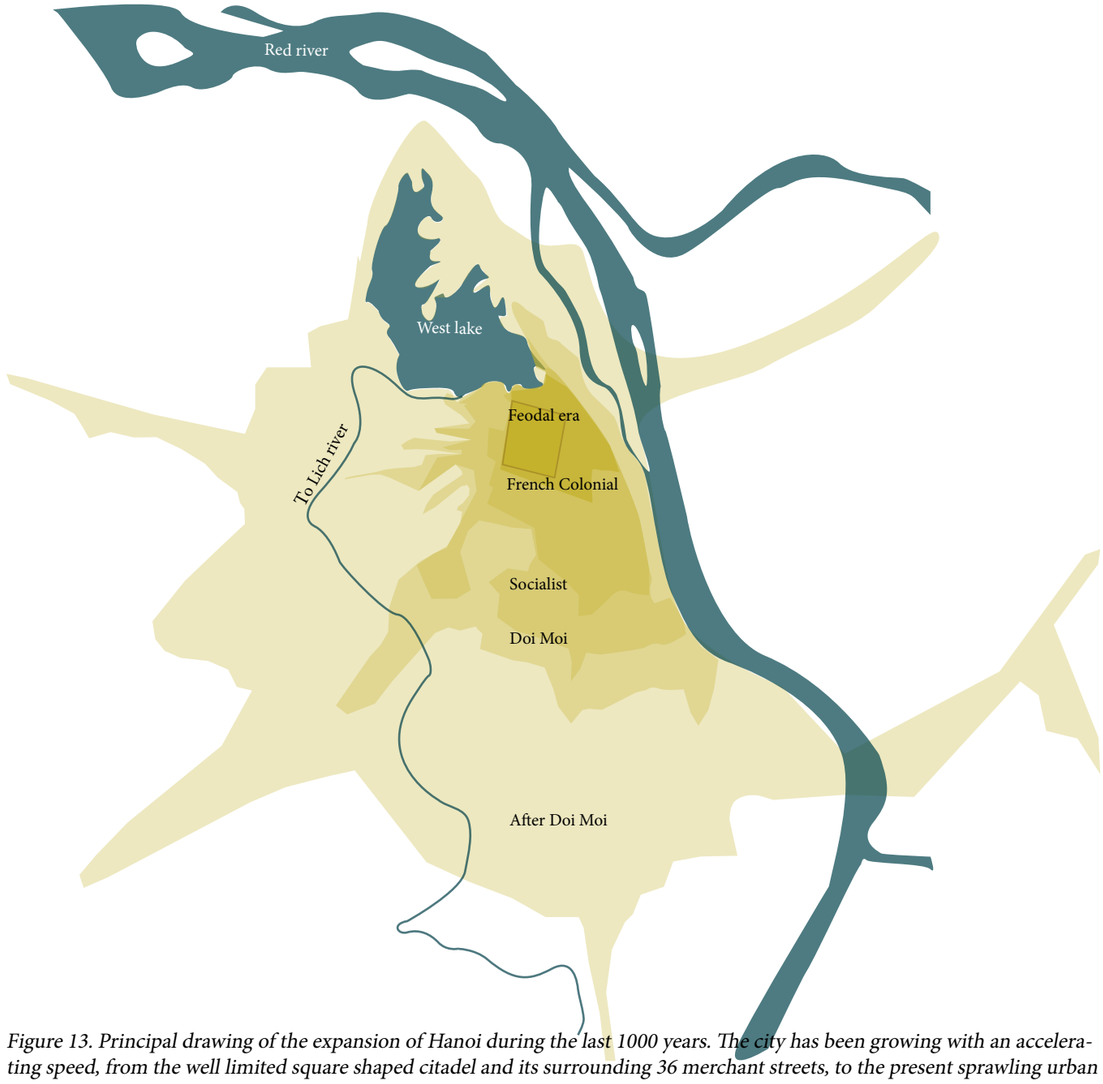
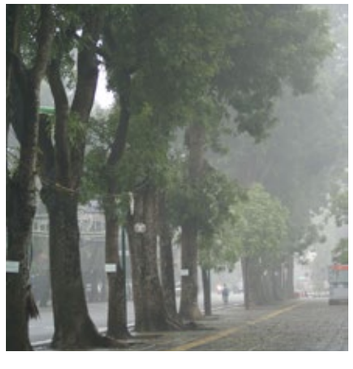


Figure 13. Principal drawing of the expansion of Hanoi during the last 1000 years. The city has been growing with an accelerating speed, from the well limited square shaped citadel and its surrounding 36 merchant streets, to the present sprawling urban structure.

Feodal era, 1010-1888
No visible urban transformation

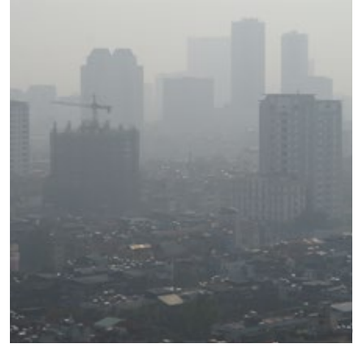
French colonial, 1888- 1954
South expansion. Streets were straightened and broadened, larger square block houses.



Socialist, 1954-1985
Significant city growth. Apartments housing complexes owned by the state, plenty of public space, industries.

Doi Moi, 1986
Market economy. Free land use. Investments in building and infrastructure. Improved socio-economical standard.

After Doi Moi, 1986- today
City expansion crossed natural boarders. Hanoi has become a sprawling city with a dense urban core. Urban growth follow transportation axes.



The Vietnamese planning system

Without mention the urban planning system in Vietnam, the picture of the development of green, blue and public space in Hanoi would be distant from reality.

The leading institutions of regional and city planning are Ministry of Construction, MoC, Ministry of Planning and Investment, MPI and Ministry of the Natural Resources and Environment, MoNRE. MoC is responsible for construction, architecture, infrastructure and public services, MPI is responsible for the socio economic plans and MoNRE is responsible for land-, water-, geology, environment, climate change and more. In theory, spatial plans are supposed to follow socioeconomic plans and sector plans; however, in practice the plans do not always converge (Shah & Ranghieri 2012, p. 12).

Subordinated to MoC, the Hanoi Department of Planning and Architecture, DPA, develops masterplans. This is described by Elke Pahl-Weber and Frank Schwartze who further claim that Hanoi People Committee coordinates and approves the plan, which finally is officially approved by MoC and the Prime Minister. The masterplan is then transferred into detailed plans at the district level. The District People Committee are in charge of general planning and management, while detailed plans are done by private developers (Pahl-Weber & Schwartze 2014, p. 50).

The Department of Consruction, DoC, also subordinated to MoC, is responsible for developing of urban parks, flower gardens in the city. At the district level, the District People Committee is responsible for organizing management of greenery along the remaining roads, parks, flower gardens and other public spaces within the district. Both state owned and private providers then manage and protect urban greenery (Nguyen 2015 p. 16). According to Nguyen it would be natural that the most local government, the Ward People Committee, also was committed by the same department in order to manage local green and public space. Instead the Ward People Committee is ordering from MoNRE (Nguyen 2015 p. 16).

The overlap of tasks between departments make coordination of implementation of green, blue and public spaces complicated (Nguyen 2015 p. 18). Nguyen further claims that lack of transparency in management of public land is another problem. The upper levels in the political system rely on the information provided by the local ward government in decision making. The ward government on the other side do not always report illegal building constructions because it can be rendered as weakness in planning management (Nguyen 2015 p. 13). According to Pahl-Weber and Schwartze, the planning regulations in Vietnam are low and construction projects are seldom controlled.

Requirements of urban design are further described mostly about providing housing and infrastructure based on traditional planning ideal. Planning sustainable development are general missing (Pahl-Weber and Schwartze 2014, p. 50).

Competition of public space

According to Nguyen Thi Hien a high competition of public space among the city government policies exist, such as those about sport, education and exploitation (Nguyen 2015 p. 6). Nguyen Thi Hien claims that one of the biggest challenges for the growing Hanoi is to provide good living conditions for urban citizens, especially for them living in historical inner city district. According to Nguyen (2009), public spaces in Hanoi have been shrinking since the economy was changed in 1986. Large and small areas of green spaces, ponds, lakes, playgrounds and alleys have been turned into housing, offices and shops. Exploitation by infilling construction, of even small spaces between buildings has significantly contributed to a loss of open space (Nguyen 2009). The average green area per person is about two square meter in central Hanoi, with little or no possibilities of developing greenery (Nguyen 2015). Pham Duc and Nakagoshi have found that the reduction of area and quality of green spaces are unevenly distributed throughout the city (Pham Duc and Nakagoshi 2007).

On top of this, this Stephanie Geertman[1], a senior urban specialist, have studied accessibility of public places in Hanoi, and found that only few playgrounds and parks are accessibility without entrance fees. Young and poor people become excluded from the public space.

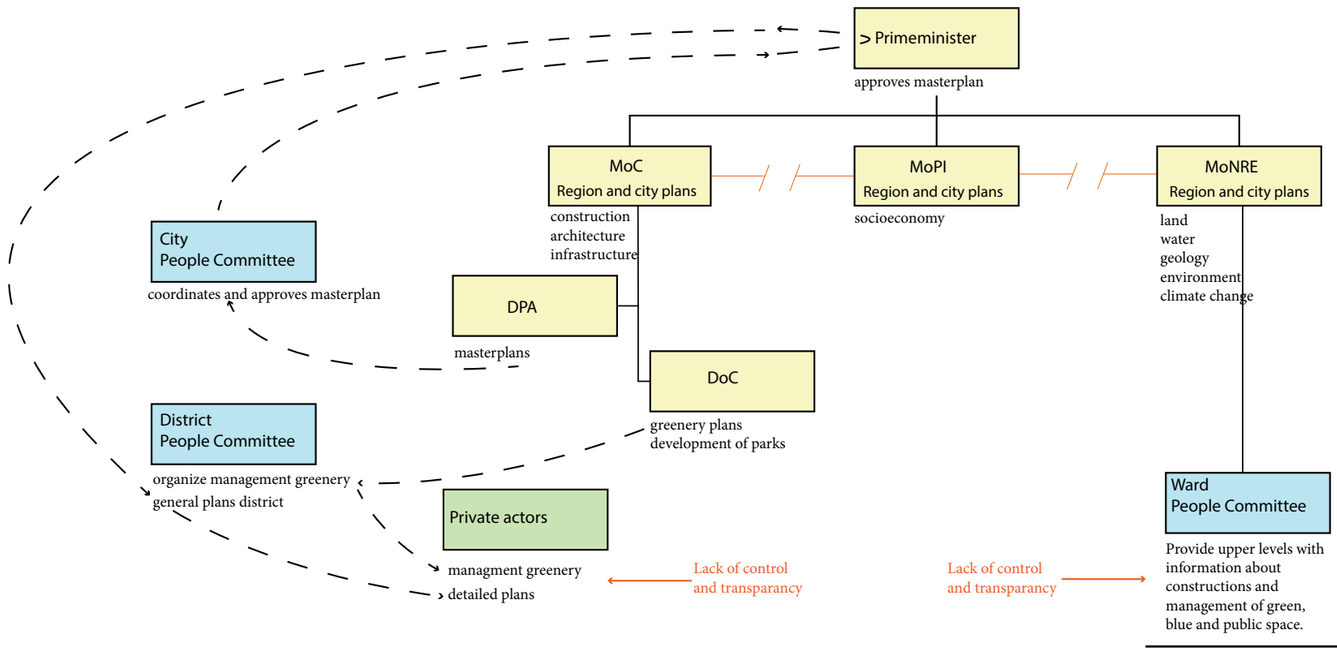


Figure 14. Schematic illustration of the planning system in Vietnam. Red illustrates weaknesses of the planning system according to Pahl-Weber & Schwartze (2014) and Nguyen (2015).

[1] Stephanie Geertman, PhD Senior urban researcher, Freelancer. Interview 2 March 2015.

Urban sprawl effecting urban diversity

Pham Duc and Nakagoshi (2007) have analyzed the urban green space pattern of Hanoi between 1996 and 2003, and found that the area of green space has decreased while the number of patches have increased, indicating a fragmented landscape with less connectivity and greater isolation of habitat. According to the Secretariat of the Convention on Biological Diversity, CBD, fragmentation of land is considered as the most serious threat to biological diversity (CBD 2000, pp. 5). This is based on the theory of species diversity increases with area and decreases with distance, which was first explored by H.C. Watson in 1859. This theory was further explored by MacArthur and Wilson in 1994 who found that species on distant habitat islands had lower immigration rates and therefore greater risk of species extinction, than on islands close to the mainland (Cain, Browman & Hacker 2011, p. 380).

A diverse environment provide services that sustain life on earth (CBD 2000, p. 2). This is because diverse environments control plant productivity, soil fertility, water quality and availability, atmospheric gas exchange, resistance and recovery to disturbances, better than homogenous environments (Cain et al 2011, p. 402). Diverse environments have greater ability to compensate for possible fluctuations in species populations, the functions they perform and buffer capacity of disturbances on the ecosystem functions (Mc Phearson et al. 2014). Edward O. Wilson claim in The Diversity of Life, that biodiversity can be sustained in urban areas by integrating forests, hedgerows, watersheds, artificial ponds and lakes (Wilson 1992, p. 317).

The homogenous global World

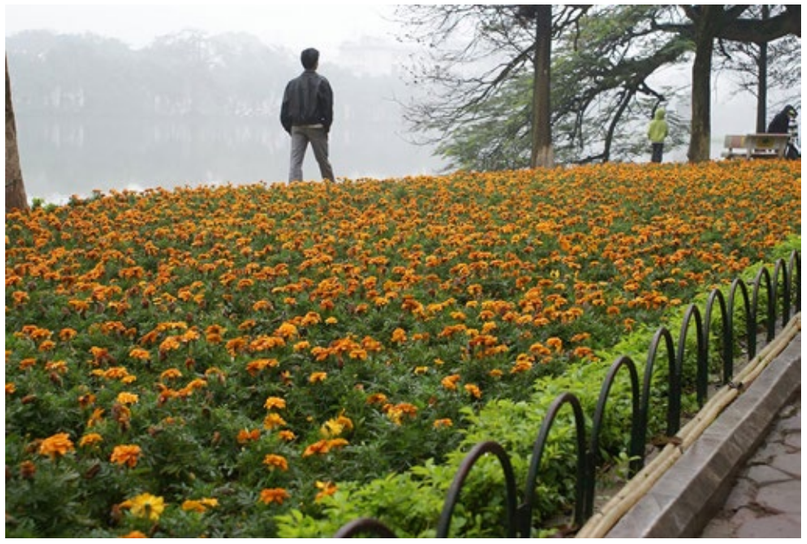
Maria Ignatieva describes that the western ideal in architecture, urban planning and landscape architecture, predominates in cities around the world. This globalization trend in cities, is according to Ignatieva inter alia, apparent in their skyscraper skyline, making a powerful symbolism of a successful market capitalism. Also the landscape architectural style has a global ideal. This is influenced by the western picturesque landscape movement, with gently curved, open green landscapes smoothly interrupted by woodlands, and later by the gardenesque landscape style, preferring exotic plants, such as unusual palms, ferns and cacti. According to Ignatieva the globalization process still continuous, with introduction of new western "cultural clichés", such as mowed lawns and palm trees, resulting in an urban aesthetic and ecological homogenization.

In order to promote biodiverse urban landscapes, Ignatieva presents several approaches at different scales around the world. Ignatieva claims, that biodiversity at the large scale can be designed by connecting natural habitat, through green infrastructure and greenways in long term planning projects (Ignatieva 2010). Many concepts have been formulated in order to preserve biodiversity at this scale. Kongjian Yu mentions: green infrastructure, ecological infrastructure, ecological network, habitat network, wildlife corridors, ecological corridors and eco-structures as commonly used synonyms (Yu 2012 p. 156). Ignatieva claims that urban and rural ecological networks are especially ecological important, because they may be the only connection for species dispersal in fragmented landscapes (Ignatieva 2011).

At the intermediate scale there is, according to Ignatieva, a growing interest, mostly in the western world, in designing with spontaneous native vegetation. Using native vegetation, not only enhance biodiversity but also resist a homogenization of the identity and aesthetic expression (Ignatieva 2010).

At the small scale, local biotopes, such as backyards, street plantings and cemeteries are increasingly regarded as important to develop. Neglected land, wasteland or brown fields are also mentioned as potentially ecological stepping stones (Ignatieva 2011). While the research about design solutions on urban biodiversity is going ahead in the west, it is much slower in tropical cities (Ignatieva 2010). However, as the globalization with western influences seem to continue in the nonwestern world, Ignatieva raises a slight hope, that also these cities will adapt the knowledge of, and use the opportunities with native and ecological design (Igantieva 2010).

A gardenesque landscape style, make the globalization trend visible in Hanoi.



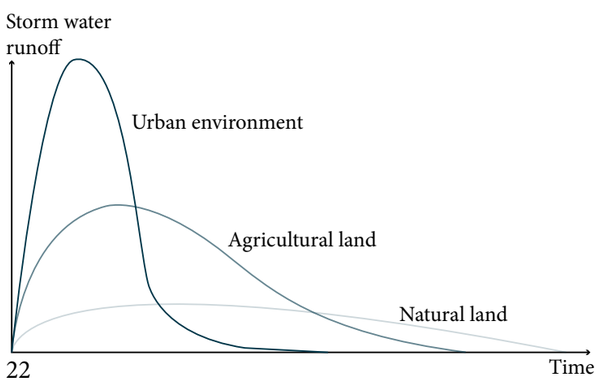
More examples of landscape styles with influences from west. Above, Ba Mau Lake Park has recently been renovated and got a green lawn, which people are not allowed to access.

Middle and below, Hoan Kiem Lake Park with ornamental flower plantings in a gardenesque style.

Urban resilience

Urban resilience, is about making a city less vulnerable to natural hazards and building a long term capacity to deal with change (Moberg & Hauge Simonsen). In the case of Hanoi, it is about making the city less vulnerable to flooding, storms and heat. Voskamp and Van de Ven (2014) emphasize the function of green measures to mitigate urban flooding and explain the relationship with blue and green measures and resilience. According to them green infrastructure increase the coping and adaptive capacity (slow down runoff); threshold capacity (store water and prevent drought) and recovery capacity (infiltration after flooding), important ecosystem services for a resilient development.

Mc Phearson, Andersson, Elmqvist & Frantzeskaki, agree about these urban ecosystem services are important in fostering urban resilience. They also claim that ecosystem services are influenced by norms, beliefs, traditions and social values, which are important to understand in building resilience (Mc Phearson, Andersson, Elmqvist & Frantzeskaki 2014). Moberg and Hauge Simonsen from Stockholm Resilience Centre, also argue this being highly relevant (Moberg & Hauge Simonsen). Their explanation is that resilience in a society is about creating abilities to deal with natural disasters in a long perspective and that humans and nature are interconnected. They consider lack of knowledge of the link between ecological and social systems, is the reason why natural resource management is difficult (Moberg & Hauge Simonsen). Johan Colding and Stephan Barthel claim that there is a potential in public properties, or urban green commons as they call it, in building resilience (Colding & Barthel 2013). Their explanation is when common interests are shared by managing public green space in a participatory way, they become good platforms for cultural integration, exchange of ideas and environmental skills. Since two thirds of the global population is projected to live in cities in a few decades, Colding and Barthel argue that the human understanding of the dependence on ecosystem services need to be broaden, and that urban design can make visible links between human and nature.



The urban water balance

Dagmar Haase has studied the impact of urban growth on water balance. She has found that the increase of impermeable pavements, due to urban growth and sprawling, is the main cause of disturbed urban water balance. Haase claims that gray pavements, compared to green, lose the function of evapotranspiration, infiltration of storm water into the ground and a decrease in groundwater recharge. The effect is consequently an increase in direct runoff in a short period of time (Haase 2009). Claessens, Schram-Bijkerk, Dirven-van Breemen, Otte & van Wijnen (2014), advocates green permeable surfaces to decrease the amount of runoff. They also underlined the capacity of vegetated land to natural purify water. Other services promoted by green- and blue structures are decreased air temperature by evaporation and shade and improve air quality (Boverket 2012).

Figure 15. The difference in time of storm water runoff in three different environments. The great proportion of impermeable pavements that are common in cities, need an infrastructure that can manage large volumes of water in short times (Svenskt Vatten 2011).

Both pictures Dong Da from district. Just a minor morning rain in the dry season, create waterpools on the street and fill up the rain channels.

Tropical storm water managment

The National Water Agency, PUB and The Institution of Engineers Singapore, IES offer solutions for water management suitable to Singapore, a dense populated city in the tropics. Since the climate and population densities in Hanoi is simliar to situation in Singapore, their recommendations are regarded as applicable in the context of Hanoi. According to PUB and IES, expanding canals and drains, is not sufficient to slow down and reduce storm water runoff in urban areas with a monsoon climate and high construction densities (PUB & IES 2013). Instead they claim that managing storm water on green roofs, in planter boxes, bio retention swales, storm water ponds, permeable pavements and in local water tanks, at the source where the water is generated, is more effective.

The storing capacities, offered by underground water collecting tanks, also offer recycling of rainwater for irrigation, air condition and toilet flushing which reduces water consumption. By integrating storm water treatment into the urban landscape and make it visible to the public, interactive, learning and aesthetic environments are further claimed to be created. The vegetation in the swale slows down the water flow, and make pollutants possible to sediment. This is regarded as a good pretreatment of storm water. Further treatment in bio retention systems is considered a good complement (PUB & IES 2013). PUB and IES emphasizes however, the need to consider the public health aspect of urban storm water management in the tropics. A careful implementation to reduce the risk of mosquito breeding is essential. According to PUB and IES, open storm water systems need to be designed to promote good water circulation. Infiltration capacity of the soils or filters that are used in the systems need to be carefully controlled. Introduction of natural mosquito predators as well as making sure that larvae controls twice a week is feasible, is essential (PUB & IES 2013).

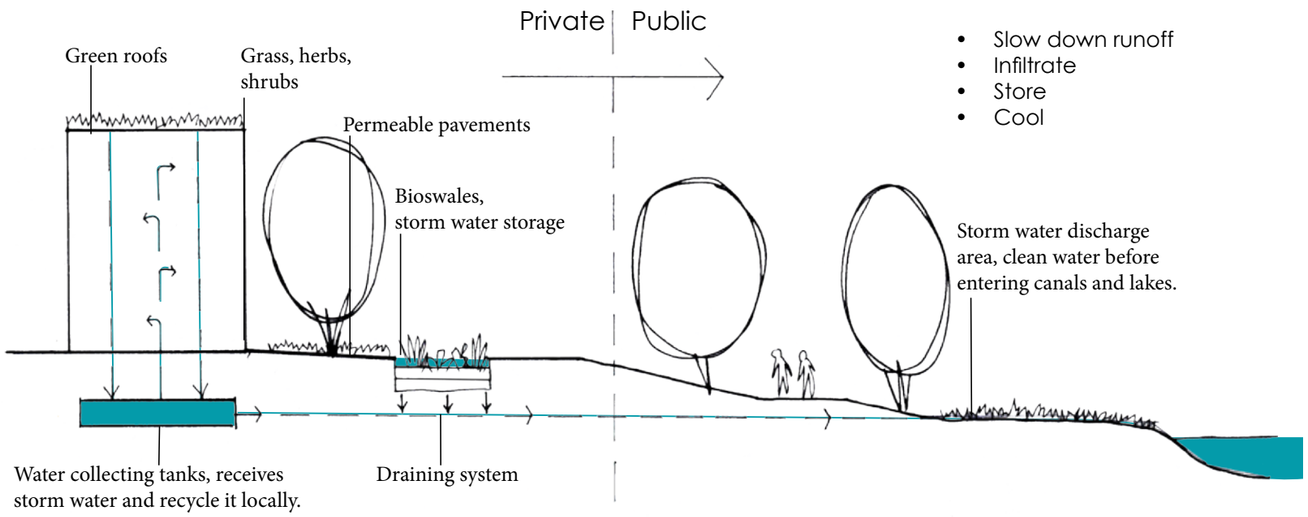


Figure 16. Storm water managment in a tropical climate, according to PUB and IES. The construction of the bioswale need an appropriate infiltration capacity to avoid mosquito breeding (PUB & IES 2013).

Analysis

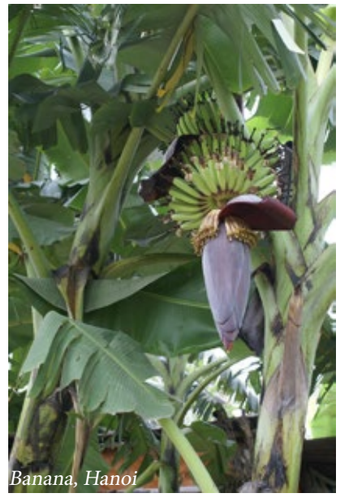
Region

Vegetation at the region scale. Natural tropical forests are made up of big shading-, fruit- and flower trees. On agricultural land crops like rice, maize, sugercane, tea, rubber and vegetables are cultivated.


Bamboo, Sapa


Peachtree, Sapa


Love Waterfall, Sapa


Banana, Hanoi


Sugercane, Hanoi


Bananatree, Sapa


Maize, Dai Bat


Plumtree, Sapa


Rice, Sapa


Rice and vegetables, Dai Bat

Green and blue structure in the region

Uy and Nakagoshi (2008) have studied Hanoi from a landscape ecological perspective, and found that the city resembles a hybrid of linear elements, greenery along rivers, roads and railways, and non-linear elements such as parks and agricultural land. They argue that preserving these different kinds of green and blue structures, is important to maintain biological diversity. Green structure at region scale include agricultural land, forests, rivers, lakes and ponds. This green structure make up the majority of green structure in Hanoi (The Prime Minister 2011, p. 40).

The 2000 century development of Hanoi

According to the Master Plan of 2030, vision to 2050, Hanoi will be "oriented to the green, cultural, civilized and modern city. The city will be developed, at the same time as natural land, traditional craft villages and historic relics are preserve (The Prime Minister 2011). The future development of Hanoi is according to the Master Plan by urban clusters, including the current Hanoi city, five new satellite towns and towns connected by the road systems. Hanoi urban core cluster is planned to be separated from the other, by green corridors in order to prevent further sprawling and preserve agriculture land (The Prime Minister 2011 p. 42). The Master Plan underline the importance of connecting green and blue structures by ecological networks of green wedges, green corridors and green belts. Green wedges will create direct links between green structures at region and the city center. Green corridors along Tich- and Day Rivers will conserve natural forests, agricultural land and prevent these structures from further urban sprawl. Key forests to preserve because their diverse habitats are Ba Vi, Soc son and Huong Son (p. 36).

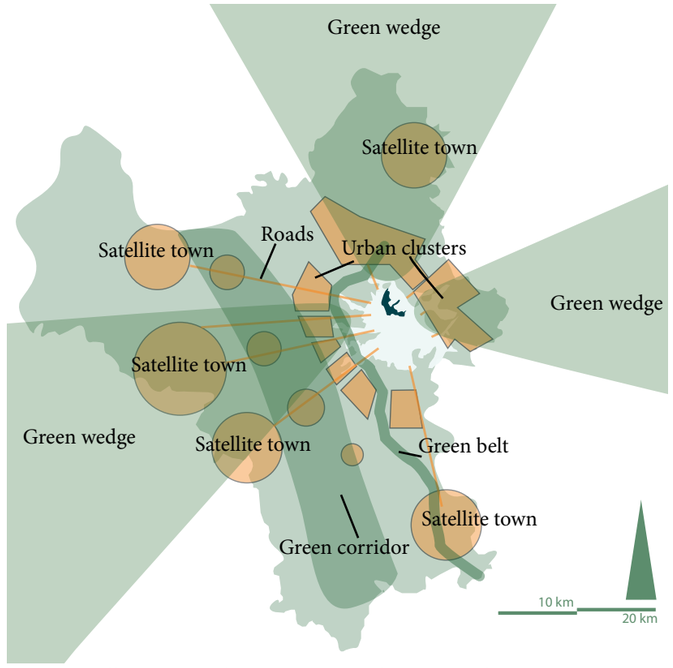


Figure 17. Illusration of the Hanoi Masterplan 2030 with vision to 2050. Proposed green wedges to create green links inside and outside the city. Green corridors will conserve natual forests and green belt prevent uncontrolled urban development (The Prime Minister 2011).

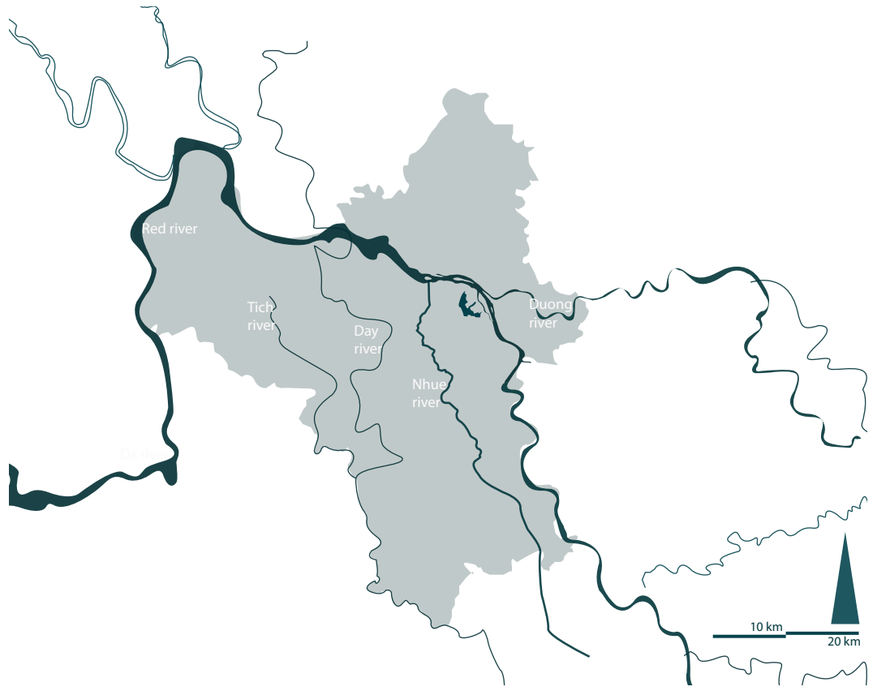


Figure 18. The big river network in Hanoi region.

Summary

- The regional landscape is made up of linear and nonlinear green and blue elements that are connected. This network needs to be preserved to maintain biodiversity.
- Green wedges, corridors and belts are supposed to enhance the connection between the regional and urban landscape.
- The green structure in the region that can be represented by the pre-urban layer described above is made up of forests of big shading-, fruit- and flower trees and agricultural products as rice, maize and vegetables.

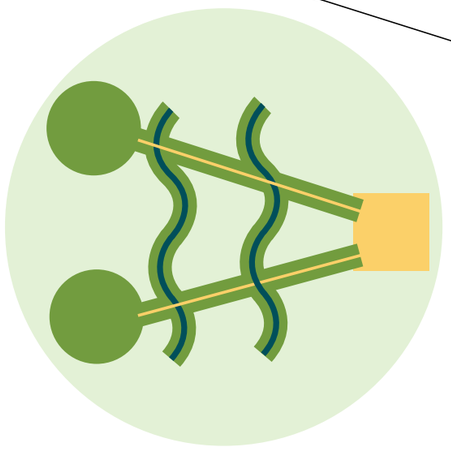


Figure 20. Schematic illustration of the existing regional green structure, according to Uy and Nakagoshi (2008).

Figure 19. Green structure at region scale is made up of forests and agriculral land. Along and in between the big rivers there are connected natural land. Socson Mountain, Ba Vi and Huong Son are diverse ecological important forests (The Prime Minister p. 36).

City

At the city level, vegetation is quite formal. Native and exotic plants exist in a variation. A selection is presnted here. Exotic vegetation are the palms *Livistonia tonkinensis* and *Areca catechu* and *Geranium* seen in parks and flower gardens at ground level. The grass seen in existing lawns are not specified here, but is a global element seen in Recreational parks and parks.

Native vegetation are the leguminous tree *Saraca dives;* the weeping fig *Ficus, Gnetum gnemon* and the decorative *Barringtonia acutangula*. Bushes are kept low and shapted.


Topiary art


Areca catechu


Ficus Elastica


Gnetum gnemon


Areca catechu


Ficus Elastica


Livistonia tonkinensis


Barringtonia acutangula


Geranium

The infrastructures layer, have emerged parallel to development of roads, railways and canals. Species associated with roads are Alstonia scholaris (L.) and Dracontomelum duperreanum. Big street trees follow the roads in the urban city center. Along the ring roads lower bushes and decorative flower plantings dominate. The highly decorated roads are further an example of a global pattern, inspired by the European gardenesque landscape style.


Rows of Lagerstroemia speciosa


Intensively manage low raised plantings


The street Hoang Quok Viet, from above


Intensively manage low raised plantings


Canals are lined with concrete edges with some grass

Green infrastructure in the city

The green infrastructure in the city is made up of a mixture of r*ecreational parks, parks, flower gardens, street trees and attached green space.* The current area of parks and smaller parks, the so called flower gardens is, in the five inner district of Hanoi, Tay Ho, Ba Dinh, Hoan Kiem, Dong Da and Hai Ba Trung, in total 2, 08 m^2 per person. Flower gardens have the potential, because their limited size, of being well distributed over the city and close to the citizens. The case is however that the historical inner districts only reach in average 0, 1 m^2 flower garden per person. These data can be compared with green space per person in other cities like New York City 23, 1 m^2, Paris 11, 5 m^2 and Tokyo 3 m^2 (Skyscraper city 2015). The urban green structure is, on top of the limited size, unevenly distributed. Among the inner districts, Hai Ba Trung has the highest cover of parks and flower gardens while Dong Da has the lowest.

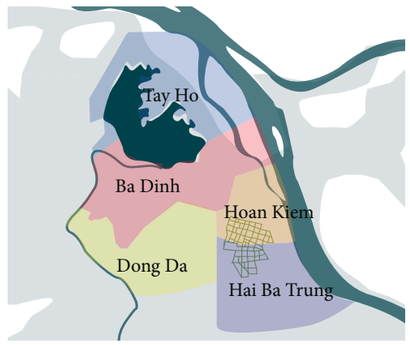


Figure 21. The five inner districts of Hanoi.

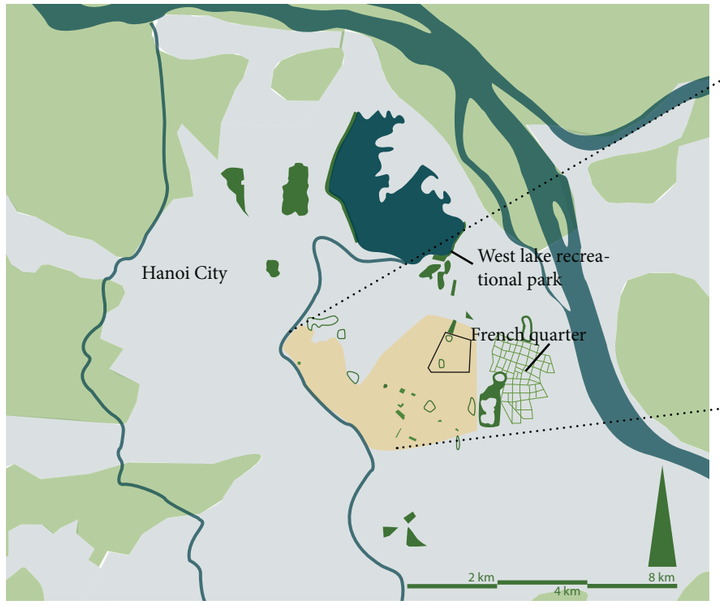


Figure 22. Green structure of Hanoi city. Agricultural land surrounds the gray urban fabric. The darker green spots represent recreational parks, parks, flower gardens. The French quarter is illustrated by the green grid.

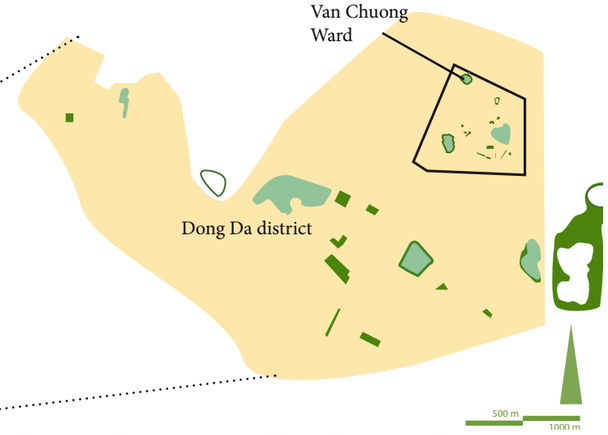


Figure 23. Green structure of Dong Da district. Green spots represent all kinds of green space such as parks, flower gardens, lake areas and attached green space.

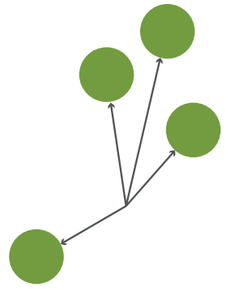


Figure 24. Green spaces in the city are small, isolated and unevenly distributed.

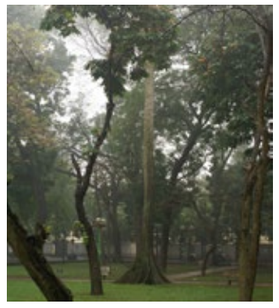
Summary

- The green structure of Hanoi city is made up of urban agricultural land, parks, flower gardens, street trees, lake- and river vegetation and attached green space, but is too small, isolated and unevenly distributed.
- 33 green nodes need to be connected by an inner greenbelt to prevent further urban sprawl, maintain biodiversity, offer shade, connect the city with the lake and river systems, enhance recreation and interweave public space with lakes and rivers.
- High construction density with large proportion of impermeable surfaces and low cover of green space .

Recreational Park

Recreational parks are the biggest green urban space, offering possibilities to walk, fish, exercise and to get some tranquility. Recreational parks only exist in the urban center. Access require a ticket.

Park



The next in order of size are Parks. They are most of the times associated with lakes. They have trees, shorter walking paths and are sometimes surrounded by fences. Parks are usually accessible without ticket.

Flower garden

The smallest public green spaces are flower gardens. They are smaller open spaces, which are decorated with flowers and offers some seating possibilities.

Street tree

Street trees exist on many streets. They differ much in size, age and quality. In the French quarter, Hoan Kiem district, the streets offer much space for street trees.

Attached green space

Attached green spaces are not availabe to the public, since they are within areas such as hospitals, schools and governmental buildings. They can however contribute to biodiversity and the visual quality in the city.

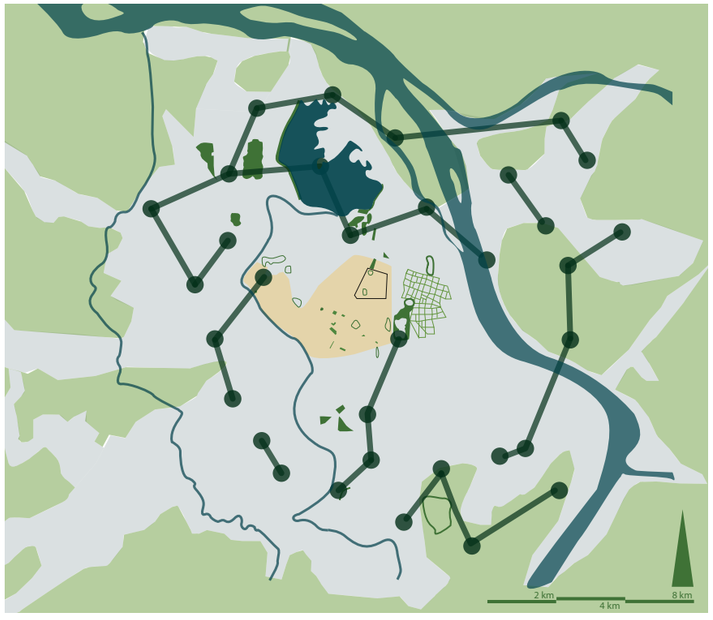


Figure 25. 33 green ecological nodes are selected by Uy and Nakagoshi as important to connect by an inner greenbelt. The purpose of this inner greenbelt is to prevent further urban sprawl, maintain biodiversity and enhancing recreation (Uy & Nakagoshi 2008). According to this plan, some parts of Hanoi will be connected and improved regarding green space. Still, Dong Da district has limited green space, large proportion of impermeable surface and quite far from the closest proposed ecological node.

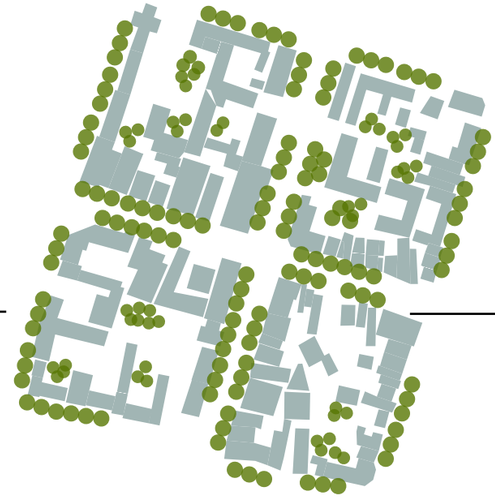
Three typical spatial urban structures and corresponding green cover in the city

Ho Dinh and Mamoru (2009) have studied the spatial structure of Hanoi and identified three different types of road and housing construction densities which are: high, medium and mixed. They have found that green space is different in these respectively structures. These figures illustrates the study result of Ho Dinh and Mamoru.

High construction density. These areas are found in the urban center. The spatial density is high, with small houses, short and narrow streets with low coverage of green space and large amount of impermeable surfaces.

Van Chuong, view from Capital Tower.

Medium construction density. These areas are also found in the urban center, mostly south of Hoan Kiem lake in the very core of Hanoi. The built structure is more regular with square blocks, larger buildings, residential courtyard spaces and many street trees.



Cau Giay district, west of city center. South view from Somerset Apartments.

Mixed construction density. At the urban fringe a spatial structure with irregular construction density, is found. Small houses are mixed with high buildings in large blocks. Trees and agriculture land remain in between houses.

Cau Giay district, west of city center. East view from Somerset Apartments.

Figure 26. Three typical spatial urban structures in Hanoi, with corresponding green structure.

Figure 27. ***Rivers****. To Lich, Lu, Set and Kim Nguu Rivers, creating a blue network. To Lich River used to be a branch of Red River, but was filled in 1889, during the French colonial period. Today To Lich is a seriously polluted drainage canal.*

Figure 28. ***Canals****. The canals are important in the draining and sewer system. Many canals are covered by land, but some open systems remain. Solid and liquid wastes into the canals are a big sanitarian problem.*

Figure 29. ***Lakes.*** *The above mentioned lakes do have social and cultural values to the people of Hanoi. Other benefits from the lakes are improved microclimate and regulated water. West Lake is the biggest lake with a history dating back to the Vietnamese Ly dynasty in 1009. 61 temples and pagodas remain around the lake. Hoan Kiem Lake also have a temple and, the so called Ngoc Mountain, reflecting the Daoism philosophy. Truc Bach Lake is separated from West Lake by an embankment. The southern lakeshore has in the past being a silk weaving village. Thien Quang Lake used to be connected with Bay Mau Lake. Bay Mau Lake is popular for fishing, going by pedal boat and walking around, but is accessible only with ticket. Linh Quang Lake is a small lake, and not well known. It used to be a recreation park but is today polluted, surrounded by informal settlements and not accessible.*

Blue structure in the city

Within the city there are four main rivers, To Lich, Lu, Set and Kim Nguu, running in a nort-south direction. These rivers are connected by smaller constructed draining canals. This fabric of blue linear elements througout the city is also connected with the lakes and associated with the green structure. According to Ta Quynh Hoa [1], there used to be 111 lakes and ponds in the city. Now only half of them remains due to densification of the city by infilling construction works. As a result the increased proporton of sealed surfaces make flooding to a real threat to the city. The population growth, urban expansion, overloaded drainage and sewerage systems and surface and groundwater pollution, thus stands in a conflict to water as an ecological and cultural resource. According to Thanh Van [2], planning of distinctive edges around green, blue and public spaces, are effective methods in preventing these from further informal occupation.

Further the structure of traditional Vietnamese villages relates to a pond which is located in the center of the village, in front of the communal house and pagoda. The pond was important for fishery, worshiping and meeting people. Preservation of the blue structure is according to Ta Quynh Hoa[1], very much a concern of the culture.

Polluted canal in Dong Da district.

Summary

- Urban growth pressure the lake area and quality of water, and stands in conflict with water as an ecological and cultural resource.
- Water is both a threat and a limited resource. By a sustainable storm water managment, the disturbed urban water balance can be mitigated. At the same time water become a resource to vegetation, aesthetic and social values are enhanced.
- Distinctive edges are considered preventing infilling of lakes.

[1] Ta Quynh Hoa, PhD candidate and lecturer at National University of Civil Engineering Interview 10 February 2015.

[2] Thanh Van, MSc in urban planning and lecturer at Faculty of Architecture and Planning, National University of Civil Engineering, NUCE. Interview 12 March 2015

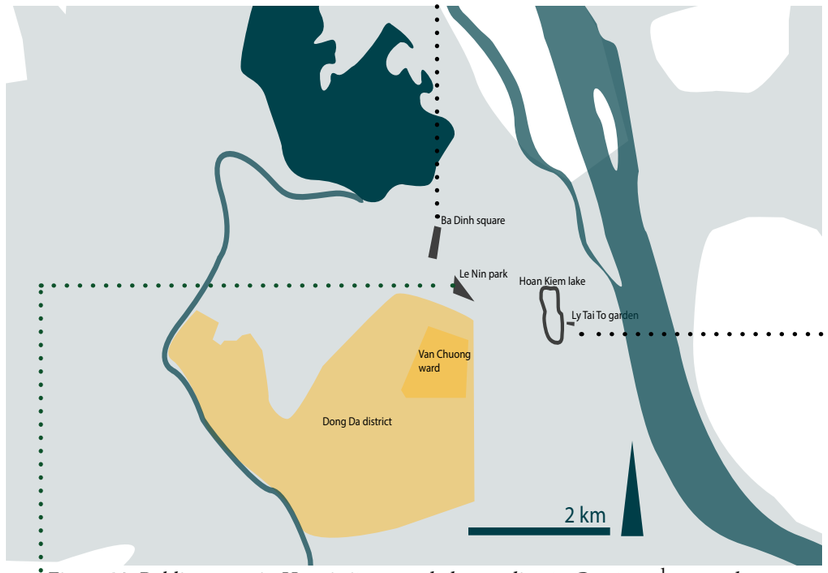


Figure 30. Public spaces in Hanoi city, regarded according to Geertman[1] as good examples. The use of public space linked to water have been studied by Kato et al. (Kato et al. 2008) to be walking, jogging, reading, tea drinking, eating and cultivation of vegetables.

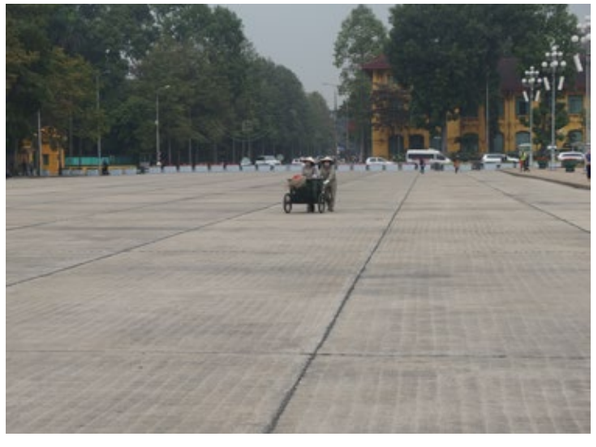
LeNin park, not to mix up with the former Lenin park- the present Thong Nhat Park, is a small triangular formed public park located in between busy streets. In the middle of the park a statue of the former Soviet leader Vladimir Lenin is placed. LeNin Park is especially visited in mornings and evenings by people exercising, dancing and most of all by young skateboarders.

Ba Dinh Square is in the center of Ba Dinh district and is surrounded by ministry buildings, including the President´s palace. The square is where president Ho Chi Minh read the Vietnam Independence Proclamation in 1945, wherein “All men are created equal and that everyone has the right to life, liberty and pursuit of happiness” was included. In memorial to the formal president, the Ho Chi Minh Mausoleum was built. Today, Ba Dinh Square is made up of both a large area of paved surface and a large area of 240 smaller grass squares. The area is an important attraction to tourists and people of Hanoi. Parades and everyday gatherings of people that exercise, walk and just hang out are common activities at the square.

Ly Thai To garden is located next to the City Peopole Committee in the center of Hoan Kiem district. This park is dedicated to Ly Thai To, the former emperor of Vietnam who moved the capital to Hanoi in 1010. The park surrounds the statue of Ly Thai To and is a popular public place to families and young people, in particular to girls.

[1] Stephanie Geertman, PhD Senior urban researcher, Freelancer. Interview 2 March 2015.

Characters of Ba Dinh square



Ba Dinh Square show fairly good condition for public life. The place offer a safe and secure environment with good walking, standing, playing, talking and viewing opportunities. Improvments can be made by offering some more shade and sitting possibilities. Ba Dinh Square is reflecting the Cunfucianism ideal, influenced from China.

- large, open quite empty space, inviting for different public activities, not decided in advance, or ”not programmed”.
- strict, official design, sharp edges
- historical value

Characters of LeNin park

LeNin Park show, apart from high traffic noise and apparent air pollution, good condition for public life regarding protection and comfort. The park is dived into two parts. The open space shown in the pictures offers long sightlines and decorative flowerarrengments. The other part is compose of many big old trees offering shade and shelter from wind. Influences from the gardenesque landscape style is visilbe in the flower arrengements.

- small space, inviting for different public activities, not decided in advance
- strict design, sharp edges with an official character
- good physical availability
- higly decorated with flowers
- surrounded on two sides by big old trees

Characters of Ly Thai To garden

Ly Thaoi To Garden show an almost optimal place to public life, according to Gehl. Only the noise level is slightly increased in this place.

- small space, inviting for different public activities, not decided in advance
- sharp edges with an official character
- good physical availability
- some big old trees surrounding tha park

Summary

The public spaces analysed above are according Geertman[1], good examples since they are fully accessible to the public and used by a variety of people. Common characters of the places, are that they are not fully programmed, have sharp edges, a simple and obvious design, good physical availability, decorated with flowers and have a historical value.

According to the Gehl analysis, these places offer overall good conditions for public life regarding protection, comfort and delight.

- All three places offer protection to pedestrians from traffic, good lighting and public life during day and night, which increases the chance of feeling both safe and secure. Shelter from wind, rain, heat, pollution and traffic noise can be improved.
- All three places offered good comfort, like accessibility, unhindered sightlines and opportunities for physical activities. Improvements were needed in sitting, standing and silent possibilities.
- LeNin Park and Ly Thai To Garden both offered spaces designed to human scale, opportunities to enjoy climate and interesting views. The large area of Ba Dinh Square on the other hand, enable gatherings of large amount of people, but lose the enjoyable size to the human, interesting details and become exposed to wind and sun.

[1] Stephanie Geertman, PhD Senior urban researcher, Freelancer. Interview 2 March 2015.

Van Chuong

The neighborhood is part of the city and therefore having related vegetation presented above. Away from the biggest roads, the streets are more privatly decorated than the rest of the city. Flowers, vegetables and trees seem to be managed by residents themselves.

Vegetables cultivated along a street in Hai Ba Trung district.

Private flowers decorate the street.

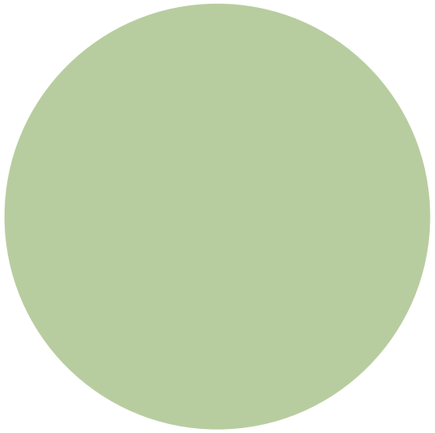
Citrus japonica, Kumquat

Common way to cultivate vegetables in the wards of Hanoi

Enydra Fluctuans, waterplant reduce pollutants

Ecology

The green and blue structures were studied by analysing satellite images, from a landscape ecological perspective. The images made it possible to study the favorable and unfavorable spactial structures as recommended by Cain et al. (2011, p. 515).



Community

The social dimension of community, was carried through by analyzing public space from the perspective *"12 quality criteria of the pedestrian landscape"* according to Jan Gehl (Gehl 2010, p. 238), in the city- but foremost in the ward scale. Further the social dimension was also carried through by conducting five interviews with local residents in Van Chuong ward.

Delight

Using the methodology by Kevin Lynch was used by studying barriers, paths, districts, nodes and landmarks of Van Chuong ward. This analsyis is included below in the ward scale, within the chapter of Delight, since Lynch claim that the arrengement of the elements influence the visual quality of a city.

Green structure of Van Chuong

The uneven distribution of parks and flower gardens within Dong Da district, further continue in lesser and lesser scales. Among the 21 wards in Dong Da district, Van Chuong is one of the densest populated with lowest coverage of green space (Nguyen 2015). By referring to the Hanoi Greenery Planning, Nguyen claim that flower gardens within housing units should be no farther than 500 meters from any home. Today this is not achieved to anyone in for example in Van Chuong.

Existing green structure in Van Chuong is primarily based on trees around the three lakes, Van Chuong Lake, Van Lake and Linh Quang Lake. Only Van Chuong Lake is fully accessible to the public and mostly used by the citizens living next to it. The entrance of Lake Van faces the historical Temple of Literature at the north, just outside the boarders of Van Chuong, and is in reality not accessible to the citizens in Van Chuong. Linh Quang Lake is informally accessible just for the people living next to the lake. The green structure at the rest is made up of trees between houses and attached green space. No permeable surfaces were observed during the field observations.

Small green patches can despite their unevenly distribution and isolation, be function as small ecological stepping stones (Uy & Nakagoshi 2008). In densely built areas Uy and Nakagoshi further suggest solutions to enhance connectivity between patches, by restore and insert greenery on roofs-, balconies- and facades. They also suggest taking advantage of linear elements such as roads and canals as well as current vacant spaces between buildings to expand the green structure.

Summary

- Green space is unevenly distributed in Dong Da district with very little cover of vegetation in Van Chuong. Within Van Chuong the neighbourhoods close to Van Lake and Linh Quang Lake suffer from very limited green space.
- The existing green elements are small, elongated, dispersed and isolated.
- There are four spaces within Van Chuong that possible can be developed. These are the gathering path, the little square, the playground and Linh Quang Lake. Further, connection to the lake can be improved at four places shown with white arrows.
- By open up the built structure at selected spots, the green and blue structure can expand and be connected. The green structure should offer more trees, hedges and flowers in a variety of species, to increase biodiversity.

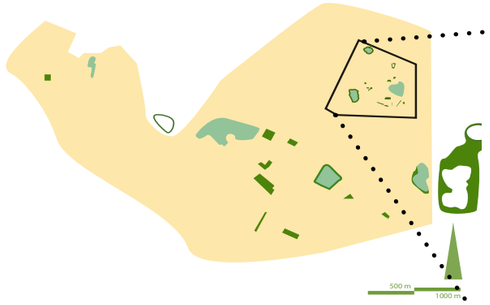


Figure 31. The location of Van Chuong ward in Dong Da district. Green space is isolated and unevenly distributed in the district as well as in the ward.

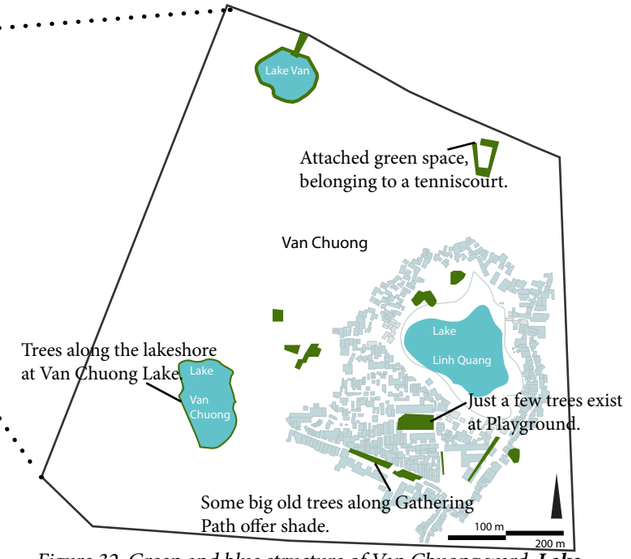


*Figure 32. Green and blue structure of Van Chuong ward. **Lake Van** in north, and its related flower garden is next to the Tempel of Literature and have a high cultural and historical value. **Lake Van Chuong** is also surrounded by trees of different speces and sizes. The vegetation of **Lake Linh Quang** is mostly waterplants that has grown over the lake.*

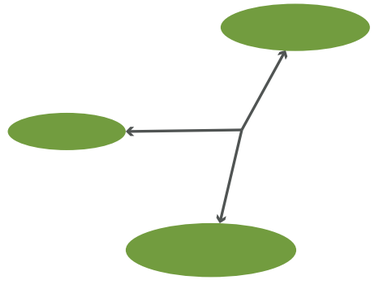


Figure 33. Van Chuong is overall covered by concrete or asphalt, with limited possibilities of storm water to infiltrate into the ground. The green spaces are small and isolated.

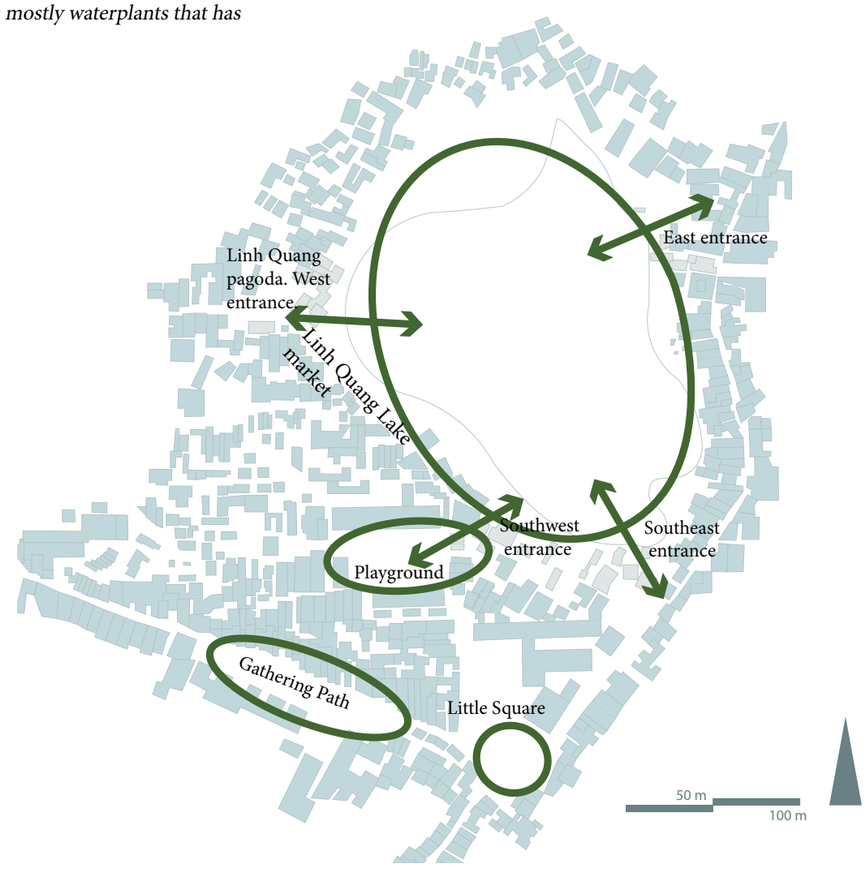


Figure 34. Linh Quang Lake neighborhood in Van Chuong. By expanding and connecting green and blue space, biodiversity and urban resilience to flooding will be promoted. Open systems of storm water management, multiple services like slowing down the runoff and cleaning polluted water are developed. Open storm water systems, further support vegetation and become interesting element in the city. Green and blue structures are the basic elements that will enhance biodiversity.

Spatial structure of Van Chuong

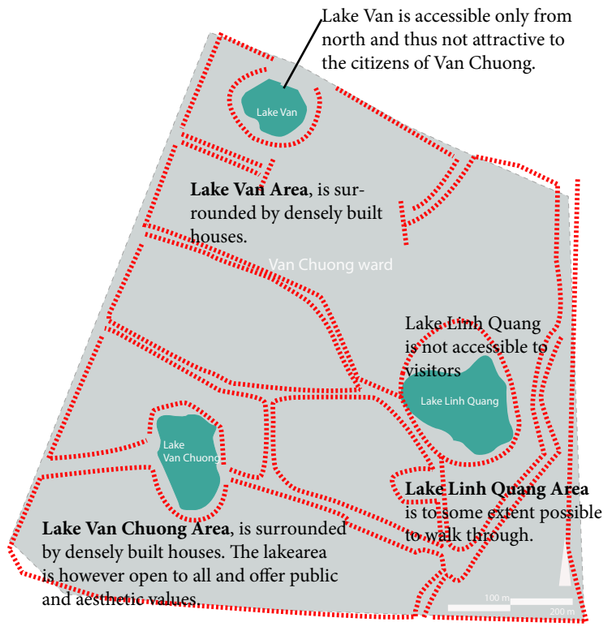


Figure 35. Analysis of barriers in Van Chuong ward, according to Kevin Lynch (1960).

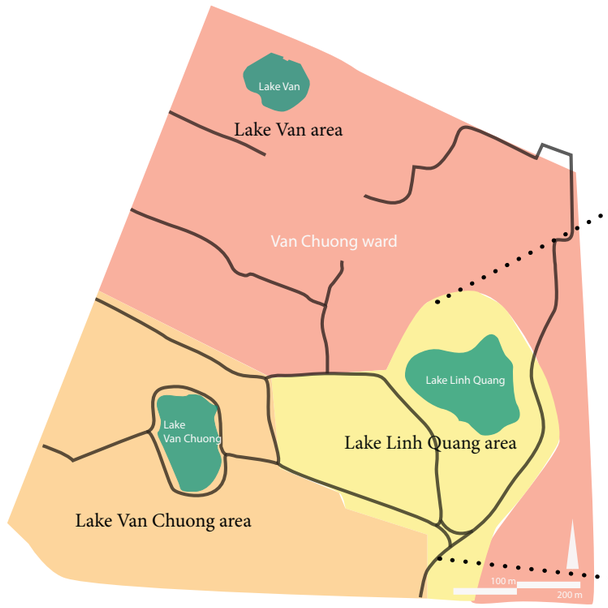


Figure 36. Analysis of paths and districts in Van Chuong ward, according to Kevin Lynch (1960).

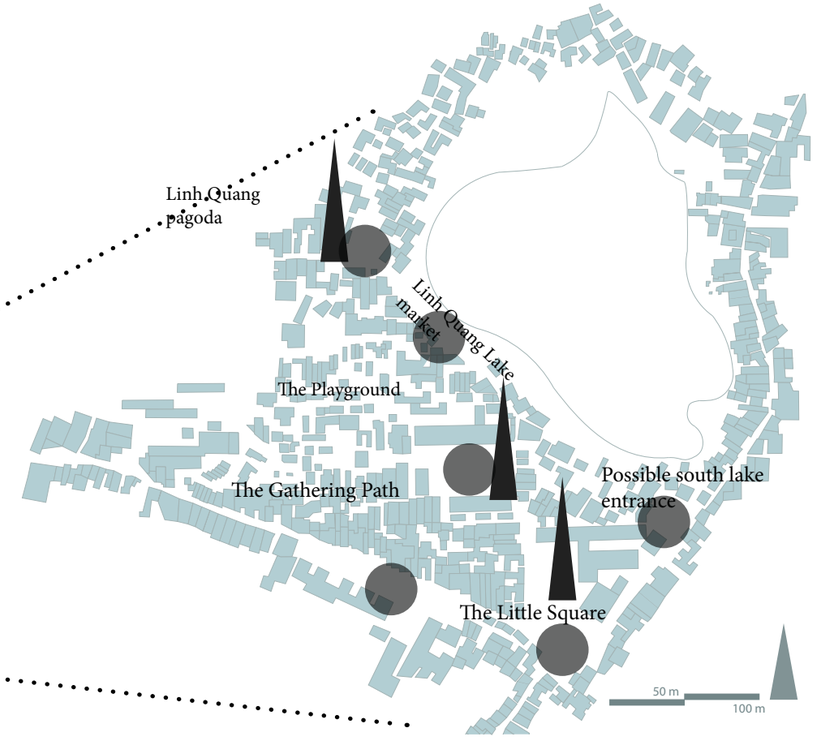


Figure 37. Analysis of nodes (dots) and landmarks (triangles)in Linh Quang lake area, according to Kevin Lynch (1960).

Barriers. The dense building construction limit accessibility to the ward and the possibility to walk freely within the ward, except from the given alleys. The houses thus make a barrier around and within the ward.

Access to the area around Lake Van is difficult, making analyzing this part impossible. The area around Linh Quang Lake have narrow streets possible for visitors to walk. The area also have some structural widening, making orientation possible. The Linh Quang Lake itself, is unofficially closed to visitors. Only by the hospitality of some residents it is possible to pass their homes and get access to the lake.

To open up the built structure to improve the accessibility to the public, it is however required to relocate some houses. The best for the public is disadvantaged by the residents living there, many of them with low income and the reason why they live there.

Districts and paths. The main paths of Van Chuong ward are illustrated in black. These are also the only possible entrances to the ward. Following these three to five meter narrow alleys made the exploration of the whole ward limited. To cover the overall ward, strolling through half private mazelike alleys was required and difficult to orient within. These alleys are therefore not considered being paths. To improve the readability of the ward, making the orientation easier is important.

Three districts, Van Lake, Van Chuong Lake and Linh Quang Lake were identified in Van Chuong ward. This classification was done because each of these lakes have a belonging to a pagoda. The pagoda and the lake make up a natural meeting place for the residents living in the surrounding neighborhood. This is still the case the neighborhood around Lake Van Chuong, making a natural Lynch district. The other two lakes no longer provide meeting places, because their obvious lack of accessibility. The neighborhood around Lake Van is difficult, or at some spots even impossible to access. The lack of accessibility to this neighborhood, made me analyses it as a separate district. The third district is the neighborhood around Linh Quang Lake. Even though the lake itself is not accessible to the public, the neighborhood around it is. This district also showed to be in great need of development of green and public space and was selected as my study area.

Nodes and landmarks. According to the Lynch analysis, Linh Quang Lake district have six structural widening, functioning as landmarks with their food markets, playgrounds and pagoda, important to enhance the readability of the ward. These spots are in the following named as above and considered possible to enhance green, blue and public space.

All places have in common that the boundaries between private and public areas are weak. To enhance publicness and readability of the neighborhood, these areas need to be clearly defined.

Summary

- Parts of Linh Quang Lake district is feasible to analyze. The high building density and few and narrow alleys do however strongly limit the accessibility through the neighborhood. Six structural widening are found and considered possible to develop regarding green, blue and public space.
- Barriers need to be bridged. At selected nodes some relocation of houses are necessary to develop green, blue and public space.
- Boarders of private and public need to be clearly defined in order to enhance publicness and readability of the neighborhood.

Gathering Path. The former private resident courtyard and playground is now used as parking of motorbikes. It has also become a place for selling and eating food. This is considered a node to the residents. The feeling is that the place is for regular visitors only, making it somehow to a barrier to visitors. Storm water is poorly managed.

Little Square. It´s the place were four streets meet. Many people are passing by. The widening of the square, in the otherwise dense built structure, is a liberation. Small fruit markets and small places to eat edges the square. The yellow wall is the entrance to a school and a landmark.

Playground. The only real playground of Linh Quang Lake district. The wall that surrounds the playground, prevent to some extent from occupation of vendors, motorbike parking and food stalls. It is an important node to families, but is poorly managed. Linh Quang Lake is just next, but not accessible. 18000 people live in Van Chuong and share the scarce current public space. There are three playgrounds, where the largest is 500 m^2 (Nguyen 2015).

Linh Quang Lake Market. The market follow a fence, making a barrier to the lake. One entrance to the lake exist, but visitors are still not permitted. The food market that used to be inside the fence, is replaced by a car parking.

West entrance to Linh Quang Lake.

Linh Quang Lake market, along the fence to the lake.

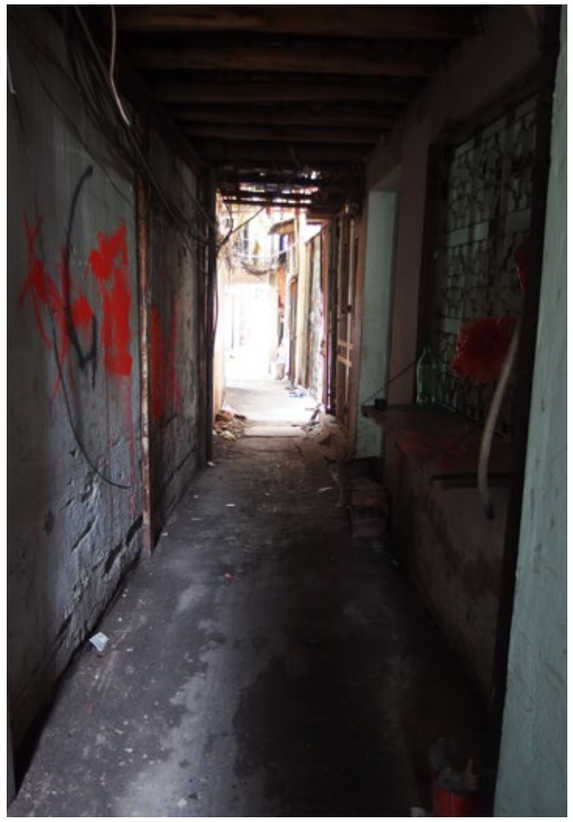
Smaller disposal plant, next to the market.

Linh Quang Lake Pagoda. Historically connected to Linh Quang Lake, but today separated from it by buildings.

Linh Quang Lake. As already mentioned this lake is not accessible, except from them living by the shoreline. The only possible access the lake was by passing through a resident's private yard. Solid waste is dumped into the lake, and partly used as infilling material. The water is completely overgrown with water plants.

A former entrance to the lake is shown below. It used to be a food market, but is now transferred to parking lots. Since five year the lake is fenced. A garbage station are placed nearby and food markets follow alongside outside of the fence. Traditionally every pagoda is connected to a pond and almost the case the other way around. The pagoda of Linh Quang could possibly be reconnected to its lake, by removing some of the houses which make a barrier.

The space that the lake offer, possesses a great opportunity to satisfy the need of walk, exercise, play, meet and rest. By connecting the lake and pagoda, it offers opportunities to reclaim parts of the Vietnamese culture.



East entrance to Linh Quang lake. View from the street. The narrow alley is between private houses and part of their private space.

Half way through the alley to the lake.

Above, view at west. Below view at south. The lake is completely overgrown with water plants and lakeshore covered by solid waste. Houses closest to the lake are informally constructed.

Public structure of Van Chuong

Figure 38. Selected spaces in Van Chuong analysed according to Gehl.

Linh Quang lake market

Linh Quang lake market follow the narrow and frequently travelled street Van Chuong lane. The market is a local landmark and a natural meeting place for local residents. The competition of vehicles, pedestrians and social activities is tuff in the limited shared space. According to Gehl the more space that is offered to the public, the more life come to a city (Gehl 2010 p. 12).

Proposal
- reclaim and open up the former market place to the public
- offer lighting
- provide shade
- become a visual focal point
- convenient sitting and standing areas

Little square

The **Little square** is an important node of Van Chuong, with a school, four meeting streets, a smaller market and some places to eat. The exposure to traffic make the square unsafe and noisy to pedestrians. There are few trees offering shade and protection from wind. The open space provide some opportunity for development of public as well as green and blue structures.

Proposal
- provide shade
- become a landmark

Gathering path

The **Gathering path**, is constructed in the 1960s and meant to be a playground. Nowadays the area is old and degraded. Parts of the playground still remains, but mostly the area is a meeting place for cooking, eating, motor bike parking and washing. The Gathering path is located in between Van Chuong- and Linh Quang lake areas and is regarded as an important link between people in these neighborhoods. The place offers a good sense of human scale, but lacks interesting details such as water, decorative vegetation or fine views.

Proposal
- offer lighting
- become a local landmark
- improve sightlines
- improve the publicness

Playground

The 800 square meter large **Playground** is part of an open space of the double size. The Playground is surrounded by a low concrete wall protecting children from traffic. The place do however lack lights and city life. This make the place feel insecure. Few old playing equipment exist and some smaller trees do not offer enough shade. Motorbikes, private properties and people compete of the limited space.

Proposal
- offer lighting
- improve the publicness
- become a visual focal point
- improve sightlines and connection to the lake
- convenient sitting and standing areas

Summary

These spaces mentioned here were chosen to develop, because they were considered feasble in adding ecological, aesthetic and public values to the ward. These spaces were also accessible and possible to explore. According to the Gehl analysis, these places offer overall average and poor conditions for public life regarding protection, comfort and delight.

- The strengths are that all four spaces offer scales desigend to humans, good or average sightlines and interesting views. The little square also offer an environment with somewhat city life day and night.
- All places suffer from many weaknesses. The already limited open space is many times occupied by motorbikes, foodstalls, vendours and private properties. Traffic jam hinder safe walks for pedestrians. Few lightings, narrow alleys and limited citylife in evenings make the places feel unsecure. Little protection against sun and rain, few public benches, noisy enviroments and no invitation for physical activities degrade the comfort. The sensory experience is at most average, with poor plant material and no visible water.
- The occupated lakeshore around Linh Quang lake, limit public access. According to the residents interviewed, there are desires to get access to this area.
- All spaces therefore need to be upgraded regarded the mentioned aspects above.

Interviews of Van Chuong

The public use of lakes, ponds and marshes have been studied by Daisuke Kato, Masanori Sawaki, Shigemori Kanazawa and Tran Anh Tuan (Kato et al. 2008) to be walking, jogging, reading, tea drinking, eating and cultivation of vegetables. These are activities that people interviewed in Van Chuong, also express as a strong desires. The focus of the interviews were on what the residents considered being strengths, weaknesses and if they had certain wishes about development of their neighborhood.

The first interviewed was with a 45 year old confectioner, who had lived in Van Chuong since 1992. He experience Linh Quang Lake as smaller and not as wide, than it used to be. Illegal squatting encroachment of the lakeshore was his explanation of the shrinking lake. An increased dumping of solid waste on the lakeshore, was also brought up as an issue, according to him leading to a degraded living environment. He had attended political meetings regarding the development of the lake. He claimed that many ideas had been discussed but change was, conspicuous by its absence. The interviewee had wishes of the lake becoming a green park, in a near future to a reasonable expense.

The second interviewed was an older woman selling drinks next to Linh Quang Lake. She had lived in Van Chuong since 1962, also experiencing Linh Quang Lake as much bigger before. People used to go fishing and around the lake there used to be a food market. She dreamed about Linh Quang Lake being developed like the southern Vietnamese Can Tho floating market. Today the water was mentioned as polluted, with any fish alive. In the last five years the lake had been fenced and the market moved out from lake area. Lack of money was the explanation given, that no development happens.

The third interviewed was a young woman with a little child, selling fruit. She had recently moved to Van Chuong and had no real wishes about the structural development of her neighborhood. However, she wanted more big trees giving shade and trees with fragrant flowers spreading some delight.

The fourth interviewees were three old women, living on the east side of Linh Quang Lake. The walls of their homes created an alley leading to the lake. Their great hospitality gave my interpreter and I, access to Linh Quang Lake. Despite waste, dirt, bad smell and totally overgrown water surface, they utilized the open space offered by the lake to dry clothes. Their wishes were that the lake, like many other lakes in Hanoi, would develop to a public place with possibilities to exercise, walk and let children play.

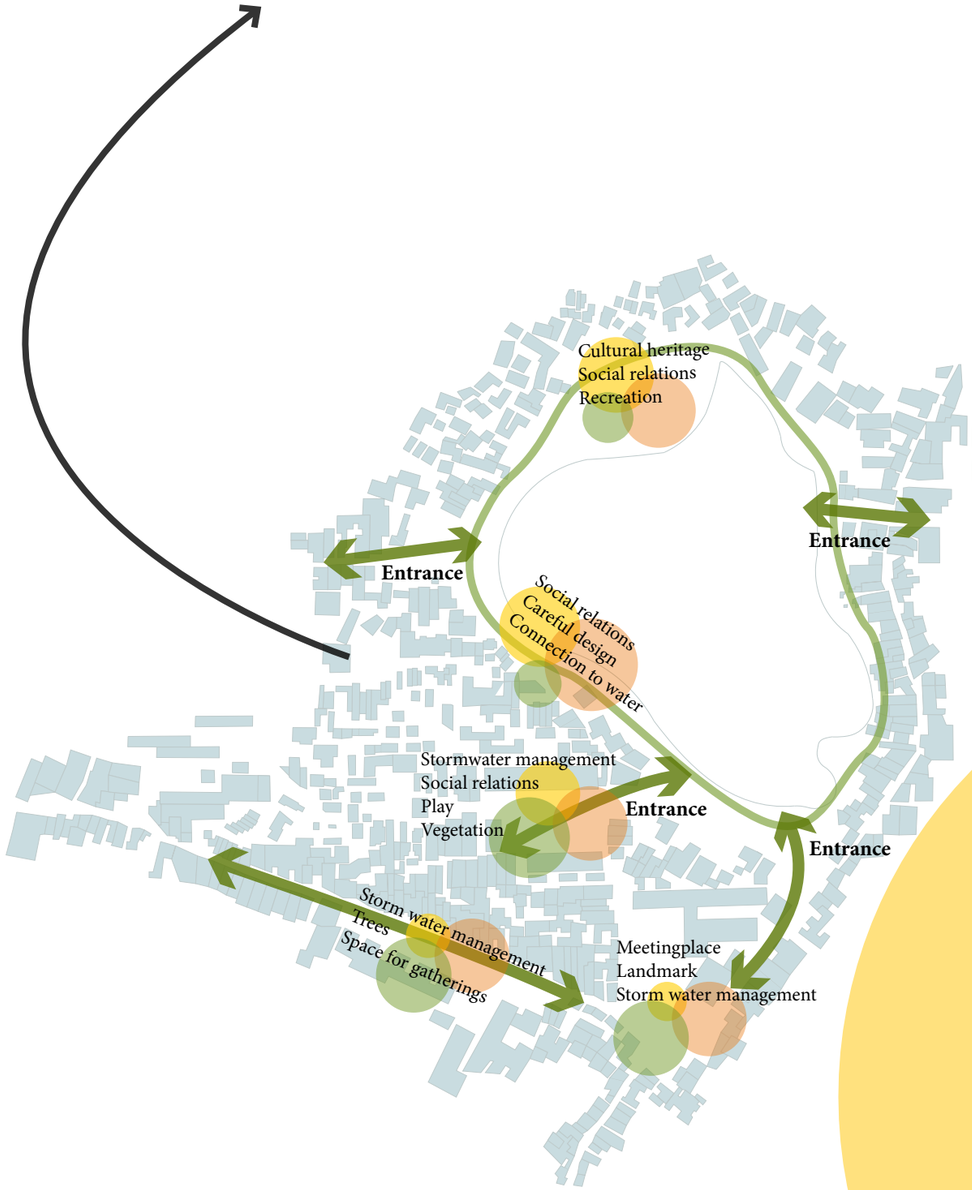
The fifth interviewed were a 55 year old motorbike-taxi driver, a resident of Van Chuong since the 1980´s. He had memories of fishing in the lake, something he wished to someday be able to do again. As all other interviewees he was concerned about the future of Van Chuong and Linh Quang Lake, but also like the others, a weak trust of the urban development system.

Summary

- The lake is smaller, encroached by squatters and not as accessible as before.
- As a result of increased dumping of solid waste by the lake, the living environment is degrading.
- The polluted water has stopped the possibility to fishing in the lake.
- Despite fishing, meeting and trading on the former local food market used to be activities around the lake.
- Wishes of the development of the lake were similar to all interviewees. Transforming the encroached polluted environment to becoming a green park, with possibilities to exercise, walk and let children play, were common desires.
- Move the food market back to the lake area, and develop a floating market, was also one concern.
- The experience was that the accessibility had decreased the last five years.
- Despite many ideas about development of the area, no change was experienced and the trust to the political planning system was mainly low. Lack of money was one given explanation.

Concept and proposal

Reclaimed connections



The analysis of Van Chuong is framed by the Tri valent design theory. Through the analysis the concept *Reclaimed connections* has evolved. Reclaimed connections refer to the need of connect natural habitats; nature and people; and people to each other. The slightly different sizes of the colored bubbles, exemplify that different emphasis on ecology, community or delight, have been put at the different places.

Ecology

- Expand and connect green and blue spaces
- Increase the amount of permeable surface and manage storm water in a sustainable way. Make storm water management visible and connected to other uses
- Use native tree species, which provide shade, fragrant flowers and fruits
- Decorative flowers and grass at ground level
- Vegetation with deep root systems and tolerant to dry and wet conditions.
- Playful and ecologically learning elements

Community

- Public spaces offer good lighting
- Shelter from wind, rain, sun, pollution, traffic noise
- Good accessibility, interesting sigtlines and opportunities for physical activities
- Comfortable seating and standing
- Reclaimed accessability of Linh Quang Lake and make it to a place for gatherings, play, recreation and social interactions

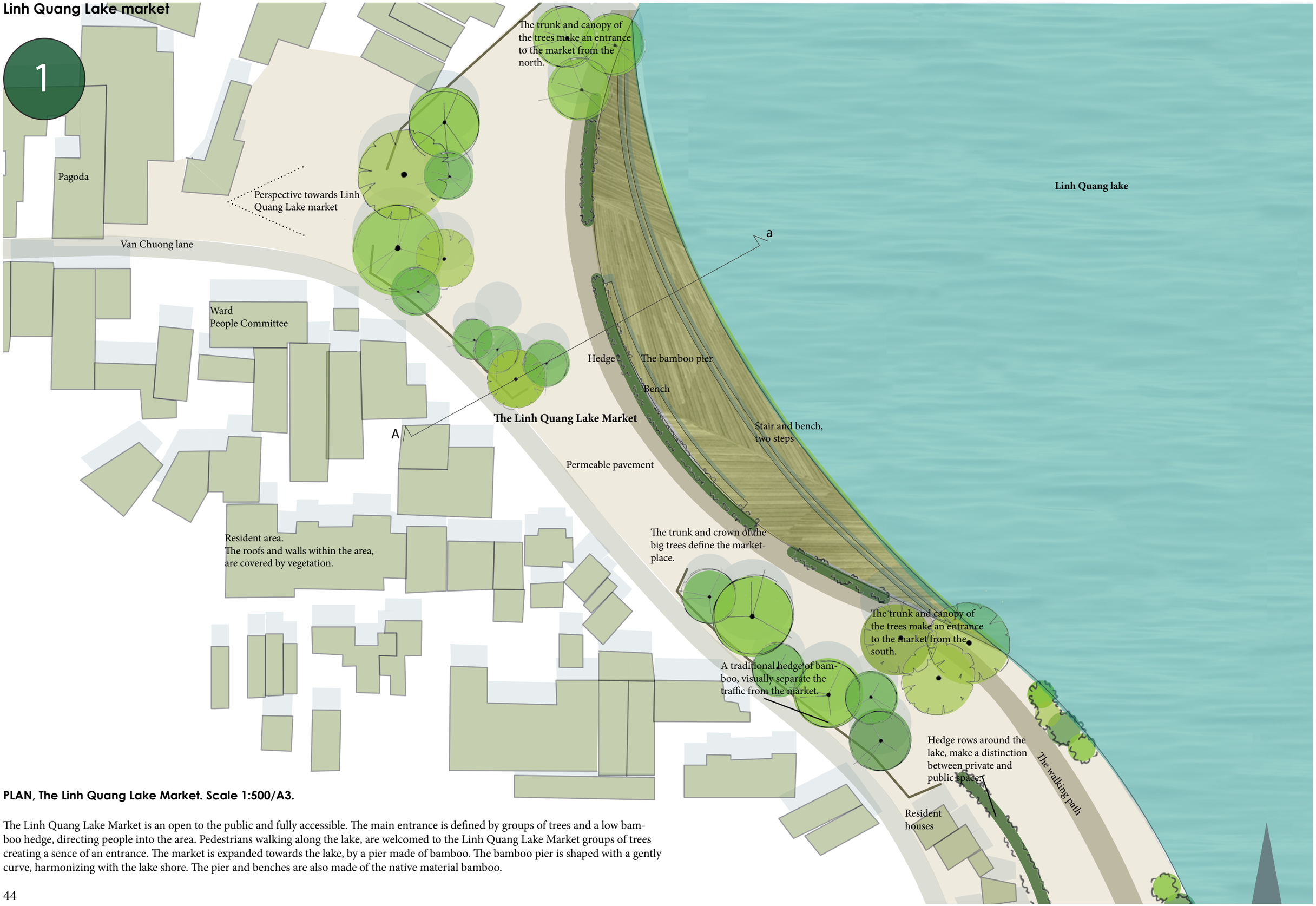
Delight

- Remove the barriers. Some buildings need to be removed in order to connect existing paths and nodes. The selected nodes need focal points to enhance the readability of the neighbourhood
- Shan-shui: rock and water, scenic views reflecting the natural landscape.
- Yin and yang: balancing natural and human built elements, sizes, colors, textures and spatial arrangements.

Linh Quang Lake area

PLAN, Linh Quang Lake area in Van Chuong. Scale 1:2000/A3

Storm water is managed in a sustainable way, by green roofs and green walls within the resident area. Further storm water is collected in local vegetated ponds, which unburden traditional drain-age systems. The ponds are designed in order to define, separate spaces and add aesthetic values. In the resident areas the ground is paved with permeable material, like consolidated sand or paving stones with joints enabling water infiltration. Linh Quang Lake is accessible by four new entrances, where green-, blue- and public structures also have been expanded and connected through. Native trees in a variety of species and sizes, are planted in groups to become focal points and enhance readability within the neighborhood. Other functions of the trees are to strength-en the green character of Van Chuong, enhance readability, decorate, offer shade, shelter from wind, fragrance and manage storm water. Rows of hedges are planted around the lake to define space and add ecological values. The mountains made of rock, at the Playground and Recreational Park will offer scenic views within the neighborhood and invite to play. The combination of rock and water is associated to Shan-shui culture. At the storm water ponds, Shan-shui is symbolized by rocks and water. The Linh Quang Lake food market become an important social landmark. A bamboo hedge, reflecting the traditional Vietnamese village, and trees are defining the place. An area free from traffic make the place feel safe. Food market during the days, public activities and good lightings at night make the place feel secure. Benches around the area offer seating possibilities. Groups of trees, storm water ponds and the lake entrances make it easier to orient within the neighborhood and offer interesting sightlines.



PLAN, The Linh Quang Lake Market. Scale 1:500/A3.

The Linh Quang Lake Market is an open to the public and fully accessible. The main entrance is defined by groups of trees and a low bamboo hedge, directing people into the area. Pedestrians walking along the lake, are welcomed to the Linh Quang Lake Market groups of trees creating a sence of an entrance. The market is expanded towards the lake, by a pier made of bamboo. The bamboo pier is shaped with a gently curve, harmonizing with the lake shore. The pier and benches are also made of the native material bamboo.

1

PERSPECTIVE, towards the Linh Quang Lake market.

Lakeview from the Pagoda. The former closed path and the culturally important pagoda and the lake, are reconnected and accessible to the public. The magnificent native tree, Barringtonia acutangula with red flowers, embrace the visitors. Inside the entrance, in the shadow of the trees, the Linh Quang Lake Market begin. The walking path to the left by the lake, take the visitor to the Recreational Park.

1

The area for the food market is expanded from the Van Chuong street to the lakeshore, making room for vegetation and social life. The smoothly sloping ground is covered by consolidated sand making infiltration of storm water into the ground possible.

A hedge of bamboo and groups of trees separate the market from the street, make the characters of the spaces apparent and enhance readability of the place.

Tree species are planted in groups to strengthen their characters, become focal points and improve the micro climate. Here the leguminous plant, Saraca dives, with orange flowers, decorate the market in early springtime.

A hedgerow along the walking path, make a comfortable shelter for people sitting on the bench on the pier.

The bamboo pier create a closer connection to the water and offer a distinct edge of the lakeshore. The bamboo pier offers places to walk, sit and fish.

SECTION A-a. Linh Quang Lake market. Scale 1:200/A3.

2

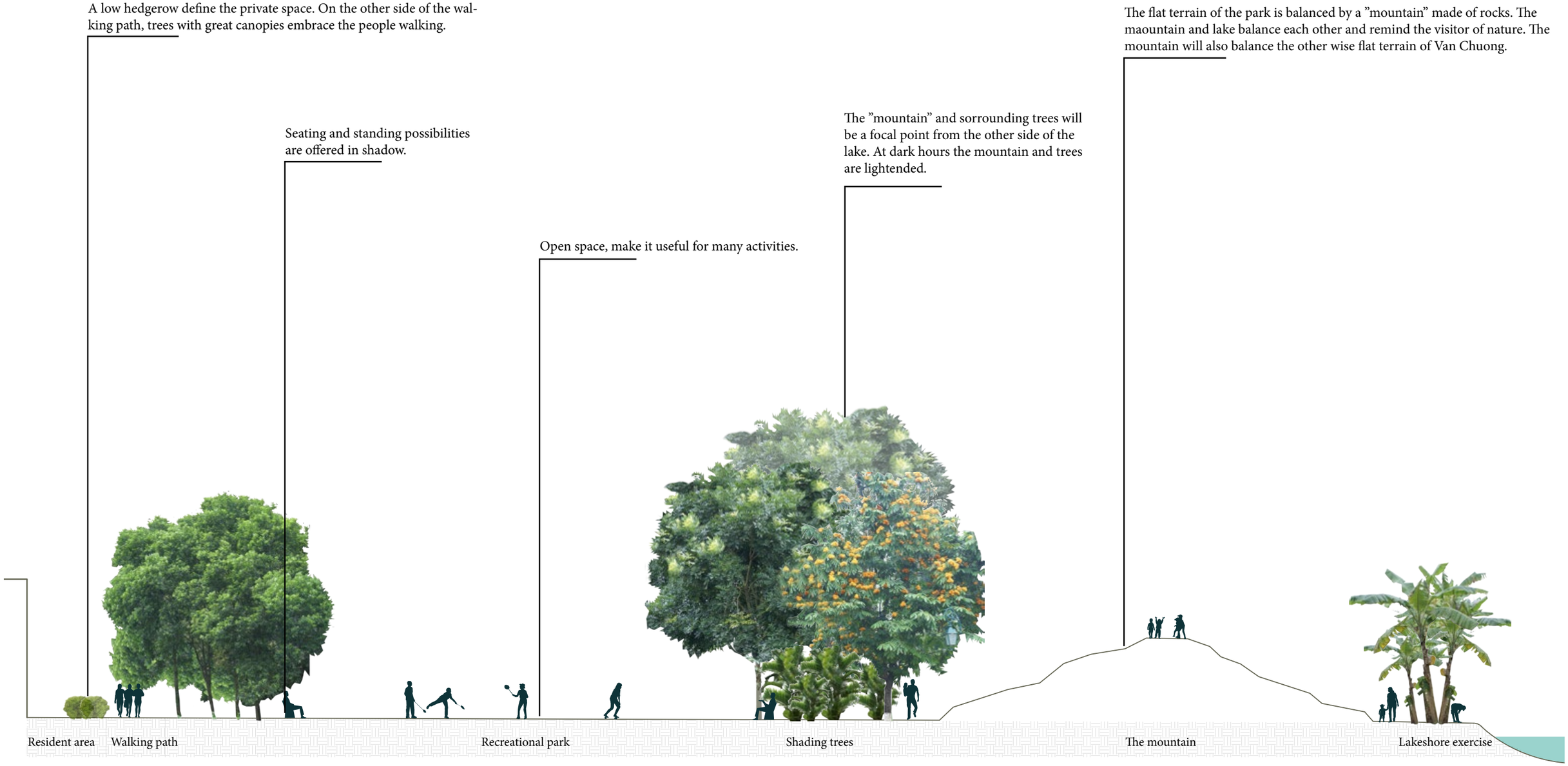
A low hedgerow define the private space. On the other side of the walking path, trees with great canopies embrace the people walking.

Seating and standing possibilities are offered in shadow.

Open space, make it useful for many activities.

The ”mountain” and sorrounding trees will be a focal point from the other side of the lake. At dark hours the mountain and trees are lightended.

The flat terrain of the park is balanced by a ”mountain” made of rocks. The maountain and lake balance each other and remind the visitor of nature. The mountain will also balance the other wise flat terrain of Van Chuong.

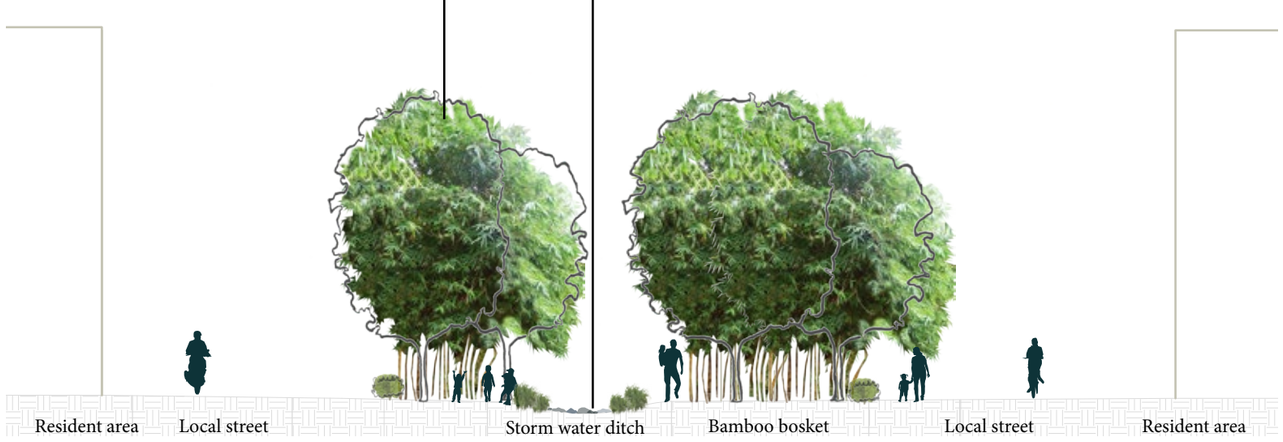


SECTION B-b. The Recreational Park. Scale 1:200/A3.

3

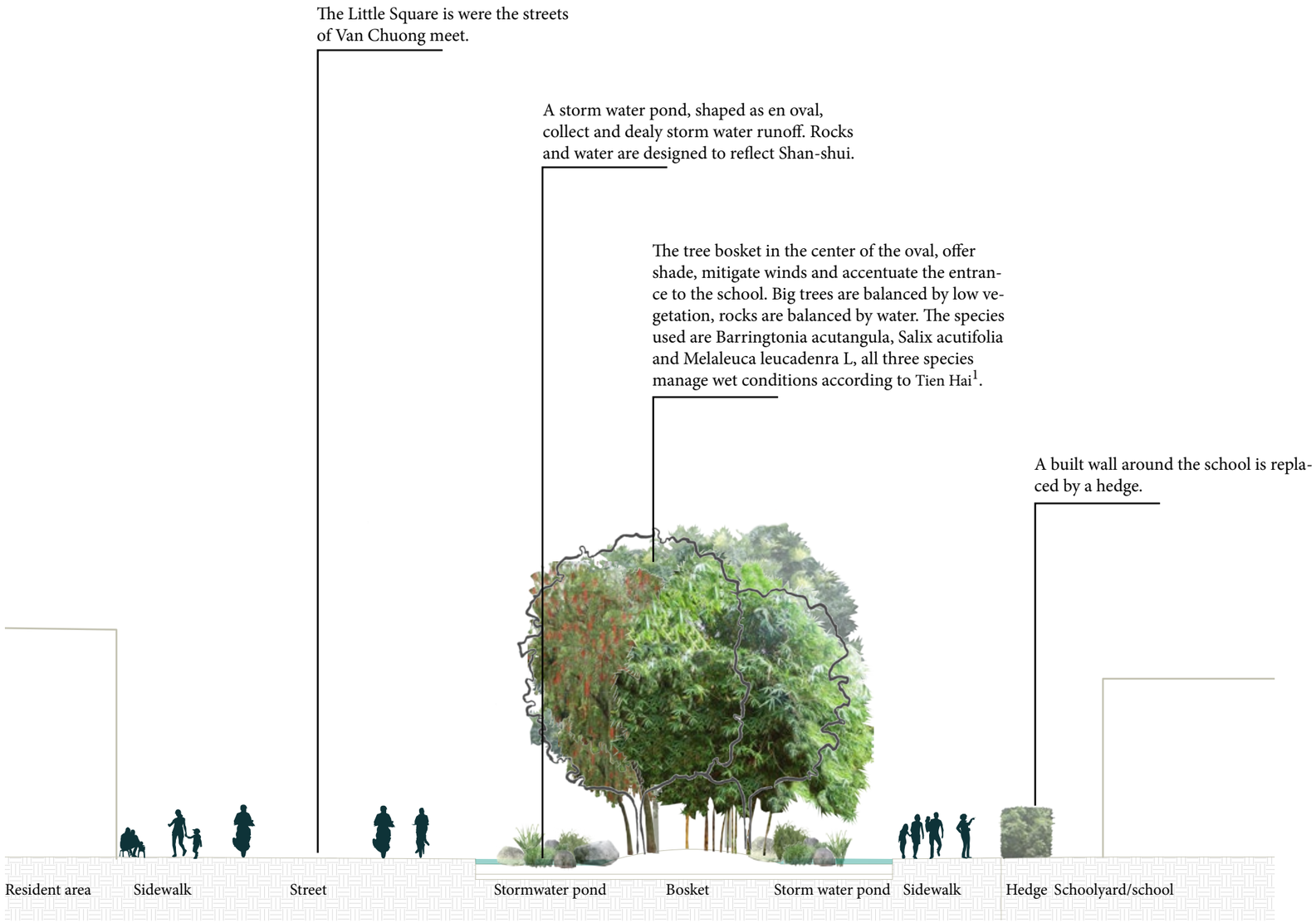
The Playground is designed in order to connect to nature. A bosket of the bamboo, embrace the storm water swale.

The collected storm water runs along the swale, which is possible to follow through the neighbourhood all the way to Linh Quang lake. Along the way, the water becomes purified as it passes through vegetatied ponds, that filtrate and further delay the runoff. The open system, make the storm water management visible. A rocky hill, on the other side of the Playground create a dynamic in the other wise flat terrain of the Playground. Close to the lake the water is collected in a pond and filtraded in a bank of sandy soil, before reaching the lake.



SECTION C-c. The Playground. Scale 1:200/A3.

4



SECTION D-d. Little square. Scale 1:200/A3.

[1] Tien Hai, MSc and lecturer at Vietnam Academy of Forest Science, VAFS. Interview 6 March 2015.

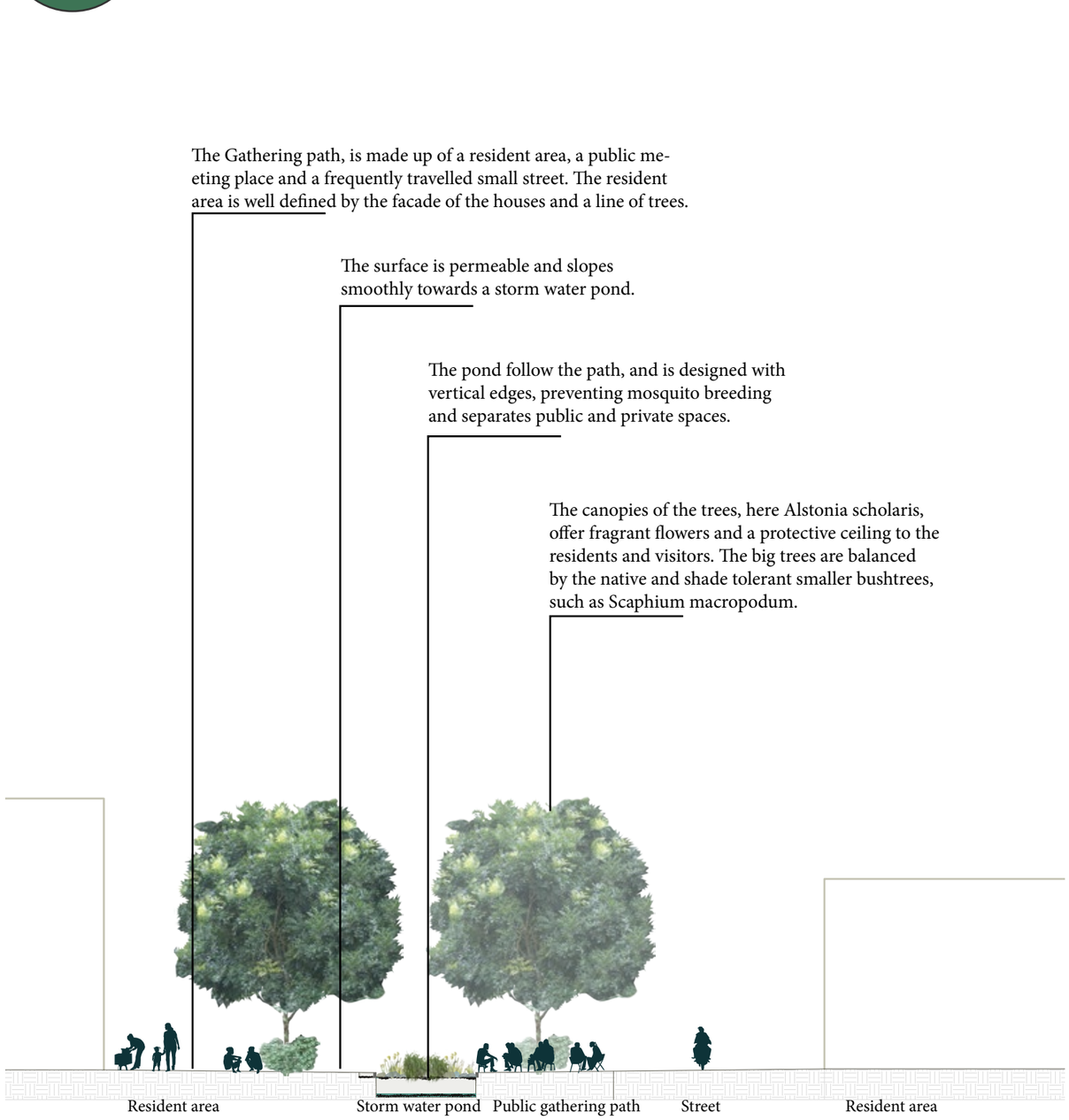
5

The Gathering path, is made up of a resident area, a public meeting place and a frequently travelled small street. The resident area is well defined by the facade of the houses and a line of trees.

The surface is permeable and slopes smoothly towards a storm water pond.

The pond follow the path, and is designed with vertical edges, preventing mosquito breeding and separates public and private spaces.

The canopies of the trees, here Alstonia scholaris, offer fragrant flowers and a protective ceiling to the residents and visitors. The big trees are balanced by the native and shade tolerant smaller bushtrees, such as Scaphium macropodum.



Section E-e. The Gathering Path. Scale 1:200/A3.

Discussion

I first explored the research questions through the literature and then by talking to people. The persons I met had different perspectives, giving me a broad, but not as concrete picture of the issue as I had hoped. In most cases the language became a barrier to the understanding of each other. Both in the interviews without interpreter and those with, I was never sure about whether my question was interpreted as I meant, or if I could correctly understand the answers. In addition the discussions were time consuming, hitting me with some frustration. Field observations were conducted parallel to the interviews, and a picture of the context of Hanoi started to evolve.

When getting into the design process, an energy consuming process took place. Visionary ideas should be transformed into concrete paper solutions. Analysis shifted between scales and focus, from being on the level of plant species to suddenly be about how to reconstruct the whole neighborhood. Illustration techniques also constantly alternated between manual and digital, in order to provide preferable scales and aesthetic expressions. Throughout the process, the photographs have been an effective support to remember the context of Hanoi. In the proposal it has been important to create space that enables uses of different purposes, as Geertman[1] claimed was one of the successes of LeNin park, Ba Dhin square and Ly Thai To garden. Other strengths of these places that has been applied in the proposal, were a strict design creating a sense of formality and that made it obvious what different spaces were aimed at.

Besides the site observations, inspiration was taken from Daoism philosophy and the Shan-shui culture. Still, I have constantly had a doubt whether it is possible to make a credible proposal based on these originally Chinese philosophies in a Vietnemeese context, for a visitor with other cultural preferences, limited time and knowledge? Chen and Wu (2009) namely claim that "landscape architecture, as well as landscape ecology, is profoundly influenced by cultural traditions and philosophical roots that must be acknowledged and respected". Doing this work, in a closer dialogue and collaboration with residents of Van Chuong and professionals within the field, would from this point of view have been a better way.

Methodology discussion

Using the Tri valent design theory was an early idea, since ecology, community and delight, was considered being dimensions of landscape design that corresponded with the ideas of this thesis. The longer in the process, the more I have understood that the selection of methodology has been to ambiguous. The desire to cover a whole lot, adventure the fine solutions. Concentrating on *one* of the dimensions, leaving the other two for future projects, would have been an option. On the other hand, I experienced all three aspects being interrelated to a great extent and difficult to separate.

The readability and visual qualities of Van Chuong was analyzed from a Lynch perspective. Lynch offers a hands on methodology for inventory and a vocabulary to describe the spatial arrangements within the city. When it comes to interpreting the findings, make substantial analyses from it and proceed in the process, the methodology was experienced as somehow insufficient.

Using the "12 quality criteria of a pedestrian friendly city", was another western methodology used, because Gehl claims that it is necessary to *"ensure reasonable protection from physical risks, insecurity and unpleasant sensory, before qualities of comfort and delight are planned"*. This toolbox was easy to use and offered qualities of a city that was considered applicable in Hanoi as well. However, as Gehl claims, it offers the *basic* needs of a pedestrian friendly city. By using the methodology some urban qualities significant to Hanoi, was experienced not really being captured. For example, to a western visitor the streets of Hanoi are mostly not pedestrian friendly at all, as the streets where people walk are massively travelled by motorbikes. To people in Hanoi this doesn´t seem to be a big problem and as a man put it *"without the crowded streets-its not Hanoi"*.

In order to understand the structure of the green- and blue structures at different scales, landscape ecological principles were used. Besides studying literature and satellite images, an interview with Professor Nguyen An Thinh, at Department of Landscape Ecology and Environment, provided me with information. The little more than one hour I got to talk to him was interesting, but far from enough. Time and difficulties in getting appointments became a limit. The fact that human beings influence what ecosystem services a city has and that ecosystem services influence human beings as Niemelä et al. claim (Niemelä et al. 2010), is a relationship that would have been interesting to discuss with a local urban ecologist.

What values do green and blue structures add residents of Van Chuong?

One of the first interviews I made in Hanoi was with Ta Quynh Hoa, who emphasized the cultural values of water and vegetation to the people in Hanoi. The traditional production of water demanding products like silk, rice noodles and pottery as well as the culture to gather and pray by the pond of the pagoda, have made water to a basic and important element of social relations in Hanoi. Even if the proportion of people living in rural areas are decreasing in Hanoi, Ta Quynh Hoa, claimed that many people still have daily contacts with animals, vegetation and agriculture. The seemingly strong influence of the Daoism and Buddhism philosophies in Hanoi, indicates that the connection between human and nature are important to people. The residents of Van Chuong expressed the value of green and blue space, as spatial opportunities to do ordinary things such as fish, exercise, socialize, walk and let children play.

However, the research question is complex and I experienced the answers to be quite brief, with difficulties to get a deeper analysis of the true values. The way the interviews were conducted, on site and people to interview randomly chosen, can be a weakness. People may have been suspicious of the objective, not prepared and with limited time to talk. Early in the process, my intention was to organize a focus group with some residents. Difficulties in the management of gathering people, became a fact even in this case, since a permission from the ward People Committee, was required. An application was given to the Committee, but time in this case became a limit.

In my proposal some houses have been removed. I have been aware of the dilemma of removing houses, belonging to people many times with few other living options. The purpose was to improve the living conditions of the general public, as it was strong desires among the people I interviewed. The increased accessibility to Linh Quang Lake on one hand and a probable tragedy to others, have left me with a sense of dissatisfaction. Question have aroused, whether values of green and blue structures would be expressed differently, depending on the conditions in which people live, and in that case in what ways?

How can green- and blue structures in Van Chuong be designed in order to foster urban resili-en-ce?

The fragmented landscape and increasing proportion of impermeable pavements, due to urbanization and the fact that Hanoi is situated in a lowland, make fostering resilience in the city important. Expanding green space in Van Chuong, with a high construction density was a challenge. Focusing on existing structural openings, finding solutions in the small scale to mitigate the impact of urbanization and fragmentation became my strategy. Quite simple technical solutions were proposed, as green roofs, green walls, slowing down and cleaning storm water in swales and water ponds, replacing built elements with vegetation, selecting native plants and a diversity of species, which is argued to be important by the PUB and IES in Singapore (2013), Mc Phearson et al. (2014) and Voskamp and Van der Ven (2014) among others.

However, Mc Phearson et al. claim that resilience is more than these technical solutions. According to them it is about connecting humans to nature, and increase the understanding of natural processes. Niemelä et al. claim that human action and biological responses can be improved by identifying what kinds of ecosystem services cities provide (Niemelä et al. 2010). By interviewing the residents of Van Chuong and using Daoism philosophy and Shan-shui culture was an attempt to try to catch aesthetic values, social relations and spiritual inspiration and a way to evoke engagement for resilient urban development in Van Chuong. The storm water management was also made visible and playful in environments where people meet and exchange ideas, which is thought enhancing the understanding of natural processes. This is important since Mc Phearson et al. claim that learning environments can foster urban resilience (Mc Phearson et al. 2014). In order foster a local identity and at the same time increase biodiversity, native species have been used in the proposal as Igantieva promotes (Ignatieva 2010).

The interviews gave me local perspectives and ideas. Organizing some kind of focus group had probably provided me with deeper understanding about values, beliefs, desires and attitudes in Van Chuong.

As a landscape architect, dealing with competition of urban space in an area vulnerable to climate change, it has been of great interest gaining a greater understanding of the landscape ecological-resilient chain. The question remains, whether this is how the literature about fostering resilience is supposed to be interpreted? Are there other ways that aesthetic values, social relations and spiritual inspiration could be used to foster resilience in Van Chuong?

[1] Stephanie Geertman, PhD Senior urban researcher, Freelancer. Interview 2 March 2015.

Can green, blue- and public space in Van Chuong be preserved by design?

Using green space for stopping urban development, as described in the Hanoi Masterplan, is not unique. According to Professor Kongjian Yu (2012) this way of urban development is widely used in both eastern and western cities. Yu claims that current evidence show that the idea of green belt and wedges to preserve natural land has generally failed. According to Yu the reasons are that planned green space usually are based on political boarders and lack relationship with natural boarders. He claims that the purpose of green space many times are just to stop urban growth and lack integration of recreation, flood control or habitat protection. He also mentions lack of accessibility as a reason why green spaces instead become easy development opportunities.

The analyses used in this project, I believed was not sufficient enough to answer this specific research question. I am also aware of that more emphasize could have been put on this issue in the interviews in order to gain a greater understanding of design as a tool for preservation of open space in Van Chuong. In spite of this, my intention has been to enhance preservation of green-, blue- and public space, in a smaller scale than Yu refer to. However Yu's ideas may be applicable in Van Chuong as well. According to the residents, they had wishes to live in a neighborhood where recreation was possible in green- and blue environments. Besides using sharp edges in the design, as Tien Hai[1] claims, the proposal strongly emphasize the need of accessibility, in accordance with the idea of Yu. Further, the values of multifunctionality, like water management interweaved with play and aesthetics and design of tree plantings to separate spaces, enhance readability, offer shade, increase bio diversity and to conserve a cultural heritage, have also been used to promote preservation. All these an interpretation of the idea of Yu. Through the process of this project I have had a thought that this may be one of the most important commitments to a landscape architect. Cities grow, either by densification or sprawling, in both cases on behalf of green-, blue- and public space. I have made my interpretation of how to preserve green-, blue- and public space in the small scale. Are there other ways to preserve green-, blue- or public space by design, and how does it differ at different scales?

Considering the fact that people need somewhere to live and many people in Van Chuong live in economically poor circumstances, it is however understandable why squatting might be their only option. It is not only the small scale occupation of land that is a problem though. On the question to the residents why this happens anyhow, in a culture that seem to put such a great value to nature, the answers were mainly a deficient political system. Nguyen Thi Hien (2015) explained it to be a lack of coordination, cooperation and reporting between government agencies and sectors regarding planning and management of public space. The big gap between comprehensive long term planning and behavior, was according to Pham Thuy Loan[2] another, indicating this being a matter of politics rather than design.

It is interesting to put this discussion in relation to an ongoing debate in Sweden, where the demographic pressure on public land in the big cities, is high as well. According to a group of landscape architects, there is an increasing gap between regulations for planning of-, and the actual construction of residential courtyards. They experience a resistance in many municipalities, who carry out master- and detailed plans, to realizing the regulations. By a one sided focus on creating buildings, they claim that municipalities lose opportunities to develop public spaces that promote playful, learning and healthy environments for the residents. According to the landscape architects, this construction behavior is regarded as a short term solution, resulting in small courtyards. The smaller the yards, the higher the physical pressure on the ground, which further forces the planners to use hard surfaces (Jensfelt 2015). This logic brings the issue of public space into the field of urban resilience, apparently a matter in countries with a stricter planning regulation systems as well.

Concluding remarks

Technical solutions, social relations, aesthetic values and spiritual inspiration are all dimensions that seem to be important in foster urban resilient development and in Van Chuong in particular it could be successful to frame the resilient development by Daoism philosophy and Shan-shui culture.

Gaining inspiration from native plant species rather than from western ideal, not only strengthen the identity of the place but also enhance biodiversity.

Using a more participatory approach when exploring green-, blue- and pub-lic space, would probably have provide a deeper understanding of the local context.

By expanding the spatial limits of the proposal to reach outside the boarders of Van Chuong would have been ecologically better, since developing a stepping stone, not only is dependent of the quality of the space itself. According to Baum, Haynes, Dillemuth & Cronin (Baum, Haynes, Dillemuth & Cronin 2004), a stepping stone should also be seen in relation to the composition of its surroundings. By including Dong Da district and connecting it to the "inner green belt" suggested by Uy and Nakagoshi (2008). Therefore doing a proposal in a larger scale, may have been a fruitful challenge in creating a stepping stone of Hanoi.

My hope is that this thesis about fostering urban resilience, can serve as an inspiration to the people and decision makers of Van Chuong, or elsewhere in similar contexts. This project may also inspire landscape architects, to explore whether there are norms, beliefs or attitudes within the local context that can be used in preserving green-, blue and public space.

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[1] Tien Hai, MSc and lecturer at Vietnam Academy of Forest Science, VAFS. Interview 6 March 2015.

[2] Ass. Professor and Deputy Director Pham Thuy Loan, Vietnam National Institute of Architecture, Ministry of Construction, MoC. Inerview 6 February 2015.

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Appendix 1

The questions aksed to the ten professionals are presented in chronological order below.

Interview questionnair to professionals

Associate Professor Nguyen An Thinh. Department of Landscape Ecology and Environment, Vietnam National University of Science Hanoi, NUH.

1. Can you describe the flooding pattern in Hanoi?
2. Are there certain areas of Hanoi that are especially vulnerable to flooding?
3. How can storm water management be improved in Hanoi?
4. How can ecosystem services be improved in Hanoi?
5. Are there certain plant species that should be used in order to increase biodiversity?
6. How can urban resilience be improved in Hanoi?

Associate Professor and Deputy Director Pham Thuy Loan. Vietnam National Institute of Architecture, Ministry of Construction, MoC.

1. What is the governmental goal of the development of green and blue structures in Hanoi?
2. What are the general advantages of green and blue structures in Hanoi?
3. Are there disadvantages of green and blue structures in Hanoi?
4. What are the values of green and blue space to people in Hanoi?
5. How is green and blue space used by people of Hanoi?
6. What are the man social values of green and blue space to people in Hanoi?

. Faculty of Architecture and Planning, National University of Civil Engineering, NUCE.

1. How does the blue structure of Hanoi look like?
2. What are the values of green and blue space to people in Hanoi?
3. How is green and blue space used by people of Ha noi?
4. How can the spatial structure of Hanoi be developed in order to reconnect people to vegetation and water?

MSc Architect Nguyen Tuan Minh. Vietnam National Institute of Architecture, Ministry of Construction, MoC.

1. Can you describe the spatial structure of a traditional Vietnamese village?
2. Are there certain elements that are significant to a traditional Vietnamese village?
3. Are there certain vegetation that is significant to a traditional Vietnamese village?
4. What public activities attract people of Hanoi?

PhD Senior urban researcher Stephanie Geertman. Freelancer.

1. What public activities attract people of Hanoi?
2. Do different public places in Hanoi attract different people?
3. Are there certain characters of public places that attract people?
4. In what ways are vegetation important to people in Hanoi?

PhD and lecturer Chi Le Quynh. Faculty of Architectre and Urban Planning, National University of Civil Engineering, NUCE.

1. Can you describe the flooding pattern in Hanoi?
2. Can you describe the spatial structure of Dong Da?
3. What green-, blue- and public places are there in Dong Da district?
4. Are there any special places where people meet?
5. What public activities attract people of Dong Da?

MSc and lecturer Tien Hai. Vietnam Academy of Forest Science, VAFS.

1. How can the spatial structure of Hanoi be developed in order to reconnect people to vegetation and water?
2. What plant material should be used to promote biodiversity?
3. What plants tolerate wet and dry conditions?
4. What plants are commonly used in Hanoi?

PhD urban planning Tung Phoduc. Freelancer

1. How can green and blue structures be developed in Van Chuong?
2. What plants are commonly used in Hanoi?
3. How can green and blue space be preserved by design?
4. How can resilience be promoted in Hanoi?

PhD and Project manager Ha Tran Kieu Thanh. Health Bridge, a NGO for livable cities.

1. What public activities attract people of Hanoi?
2. Where do people meet in Van Chuong?
3. How can green and blue structures be developed in Van Chuong?
4. How can Van Chuong be developed in order to be a better place to live in?

MSc in urban planning and lecturer Thanh Van. Faculty of Architecture and Planning, National University of Civil Engineering, NUCE.

1. What are the values of green and blue space to people in Hanoi?
2. What aesthetic values are important in green, blue and public space?
3. Are there certain characters of public places that attract people?

Appendix 2

The questions aksed to the five residents of Van Chuong are presented below.

Interview questionnair to residents

1. How long have you lived in Van Chuong?
2. What do you do for living?
3. Are there anything you would like to be developed in Van Chuong?
4. What does green space mean to you?
5. What does lakes and rivers mean to you?
6. Where do you go to meet people in Van Chuong?
7. Are there public activities you would like to be able to do in Van Chuong?