

Locally Appropriate Sustainable Urban Form: the Case of Sukhumvit Superblock

Singhanat Sangsenahat (2013)

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(2013) *Locally Appropriate Sustainable Urban Form: the Case of Sukhumvit Superblock*

PhD, Oxford Brookes University

# **Locally Appropriate Sustainable Urban Form: the Case of Sukhumvit Superblock**

Singhanat Sangsehanat

A thesis submitted in partial fulfilment of the requirements of  
Oxford Brookes University  
for the degree of Doctor of Philosophy

December, 2013

**Abstract**  
**Locally Appropriate Sustainable Urban Form:**  
**the Case of Sukhumvit Superblock**

Singhanat Sangsehanat

Futurity and equity are the complementary concepts of sustainability in which global ecological sustainability and local environmental quality and basic needs ought to be integrated to achieve sustainable urban form. A specific framework for defining global and local sustainability and ways in which they can be accommodated and delivered through locally distinctive patterns of form is central to the current research.

The aim of the research is to develop a conceptual framework and appropriate methodology for identifying locally acceptable sustainable urban form by synthesising global and local perspectives of sustainable urban forms, perceptions of sustainability, capacity for change and modification of forms in terms of sustainability. A series of conceptual frameworks are formulated and tested in a cyclical process in order to ascertain comprehensive answers to the question of sustainable urban form.

The methodology for identifying locally acceptable sustainable urban forms was established by using a multi-method approach for analysing a particular location (Sukhumvit, Bangkok). Morphological and typological analytical methods were used to study its socio-spatial patterns. Qualitative and quantitative methods were applied for assessing perception-based data of form-adaptations reflecting capacity for change. To investigate the global and local sustainability of a location, methods of physical evaluation in relation to sustainable urban form and methods of perceptual evaluation in relation to acceptable sustainable urban form were devised. The establishment of global indicators and the modification of local indicators were substantial in evaluating levels of sustainability. Enquiry by design methods was applied to illustrate locally acceptable sustainable urban forms.

By analysing Sukhumvit, the research suggests that both modern and local settlements are socially and culturally constructed within a superblock land structure and road development. Multilayered socio-spatial patterns are defined from the superblock typology, which are a foundation to interrogate aspects of sustainability and to interpret acceptable degrees of sustainable development which varies between the patterns of form.

Design principles for achieving locally acceptable sustainable urban forms were developed to sustain and encourage identified sustainability features and tested and refined in the field study. The research suggests that the capacity to deliver local sustainability is constrained by individual interpretations and social evaluations of choice. Political negotiations for suitable modification of forms are required to achieve the best solution in which both global and local sustainability can be accommodated. The interchange between choice and aspects of sustainability between the morphological layers is crucial to deliver locally acceptable sustainable urban forms.

The conceptual framework, together with the proposed methodology identifies locally acceptable sustainable urban forms. The study provides the way in which local capacity for change, local indicators and local sustainability can be investigated and refined further in other locations. Once a locally acceptable sustainable urban form has been identified it fosters design change and alters processes in order to deliver a local sustainable urban design in a broader context.

## **Acknowledgements**

Having thought of people whom I would like to thank in regard to this study, I realize that the greatest debt goes to my family. Without my father, mother, brothers and sister, the opportunity to study abroad is impossible, as well as the ambition in completing a PhD. I cannot thank them enough for their devotion and encouragement.

Grateful thanks must also go to people who assisted my education. Because of the things they taught, I was able to extend my experience in England. They are Luangpor Swat Dhamma Gamo, Dr. Rujiroja Anambutr and Dr. Chaiyasit Dankittikul.

Thank you very much for Professor Georgia Butina Watson and Dr. Jon Cooper. They are admirable supervisors along the journey of this doctoral research, as well as the good friends who always keep me 'on track'. They enlighten me to see the reality of things and ways to approach it. Thank you for your kindness, empathy and advice.

Genuine thanks to Emeritus Professor Ian Bentley who inspired me from his written work which opened my eyes to understand a number of issues related to this study. Thanks also to Dr. Roy Preece and Dr. Roger Ramsbottom who helped to complete a final version of the thesis.

Warm regards also to members of Oxford Brookes University who made a friendly study environment for me. Thanks for Professor Brian Goodey, Dr. Alan Reeve, Dr. Regina Mapua Lim, Dr. Laura Novo. Grateful for friendship from Edgardo, Hai, Hanh, Sunny, Becky, Maria, Mohammad, Vera, Avar, Huiming, Wang, Umut, Soroush, Pamela, members of Joint Centre for Urban Design and all my colleagues in AB2.01 and AB4.01.

My appreciation to the Office of the Civil Service Commission, Thailand, the sponsor of my study, and ML.Patcharapakorn Devakula and Wandee Taechaprut, Office of the Educational Affairs, the Royal Thai Embassy, who give the best support for government scholarship students.

Finally, my sincere gratitude goes to my beloved wife, Nisakorn, who sacrifices her life to be in the United Kingdom; for encouraging and appreciating my studies. Thanks for her union and thanks for her patience of my inconsistent emotion. She is a PhD student as much as I.

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# Introduction

## **0.1 Sustainability Issues**

It was not until the early 1970s that the concept of sustainability influenced the discourse of development and entailed a new direction of decision-making across different disciplines. As an umbrella term covering environmental, social and economic dimensions of development, sustainability is a concept to reduce environmental degradation, resource depletion and climate change globally; as well as to tackle basic human needs at specific locations where poor sanitation, health and social and economic inequalities are identified. Thus, sustainability and solutions to encourage sustainability vary from place to place.

To interrogate sustainability, the city concept is crucial when the city is seen as the root cause of sustainability problems and a certain location defines a platform to reshape human-environment relationships for ascertaining sustainability in both global and local terms. In regard to a given place, a specific local framework is needed for identifying ways in which sustainability can be interpreted and a distinctive pattern of sustainable urban form can be examined at the local level.

In order to develop the aim and objectives of the study, principles and agendas of sustainability are further examined in the following sections. The importance of having a locally specific framework for identifying sustainable urban forms is discussed. In addition, to investigate sustainability located in both time and space, sustainability problems in relation to superblock form patterns of inner Bangkok are provided.

## 0.2 Principles of Sustainability

The concept of sustainability was defined as a global agenda for change (WCED, 1987). Awareness of environmental deterioration and demand for higher environmental standards were recognized when high rates of industrial growth and changes to a consumer-based society threatened the limited stock of natural resources. Burgess *et al.* (1997) describe four fundamental processes transforming the contemporary world which result in the concept of sustainability: continued rapid urbanization; the globalization of economic, social, cultural and political activities; the intensification and globalization of an ‘environmental crisis’; and the evolving relationship between state and society.

Hassan and Zetter (2002, p.21) state that

*“[i]t became clear that scarce natural resources and environmental conditions were increasingly threatened, and that the orthodox view of unlimited growth as a ‘natural law’ would need to be replaced.”*

To tackle the environmental agenda, sustainability is the long-term maintenance of responsibility in resource use. Its objectives are to manage environmental resources, ensuring both sustainable human progress and human survival, not only for present human needs but also for future generations. Sustainable development, therefore, is a goal in which resource management, investment direction and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations (WCED, 1987).

Defined in the 1987 Brundtland Report (*ibid.*, p.28), the most often-quoted definition of sustainable development is:

*“[s]ustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.*

Based on this definition, ‘futuraity’ is one of the key aspects behind the philosophy of sustainability. Breheny (1992, p.1) views sustainable development as the development that fulfills “the economic, social, and environmental aspirations of groups, which may or may not have economic growth as a priority” in which the stock of natural resources can be preserved for the future. In other words, “future generations should be compensated for reductions in the endowments of resources brought about by the actions of present generations” (Pearce *et al.*, 1989, p.3).

Nonetheless, because a clear statement in the case of responsibility to deliver sustainability is not clarified by that definition, sustainability is not a concept that can be simply interpreted and implemented. Regarding this ecologically sound concept, Barton (2000a, p.6) points out that

*“[t]he phrase, ‘sustainable development’ is itself a paradox.”*

Strandenaes (2012, p.3) goes further, stating that

*“[t]he concept [of sustainable development] has been ridiculed, criticised, charged with being scientifically unacceptable and politically misconstrued, but has had a significant and lasting impact on the global development agenda”*

Nurse (2006) considers the concept of sustainability popularized by *Our Common Future of the Bruntland Commission* (WCED, 1987) as a critical issue when the needs of future generations place limitations on the present generation. Lafferty and Langhelle (1999, p.9) also found problems relating to the definition of sustainable development and state that “[t]he limitation of the concept is based on a supposition of separability between equity within a generation, and equity between generations.

It should be emphasized that ‘need’, represented by sustainable development is a moral issue. When ‘need’ is introduced as the distribution of resources, it becomes a conflict because levels and needs in the use of resources vary from place to place. Blowers (1993, p.1) writes that

*“[t]here are wide contrasts in the use of resources and the quality of the environment between rich and poor, between East and West, and between North and South.”*

‘Equity’ in this case is specified by sustainable development. It is placed as the “emphasis on providing for the needs of the least advantaged in society (intragenerational equity), and

on a fair treatment of future generations (intergenerational equity)” (Pearce *et al.*, 1989, p.2). Based on this argument, the concepts of sustainability become enlarged and go beyond globally ecological protection to encompass the needs of local people and places. The principles for sustainable development have to be defined in relation to the aspects both of futurity for a global term and of justice for a local term. Crucially, the responsibility to deliver sustainable development is required for achieving both aspects.

### 0.3 Global and Local Agendas of Sustainability

*“While efficiency deals with how costs and benefits for any one group are distributed among the several types of value, justice is the way in which benefits and costs of any one kind are distributed between persons” (Lynch, 1981, p.225)*

The aspects of futurity in a global sense and equity at a local level are the complementary concepts of sustainability. Even though the first concerns of sustainable development are given to global warming, pollution, and depletion of fossil fuel reserves (Carmona *et al.*, 2003), sustainability problems have become related to other boundaries regarding locally-based social and economic dimensions. The notion of people and their capacity to survive as individuals and cultures has been recognized as the core of sustainable development (Juarez-Galeana, 2006).

As two sides of the same coin the standpoints between global and local issues of sustainable development are found in several disciplines, defining the revolutionary concepts to secure the environment and the development. They are: realism and consensualism - nature-based and human-based morality (Betty, 2001); strong and weak sustainability - ecocentric and anthropocentric ethics (Curry, 2011; Davoudi and Layard, 2001); and radical and conservative development (Pugh, 2000b).

However, according to Hassan and Zetter (2002), McGranahan and Satterthwaite (2002), White (2002), and Zetter and White (2002), ‘green’ and ‘brown’ agendas are central in the discussion of global and local relevance in the development of sustainability.

1. The Green agenda is recognized for global ecological sustainability, focusing on the carrying capacity of the biosphere and the contribution of urban-based production, consumption, and waste generation to ecosystem disruptions, resource depletion, and global climate change.

2. The Brown agenda is acknowledged for local environmental quality, focusing on the basic needs for encouraging the quality of life and local environmental health issues such as unsanitary living conditions, pollution in the urban air and waterways, and accumulation of solid waste.

According to these agendas, the former addresses the aspects of futurity, the environmental long-term importance of energy consumption and environmental preservation in the global context. The latter responds to the aspects of equity, short-term urgencies of the quality of life and diversity of local contexts. Further, based on three basic principles for sustainable development as defined by Haughton and Hunter (1994), which are intergenerational equity, intragenerational equity and transfrontier responsibility, McGranahan and Satterthwaite (2002) go further to specify them in regard to the green and brown agendas as shown in Box 0.1.

Box 0.1 Different Perspectives between the Green and Brown Agendas

*“For proponents of the green agenda, the priorities are:*

- ***intergenerational equity***, which includes a concern that urban development does not draw on finite resource bases and degrade ecological systems in ways that compromise the ability of future generations to meet their own needs
- ***transfrontier equity*** to prevent urban consumers or producers transferring their environmental costs to other people or other ecosystems – for instance, disposing of wastes in the region around the city
- ***interspecies equity***, with the right of other species recognized.”

*“For proponents of the brown agenda, the main priorities are:*

- ***intragenerational equity***, as all urban dwellers have needs for healthy and safe living and working environments and the infrastructure and services these require
- ***procedural equity*** to ensure that all persons’ legal rights to (among other things) a safe and healthy living and work environment are respected, that they are fairly treated, and that they can engage in democratic decision-making processed about the management of the urban centre in which they live.”

Source: McGranahan and Satterthwaite, 2002, p.44 and 46

Although the global and local aspects of sustainable development show differences when compared, they relate in terms of sustainability implementations. Local contexts have the

ability to deliver both aspects because they define distinctive aims and strategies to accommodate global and local requirements at specific locations. Nonetheless, a number of sustainability solutions pay more attention to achieving sustainability for a global term, with less attention paid to integrating global and local requirements for sustainability. The relationship between globalization and localization and concerns for 'local' contexts becomes a key driver for the delivery of sustainability as well as sustainable urban forms.

## **0.4 Locally Specific Frameworks for Sustainable Urban Forms**

Achieving sustainability at the local level is not only the action to deliver local environmental quality but also the instrument to secure global ecological sustainability. How the authenticity of local contexts can be retained while accommodating globally ecological protections at a local level is substantial.

'Local' is defined as "[d]istinctive settings or contexts in which interactions between people take place" (Knox and Pinch, 2000, p.413). What is challenging in these arguments is that 'local' is not a subject to be studied on its own right. 'Local' limits, qualifies and specifies those subjects into particular settings, spaces and time. As shown in Box 0.2, the characteristics of 'local' are more holistic, complex and flexible than those of 'global', which emphasize a diversity of different meanings that people feel for different places (Lovell, 1998).

The proposition of 'local' opens up the distinctiveness of one place separate from other places as well as individualized solutions. Shown in Box 0.2, a key feature of 'local', such as neighbourhood, spatially based holistic and complexity, emphasizes the importance to have distinctive frameworks specifying locally responsive degrees of sustainable development (accommodating both global and local aspects of sustainability), rather than applying a global standard for change.

Proposed as rigid models of development, most sustainability solutions which do not take into account the importance of socio-cultural dimensions cannot respond to local needs and conditions. Rather than viewing sustainable urban forms as a crucial solution, many agree that a specific framework taking account of local forms and relevant contexts is a way in which appropriate types of sustainable developments can be established (Juarez-Galeana, 2002; Schiller, 2004). Supporting this argument, Jenks (2009, p.69) states that

*“[i]n some aspects there is sufficient evidence to feel confident that they contribute to sustainability, but beware these aspects must respect local culture and form.”*

As discussed in the previous section, implementation strategies for delivering sustainability have to be defined by ways in which global and local agendas can be accommodated. Crucially, they have to be determined in regard to distinctive patterns of form and dynamics of change.

Box 0.2 Different Characteristics between Global and Local

| <i><b>Global</b></i>                        | <i><b>Local</b></i>                           |
|---|---|
| <i>Wholes</i>                               | <i>Parts</i>                                  |
| <i>The Borough<br/>(Corporate Approach)</i> | <i>The Neighbourhood<br/>(the Felt Thing)</i> |
| <i>Service Based</i>                        | <i>Spatially Based</i>                        |
| <i>Partial</i>                              | <i>Holistic</i>                               |
| <i>Simplicity</i>                           | <i>Complexity</i>                             |
| <i>Specificity</i>                          | <i>Overlap</i>                                |
| <i>Standards</i>                            | <i>Principles</i>                             |
| <i>Worry over Precedent</i>                 | <i>Emphasis on Difference</i>                 |
| <i>Closed</i>                               | <i>Open</i>                                   |
| <i>Rigid</i>                                | <i>Flexible</i>                               |
| <i>Procedure</i>                            | <i>Content</i>                                |
| <i>Words</i>                                | <i>Meaning</i>                                |
| <i>Regulation</i>                           | <i>Vision</i>                                 |
| <i>Parts</i>                                | <i>Wholes</i>                                 |

Source: Adapted from LPAC, 1994, p.24

In developing cities, a rapid process of industrialization and modernization has been proceeding, while this is not the case for the rest of the developed world. Unlike cities in developed countries, cities in developing countries are in an earlier stage of the demographic transition process which is fundamental in examining their urban developmental conditions (Burgess, 2000). Because of different stages of demographic transition process, high rates of urban growth are critical for developing countries while they are not for the developed world.

The urban transformation of developing countries results in distinctive spatial patterns and sustainability implementations. The urban forms of developing cities are defined by rapid growth causing the intensive use of land, water and energy, pollution and harmful emissions. Although many developing cities have smaller ecological footprints than cities in the developed world, “this is more likely to be due to low GNP and poverty rather than to any sustainable development policy” (Jenks and Burgess, 2000, p.349). In this context, Boonlua (2007) argues that daily survival affected by poor housing, collapsing infrastructure, crime and poverty has to be taken into account in the key objective of sustainable urban forms in the developing world instead of the debates on environmental protection alone.

Many arguments and debates have discussed the relationship between urban forms and sustainability and several urban theorists have put forward ideas on how to shape sustainable urban forms for cities (Breheny, 1992; Frey, 1999; Jenks *et al.*, 1996; Williams *et al.*, 2000) and neighbourhoods (Barton *et al.*, 2003; Rudin and Falk, 1999; SUN, 1995; 1996; 1997; 1998a; 1998b). However, the achievement of sustainable urban forms for developing cities is not simple when it requires strategies to deliver sustainability based on local capacity, upon which the pressure of globalization has been placed.

Appropriate degrees of sustainable development therefore have to be examined in relation to local relevance in which distinctive patterns of forms and socio-cultural constructions define. Zetter and Butina Watson (2006, p.4) go further, stating that “how people design their own places and spaces, how they sustain yet adapt local technologies and traditions, and how they deploy innate capacities to adapt cultural precept to a modern idiom” are crucial for sustainability implementations. While global propositions of sustainability are important and actions are required at the local scale, the term ‘local’ itself must be recognized in broader social and political terms in defining levels of sustainability, degrees of sustainable development and delivery of sustainable urban forms.

As a setting where interactions between people take place the sustainable urban forms have to be tied in by both the global sustainability agenda and the locally sensitive socio-spatial patterns. Sustainable urban forms cannot be determined by a model of sustainable urban forms which lacks a context in regard to local aspirations and actions, but they have to be identified by a framework for identifying local sustainable urban forms with respect to physical, economic, and political contexts and to emotional, perceptual, and experiential precepts.

## 0.5 Sustainability Problems and Inner Bangkok's Superblocks

As a city needs a more locally based coherent praxis for sustainable directions, Bangkok is one of the most challenging cities in the world to be analysed in terms of sustainable urban forms. Not only is Bangkok a classic example of urban primacy which is larger and more noticeable than in other cities (Webster, 2005), but also both locally distinctive socio-spatial patterns and serious problems of urban sustainability are highlighted.

Founded in 1782, Bangkok is a capital city located in the central part of Thailand. It was known as the 'Venice of the East' because almost all transportation was by boat and waterways. However, within a period of 200 years, since being integrated into the world economy, Bangkok has been experiencing an extreme rate of urban transformation (Askew, 2002; Dutt *et al.*, 1994; Laquian, 2005). It was one of the fastest growing urban economies in the world by the late 1980s and early 1990s, growing at an annual rate of 17.2 percent between 1990 and 1996 (Webster, 2004).

In this context, Bangkok's patterns of urban form are dramatically changing from an indigenous city with a series of waterways, small-scale built forms, mixed-use traditional blocks and buildings (Webster, 2004; Yeh, 2008), into a metropolis comprised of a series of modern superblocks where all development patterns are driven by the road network (Kaothien and Webster, 2000). Figure 0.1 shows the different built forms between the historic core and modern areas of Bangkok.



Figure 0.1 Built Forms of Bangkok, Showing the Historic Core and Modern Areas  
Source: DCP, 2012

In 2008, Bangkok covered an area of 7,761 sq.km and had a registered population of 10 million; nonetheless, there are large numbers of unregistered permanent migrants and other nationalities in combination with those who commute to the inner city during the daytime - which means the population is possibly closer to 15 million people (Kaothien and Webster, 2000).

Bangkok has serious problems in terms of urban sustainability at different levels. At the regional scale, rapid urban growth has been taking place in Bangkok and the questions of unbalanced regional growth and Bangkok's disproportionate growth have been addressed in many National Economic and Social Development Plans of Thailand. At the city scale, Bangkok is identified as a land-consuming city because of excessive urban sprawl with the forms of gated communities in the suburbs (Hall, 2000). At the town scale, the problem of land pressures on what is an essentially cramped and marshy site is crucial in inner Bangkok (Cleary, 2005). Figure 0.2 shows the urban sprawl of the suburbs and the high density built forms in the inner area of Bangkok.



Figure 0.2 Built Forms of Bangkok, Showing the Urban Sprawl on the Suburb and the High Density in the Inner City

Source: DCP, 2012; Author, 2005

Bangkok's urban forms, and many of its problems, are defined by the morphological patterns of the superblock. The superblock of Bangkok is described as the mode of road and land development; a single superblock can be as large as 20 sq.km and the current Bangkok agglomeration is influenced by superblocks continuing and extending 30-40 km from the original city center to suburbia (Kaothien and Webster, 2000). Figure 0.3 shows examples of Bangkok superblocks; the superblocks can be seen on the right while the smaller blocks of the original Bangkok are on the left of the figure.

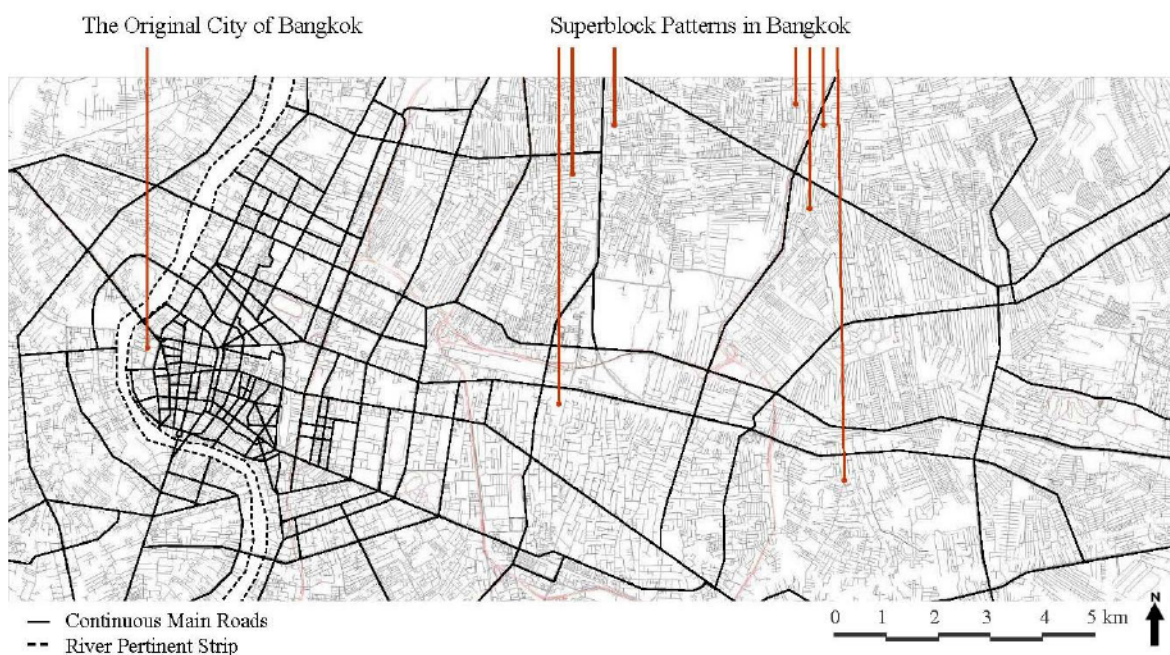


Figure 0.3 Bangkok Superblocks

Source: Adapted from the 2001 Bangkok GIS (DCP, 2001)

Note: Superblocks can be seen on the right of the figure.

A superblock is a distinctive local tissue in inner Bangkok when several segments of low density traditional neighbourhoods are overwritten by coarse-scale connections of modern road networks; and the residue of traditional neighbourhoods is encompassed by, and tied into modern districts with the forms of high density buildings developed along the road strips. Despite being settled without planned development, Bangkok superblocks have become the thread of the entire built environment where complex dimensions of culture, society and economy take place. Figure 0.4 shows urban characteristics found in a superblock in inner Bangkok, reflecting morphological distinctiveness of historical continuity, urban life and multilayered socio-spatial patterns.

The lack of appropriate spatial solutions capable of dealing with the large area of modern superblocks and complex land tenures leads to several sustainability problems. Superblocks where high population density accumulates result in land pressures, high cost of land, insufficient public open space and congestion in the inner city. Boonlua (2007) goes further stating that, despite being high density and mixed use development, the emergence of Bangkok's transformation does not provide balanced uses between jobs and housing in the city. In this case, Bangkok has been experiencing urban fragmentation when people are forced to move to the periphery (Cleary, 2005; Kaothien and Webster, 2000;

Webster, 2004), which goes against Bangkok's unique and diverse historically formed urban experiences.



Figure 0.4 Urban Characteristics found in the Example of Bangkok Superblocks  
Source: Author, 2009

Although Bangkok superblocks are the cornerstone for identifying local morphological patterns of the inner city, they are rarely mentioned in the literature. It is a fact that several urban theorists have put forward ideas on how to shape sustainable urban forms and The Government of Thailand and many practitioners have been trying to sort out sustainability solutions with the form of polynucleated urban regions in Bangkok (Laquian, 2005). Nonetheless, without understanding Bangkok's local forms, the question of local applicability for those solutions still remains, as well as local capacity to deliver sustainability. How sustainable urban forms can be shaped, while at the same time addressing Bangkok's serious problems and maintaining its locally based heterogeneity and distinctiveness, is the main concern of the current research.

## 0.6 Research Questions

Based on general background of the topic as presented in previous sections, the main question and sub-questions of the research are formulated as follows.

The key questions:

*What is locally appropriate sustainable urban form and how can it be achieved within the context of inner Bangkok?*

Sub-questions:

1. *What are the approaches to identifying sustainable urban forms from a global perspective?*
2. *What are the approaches to identifying sustainable urban forms from a local proposition?*
3. *What are the locally appropriate sustainable urban forms suitable for inner Bangkok?*

## 0.7 Research Aim and Objectives

As discussed in the background (above), sustainable urban forms cannot be considered outside social constructions located in time and space; this recognition results in ways in which the research strategy is established. Human beings, their behaviour and the entire environment cannot be understood or studied outside of the context of normal daily life, life world, and activities (Low, 1987). New concepts have to be interpreted and the validity of claims, theories, or generalizations has to be verified within real-world contexts (Leedy and Ormrod, 2001), as well as an explanation for local sustainable urban forms.

The development of a conceptual framework identifying sustainable urban forms appropriate to the locality is central to the current research. It aims to find comprehensive answers for the research questions. It should be emphasized that the concepts cannot only be developed by literature-based interpretation but also are the result of locally based social ideas and constructions. In other words, the strength of the conceptual framework is drawn from the process of testament and refinement as sequential shifts in the field study. This sequence continues until consistency is found between cases and answers of the

research. According to Low (1987), the validity of the framework therefore relies on the close fit between the empirical data and the identification of local sustainable urban forms.

In accordance with the research questions, the key research aim and objectives are established as follows.

The aim of the present research:

*To develop a conceptual framework and methodology for identifying locally appropriate sustainable urban forms.*

The objectives of the present research:

1. *To develop a theoretical framework for understanding sustainable urban forms from a global perspective.*
2. *To establish a theoretical framework for defining sustainable urban forms from a local perspective.*
3. *To produce a preliminary conceptual framework for identifying locally appropriate sustainable urban forms with respect to global and local propositions.*
4. *To formulate fieldwork methodologies for an analysis of locally appropriate sustainable urban forms with relevance to the morphological patterns of inner Bangkok.*
5. *To apply the preliminary conceptual framework and fieldwork methodologies to a case study in order to analyse levels of sustainability and locally appropriate sustainable urban forms.*
6. *To propose alternative solutions for the delivery of locally appropriate sustainable urban forms for a case study area.*
7. *To consolidate the final conceptual framework based on theoretical and practical propositions for identifying locally appropriate sustainable urban forms.*
8. *To define key contributions to new knowledge on the identification of locally appropriate sustainable urban forms.*

## 0.8 Methods of Inquiry

To fulfill the research aim and objectives, methods of inquiry have been identified to provide the methodology stages and the extent to which inquiries need undertaking to identify local sustainable urban forms. Figure 0.5 shows the relationship of the research aim, objectives and methods of inquiry.

### Construction of Preliminary Conceptual Frameworks

As stated in the previous section, the development of a conceptual framework is the cornerstone for establishing, verifying, and generalizing answers of the study. In this sense, the framework has to be constructed, tested, and refined in order to provide a workable explanation for local sustainable urban form.

Figure 0.5 shows that preliminary conceptual frameworks are produced for identifying sustainable urban forms; three research objectives (objectives one, two and three) are informed by the development of these frameworks. The conceptual frameworks established are: 1) the framework defining a global perspective of sustainable urban forms; 2) the framework describing local forms and productions; and, 3) the framework identifying local sustainable urban forms and levels of sustainability. It should be noted that they are used for formulating the fieldwork methodology and collecting data and the final conceptual framework is established with respect to data collected as discussed in the following sections.

To develop the preliminary frameworks, a review of texts is carried out on two key topics: 1) sustainable urban forms from a global perspective; and, 2) sustainable urban forms from a local proposition.

In terms of a global perspective, because sustainability issues include both environmental concepts and socio-cultural dimensions, several design inquiries therefore relate to the achievement of sustainable urban forms: 1) the eco-system approach (CEC, 1990; Dawson, 2002; Girardet, 1996, 1999 and 2004; Jenks *et al.*, 1996; Lehmann, 2010); 2) the approach of co-dwelling with nature (Barton, 2000b; BCC, 2001; Bentley, 1999; Butina Watson and Bentley, 2007; RUDI, 2009; UDAL, 2000 and 2007); and, 3) the place-making approach (Alexander, 1965; Bentley *et al.*, 1985; DETR, 2000; Jacobs, 1961; Lynch, 1981; Tibbalds, 2007).

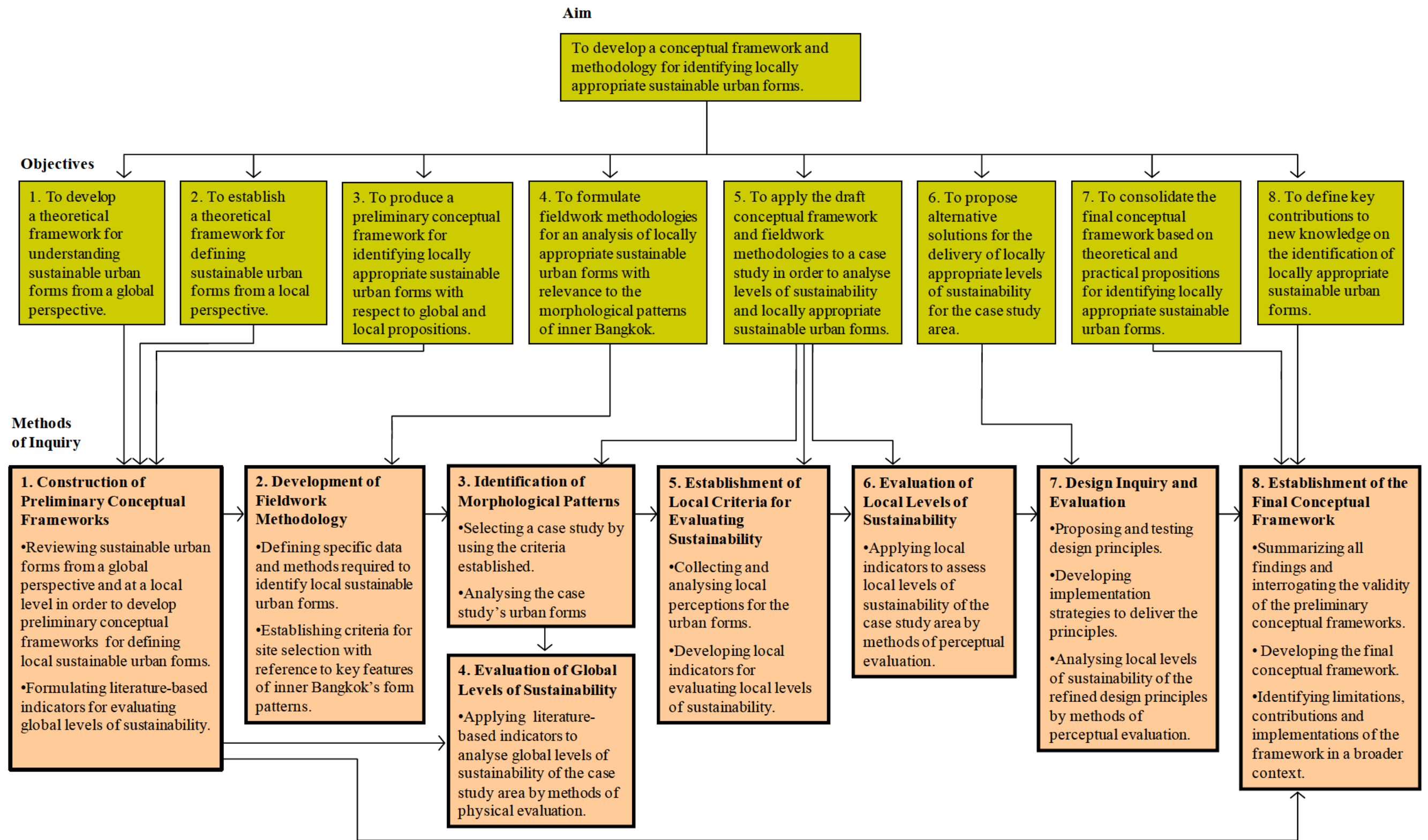


Figure 0.5 Research Aim, Objectives and Methods of Inquiry

Nevertheless, the failure to implement sustainable urban forms is the result of a lack of recognizing sustainability agenda and of delivering the dimensions of sustainable development. To contribute a key definition of sustainable urban forms, environmental ethics, the discipline demonstrating the relationship of human beings, environment and development (Curry, 2011; Naess, 1989; Rowe, 1990; Taylor, 1986), are utilized. They are implemented to determine a linkage between the objectives of sustainable development and the design approaches for defining sustainable urban forms. It should be emphasized that key texts dealing with sustainability dimensions are Blowers, 1993; Hassan and Zetter, 2002; Hawkes, 2001; Lafferty, 2001; McGranahan and Satterthwaite, 2002; Nurse, 2006; Pearce *et al.*, 1989; UCLG, 2004; UNCED, 1992; WCED, 1987; White, 2002; Zetter and White, 2002.

Based on the established definition of sustainable urban forms, various qualities of forms in relation to sustainability are defined by a consensus among theorists' and practitioners' ideas to deliver sustainable urban forms by design. Texts dealing with this matter are Barton, 2000b; Bentley, 1999; Butina Watson and Bentley, 2007; Carmona *et al.*, 2003; Cooper, 2000; Fuse, 2005; Haughton and Hunter, 1994; RUDI, 2009; Rudin and Falk, 1999; UDAL, 2000 and 2007. In relation to ways in which sustainability qualities are delivered through the urban forms, notably, literature-based criteria for evaluating levels of sustainability from a global perspective are established by using design inquiry methods (Zeisel, 2006).

In terms of a local perspective, how local forms are socially and culturally constructed is crucial for achieving sustainability because it defines how the global agenda of sustainability can be accommodated into local contexts and conditions.

The entire environment is a social construction (King, 1980, 1990 and 2004; Rapoport, 1977, 1982 and 2005; Zetter and Butina Watson, 2006). In order to examine the delivery of sustainability at the local level, on the one hand, concepts of local forms have to be reviewed: place, community, and morphology (Altman, 1975; Conzen, 1969; Jones and Eyles, 1977; Kropf, 2009; LPAC, 1994; Lovell 1998; Nilufar, 1997; Zetter and Butina Watson, 2006). On the other hand, issues of how these forms are locally shaped, reshaped, and sustained are also important because they represent a real potential to deliver sustainability located in time and space. The key actors and how they perceive and play their roles in form-production have to be examined (Adams, 1994; Bentley, 1999;

Carmona *et al.*, 2003; Crang, 1998; Knox and Pinch, 2000; McGlynn, 1993; Rapoport, 1977, 1982 and 2005).

Based on a literature review, the preliminary conceptual frameworks are formulated by using content analysis methods (Weber, 1990). Key concepts of sustainable urban forms and of local forms are identified, and the focus in that content is scrutinized for developing the conceptual frameworks defining a global perspective of sustainable urban forms and describing local forms and productions. Consequently, relevant issues are synthesized to establish the integrated framework identifying locally appropriate sustainable urban forms and levels of sustainability.

### **Development of Fieldwork Methodology**

As discussed in previous sections, the conceptual framework has to be tested and verified in order to provide an efficient explanation of local sustainable urban forms. To achieve this aim, the fieldwork methodology is formulated for testing the conceptual framework, which is a set of instruments allowing collection of data and providing ways to analyse them. It includes: data requirements; collection techniques; analysis methods; fieldwork procedure; sampling methods; and, criteria for site selection.

Figure 0.5 shows that, in response to objective four of the study, the key to establishing the fieldwork methodologies is to focus on relevant factors for defining sustainable urban forms. Content analysis methods are used for formulating the fieldwork methodology. Presented by the preliminary conceptual frameworks, key data need collecting and analyzing are: 1) local forms; 2) local perceptions; and, 3) levels of sustainability.

Local form is a socio-spatial construction, which is a foundation to interrogate sustainability located in time and space. To examine the local built forms, observation techniques (Bernard, 2006; Denscombe, 2003; Walliman, 2008) and concepts of environment-behaviour study (Rapoport, 1982; Zeisel, 2006) are incorporated in the methodologies to define how people use and shape local forms. Morphological analysis is also included for investigating distinctive form patterns and process of change (Conzen, 1969; Kropf, 1993 and 2009; Panerai *et al.*, 2004; Moudon, 1986 and 1997; Whitehand, 2001 and 2009).

Local perception is a social idea shaping urban forms, defining a capacity to deliver sustainable development. To ascertain people's opinion about built forms, multiple sources comprising of primary and secondary sources have to be collected (Creswell, 1998; Silverman, 2005). Face-to-face semi-structured interviews (Arksey and Knight, 1999) are incorporated as a tool for allowing interviewees to develop ideas and speak more widely on factors underpinning sustainable urban forms at the local level. Both qualitative and quantitative methods for collecting and analysing data are combined (Wolcott, 1994; Fink, 1995a and 2003).

Level of sustainability is a degree of development, demonstrating ways in which a sustainable urban form is established for a specific location. Without the assessment of levels of development responsive to urban localities, locally appropriate sustainable urban forms cannot be identified. To assess levels of sustainability, on the one hand, the use of the literature-based criteria for evaluating sustainable urban forms is included to evaluate levels of sustainability from a global perspective. On the other hand, the use of perception-based data in identifying local levels of sustainability is developed. A systematic evaluation of levels of sustainability is formulated in the fieldwork methodology.

Furthermore, typological analysis methods are applied to provide criteria for site selection. By using inner Bangkok as a case study, the evolution of Bangkok settlement is investigated and several sustainability problems are defined with reference to distinctive features of the urban forms. Documentation and archival records are utilized. Crucially, the key socio-spatial patterns representing inner Bangkok's urban forms which can be generalized for other critical examples become the criteria for selecting a case study. The existing literature emphasizing inner Bangkok's urban forms are Askew, 1993 and 2002; Barter and Kenworthy, 1997; Boonlua, 2007; Cleary, 2005; Drakakis-Smith, 1981; Dutt *et al.*, 1994; Hall and Pfeiffer, 2000; Kaothien and Webster, 2000; Krongkaew, 1997; Laquian, 2005; Webster, 2004 and 2005.

### **Identification of Morphological Patterns**

Figure 0.5 shows that the study of urban forms is part of the research's case study practices as demonstrated by objective five of the study; fundamentally, it provides a platform to examine local issues and sustainability.

By applying the criteria for site selection, the Sukhumvit superblock was selected to be the case study for an analysis of locally appropriate sustainable urban forms. To analyse socio-spatial patterns of Sukhumvit, morphological analysis methods are implemented, which is the study of the urban form through its transformation. Although Kropf (2009) defines several approaches which can be used for an analysis of the urban forms, the historico-geographical approach developed by Conzen (1969) provides the best example for analysing a case study's constituent elements developed through time.

Sukhumvit's records of historico-morphological elements are instrumental to explore evolutionary process, to investigate socio-spatial patterns and to identify distinctive features of built forms. The dialectic relations of socio-spatial transformation, continuations and differentiations are central in the identification of Sukhumvit's patterns of form. On the one hand, morphological outlines influence on subsequent urban patterns revealing where current form patterns overwrite and change takes place have to be identified (Conzen, 2001; Whitehand, 2001; 2009). On the other hand, multilayered relations between different socio-spatial patterns are investigated in Sukhumvit.

### **Evaluation of Global Levels of Sustainability**

Global levels of sustainability specify qualities of built forms and scales of development that should be undertaken for sustainable urban forms from a global perspective. They are important to be assessed in order to attain results of global analysis and values of forms in regard to concepts of sustainability. Importantly, these levels and ways to evaluate them enable the consequent modification of local criteria for evaluating sustainability at the local level.

With reference to objective five of the research as shown in Figure 0.5, degrees of sustainability in relation to global views are examined by applying the literature-based indicators for evaluating global levels of sustainability. Including compositions of town plan, building fabric, and land and building utilization, Sukhumvit's morphological components are analysed with reference to global concepts of how sustainable urban forms can be shaped. Both qualitative and quantitative aspects of forms are examined; such as the linkage between green corridors, accessible public spaces and density of built forms and population.

### **Establishment of Local Criteria for Evaluating Sustainability**

To define sustainable urban forms, social ideas and local actions are instrumental because they influence the implementation for sustainability at the local scale. The key to identifying sustainable urban forms suitable for local contexts is to assess people's perceptions, interpretations and expectations for their environment. In this sense, both qualitative and quantitative methods are incorporated in face-to-face semi-structured interviews (Arksey and Knight, 1999) to collect and analyse local perceptions in the field (Figure 0.5). Inquiry for qualitative analysis developed by Wolcott (1994) is implemented to provide a framework for description, analysis and interpretation of people's attitude of their urban forms.

Content analysis methods (Weber, 1990) are used to assess information by identifying intentions of interviewees, reflecting local factors influencing those intentions, and revealing people's focus of the urban forms and desirable features in relation to sustainable development. Quantitative analysis methods are also included to describe and compare the responses between interviewees (Fink, 1995a).

Crucially, based on perceptions about local forms collected from the field study, a local framework presenting social aspirations of how Sukhumvit's form patterns should be shaped and sustained in point of local views has to be formulated. As shown in Figure 0.5, following these perceptual data, the structured interpretation is consequently proceeded to develop local indicators for evaluating sustainability.

### **Evaluation of Local Levels of Sustainability**

Levels of sustainability are a key construct to justify appropriate degrees of development. As discussed in the research background, not all urban settings have sustainability assessed of the same levels, regarding different local culture and forms. Further, levels of sustainability can be different depending on relevant factors and criteria used in the judgments. While global levels of sustainability are determined by using a global perspective, local levels of sustainability have to be specified by a perspective representing local aspirations for distinctive form patterns.

An inquiry to assess local levels of sustainability is to apply the established local indicators to analyse Sukhumvit's urban forms (Figure 0.5). Developed in the fieldwork methodologies, perceptual evaluation in relation to sustainability is utilized to achieve this

aim. It should be noted that two sets of sustainability levels, global and local, demonstrate the gap in defining sustainable urban forms responsive to locality. They also exhibit ways to manifest local sustainable urban forms and ways to consolidate the conceptual framework as discussed in the following sections.

### **Design Inquiry and Evaluation**

To identify local sustainable urban forms, actions to deliver locally responsive sustainability have to be specified. This aim can be replaced by establishing design principles and implementation strategies to encourage sustainability. Based on the local levels of sustainability, the design principles for the delivery of Sukhumvit's sustainable urban form are proposed by using design inquiry methods developed by Zeisel (2006). Five design characteristics influencing the development of the design principles are shown in Box 0.3.

#### **Box 0.3 Five Design Characteristics**

1. *Three Elementary Activities*

*The complex activity called "designing" interconnects three constituent activities: imaging, presenting, and testing.*

2. *Two Types of Information*

*Information used in designing tends to be useful in two ways: as a heuristic catalyst for imaging and as a body of knowledge for testing.*

3. *Shifting Visions of Final Product*

*Designers continually modify predictions about their final result in response to new information and insight. The design process is thus a series of conceptual shifts or creative leaps.*

4. *Toward a Domain of Acceptable Response*

*Designers aim to reach one acceptable response within a range of possible solutions. This domain of acceptance is measured largely by how well a product is adapted to its environment and how coherent constituent parts of the product fit with one another.*

5. *Development through Linked Cycles: A Spiral Metaphor*

*Conceptual shifts and product development in design occurs as the result of repeated, iterative movement through the three elementary design activities.*

*Source: Zeisel, 2006, p.22*

Design actions have to be identified by following the information of what users aspire for their locations and by going beyond the information given as the conceptual shift. As shown in Box 0.3, a series of activities have to be conducted as a spiral metaphor to three constituent activities: imaging, presenting, and testing. Therefore, a series of conceptual shifts is undertaken by the design evaluation to assess a domain of acceptable responses from various stakeholders who get involved with form-production processes in Sukhumvit. Both face-to-face semi-structured interviews (Arksey and Knight, 1999) and inquiry of focus groups (Morgan; 1998a, b) are implemented to test the principles and design inquiry methods are employed to refine them in real-world contexts. Importantly, to evaluate and consolidate the design is to seek the extent to which all local aspirations and development dimensions can be accommodated.

Further, in order to reconcile objective six of the research, implementation strategies for delivering the design principles are also developed. To settle appropriate key mechanisms for implementing the design principles, methods of focus group discussion are utilized with various key stakeholders in the field study. Notably, key implementation strategies are both medium and as final outcomes of the research. On the one hand, the design implementations themselves are a pathway to attain sustainability at the local level. On the other hand, they are a tool to clarify key actors' roles and involvement in the delivery of local sustainable urban forms, generating feedbacks to verify the validity of the preliminary conceptual frameworks and to specify key contributions of the research.

It should be noted that, to consider a real capacity to deliver sustainability, again, perceptual evaluation in relation to sustainable urban forms has to be implemented. It is a fact that local levels of sustainability have been assessed from Sukhumvit's current form patterns but they do not present as yet a real potential of which degrees of sustainability can be carried out by locally appropriate sustainable urban form. By evaluating levels of sustainability of the refined design principles, the extent to which sustainability levels can be accommodated into the local forms is demonstrated.

### **Establishment of the Final Conceptual Framework**

Figure 0.5 shows that, to address objective seven of the research, the final conceptual framework identifying locally acceptable sustainable urban forms is developed with respect both to theoretical and practical aspects. In this stage, key findings are summarized from all research processes. Logical coherence is interrogated between theoretical

explanations presented by the preliminary conceptual frameworks and the empirical evidence derived from case study practices.

It should be emphasized that key research questions are comprehensively informed by this final conceptual framework, revealing ways in which local sustainable urban forms can be defined and achieved in the case of inner Bangkok. Analytical induction methods (Bryman and Burgess, 1994) are utilized to theorize the explanation of sustainable urban forms. A systematic interpretation is carried out of relevant factors found during the research process.

Furthermore, according to the developed final conceptual framework based on theoretical and practical practices, limitations and contribution to new knowledge of the research are determined in order to inform objective eight of the research (see Figure 0.5). Generalization of the research to a broader context is specified by suggesting several potentials for implementing the research's key findings in terms of form-productions. Recommendations for further research are also provided to strengthen a body of knowledge of local sustainable urban forms.

## **0.9 Thesis Structure**

In accordance with the research methodology, thesis structure is defined in this section. The connection between the research aim, objectives, methodology stages and chapters is shown in Figure 0.6.

### **Introduction**

The background of sustainable development and the importance of a specific framework in defining sustainable urban forms at the local level are identified. This aims to outline the scope of the research influencing the development of research questions, aims and objectives. In addition, the research methodology is constructed to guide the overall research processes and ways in which the outcomes are derived.

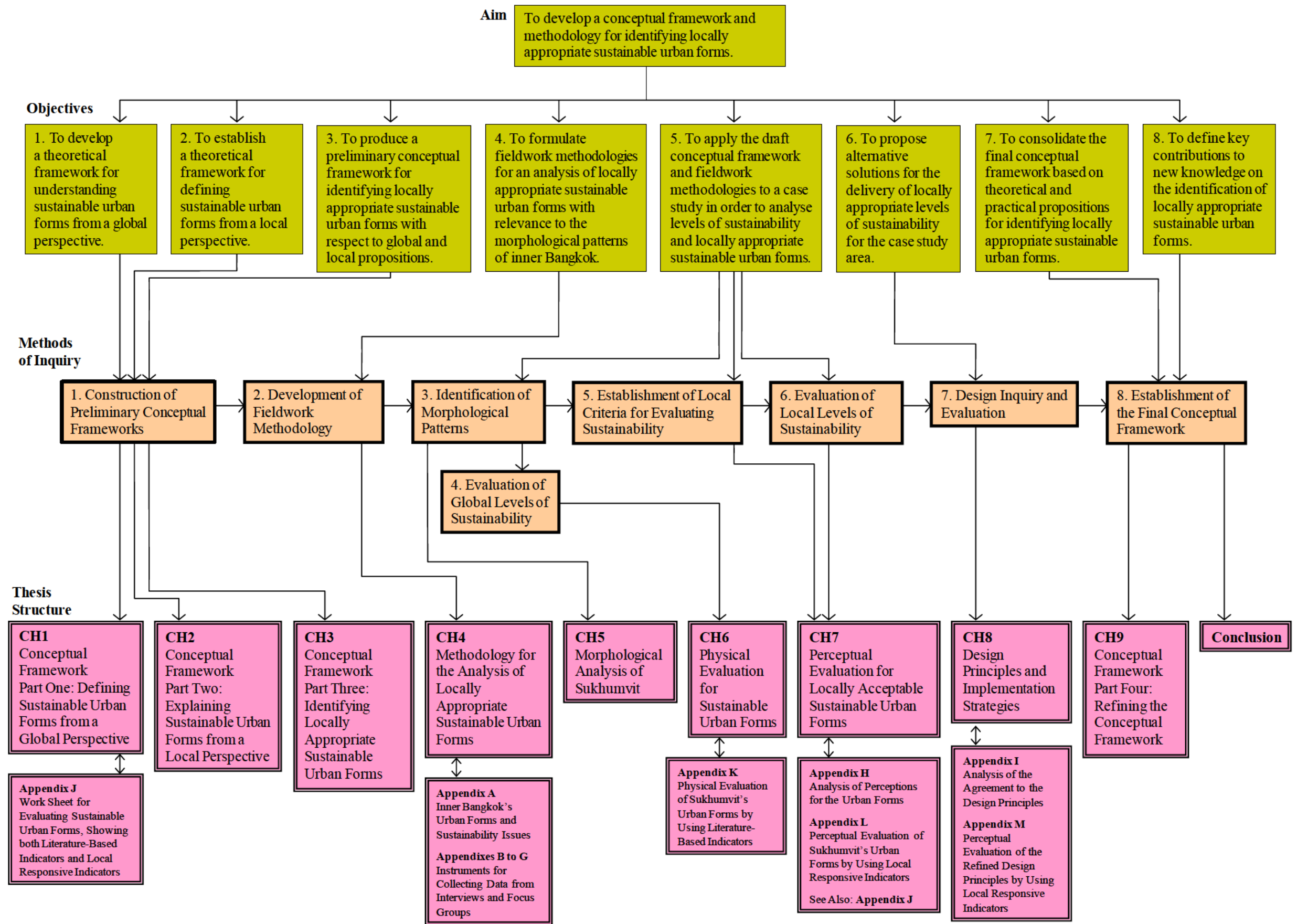


Figure 0.6 The Research Flowchart Showing the Relationship between Research Aims, Objectives, Methods of Inquiry and Thesis Structure

### **CH1 Conceptual Framework Part One:**

#### **Defining Sustainable Urban Forms from a Global Perspective**

To identify the conceptual framework of sustainable urban forms from a global perspective, several approaches relating to sustainable development and to sustainable urban forms are reviewed in this chapter. The focus of CH1 is to establish the definition of sustainable urban forms and ways in which they can be analysed. To fulfill this aim, literature-based indicators are formulated as a work sheet for evaluating sustainable urban forms, relating to theoretical acquisitions of sustainability through spatial patterns. It should be noted that this chapter informs the first research objective as shown in Figure 0.6.

### **CH2 Conceptual Framework Part Two:**

#### **Explaining Sustainable Urban Forms from a Local Perspective**

As discussed in the research background, a built form is a socio-spatial construction influencing the examination of local sustainability. The investigation of aspects of local forms and the process by which they are locally constructed are undertaken in CH2. Crucially, how sustainable urban forms can be built up from these local significances is interpreted as the framework to determine sustainable urban forms from a local perspective.

### **CH3 Conceptual Framework Part Three:**

#### **Identifying Locally Appropriate Sustainable Urban Forms**

By synthesising the previous conceptual frameworks developed in CH1 and CH2, the third conceptual framework identifying locally appropriate sustainable urban forms is established to achieve the third research objective (see Figure 0.6). Key standpoints for examining sustainable urban forms from both global and local notions are summarized on the one hand; the interpretation of the comprehensive framework is undertaken on the other. As well, required actions to analyse locally appropriate sustainable urban forms are identified, influencing the establishment of the fieldwork methodology in the next chapter.

### **CH4 Methodology for the Analysis of Locally Appropriate Sustainable Urban Forms**

Based on the preliminary framework and the required actions settled in the previous chapter, the fieldwork methodology for analysing locally appropriate sustainable urban forms is delineated in CH4 by providing analytical frameworks and research tools for data

collections and analyses. Necessary techniques are discussed in order to test the explanation of local sustainable urban forms in the case study. Criteria for site selection are included in this chapter. This chapter informs the fourth research objective.

### **CH5 Morphological Analysis of Sukhumvit**

As shown in Figure 0.6, objective five of the research is addressed in this chapter. Following the analytical procedure established in the previous chapter, CH5 presents the morphological analysis of the case study. General background of Sukhumvit is provided to shed light on the evolutionary process of social constructions and forms. The study of forms is preceded by analysing the compositions of town plan, building fabric, and land and building utilization. Socio-spatial outlines exhibiting the process of change are examined and relations between form patterns are discussed. It should be noted that the case study's distinctive form pattern identified in this chapter is utilized to investigate local relevance of sustainability in following chapters.

### **CH6 Physical Evaluation for Sustainable Urban Forms**

CH6 fulfils the fifth research objective by applying methods of physical evaluation to assess levels of sustainability of the case study as shown in Figure 0.6. The literature-based indicators are implemented in the evaluation. The outcome of this chapter presents the case study's capacity to achieve sustainability from a global proposition, providing a platform to compare global and local levels of sustainability.

### **CH7 Perceptual Evaluation for Locally Acceptable Sustainable Urban Forms**

CH7 is to reconcile the fifth objective of the research by examining local levels of sustainability of the case study area. Collected from the field study, local perception-based data are reported and how they inform social ideas and acceptance about local forms and sustainability is analysed. Based on these empirical data, a local framework presenting social aspirations for future form adaptations is derived and perception-based indicators for evaluating local levels of sustainability are established. By using local perceptions as a standard, perceptual evaluation in relation to sustainable urban forms is carried out to assess levels of sustainability of Sukhumvit's form pattern.

## **CH8 Design Principles and Implementation Strategies**

In CH8, based on local levels of sustainability assessed from the previous chapter, the design principles are established as alternative solutions for the delivery of locally acceptable sustainable urban forms, replacing the sixth research objective as shown in Figure 0.6. Furthermore, the process of design testament and refinement undertaken with key personnel in Sukhumvit is presented. The results of evaluation and the outcome of design improvement to accommodate various aspirations and development dimensions are also demonstrated. Developed together with key stakeholders in the field study, implementation strategies to deliver the design proposals are indicated, revealing key roles and involvement to achieve sustainable urban forms in the local process of form-productions.

## **CH9 Conceptual Framework Part Four: Refining the Conceptual Framework**

Summary of theoretical issues, relevant factors and empirical evidence defining locally acceptable sustainable urban forms are exhibited in CH9. This provides the discussion of how sustainable urban forms can be identified at the local level. The validity and reliability of the preliminary conceptual framework developed in CH3 is interrogated and the refinement of the conceptual framework is delivered. Based on the consolidated framework, inquiry to identify sustainable urban forms at the local level are demonstrated. Figure 0.6 shows the relationship between this chapter and the seventh objective of the research.

## **Conclusion**

In this last chapter, all findings of the research are taken into account to derive a conclusion. Assessment of the research methodology is carried out by reviewing the consistency between the research strategy and the validity of the research answers, presenting limitations of the research and contributions to new knowledge on the identification of locally appropriate sustainable urban form. The recommendations for and further research of sustainable urban forms are also demonstrated in a broader context.

## **0.10 Summary**

This chapter presents the scope of the research and all inquiries to carry it out to completion. Relevant topics in regard to sustainable urban forms are determined on the one hand; ways in which they can be analysed at the local level are demonstrated on the other. The ultimate aim is to provide a comprehensive foundation for the study of local sustainable urban forms, which is a platform to be interrogated by others in order that a body of concepts about sustainable urban forms can be strengthened.

# Chapter One

## Conceptual Framework Part One: Defining Sustainable Urban Forms from a Global Perspective

### **1.1 Introduction**

The aim of this chapter is to develop a theoretical framework for understanding sustainable urban forms from a global perspective, defining the first research objective. Importantly, this process is the first part in the construction of preliminary conceptual frameworks for identifying local sustainable urban forms. While a global notion of sustainable urban forms is discussed in this chapter, a local perspective of those is investigated in the following chapter.

In order to fulfill the aim of the current chapter, three objectives are identified.

1. To identify dimensions of sustainable development and approaches for defining sustainable urban forms from a global perspective.
2. To establish the definition of sustainable urban forms and criteria for evaluating global levels of sustainability.
3. To formulate the conceptual framework for explaining sustainable urban forms from a global perspective.

To achieve the chapter objectives, a flow diagram to define the conceptual framework is shown in Figure 1.1. To attain the explanation for sustainable urban forms from a global view, this chapter starts with a review of the various dimensions of sustainable development. This is to specify key sustainability objectives as a foundation for which the urban development should be aimed. In addition, a literature review provides relevant approaches for defining sustainable urban forms.

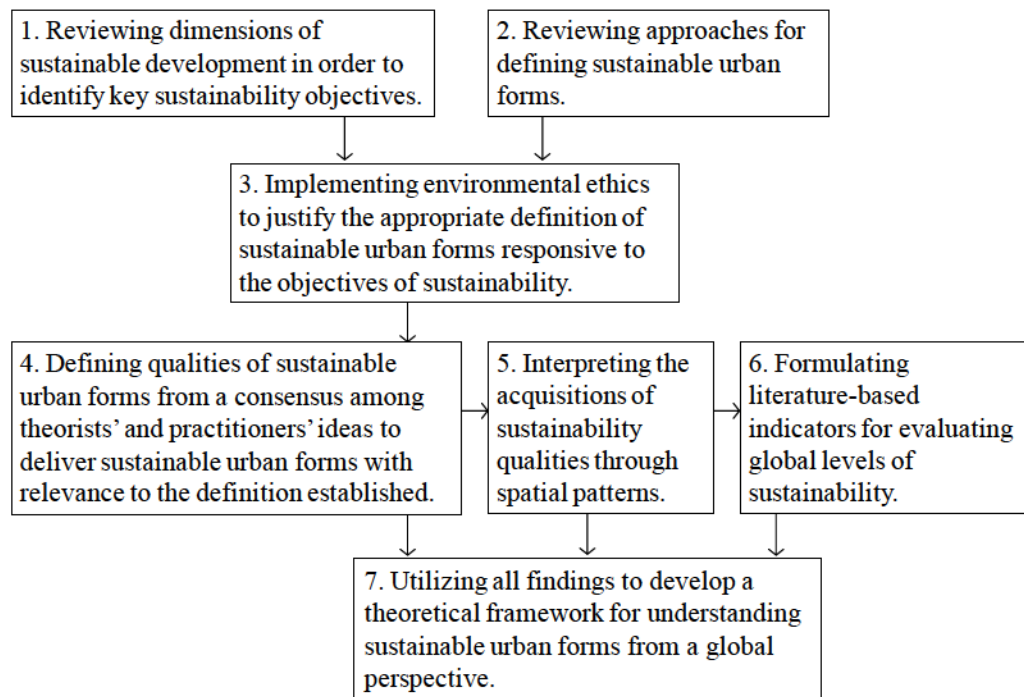


Figure 1.1 Flow Diagram to Identify a Conceptual Framework of Sustainable Urban Forms from a Global Perspective

Figure 1.1 shows that findings from two disciplines (the dimensions of sustainable development and the approaches for defining sustainable urban forms) are synthesized by using environmental ethics to justify the theoretical relevance between them. The appropriate definition of sustainable urban forms which can inform all objectives of sustainable development is established with respect to the theoretical connection defined.

Moreover, in accordance with the definition of sustainable urban forms, key qualities of sustainable urban forms are settled by determining the consensus among theorists' and practitioners' ideas of how the urban forms should be shaped for the delivery of sustainability. Ways in which spatial structures can deliver the qualities of sustainable

urban forms are indicated, including street and open space, block, plot, building and use. As shown in the figure, this acquisition of sustainability qualities through spatial patterns is consequently utilized to develop literature-based indicators for evaluating global levels of sustainability.

Finally, all findings are drawn together to describe what is the sustainable urban form and how it can be delivered and evaluated in terms of a global perspective. Based on these findings, the conceptual framework for explaining sustainable urban forms from a global perspective is formulated.

With reference to the chapter objectives and inquiry to deliver them, the chapter is structured as follows.

- 1.1 Introduction
- 1.2 Objectives of Sustainable Development
- 1.3 Approaches for Defining Sustainable Urban Forms
- 1.4 Definition of Sustainable Urban Forms
- 1.5 Qualities and Spatial Patterns of Sustainable Urban Forms
- 1.6 Literature-Based Indicators for Evaluating Global Levels of Sustainability
- 1.7 The Conceptual Framework from a Global Perspective
- 1.8 Conclusion

## **1.2 Objectives of Sustainable Development**

*“Development is often confused with growth. Growth conveys the idea of physical or quantitative concept incorporating notions of improvement and progress and including cultural and social, as well as economic, dimensions.” (Blowers, 1993, p.5)*

Although the awareness of the limited carrying capacity of the biosphere is central for sustainability, various aspects are included in the achievement of it. As discussed in *Introduction*, sustainability is a goal of development that has to be carried out for intergenerational equity (a fair treatment for future generations) as well as intragenerational equity (a fair treatment between people of the same generation). Several dimensions encompass sustainable development, these are environmental, economic, social, cultural and political aspects. Furthermore, each dimension varies in degree ranked from ‘strong’ to ‘weak’ (Davoudi and Layard, 2001; Osment, 2002) or from ‘deep’,

‘shallow’ to ‘light’ (Fuse, 2005). Crucially, this is the result of how global and local requirements are prioritized from each aspect.

**The environmental dimension** of sustainable development is recognized not only for global ecological sustainability but also for local environmental quality. On the one hand, current processes of development have to be pursued with the idea of protecting the natural resources which do not go beyond its ecological footprint - “a measure of the ‘load’ on nature imposed by meeting the needs of its population” (Newman and Jennings, 2008, p.80). On the other hand, current processes of development that degrade or pollute the local environmental health and diminish the quality of life have to be prevented (Blowers, 1993).

Nonetheless, since sustainability problems are much broader in contexts, other dimensions of development have been integrated into sustainable development. These consist of environmental, economic, and social dimensions. Figure 1.2 shows the well-known ‘trefoil’ diagram of sustainable development presenting both the connection of the different dimensions and the importance in balancing them in a harmonious fashion (Barton, 2000a; Barton *et al.*, 2003; Echenique, 2005; NS+, 2009).

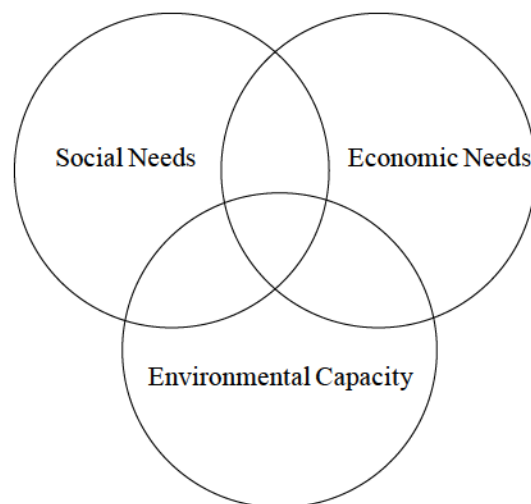


Figure 1.2 The Trefoil Diagram of Sustainable Development  
Source: Barton, 2000a

What is interesting is that **the economic dimension** becomes key to understanding sustainability, as it interacts with environment reciprocally. Pearce *et al.* (1989, p.4) state that

*“Fundamental to an understanding of sustainable development is the fact that the economy is not separate from the environment in which we live. There is an interdependence both because the way we manage the economy impacts on the environment, and because environmental quality impacts on the performance of the economy.”*

Because one of the aspects of sustainability is to achieve futurity in terms of environmental protections, “[e]conomic progress should not be made at the expense of intergenerational equity” (Nurse, 2006, p.34). Fundamentally, this proposition results in the ‘limit of growth’ or presumably ‘no growth’ if the absolute defense of nature is carried out. Pugh (2000b) defines this notion as a radical approach of development while a softer approach, a more conservative notion of development, allows a small change, but “significant adjustments to ongoing development” (ibid, p.22). However, Davoudi and Layard (2001, p.10) argue that “[c]ertainly analysts are keen to avoid a ‘growth - no growth’ dualism - there is no need for either-or.”

For Hassan and Zetter (2002) and Schiller (2004), to achieve economic sustainability, local economies should be supported, equitable distribution of wealth (costs and benefits) should be promoted, and ethical procurement and investment policies should be encouraged. Equity between nations and generations is achieved by promoting development, where natural resources are used in efficient and responsible ways, as well as the equitable distribution of local economies for short term priorities.

**The social dimension** of sustainable development reconciles the trefoil diagram of sustainable development as shown in Figure 1.2. While the economic dimension is instrumental in defining the extent to which natural resources should be protected, the social dimension addresses the principle of equity. It is to secure that subsequent generations should be able to access natural and social resources and the distribution of resources should also be provided within a generation.

Although rising poverty and unemployment in less-developed countries are seen as the cause of increasing pressure on environmental resources (WCED, 1987), unequal access to basic needs are also recognized as unsustainable. In this sense, the equitable opportunity for all to access, and the diversity of choices that are available to be accessed, is fundamental in both global and local terms of social sustainability. Schiller (2004) goes

further, stating that social sustainability and cultural and social integrity can be categorized as the concepts of ‘benefit’ that constitute the improvement of quality of life and should be promoted.

Although the trefoil diagram of sustainable development is broadly acknowledged as the linkage of social, economic, and environmental dimensions, UCLG (2004) argues that **the cultural dimension** has to be integrated into the notions of sustainability and identified as the fourth pillar of sustainable development.

Nurse (2006, p.33) defines that “culture is more than just the manifestations of culture” and goes further, stating that culture is crucial for sustainable development because it is the ‘whole social order’ and the ‘whole way of life’. In other words, culture is a dynamic process driving sustainable development with the forms of engagement, creativity and innovation (Hawkes, 2001), which defines the involvement of institutions and civil society in delivering sustainability (Harpham and Allison, 2000).

Introduced by United Cities and Local Governments (UCLG), The Agenda 21 for Culture points out that sustainable development can be accomplished if there is harmony and alignment to cultural diversity – “a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence” (ibid., p.5). Culture defines various local potentials in an achievement of sustainability depending on how powers are exercised in society and how sustainability is valued among institutions, rooted in specific ethical values and beliefs of people, located in time and space.

While culture is seen as a set of values located in time and space, **the political dimension** is a process by which other dimensions of sustainable development are exercised and interconnected within a framework of cultural aspiration.

Good governance is recognized as the first step where sustainable development can be promoted in all levels of society. Giddings *et al.* (2005) argue that how cities provide ‘quality of life’ depends on the ways in which cities are funded and governed. In terms of sustainability, Pugh (2000b, p.44) states that

*“[g]overnance is an important element in sustainable development, deriving from wider development policies. It is essentially about state-market-society relations, where the state both influences socio-economic change and is itself influenced by the change.”*

However, the term ‘governance’ does not only refer to the exercise of governmental authority, but includes “collective decision making, formal and informal, participatory and

representative, and national as well as local” (Harpham and Allison, 2000, p.115). According to Lafferty (2001) and the Local Agenda 21 (UNCED, 1992), any strategic programme, plan or policy has to be delivered through a consultative process incorporated by all local stakeholders so that an achievement of sustainable development can be defined. Sustainable development could be simply seen as the profound change towards environmental preservation, but it is an eclectic concept and a wide range of developmental dimensions is included within the notions of sustainability. As shown in Figure 1.3, both cultural and political dimensions are integrated with the other dimensions as key pillars of sustainable development. They become a basis for examining the practice of sustainable development as well as emphasizing the importance of people at the centre of all dimensions.

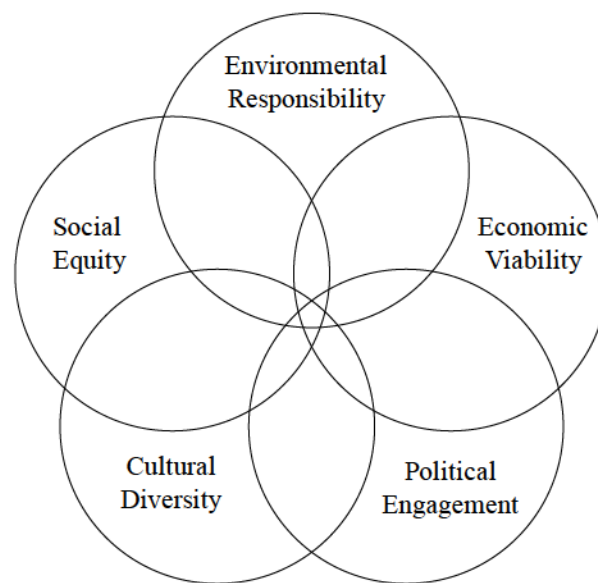


Figure 1.3 Five Pillars of Sustainable Development  
Source: Hawkes, 2001; Lafferty, 2001; UCLG, 2004; UNCED, 1992

Based on all dimensions discussed, Table 1.1 summarizes the key objectives of sustainable development as an umbrella of how sustainability can be manifested. The table shows that the objectives are exhibited in various forms and scales of development. Encouraging aspects of futurity on the one hand and of equity on the other, two sets of key objectives of sustainable development are identified. In terms of global relevance, green rights, earth survival, self-reliant settlement and global environmental-sustaining programmes are

identified; in the case of local relevance, local environmental and economic imperatives and ethical production and consumption are emphasized (Fuse, 2005).

Table 1.1 Key Objectives of Sustainable Development

| Sustainability Dimensions    | Key Objectives   |   |
|------------------------------|--|---|
|                              | Global Relevance   | Local Relevance   |
| Environmental Responsibility | Global ecological sustainability should be achieved in which human settlement should not go beyond its ecological footprint.                           | Local environmental quality should be encouraged by preventing development that degrades or pollutes the local environmental health and diminishes the quality of life. |
| Economic Viability           | Growth affecting global ecological sustainability should be limited.   | Equitable distribution of local economies, costs and benefits should be provided.   |
| Social Equity                | Poverty and unemployment increasing pressure on environmental resources should be resolved.  | The quality of life and basic needs such as health, housing, education, employment and safety should be promoted.   |
| Cultural Diversity           | N/A  | Culturally-based development should be enacted in order to achieve a more satisfactory intellectual, emotional, moral and spiritual existence.                          |
| Political Engagement         | Good governance should be undertaken, so that legal frameworks are fair and enforced impartially to meet needs while making the best use of resources. | Self-reliance and self determination should be encouraged in the process of decision-making.  |

Source: Based on Schiller, 2004; and completed by author

Despite being parallel programmes (global and local objectives), inevitably, they are the comprehensive objectives of sustainable development, shedding light on how decision-making for sustainability should be made and how urban development may achieve sustainable urban forms.

### 1.3 Approaches for Defining Sustainable Urban Forms

Since sustainability has included several dimensions of development, several design inquiries therefore relate to an achievement of sustainable urban forms. Although Jenks *et*

*al.* (1996) argue that the links between urban form and sustainable development are not simple and straightforward, this is likely to be due to the responsibility to deliver both global and local issues of sustainability by design, rather than spatial relations.

The present section reviews several design approaches in defining sustainable urban forms with respect to global ecological protections and to quality of life and human well-being. They are: the eco-system approach; the place-making approach; and, the approach of co-dwelling with nature. The examination of design approaches is to provide all relevant perspectives in the identification of sustainable urban forms in order to be used for interrogating the appropriate definition of that principle in the next section.

### **1.3.1 The Eco-System Approach**

In the past decades, the concern for eco-systems has fallen into the debate on sustainable urban forms (Downton, 2008; Girardet, 1996, 1999, 2004; Guy and Marvin, 2000; Newman and Jennings, 2008; Register, 1987) when the notion of eco-development is defined as a new political ideology of environmental sustainability (Hassan and Zetter, 2002).

Because cities import large amounts of resources and produce large amounts of waste, they cause environmental depletion and natural degradation. The metabolism of the city in this sense is the key to the understanding of how a natural resource is degraded and to define a new model of urban development. According to Girardet (2004) and Newman and Jennings (2008), the natural eco-systems are investigated as a cyclic metabolism; on the contrary, the metabolism of most modern cities is generally a linear pattern, which is unsustainable. Breheny (1992, p.2) suggests

*“[i]f cities can be designed and managed in such a way that resource use and pollution are reduced, then a major contribution to the solution of the global problem can be achieved”.*

To reduce negative human impact and enhance ecosystem services, the urban footprint has to be reduced and a profound change of urban metabolism has to be promoted (Girardet, 1999). Human settlement should be seen as a system between the settlement and the wider environment; inputs from and outputs to wider spheres should be a cyclic pattern which can enhance the ecological responsibility of cities (Rogers and Gumuchdjan, 1997). Crilly

(2000) considers this system as the quality of self-sufficiency, defining the control of and living within limits of current systems.

One of the radical challenges to the eco-system approach is contributed under the ideas of urban compaction. To stop the extension of the urban footprint and to de-carbonize the energy supply, a compact urban form with mixed-use programmes and a strong focus on low-impact public transport are suggested (Dawson, 2002; Jenks *et al.*, 1996; Lehmann, 2010; Williams *et al.*, 2000). Lloyd-Jones (2004) says that the compact city strategy introduced by the Green Paper on the Urban Environment published by the Commission of the European Communities (CEC, 1990) is a 'state of the art' in urban design and is still a valid solution for sustainability.

However, "what is a socially acceptable level of space consumption and proximity seems to change historically in all cultures" (Burgess, 2000, p.14). The concept of urban compaction can be traced back to the model of densely developed cores of historic European cities but "[t]he danger is that it is a romantic vision" (Jenks *et al.*, 1996, p.5).

### **1.3.2 The Place-Making Approach**

Because sustainability is not only an ecological concept but also affects local environmental health, the concern for current aspirations of different groups is equivalent to the distribution of wealth for future generations. A quality of life and basic needs at local levels, therefore, are emphasized as one of key objectives to deliver sustainability. On this basis, the place-making approach is fundamental.

In a wide-ranging review of urban design theory, Carmona *et al.* (2003) point out several traditions of thought in which a social usage tradition has moved forward into a place-making tradition. The social usage approach intends to understand how people use and facilitate the built environment, how the form of space responds to the human behaviours and what the aspects of cross socio-functional connections are (Alexander, 1965; Jacobs, 1961).

However, Giddings *et al.* (2005) argue that, without being based on community involvement, sustainability cannot be achieved. To define people's needs in relation to urban functions, the meaning of places becomes the key debate (Tibbalds, 2007). Cooper (2000) goes further, stating that the place-making tradition includes two aspects: the visual-artistic tradition (Cullen, 1961; 1971; Sitte, 1976) and the integration of elements

making up a place. In this sense, the place-making approach can be identified as a synthesis of the visual-artistic approach and the social usage approach, searching for visual and social qualities which are rooted in the socio-cultural context of given places, as shown in Figure 1.4.

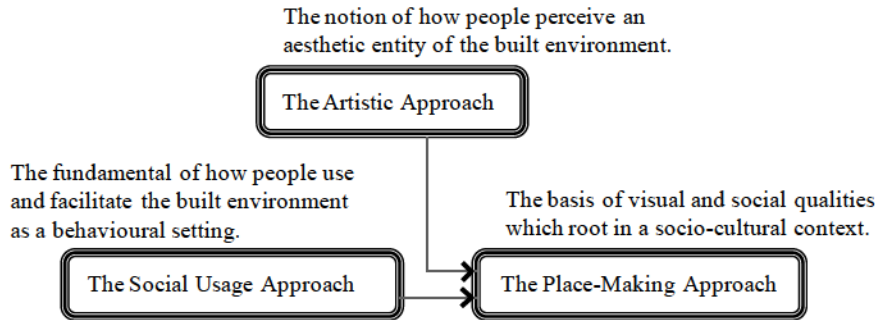


Figure 1.4 Sequential Shift in Urban Design Traditions

Source: Carmona *et al.*, 2003; Cooper, 2000

Lynch (1981, p.111) considers the quality of place as “the joint effect of the place and the society which occupies it” and defines five dimensions of basic performance: 1) *Vitality*, where the form of place supports functions and human beings; 2) *Sense*, where clear perception is generated through time and space; 3) *Fit*, where the form of space fits with the human behaviours; 4) *Access*, where people can reach others; 5) *Control*, where people facilitate spaces and activities. He also identifies two meta-criteria for spatial forms of cities: 6) *Efficiency*, which includes relative cost for achieving and maintaining the quality of place; and, 7) *Justice*, ways in which environmental benefits are distributed.

Analysing place in relation to social and political dimensions, Bentley *et al.* (1985, p.9) argue that “the built environment should provide its users with an essentially democratic setting, enriching their opportunities by maximizing the degree of choice available to them” and establish the theory of the ‘responsive environment’. To maximize choices, seven design qualities are proposed: 1) *Permeability*, the extent to which an environment allows people a choice of access through it; 2) *Variety*, places with varied forms, uses and meanings; 3) *Legibility*, the quality which make a place graspable; 4) *Robustness*, places which can be used for many different purposes; 5) *Visual Appropriateness*, the detailed appearance of the place makes people aware of the choices available; 6) *Richness*, a variety

of sense-experiences which users can enjoy; and, 7) *Personalization*, the stamp of people's own tastes and values.

Haughton and Hunter (1994) go further, maintaining that high levels of diversity within the city are important in response to a variety of activities and a wide range of desired lifestyles of the people who live and work there. In order to respond to what people need and what they want from where they live, work, and visit, the place-making concept, therefore, is the key concept of urban design, as summed up by DETR (2000, p.8):

*“Urban design is the art of making place for people. It includes the way places work and matters such as community safety, as well as how they look. It concerns the connections between people and places, movement and urban form, nature and the built fabric, and the processes for ensuring successful villages, towns and cities.”*

### **1.3.3 The Approach of Co-Dwelling with Nature**

Although the problems of natural depletion and environmental degradation can be resolved by the ideological eco-system approach, the notion of ecology includes not only the natural environment but also the social dimension. A sequential shift of design approaches, therefore, has further progressed when the actions for accomplishing sustainability have synthesized both environmental concern and quality of place.

The co-dwelling with nature (Butina Watson and Bentley, 2007) can be defined as the key concept emphasizing the interconnection of different dimensions within sustainable development. Figure 1.5 shows that the proposition of co-dwelling with nature is determined as a synthesis of the eco-system approach and the place-making approach.

According to Barton (2000b), to reduce the ecological footprint and to make place for people, the principles of sustainable settlement are to promote the local autonomy, the environmental responsiveness, and the adaptability in design for protecting the wider environment; and, to provide choice in terms of uses and spaces and their connectivity for people. Significantly, these principles are based on his definition of sustainable development including both nature and humans at the core (ibid, p.88).

*“Sustainable development is about maintaining and enhancing the quality of human life – social, economic and environmental – while living within the carrying capacity of supporting eco-systems and the resource base.”*

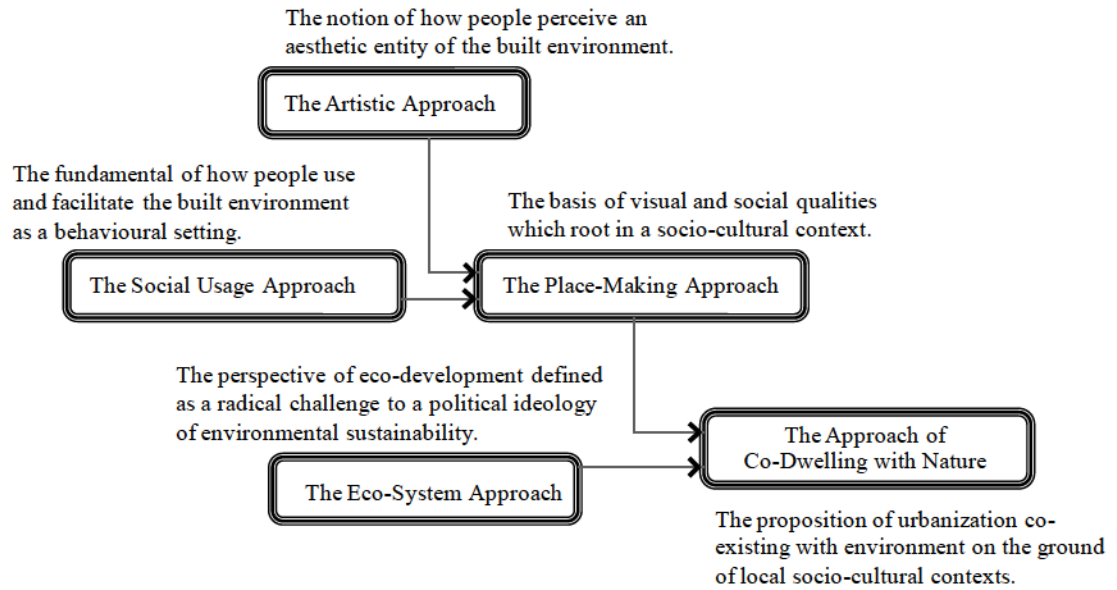


Figure 1.5 Relevant Approaches in Defining Sustainable Urban Forms

Source: Based on Carmona *et al.*, 2003; Cooper, 2000; and completed by author

‘Green’ is the term used to present the aims of protecting natural resources and for making place for people in design (Moughtin, 1996). The green concept influences a number of publications searching for the appropriate solution in joining nature and society to create a better place (BCC, 2001; RUDI, 2009; UDAL, 2000 and 2007). According to the Urban Design Compendium by UDAL (2000), the quality of place has to be delivered through a balance between the natural and the man-made environment. Reflecting this perspective, good design is not only responsive to the needs of people in terms of movement networks, jobs, and services, but also reduces the impact on the natural environment.

Furthermore, environmental importance can be seen as part of the complex values of social, cultural, and political dimensions. Bentley (1999) includes the basic environmental media as part of the ideological themes of choice that should be available to people and identifies the ‘responsive city’, grounded in political and cultural values. He also defines the responsive city typology containing the features of a deformed grid, complex use pattern, robust plot development, positive privacy gradient, perimeter block, and native biotic network.

It should be noted that the ‘responsive city’ typology can be traced back to a set of experiential qualities as follows: variety, accessibility, legibility, robustness, identity,

cleanliness, biotic support, and aesthetic richness. Fuse (2005, p.58) claims that, despite not being comprehensive in detailed design, this set of qualities includes most of the aspects and the basic values of sustainability. Compared with the ‘responsive environment’ (Bentley *et al.*, 1985), the ‘responsive city’ promotes more of the qualities of *Cleanliness*, freedom from noxious pollution, and *Biotic Support*, places valued to the extent that they look or feel ‘green’ or ‘natural’ (green sensibility). Fundamentally, *Identity* is prioritized as a rich symbolic resource for people to call on, constructing the imagined community from which the green approach and the needs of users are encouraged.

Zetter and Butina Watson (2006) go further, asserting that social constructions located in time and space are the core for generating urban conservation and sustainability, which represent the contested territory of different values, aspirations, and power. In this context, Butina Watson and Bentley (2007) define ‘place-identity’ as the key concept for making responsive places both for human beings, wildlife and the wider biosphere.

*“For us, place-identity is the set of meaning associated with any particular cultural landscape which any particular person or group of people draws on in the construction of their own personal or social identities.” (Butina Watson and Bentley, 2007, p.6)*

Because place-identity is the set of meanings attached to the multi-sensory process of inhabiting a place, the process by which people make sense of their places becomes instrumental in delivering place responsiveness as well as sustainability in design. Importantly, increasing choices and encouraging a sense of imagined community and of co-dwelling with nature are fundamental to foster positive support for place-identity.

## 1.4 Definition of Sustainable Urban Forms

*“We value things and act ethically toward them when we feel their importance deeply and when, just as profoundly, we understand why they are important.” (Row, 1990, p.140)*

As discussed in the previous sections, various objectives of sustainable development are identified and several approaches for defining sustainable urban forms are reviewed. They exhibit various dimensions and degrees of sustainability, influenced by notions of global ecological protections and of local environment and needs. In relation to these disciplines, the definition of sustainable urban forms is included in this section, established upon the

strong links between the sustainability objectives and the approaches for defining sustainable urban forms.

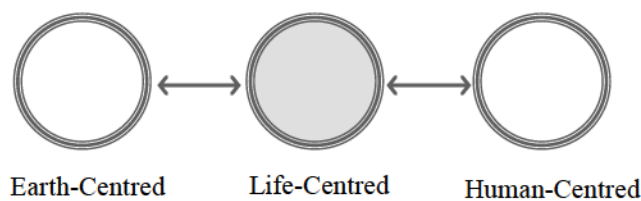
In terms of environmental ethics, the relationships between environment and humans can be valued as the spectrum from earth-centred, life-centred to human-centred, as well as the connections between sustainable development and sustainable urban forms.

Earth-centred, as opposed to human-centred, is a key concept of ecocentrism. It is the ultimate value in the natural world in which the ecosphere is more important and is the most meaningful of all other existences (Rowe, 1990). Naess (1989) goes further, stating that human beings have no right to reduce the richness and diversity of life forms that have intrinsic value in themselves. In contrast, human-centred defines notions of anthropocentrism, which is the belief that all value is human; therefore, it is “the unjustified privileging of human beings, as such, at the expense of other forms of life.” (Curry 2011, p.64).

Figure 1.6 shows that the global and local objectives of sustainable development relate to the notions of earth-centred and of human-centred. Emphasis of the importance of global ecosphere and limit of growth is presented on the one hand; priority of human well-being in the built environment in terms of health, local economies, the quality of life and basic needs is focused on the other.

#### Global Objectives

- Global Ecological Sustainability
- Limit of Growth affecting Natural Resources
- Fighting Poverty and Unemployment to decrease Environmental Depletion
- Good Governance to meet Needs and Natural Protections



#### Local Objectives

- Local Environmental Health
- Equitable Distribution of Local Economies
- Providing a Quality of Life and Basic Needs
- Cultural-Based Development
- Self-Reliance and Self Determination

Figure 1.6 Relationship between Environmental Ethics and Sustainability Objectives

Source: Based on McGranahan and Satterthwaite, 2002; Curry, 2011; and completed by author

In addition, Figure 1.7 shows that the approaches for defining sustainable urban forms are also consistent with those relations. The proposition of earth-centred is replaced by the

eco-system approach, the perspective of eco-development defined as a radical challenge to environmental sustainability. The notion of human-centred is exhibited by the place-making approach, the basis of visual and social qualities which root in a socio-cultural context for human well-being. Based on this figure, the theoretical linkages are found between sustainability objectives and design approaches: the correlations between the eco-system approach and global objectives; and, that between the place-making approach and local objectives of sustainable development.

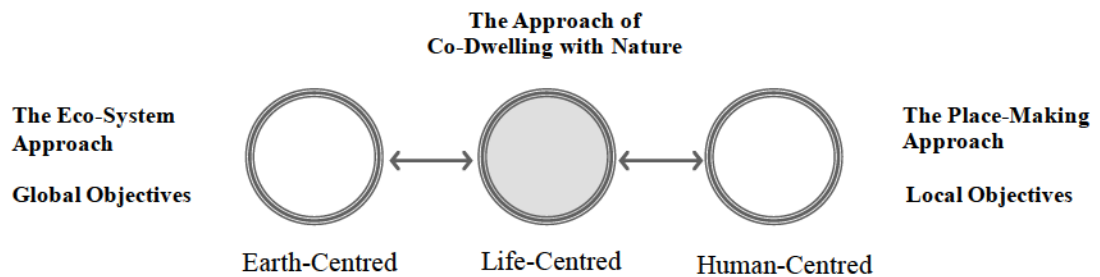


Figure 1.7 Relationship between Environmental Ethics and Approaches for Defining Sustainable Urban Forms

Source: Based on McGranahan and Satterthwaite, 2002; Curry, 2011; and completed by author

However, as a balance is needed between various sustainability dimensions, the life-centred approach is considered to be in the middle among all perspectives, representing concepts of biocentrism. This ethical value is based on the concepts of human beings as inhabitants of the Earth. Taylor (1986) points out that, to distribute this scenario, the attitude of ‘respect’ is instrumental in tackling the right relation between human and other forms of life, and between the natural world and its inhabitants. He also identifies the principles of biocentrism as shown in Box 1.1.

Based on the attitude of ‘respect’ for nature, the relationships between the design approach of co-dwelling with nature and the principles of the life-centred approach are illustrated as shown in Figure 1.7. Aiming to deliver the urbanization co-existing with environment on the ground of local socio-cultural contexts, the concept of co-dwelling with nature responds to the belief that humans are members of the earth along with all other species.

Box 1.1 The Biocentric Outlook and the Attitude of Respect for Nature

- *The belief that humans are members of the Earth's Community of Life in the same sense and on the same terms in which other living things are members of that Community.*
- *The belief that the human species, along with all other species, are integral elements in a system of interdependence such that the survival of each living thing, as well as its changes of faring well or poorly, is determined not only by the physical conditions of its environment but also by its relations to other living things.*
- *The belief that all organisms are teleological centers of life in the sense that each is a unique individual pursuing its own good in its own way.*
- *The belief that humans are not inherently superior to other living things.*

Source: Taylor, 1986, p.99-100

Identified by the environmental ethics, theoretical evidence is found not only of the connections from ethics to other disciplines, but also of the reciprocity between sustainability objectives and approaches for sustainable urban forms. This link is also emphasized by Table 1.2.

Table 1.2 shows various concepts of sustainable urban forms which can be arranged under the umbrellas of the eco-system approach, the approach of co-dwelling with nature, and the place-making approach. Moreover, they relate to global and local relevance of sustainability objectives. As shown in the table, all concepts corresponding to the approach of co-dwelling with nature are classified as the balance solutions defining sustainable urban forms where human welfare, historical conservation, and ecological robustness can be accommodated.

With respect to the standpoints of biocentrism and of co-dwelling with nature identified as the most appropriate concept to deliver all dimensions of sustainability, a definition of sustainable urban form is established as follows.

**A sustainable urban form is a culturally-specific built environment located in, and related to, the wider biosphere by providing richness of choice for all life forms including nature, wildlife and human.**

Table 1.2 Design Approaches for Defining Sustainable Urban Forms

| Global Objectives ←-----→   |   | Balanced Solutions ←-----→  |   |  | -----→ Local Objectives  |   |
|---|---|---|---|--|--|---|
| Eco-Systems   |   | Co-Dwelling with Nature   |   |  | Place-Making   |   |
| Lehmann   | Dawson  | Barton  | UDAL  | Butina Watson and Bentley  | DETR   | Lynch   |
| <ul style="list-style-type: none"> <li>• The Battle Against Climate Change: Sustainable urban design must be established in cities.</li> <li>• Adaptive Reuse: Existing buildings should not be demolished.</li> <li>• Stop Enlarging the Urban Footprint and Halt Sprawl: A compact urban form with mixed-use programmes and a strong focus on low-impact public transport have to be promoted.</li> <li>• Co2 Emission Reductions: Small distributed systems in the city, based on renewable energy sources have to be promoted.</li> </ul> | <ul style="list-style-type: none"> <li>• High Density: Protection of ecological assets with urban densities and uses.</li> <li>• Mixed Use: Diversity of housing occupancy and provision and use of public space.</li> <li>• Old and New: Enhancement of historical fabric.</li> <li>• Healthy: Reducing deprivation and crime.</li> <li>• Public Participation: Participation in community strategies.</li> <li>• 3 R's: Reduce, Reuse and Recycle.</li> </ul> | <ul style="list-style-type: none"> <li>• Local Autonomy: Inputs and outputs from the wider environment should be reduced.</li> <li>• Choice and Diversity: Various options should be permitted for people.</li> <li>• Responsiveness to Place: Places should be responsive to the particular geological, landscape and microclimate conditions.</li> <li>• Connection and Integration: Spaces and activities should connect as a whole.</li> <li>• Flexibility/ Adaptability: Options in design should be kept opened.</li> <li>• User Control: Decisions are taken at the grassroots level.</li> </ul> | <ul style="list-style-type: none"> <li>• Places for People: Places must be safe, comfortable, varied and attractive.</li> <li>• Enrich the Existing: New development should enrich the qualities of places.</li> <li>• Make Connections: Places need to be easy to get to.</li> <li>• Work with the Landscape: The natural and man made environment should be balanced.</li> <li>• Mix Uses and Forms: Places have to meet a variety of demands.</li> <li>• Manage the Investment: Projects must be economically viable and well managed.</li> <li>• Design for Change: Resource efficiency and adaptability should be achieved.</li> </ul> | <ul style="list-style-type: none"> <li>• Place-Identity: The sense of meaning should be associated with cultural landscape.</li> <li>• Maximising Choice: Choices should be encouraged through built forms.</li> <li>• Rootedness of Imagined Community: Historical continuity is promoted through distinctive typology.</li> <li>• Overcoming Nostalgia of Low Expectation: Detail of public spaces should be promoted for structures of meaning.</li> <li>• Transcultural Inclusiveness: Multicultural societies should be encouraged.</li> <li>• Co-Dwelling with Nature: Biosphere should be protected and a sense of green should be encouraged.</li> </ul> | <ul style="list-style-type: none"> <li>• Character: A place with its own identity.</li> <li>• Continuity and Enclosure: A place where public and private spaces are clearly distinguished.</li> <li>• Quality of the Public Realm: A place with attractive and successful outdoor areas.</li> <li>• Ease of Movement: A place that is easy to get to and move through.</li> <li>• Legibility: A place that has a clear image and is easy to understand.</li> <li>• Adaptability: A place that can change easily.</li> <li>• Diversity: A place with variety and choice.</li> </ul> | <ul style="list-style-type: none"> <li>• Vitality: Form supporting functions and human beings.</li> <li>• Sense: Clear perception is generated through time and space.</li> <li>• Fit: The form of space fits with the human behaviours.</li> <li>• Access: People can reach others.</li> <li>• Control: People facilitate spaces and activities.</li> <li>• Place: People's organisation into mental structures of emotional pleasure.</li> <li>• Identity: a distinction of a place from others, including spatial relations and meanings.</li> </ul> |

Source: Based on Barton, 2000b; Butina Watson and Bentley, 2007; Dawson, 2002; DETR, 2000; Lehmann, 2010; Lynch, 1960, 1976 and 1981; UDAL, 2000 and completed by author

Following the definition established, key aspects of sustainable urban forms are demonstrated as shown in Box 1.2. It should be noted that they are a platform to identify key qualities of sustainable urban forms and ways in which they can be delivered through spatial patterns as discussed in the next section.

Box 1.2 The Aspects of Sustainable Urban Forms

1. Place should support other species as well as humans (life-centred value).
2. A degree of relative autonomy should be addressed in relation to local geological, landscape, and microclimate conditions.
3. A sense of co-dwelling with nature should be promoted.
4. A balance between nature and a man-made environment should be encouraged by maximizing energy conservation and minimizing inputs and outputs from the wider environment.
5. Development should build on local context and reflect local conditions.
6. Options in the built environment should be kept open and gradual change should be aimed for.
7. Places must be easy to understand, comfortable, varied and attractive.
8. People should be able to have access to a wide range of choices regarding linkage networks, uses and open spaces.
9. Multicultural societies and historical continuity should be promoted through cultural-specific typology of forms, activities and sensation.
10. Individual and communities have to evolve.

## 1.5 Qualities and Spatial Patterns of Sustainable Urban Forms

*“[S]ustainable development is not simply a passing fashion but, rather, a fundamental goal.” (Blowers, 1993, p.5)*

Because sustainability is a goal which can be delivered in various degrees depending on manifested sustainability objectives and intricate local contexts and conditions, a wide range of urban forms can be defined as sustainable. Rather than searching for a precise

model that can never be accommodated to local diversity, quality in design is more practicable to be used in the identification of sustainable urban forms.

With relation to the definition and key aspects of sustainable urban forms defined in the previous section, theorists' and practitioners' ideas to deliver sustainability are reviewed in order to specify key qualities of sustainable urban forms. Attempting to deliver sustainable urban forms as a culturally-specific built environment located in, and related to, the wider biosphere, a number of authors have sought to identify specific qualities as shown in Table 1.3.

What Table 1.3 shows is the strong consensus among authors emphasizing how built forms should be shaped to maintain a diversity of biospheres and to deliver quality places for people which address global and local objectives of sustainable development. Including most of aspects of sustainable urban forms, the theoretical agreement is found from the most frequent of proposed concepts (highlighted in blue in the table). They are resource efficiency, biotic support, cleanliness, resilience, variety, accessibility, legibility, and identity.

These concepts inform the key qualities of sustainable urban forms which should be achieved through spatial patterns. Features of sustainability management and participatory in this sense are not included into this set of design qualities, such as environmental education and stewardship. In spite of representing important design features, concepts of comfort, self-sufficiency and safety prioritized by a few authors can be integrated into others design qualities such as biotic support, energy efficiency, variety, and legibility.

Based on the consensus among authors defining how built forms should be shaped for sustainability, the key qualities of sustainable urban forms are summarized in Box 1.3.

Table 1.3 Qualities of Sustainable Urban Forms

| Hough and Hunter (1994)               | CNU (1996)  | SUN (1996)                       | Evans (1997)           | Bentley (1999)                 | Barton (2000b)           | Cooper (2000)                                    | UDAL (2000)         | Carmona (2003)                        | Fuse (2005)                           | Butina Watson and Bentley (2007)       |
|---------------------------------------|---|----------------------------------|------------------------|--------------------------------|--------------------------|--|---------------------|---------------------------------------|---------------------------------------|--|
| Concentration and Resource Efficiency | Natural Conservation                                  |                                  | Resource Conservation  |                                |                          | Resource Conservation                            | Energy Conservation | Concentration and Resource Efficiency | Energy Efficiency                     |  |
|                                       |   | Minimal Environmental Harm       | Biotic Support         | Biotic Support                 |                          | Biotic Support                                   |                     | Biotic Support                        | Biotic Support                        | Co-Dwelling with Nature                |
|                                       |   |                                  | Freedom from Pollution | Cleanliness                    |                          | Cleanliness                                      |                     | Pollution Reduction                   | Minimizing and Control of Pollution   |  |
|                                       |   |                                  |                        |                                |                          | Comfort  | Comfort             |                                       |                                       |  |
| Environmental Education               |   |                                  |                        |                                |                          |  |                     |                                       |                                       |  |
|                                       |   |                                  |                        |                                | Local Autonomy           |  |                     | Self-Sufficiency                      | Self-Sufficiency                      |  |
| Flexibility                           |   |                                  | Resilience             | Robustness                     | Flexibility/Adaptability | Adaptability, Gradual Change                     | Design for Change   | Resilience                            | Flexibility, Resilience, Adaptability |  |
| Social and Cultural Diversity         | Diverse Use and Population                            | A Rich Mix of Uses               | Variety and Vitality   | Variety and Aesthetic Richness | Choice and Diversity     | Variety and Richness of Experience               | Variety             | Diversity, Choice                     | Vitality and Variety                  | Choice and Transcultural Inclusiveness |
| Permeability                          | Universal Accessibility                               | Integration/Permeability         | Permeability           | Accessibility                  | Connection/Integration   | Access   | Connections         |                                       | Permeability                          |  |
|                                       |   |                                  |                        | Legibility                     |                          | Legibility                                       |                     | Legibility                            | Legibility                            | Legibility                             |
| Security                              |   |                                  |                        |                                |                          | Security   | Safe                |                                       | Safety                                |  |
| Organic Design and Appropriate Scale  | Local History, Climate, Ecology and Building Practice | Quality Space and Sense of Place | Distinctiveness        | Identity                       | Responsive to Place      | Respect for Context and Appropriateness of Scale |                     | Distinctiveness                       | Community Sense, Sense of Place       | Place-Identity and Imagined Community  |
| Consultation, Participation           | Participatory   | Stewardship                      |                        |                                | User Control             | Involvement                                      |                     | Stewardship                           | Stewardship                           |  |

Note: Frequency of proposed concepts is presented in blue.

Source: Based on Cooper, 2000; Fuse, 2005; and completed by author

Box 1.3 Design Qualities for Sustainable Urban Forms

1. **Resource Efficiency**, A degree of relative autonomy should be designed to minimize energy and resource uses and reduce inputs and outputs from the wider environment.
2. **Biotic Support**, Biosphere has to be protected for wildlife and biotic networks have to be provided through a range of morphological levels. A sense of 'green' or 'natural' has to be increased in order to make sense of co-dwelling with nature and comfort.
3. **Cleanliness**, Pollution has to be reduced and basic environmental media of air, water, and soil on which all life depends have to be protected.
4. **Resilience**, Socio-spatial structures can be used for many functions and can be adapted to cope with changing purposes, activities and values. Gradual change is complementary.
5. **Variety**, A wide range of choice regarding forms, uses, meanings and experience have to be maximized, available and legible for users to choose and enjoy. A wide range of economic exchange is complementary.
6. **Accessibility**, Physical and visual permeability and connection should be provided so that users can have access from place to place to reach their choices.
7. **Legibility**, An image and structure of the place has to be easy to be read and the detailed appearance of the place should make people aware of the choices available.
8. **Identity**, Visual and scale appropriateness should be provided for users to call on constructing the imagined community, attached by local context, history, climate, ecology, building practice and personality.

The qualities of sustainable urban forms as presented in the box can be achieved through spatial patterns; the acquisitions of sustainable urban forms are shown in Table 1.4. The table shows the spatial connections between the sustainability qualities and the spatial structures including streets and spaces, blocks, plots, buildings and uses. It should be noted that these spatial structures define the key records of all features of the built-up area (Conzen, 1969), which are instrumental for the geographical analysis of the urban form (Kropf, 1993; 2009; Moudon, 1986 and 1997; Whitehand, 2001 and 2009).

Table 1.4 Relationships between Design Qualities and Spatial Elements of Sustainable Urban Forms

| Design Qualities           | Street and Open Space   | Block  | Plot   | Building  | Use  |
|----------------------------|---|--|--|---|--|
| <b>Resource Efficiency</b> | <ul style="list-style-type: none"> <li>• Energy efficiency can be promoted by the linkage between centres of high activities.</li> </ul>  | <ul style="list-style-type: none"> <li>• Appropriate block depth encouraging walkability can support the reduction of car dependency.</li> </ul>   | <ul style="list-style-type: none"> <li>• Energy retention can be increased if orientation of block, plot and building allows appropriate natural light and ventilation.</li> </ul> | <ul style="list-style-type: none"> <li>• Degree of inputs and outputs from the wider environment can be reduced by compactness of built form.</li> </ul>  | <ul style="list-style-type: none"> <li>• Local autonomy can be achieved by intensification of people inhabiting.</li> <li>• Trip length can be decreased by mixed uses (viable range of uses and facilities).</li> <li>• Broad spread of employment and rents is a factor defining mixed use, influenced by high levels of pedestrian flow.</li> <li>• Walking and cycling can be encouraged by traffic calming and restricted vehicle circulation and speed.</li> </ul> |
| <b>Biotic Support</b>      | <ul style="list-style-type: none"> <li>• A sense of 'green' can be increased by providing natural corridors and networks.</li> <li>• Street trees increase a sense of co-dwelling with nature and comfort.</li> </ul>   | <ul style="list-style-type: none"> <li>• Biotic support can be promoted by appropriate natural light and ventilation; size and orientation of blocks is fundamental.</li> </ul>  | <ul style="list-style-type: none"> <li>• Plot depth constrains public/private relationship as well as green corridors.</li> </ul>  | <ul style="list-style-type: none"> <li>• A sense of co-dwelling with nature and comfort can be achieved through greenery display and soft landscape in building groups and spaces.</li> </ul>       | <ul style="list-style-type: none"> <li>• Degree of compactness (people inhabiting) contributes to the preservation of natural land feature and wildlife.</li> <li>• Micro climate can be enhanced by promoting public transport infrastructure.</li> </ul>   |
| <b>Cleanliness</b>         | <ul style="list-style-type: none"> <li>• Natural drainage and absorption should be preserved and provided for reducing hard surfaces and run-off.</li> <li>• Street trees can reduce pollution.</li> <li>• Pollution built up can be prevented by well-ventilated space.</li> </ul> | <ul style="list-style-type: none"> <li>• Encouraging walkability, appropriate block depth supports the reduction of vehicle use and pollution.</li> <li>• Orientation and scale of block is crucial for creating well-ventilated space along streets.</li> </ul> | <ul style="list-style-type: none"> <li>• Orientation and scale of plot are crucial in defining building structures impeding natural air flow.</li> </ul>                           | <ul style="list-style-type: none"> <li>• Structure of building groups and spaces is a key to prevent heat island and pollution built up.</li> </ul>   | <ul style="list-style-type: none"> <li>• Degree of emission can be reduced by controlling private motorized transport and promoting public transport infrastructure.</li> <li>• Walking and cycling are fundamental for energy efficiency and for preventing emissions from vehicle use.</li> </ul>  |
| <b>Resilience</b>          | <ul style="list-style-type: none"> <li>• Spaces usable for many functions can be encouraged by fine grained streets.</li> </ul>   | <ul style="list-style-type: none"> <li>• Fine grained block allows capability to cope with future change.</li> </ul>   | <ul style="list-style-type: none"> <li>• Extendable and adaptable socio-spatial structure is underpinned by fine grained plots and buildings.</li> </ul>                           | <ul style="list-style-type: none"> <li>• Gradual change are influenced by retained local buildings.</li> <li>• Mixed building types, ages, and tenures are complementary for resilience.</li> </ul> | <ul style="list-style-type: none"> <li>• Degree of mixture comprising uses, facilities, employment and rents, and modes of movement encourages fine grained changes of use.</li> </ul>   |

(Continued)

Table 1.4 Continued

| Design Qualities     | Street and Open Space   | Block   | Plot   | Building  | Use  |
|----------------------|---|---|--|---|--|
| <b>Variety</b>       | <ul style="list-style-type: none"> <li>Degree of connectivity and frequency is determined on grain of streets and blocks.</li> </ul>  | <ul style="list-style-type: none"> <li>A richness of experience is contributed by fine grained blocks.</li> </ul>   | <ul style="list-style-type: none"> <li>Fine grain of plots is fundamental in defining active frontages (between buildings and public spaces) which result in sign of life and security.</li> </ul> | <ul style="list-style-type: none"> <li>A variety of forms, meaning and experience is encouraged by mixed building types, ages, and tenures.</li> </ul>  | <ul style="list-style-type: none"> <li>A wide range of choices is identified by mixed communities, a wide range of uses and facilities, a broad spread of employment and rents, and multi-modes of movement.</li> </ul>  |
| <b>Accessibility</b> | <ul style="list-style-type: none"> <li>Linkages between centres of high activities define physical permeability.</li> <li>Grain of streets are crucial to promote those linkages.</li> </ul>                                      | <ul style="list-style-type: none"> <li>Influenced by appropriate block depth, walkability is fundamental for defining degree of accessing choices.</li> </ul>         | <ul style="list-style-type: none"> <li>Because size and dimension of plots define building fabrics and blocks, they are substantial in contributing accessibility.</li> </ul>                      | <ul style="list-style-type: none"> <li>Degree of route penetration through and round is defined by scale and location of buildings in spaces.</li> </ul>  | <ul style="list-style-type: none"> <li>Because accessibility and choice interact reciprocally, good accessibility can be perceived when proximity of use is found. Mixed use is instrumental.</li> <li>Available transport modes and integrated travel modes support accessibility.</li> </ul> |
| <b>Legibility</b>    | <ul style="list-style-type: none"> <li>Degree of simplicity and predictability is identified by visually imaginable networks of space.</li> <li>Degree of readability is encouraged by landmark and space disposition.</li> </ul> | <ul style="list-style-type: none"> <li>Visual organisation of enclosure is influenced by block size and shape.</li> </ul>   | <ul style="list-style-type: none"> <li>Because plots constrain building types, they are crucial in defining degree of contrast and harmony of buildings and spaces.</li> </ul>                     | <ul style="list-style-type: none"> <li>Degree of contrast is influenced by building characteristics and locations.</li> </ul>   | <ul style="list-style-type: none"> <li>Legible settlement is determined on concentration of most active uses.</li> <li>Transport options should be accessible and legible particularly on prime permeable channels.</li> </ul>   |
| <b>Identity</b>      | <ul style="list-style-type: none"> <li>Rootedness of imagined communities is defined by significant public realm and enclosure.</li> </ul>  | <ul style="list-style-type: none"> <li>Historical continuity is encouraged by block size in which private/public relationships can be settled or retained.</li> </ul> | <ul style="list-style-type: none"> <li>Visual and scale appropriateness of public realm are contributed by scale and dimension of plots.</li> </ul>  | <ul style="list-style-type: none"> <li>Local distinctiveness, historic or townscape merit can be achieved by retaining material, style, shape, form, and type of traditional building groups and spaces.</li> </ul> | <ul style="list-style-type: none"> <li>Degree of dominance and uniqueness is defined by personalisation of communities.</li> </ul>   |

Source: Carmona *et al.*, 2003; Cooper, 2000; Bentley, 1999; Butina Watson and Bentley, 2007; Givoni, 2003; Rudin and Falk, 1999; and completed by author

In accordance with Table 1.4, the ways in which the qualities of sustainable urban forms can be delivered through the urban forms are explained as follows.

**Resource efficiency** is a degree of relative autonomy in terms of the use of resources. Hence, inputs and outputs from the wider biosphere and energy efficiency and retention are fundamental in defining global ecological protection. Table 1.4 shows that this can be achieved through the density of built components and population (Carmona *et al.*, 2003; Haugh and Hunter, 1994; Rudin and Falk, 1999). Further, to encourage energy efficiency and retention, the public transport options, well-ventilated spaces, walking and cycling priority, and trip length reduction have to be undertaken (Calthorpe, 1996; CNU, 1999; Boonlua, 2007; Nozzi, 2010).

**Biotic support** is the quality focusing on the well-being both of human beings and of all species in the healthy urban ecology, natural permeability should be provided to achieve this aim. As shown in Table 1.4, biotic support can be encouraged by the provision of public and private open spaces, the linkage between them as green corridors and as a natural network, and the design of greenery display and soft landscape (Barton *et al.*, 2003; Bentley, 1999).

**Cleanliness** defines the basic environmental media of air, water, and soil appropriate for both wildlife and human. Pollution has to be reduced. Table 1.4 shows that the quality of cleanliness can be promoted by prioritizing public transport, the control of private motorized transport, the decrease of hard surfaces and run-off, and natural ventilation influenced by configurations of streets and blocks (Bentley, 1999; Givoni, 2003; URBED, 1996).

**Resilience** is a degree of mixture, adaptability, and extendibility. To deliver this quality, the viable range of uses, facilities, employment and rents, the multi-modes of movement and mixed building types are central (Barton *et al.*, 2003; Bentley, 1999). They contribute to urban capability to deal with changing purposes, activities and values. The fine grain of blocks, plots and buildings can also promote urban capability to cope with future form alterations (Bentley *et al.*, 1985).

**Variety** is important because sustainable urban forms not only depend on shapes but also require that the needs of people should be met locally. In this sense, choices for and experience of people become fundamental. This quality can be manifested through the typologies of forms and activities (Cooper, 2000), the urban grains encouraging high level

of pedestrian flow (Jacobs, 1961) and the building frontages showing ‘sign of life’ (Butina Watson and Bentley, 2007).

**Accessibility** is substantial as the basic needs of people who live, work and visit places. In the other words, choices should be accessible. The grain of built forms, the linkage between centres of high activities, multi-modes of movement and walkability are necessary to support this design quality (DETR, 2000; Rudin and Falk, 1999). Furthermore, because of a reciprocal relation between accessibility and choice, a good accessibility can be perceived when proximity of use is found; the feature of mixed uses, therefore, cooperates in delivering the quality of accessibility (Table 1.4).

**Legibility** is a degree of simplicity, predictability and contrast, identifying a place that is easy to read (Cooper, 2000). The visual permeability through settlement and accessible public space networks, landmarks and space disposition, and the design of visually interesting buildings are central in indicating the quality of legibility (Bentley *et al.*, 1985; Carmona *et al.*, 2003; Lynch, 1960 and 1981).

**Identity** is a key for delivering quality places when people can understand how places are created, recreated, and sustained as historical continuity. Table 1.4 shows that, as the distinctive expression of collective socio-cultural patterns, the identity of place can be encouraged through the landscape character, the significant public realm, distinctive building groups and spaces and the personalization of communities (Butina Watson and Bentley, 2007; Zetter and Butina Watson, 2006).

The derivations of sustainability qualities through spatial patterns (as discussed above) are a foundation to establish literature-based indicators for evaluating global levels of sustainability in the next section.

## **1.6 Literature-Based Indicators for Evaluating Global Levels of Sustainability**

Based on ways in which the key qualities of sustainable urban forms can be promoted through spatial structures as investigated in the previous section, Table 1.5 shows 30 indicators for evaluating sustainable urban forms. The indicators show the relationships between the spatial structures (streets and spaces, blocks, plots, buildings, and uses) and the sustainability qualities (resource efficiency, biotic support, cleanliness, resilience,

variety, accessibility, legibility, and identity), as well as ways in which urban forms can be evaluated.

Table 1.5 List of Literature-Based Indicators for Evaluating Sustainable Urban Forms

|                       |              |  | Resource Efficiency    | Biotic Support | Cleanliness | Resilience | Variety | Accessibility | Legibility | Identity |
|-----------------------|--------------|--|------------------------|----------------|-------------|------------|---------|---------------|------------|----------|
| Street and Open Space | 1            | Linkage between Centres of High Activities                     | o                      |                |             |            |         | o             |            |          |
|                       | 2            | Linkage of Public and Private Open Space as Green Corridors    |                        | o              |             |            |         |               |            |          |
|                       | 3            | Linked Green Corridors as Natural Networks                     |                        | o              |             |            |         |               |            |          |
|                       | 4            | Planting and Renewing Street Trees                             |                        | o              | o           |            |         |               |            |          |
|                       | 5            | Reduced Hard Surfaces and Run-Off                              |                        |                | o           |            |         |               |            |          |
|                       | 6            | Visually Imaginable Networks of Space                          |                        |                |             |            |         |               | o          |          |
| Street and Block      | 7            | Fine Grained Street and Block                                  | o                      |                | o           | o          | o       | o             |            |          |
| Plot and Building     | 8            | Fine Grain of Land Subdivisions and Buildings                  |                        |                |             | o          | o       | o             |            |          |
| Building              | 9            | Density of Built Components                                    | o                      |                |             |            |         |               |            |          |
|                       | 10           | Active Frontages   |                        |                |             |            | o       |               |            |          |
|                       | 11           | Mixed Building Types, Ages and Tenures                         |                        |                |             | o          | o       |               |            |          |
|                       | 12           | Visually Interesting Buildings                                 |                        |                |             |            |         |               | o          |          |
|                       | 13           | Locally Distinctive Building Groups and Spaces                 |                        |                |             |            |         |               |            | o        |
| Use                   | 14           | Density of Population  | o                      | o              |             |            |         |               |            |          |
|                       | 15           | Mixed Communities  |                        |                |             |            | o       |               |            |          |
|                       | 16           | Viable Range of Uses and Facilities                            | o                      |                |             | o          | o       | o             |            |          |
|                       | 17           | Employment and Economic Activities                             | o                      |                |             | o          | o       |               |            |          |
|                       | 18           | Public Transport Infrastructure                                | o                      | o              | o           |            |         |               |            |          |
|                       | 19           | Layout of Transport Stations as an Integral Part of the Street |                        |                |             |            |         | o             |            |          |
|                       | 20           | Multi-Modes of Movement  |                        |                |             | o          | o       | o             |            |          |
|                       | 21           | Walking and Cycling Priority                                   | o                      |                | o           |            |         |               |            |          |
|                       | 22           | Restricted Vehicle Circulation and Speeds                      | o                      |                | o           |            |         |               |            |          |
|                       | All Elements | 23   | Well-Ventilated Spaces | o              | o           | o          |         |               |            |          |
| 24                    |              | Greenery Display and Soft Landscape                            |                        | o              |             |            |         |               |            |          |
| 25                    |              | Gradual Change of Spatial Configuration                        |                        |                |             | o          |         |               |            |          |
| 26                    |              | Legible Settlement through Active Use                          |                        |                |             |            |         |               | o          |          |
| 27                    |              | Legibility through Landmark and Space Disposition              |                        |                |             |            |         |               | o          |          |
| 28                    |              | Positive Identity and Landscape Character                      |                        |                |             |            |         |               |            | o        |
| 29                    |              | Preserving Significant Public Realm                            |                        |                |             |            |         |               |            | o        |
| 30                    |              | Personalisation of Communities                                 |                        |                |             |            |         |               |            | o        |

o The indicator implemented for evaluating the sustainability quality.

It should be emphasized that both the individual spatial element and the connections between several elements are taken into account of literature-based indicators. This can be exemplified by the fact that, while the indicator number 1 represents linkage between centres of high activities as a key element to be evaluated for the qualities of resource efficiency and accessibility, the indicator number 30 demonstrates personalization of communities as a morphological connection to be evaluated for the quality of identity for

which uniqueness of landscape, building traditions, and local practices and materials is defined.

While the list of 30 literature-based indicators is presented in Table 1.5, the full sets of indicators are presented as a work sheet for evaluating sustainable urban forms in *Appendix J* (p.395). It should be noted, however, that *Appendix J* shows the comparison between the literature-based indicators established in the present chapter and local indicators developed in *Chapter Seven*. Therefore, only the left hand side of tables in the appendix presents the literature-based indicators.

Both quantitative and qualitative parameters are incorporated as a clear statement of how the urban form can be evaluated. Table 1.6 shows different examples of indicators taken from the work sheet in *Appendix J*. One is the quantitative parameters for assessing the density of built components which can be defined by floor area ratio. Another is the qualitative parameters for evaluating positive identity and landscape character which can be determined by definitions of urban features. A literature review of sustainable urban forms drives ways in which both quantitative and qualitative parameters have been established.

Table 1.6 Examples of Quantitative and Qualitative Indicators from Appendix J

| Density of Built Components (FARs)   | Positive Identity and Landscape Character   |
|--|---|
| <ul style="list-style-type: none"> <li>• Good [3]: A minimum 3 FAR for town centre and/or business district and for urban containment.</li> <li>• Moderate [2]: 2.9-1.5 FARs for walkable urbanism and healthy transports.</li> <li>• Poor [1]: Under 1.5 FAR in which walkability and public transport cannot be encouraged.</li> </ul> | <ul style="list-style-type: none"> <li>• Good [3]: Distinctive patterns of development, landscape and culture are retained; as well, the continuity of scale, massing and height of new development to adjacent traditional built forms is found.</li> <li>• Moderate [2]: The inconsistency between new development and historic patterns of landscape and site characteristics are observed.</li> <li>• Poor [1]: New patterns of development have replaced the distinctive historic patterns of settlement.</li> </ul> |

Key: FAR = Floor Area Ratio

Furthermore, the advantage of Table 1.5 is not only the identification of relationships between spatial structures and sustainability qualities but also includes the proposition of how the qualities can be evaluated through spatial patterns. Based on Table 1.5, the list of indicators is re-categorized into eight key qualities of sustainable urban forms as shown in Table 1.7. Various combinations of indicators are specified to be utilized for assessing sustainability qualities of the urban forms.

Table 1.7 The List of Literature-Based Indicators for Evaluating Global Levels of Sustainability

| Sustainability Qualities | Literature-Based Indicators   |
|--------------------------|---|
| Resource Efficiency      | <ol style="list-style-type: none"> <li>1. Public Transport Infrastructure</li> <li>2. Walking and Cycling Priority</li> <li>3. Restricted Vehicle Circulation and Speeds</li> <li>4. Linkage between Centres of High Activities</li> <li>5. Fine Grained Street and Block</li> <li>6. Density of Built Components</li> <li>7. Density of Population</li> <li>8. Viable Range of Uses and Facilities</li> <li>9. Employment and Economic Activities</li> <li>10. Well-Ventilated Spaces</li> </ol> |
| Biotic Support           | <ol style="list-style-type: none"> <li>1. Public Transport Infrastructure</li> <li>2. Linkage of Public and Private Open Space as Green Corridors</li> <li>3. Linked Green Corridors as Natural Networks</li> <li>4. Planting and Renewing Street Trees</li> <li>5. Density of Population</li> <li>6. Well-Ventilated Spaces</li> <li>7. Greenery Display and Soft Landscape</li> </ol>   |
| Cleanliness              | <ol style="list-style-type: none"> <li>1. Public Transport Infrastructure</li> <li>2. Walking and Cycling Priority</li> <li>3. Restricted Vehicle Circulation and Speeds</li> <li>4. Planting and Renewing Street Trees</li> <li>5. Reduced Hard Surfaces and Run-Off</li> <li>6. Fine Grained Street and Block</li> <li>7. Well-Ventilated Spaces</li> </ol>   |
| Resilience               | <ol style="list-style-type: none"> <li>1. Multi-Modes of Movement</li> <li>2. Fine Grained Street and Block</li> <li>3. Fine Grain of Land Subdivisions and Buildings</li> <li>4. Mixed Building Types, Ages and Tenures</li> <li>5. Viable Range of Uses and Facilities</li> <li>6. Employment and Economic Activities</li> <li>7. Gradual Change of Spatial Configuration</li> </ol>  |
| Variety                  | <ol style="list-style-type: none"> <li>1. Multi-Modes of Movement</li> <li>2. Fine Grained Street and Block</li> <li>3. Fine Grain of Land Subdivisions and Buildings</li> <li>4. Active Frontages</li> <li>5. Mixed Building Types, Ages and Tenures</li> <li>6. Mixed Communities</li> <li>7. Viable Range of Uses and Facilities</li> <li>8. Employment and Economic Activities</li> </ol>   |
| Accessibility            | <ol style="list-style-type: none"> <li>1. Layout of Transport Stations as an Integral Part of the Street</li> <li>2. Multi-Modes of Movement</li> <li>3. Linkage between Centres of High Activities</li> <li>4. Fine Grained Street and Block</li> <li>5. Fine Grain of Land Subdivisions and Buildings</li> <li>6. Viable Range of Uses and Facilities</li> </ol>  |
| Legibility               | <ol style="list-style-type: none"> <li>1. Visually Imaginable Networks of Space</li> <li>2. Visually Interesting Buildings</li> <li>3. Legible Settlement through Active Use</li> <li>4. Legibility through Landmark and Space Disposition</li> </ol>   |
| Identity                 | <ol style="list-style-type: none"> <li>1. Locally Distinctive Building Groups and Spaces</li> <li>2. Positive Identity and Landscape Character</li> <li>3. Preserving Significant Public Realm</li> <li>4. Personalisation of Communities</li> </ol>  |

Source: Based on Table 1.5

The focus of the implementation of these sets of indicators is to identify degrees of the urban forms in achieving sustainability qualities. At each indicator, the range of represented values is included to rate sustainability score for each criterion (see examples in Table 1.6, p.57). There are three frequency scales which are good [3], moderate [2] and poor [1] manifestations of the urban form in point of global views. Crucially, by assessing sustainability scores, the process enables this set of indicators to be used for evaluating global levels of sustainability. The implementation of these indicators is further explained as part of the fieldwork methodology in *Chapter Four*.

## **1.7 The Conceptual Framework from a Global Perspective**

Based on all findings derived from the previous sections, sustainable urban form is a goal of development influenced by several agendas, development dimensions, and design qualities. This proposition results in the establishment of the preliminary conceptual framework for explaining sustainable urban forms from a global perspective.

Figure 1.8 shows the conceptual framework. There is, on the one hand, the strong relationship of sustainability dimensions, global and local agendas and pillars of sustainable development; and, on the other hand, the relationship between sustainable urban forms, aspects of co-dwelling with nature and various sustainability qualities. Fundamentally, both sides interact with each other reciprocally as shown in the figure.

This interaction between sustainability dimensions and sustainable urban forms is central to the definition of sustainable urban forms. Although sustainability qualities can be delivered through spatial structures of the urban form, the ways in which this progress can be encouraged depend on the support from sustainability contexts consisting of environmental, economic, social, cultural, and political dimensions. In the same way, the key agenda of sustainability, the futurity and justice, represented by global and local objectives of sustainable development will never be achieved if the process of form-productions is not undertaken with relation to urbanization and transformation co-existing with nature and being rooted in local needs. This link becomes the standpoint for explaining sustainable urban forms whereby sustainability can be promoted from global perspectives.

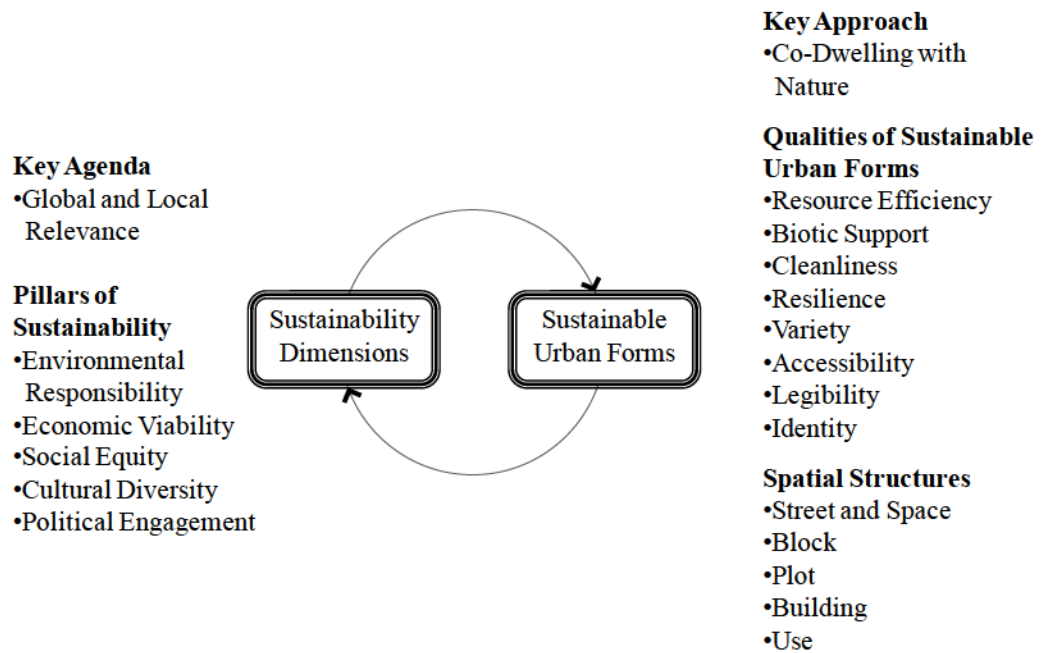


Figure 1.8 The Conceptual Framework Part One: Explaining Sustainable Urban Forms from a Global Perspective

However, the challenge for this argument is not only the stress of relations between sustainable urban forms and sustainability dimensions, but also the demonstration of degrees of sustainability which are varied regarding development contexts and spatial forms located in time and space. How local culture and forms influence the identification of sustainable urban forms and how they can be defined are central to the investigation of sustainability from a local perspective, which terms the basis of the next chapter.

## 1.8 Conclusion

In the present chapter, various dimensions of sustainable development, approaches for defining sustainable urban forms and their relations were explored in order to formulate a theoretical explanation for sustainable urban forms from a global perspective.

The notions of sustainable development were identified as the correspondence between global and local relevance emphasizing the long-term importance of global ecological protections and the short-term urgencies of local environmental health, quality of life and basic needs. These fundamental concepts shed light on various objectives of sustainability, taken into account in the achievement of sustainable urban forms. They are as follows:

1. Environmental Responsibility
2. Economic Viability
3. Social Equity
4. Cultural Diversity
5. Political Engagement

Based on the literature review regarding several design approaches, a strong link was found between concepts for defining sustainable urban forms and the objectives of sustainable development. Addressing both nature and human importance, the concept of co-dwelling with nature, the perspective of urbanization co-existing with environment on the ground of local socio-cultural contexts, is identified as a balance design solution encompassing most aspects of global and local dimensions of sustainability. Based on this finding, the definition of sustainable urban form was established.

*Sustainable urban form is a cultural-specific built environment located in, and related to, the wider biosphere by providing richness of choices for all life forms including nature, wildlife and human.*

Following this definition, key qualities of sustainable urban forms were set up.

1. Resource Efficiency
2. Biotic Support
3. Cleanliness
4. Resilience
5. Variety
6. Accessibility
7. Legibility
8. Identity

Promoting the qualities of sustainable urban forms, spatial structures of the urban form were delineated.

1. Street
2. Block
3. Plot
4. Building
5. Use

The acquisitions of how sustainability qualities can be delivered through the spatial structures result in ways in which the sustainable urban forms can be evaluated. 30 literature-based indicators were established as the key instruments to be used for assessing levels of sustainability. It should be noted that these criteria were discussed in the present chapter while a full set of literature-based indicators were presented as a work sheet for evaluating sustainable urban forms in *Appendix J*.

The holistic relationship between sustainable urban forms and sustainability dimensions indicated were consequently drawn to interpret the framework for explaining sustainable urban forms. Key aspects of sustainable urban forms were defined, as well as an inquiry to analyse sustainable urban forms from global views. In addition, it opens up the debate of how locally development dimensions and distinctive spatial patterns can make change in the identification of sustainable urban forms as discussed in the next chapter.

# Chapter Two

## Conceptual Framework Part Two: Explaining Sustainable Urban Forms from a Local Perspective

### **2.1 Introduction**

The phrase ‘think global, act local’ is broadly used for highlighting ways in which sustainable development can be achieved, but what is the local importance we have to think of and how the latter can contribute to the identification of sustainable urban forms? This chapter is intended to review various concepts of urban localities and forms in order to establish an explanation of sustainable urban forms located in time and space.

The aim of this chapter is to develop a theoretical framework for defining sustainable urban forms from local perspectives. It should be noted that the second research objective is defined by this chapter. To fulfill this aim, key objectives are formulated.

1. To examine key aspects of local forms.
2. To define local processes of form-productions.

3. To employ key findings assessed under chapter objectives one and two to establish the conceptual framework for defining sustainable urban forms from a local perspective.

A methodology to achieve the chapter objectives is shown in Figure 2.1. Aspects of the local built environment and the processes by which the built environment are socially and culturally constructed are crucial to interrogate sustainability responsive to urban localities. On the one hand, concepts of place, community and morphology defining socio-spatial constructions are investigated. On the other hand, process of change is determined from various local factors driving productions of the urban forms. They are: culture, individual perceptions, agents, development processes and market-state relations.

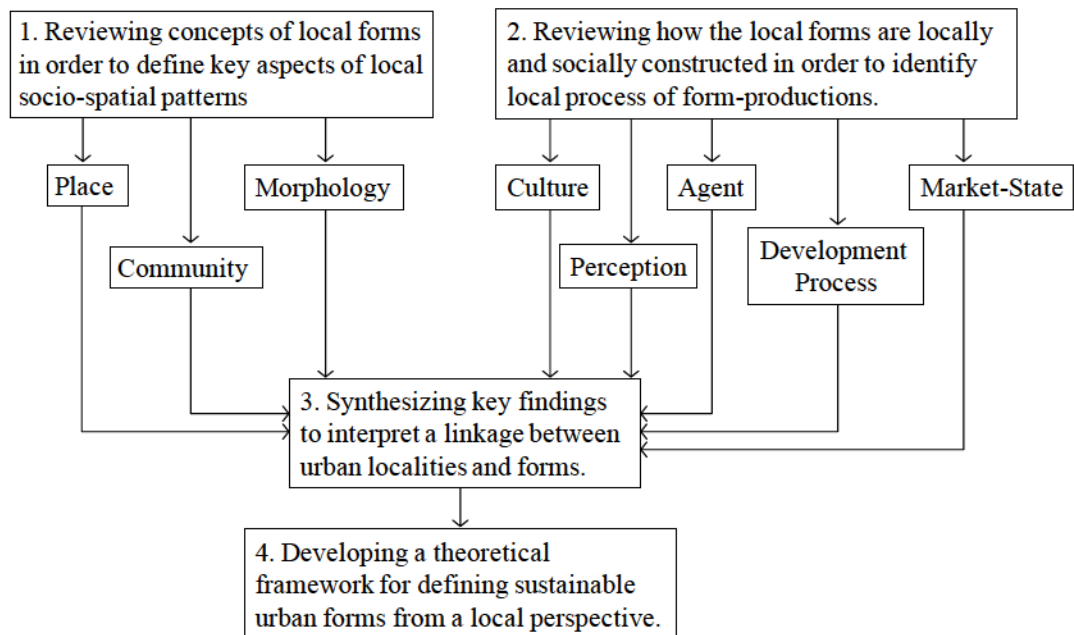


Figure 2.1 Flow Diagram to Define a Conceptual Framework of Sustainable Urban Forms from a Local Perspective

All findings are synthesized in order to determine a theoretical linkage between these two disciplines and to identify what has a real potential to deliver sustainable urban forms. Crucially, as shown in the figure, the conceptual framework for defining sustainable urban forms from a local perspective is established with relation to these data. Along with the conceptual framework from a global perspective developed in CH1, the framework

established in this chapter provides a foundation to formulate an integrated conceptual framework for explaining local sustainable urban forms in the next chapter.

To deliver the chapter objectives, the chapter structure is as follows.

- 2.1 Introduction
- 2.2 Locality and the Built Environment
- 2.3 Locality and the Process of Form-Productions
- 2.4 Notion of Local Appropriateness
- 2.5 Conceptual Framework from a Local Perspective
- 2.6 Conclusion

## **2.2 Locality and the Built Environment**

*“People make the urban environment, after all. It never just happens.” (Bentley, 1999, p.26)*

This section presents the basis of the local built environment. It seeks to answer the question what are the key aspects of local forms and how are people tied into these socio-spatial constructions? To achieve this aim, concepts of place, community and morphology are examined. These aspects of local forms are a key to interrogate ways in which sustainable urban forms can be delivered as a local product from urban localities.

### **2.2.1 Concept of Place**

The concept of place is important to understand socio-spatial structures of the built environment as it encompasses both social and spatial factors of local areas. In order to clarify ‘place’, Jones and Eyles (1977) identify two main approaches with relation to ‘space’: a container of things and an attribute of things. The former implies that people address all built environment and spatial behaviour in spaces; however, this concept tends to be classifying purposes rather the meaning purposes of spaces. In contrast, the latter approach, an attribute of things, views ‘place’ as ‘social space’ when ways people think about and how they use spaces are prioritized and people’s particular values, preferences and aspirations are attached into unique spaces.

Crucially, place is a synthesis of the locally perceived and objective dimensions of space. Supporting this argument, Lovell (1998, p.25) writes that

*“[t]he notion of ‘place’ is seen as the notion of ‘localised space.’”*

Place is the social space which can be determined by its spatial implications of social processes driving ways in which individuals and groups perceive, use and shape their spaces (Nilufar, 1997). It should be noted that the notions of places as social spaces opens up the idea of a ‘sense of place’ (also discussed in terms of ‘genius loci’) which is the process that people experience of places beyond the physical or sensory properties and can feel an attachment of a spirit of place (Carmona *et al.*, 2003).

Place is also determined as the socially defined space. In other words, individuals and groups perceive and attach meanings to their places because they are bound up by a feeling of defined spaces. It is the need for territoriality which people can feel and define space by the function it serves, such as identity, security and stimulation (Nilufar, 1997). Miguel Angel Roca (1991, cited in LPAC, 1994, p.28) goes further, stating that “[t]he city is a place because it localizes territory ... [t]o localize territory is to turn space into place”.

In general, territory is the space we need for carrying out activities by acknowledging this space as “ours”. Altman (1975, p.3) argues that territorial spaces are constructed as the inter-relationships between privacy, personal space, territorial behaviour and crowding. Besides, territoriality can be examined as a different hierarchy of places and of territorial spaces depending on a ‘sense of belonging’. Goodey (1974, p.56) writes that

*“[t]he territory, the home area, what is often called the neighbourhood in a city or town, is somewhere that feels right. It’s all tied up with feeling as though you belong – to the people, to the buildings, to the life there”.*

Coleman and Collins (2006) go further, stating that a connection between culture and place is deeply problematic. The concept of territoriality is influenced by what we think about local space and place and what power we have to control it (Storey, 2001). In this sense, place is not only the socially defined space but also local politicized space. Place, therefore, is more than simply bounded spatial properties; it can be seen as a fusion of local space, meaning and power.

In summary, place is the socially localized spaces reflecting local values, preferences and aspirations of individuals and groups. In other words, it is the socially defined space where a sense of place and belonging, power and control are defined.

### 2.2.2 Concept of Community

In terms of socio-spatial constructions, communities and neighbourhoods are acknowledged with the forms of locally based social systems. Although LPAC (1994) states that ‘community’ and ‘neighbourhood’ are different in terms of terminology, they are relevant, dependent and used interchangeably. Both are defined as a functional/network concept based on interest groupings and seen as a social bond located in a particular time and space. They are “the localities in which people live” (Barton *et al.*, 2003, p.1).

Jones and Eyles (1977) explain that individuals are bound into groups by their similar socio-economic positions and by their similar ideas about the world and how to behave in the world. In this sense, norms (guidelines for actions) and values (world-views) become the cohesive elements in identifying how people interact with one another and how they create social systems with the forms of community.

Community is a social system defined by local reference: who, with whom, does what, when and where? Sjoberg (1965, cited in Bell and Newby, 1971, p.31) defines a community as “a collectivity of actors sharing in a limited territorial area as the base for carrying out the greatest share of their daily activities”. In this sense, local community is defined by territorial area, common ties and social interaction (Jones and Eyles, 1977).

Local community can be further specified in two terms. First is ‘functional community’ which is based on functional relations of social interactions; second is ‘perceived community’ which is distinctive and distinguishable in physical or morphological features (Nilufar, 1997). Nevertheless, it should be emphasized that ‘imagined community’ is another term to describe a community. It is socially constructed by people who perceive themselves as part of that group, which is not necessarily based on face-to-face contacts or actual spatial settings. Anderson (2006, p.6) writes that

*“[c]ommunities are to be distinguished, not by their falsity/genuineness, but by the style in which they are imagined.”*

Community is the socio-spatial structures that people perceive of their own personal and social identities. It is a complex social system in which a shared religion, culture, world-view and lifestyle are all included. Defining community in this sense can also identify tensions, divisions and distinctions in differentiating in-group and out-group or “us” and “them” (Jones and Eyles 1977).

Community therefore is defined by concepts of identity which is a view to distinguish one from others, a place from other places and a community from other communities. Further, identity is the ways in which “people seem to recognize as relevant to their own everyday lives” (Butina Watson and Bentley, 2007, p.3). Carmona *et al.* (2003) and Lovell (1998) argue that the emotional gravity of identity for place and for community is stressed by a ‘sense of belonging’ and a ‘sense of rootedness’ which are fundamental to people’s experience and are a phenomenology of locality providing perceived ideals surrounding place.

People need a sense of local identity through symbolic components because they continue shared experiences of their community over time (Crang, 1998). Instrumentally, identity of place and community can be achieved by cultural landscape, the culturally distinctive product of the process by which the intimate relationship between peoples and their environment take place (UNESCO, 2013). As the result of people’s interactions to the landscape “the more modified by humans, the more ‘cultural’ does a landscape become” (Rapoport, 2005, p.29-31).

Key aspects of community can be summed up as a socio-spatial construction consisting of territorial areas, social bond and social interactions. It is the socio-cultural product that people perceive of their own personal identities and attach their own social identities to spatial patterns.

### **2.2.3 Concept of Morphology**

*“Spaces become places as they become ‘time-thickened’. They have a past and a future that binds people together round them.” (Crang, 1998, p.103)*

Morphology is a complete set of socio-spatial features which is central to understand what the local form is, how it is shaped, and how change takes place (Kropf, 2009). Importantly, it contributes to the understanding of how sustainable urban forms can be constructed as a cultural product of a place.

Morphology of the urban forms is influenced by various local factors including physical, social, cultural and economic contexts. Moudon (1997) goes further, stating that urban morphology can be understood by investigating layout and configuration of forms and spaces in order to clarify the processes of local change - how forms and spaces are locally built and why.

Zetter and Butina Watson (2006) argue that built urban forms are the products of social consensus and productions of the urban forms are the process by which socio-spatial construction take place; “cities are environments of both harmony and social conflict” (ibid, p.14). In other words, urban morphology is the locally based socio-spatial layer which cannot be merely defined as the system of spatial connections or the capacity for adaptation because it includes the socio-spatial relations, continuations, differentiations and distinctions at multi-layered scales of the built environment, as well as political constrains.

Although a series of hierarchical compositions is important to understand the built form in terms of physical formation (Caniggia and Maffei, 2001), the collective records of historico-morphological elements are central to understand the process of change (Conzen, 1969). They are defined by the distinctive plan features and the set of socio-spatial outlines influencing subsequent change (Conzen, 2001; Whitehand, 2009). In this sense, key aspects of local forms include both the dialectical relationship between existing physical forms and the socio-economic characters attached by local values, preferences and history.

Viewing built forms as locally based socio-spatial layers, Kropf (1993) identifies five main aspects of the built environment. They are: 1) the spatial aspect, the characteristic of complexity of part-to-whole and part-to-part; 2) the temporal aspect, the perception of continuity and change; 3) the energetic aspect, the source, type and pathway of energy; 4) the human aspects, the relations between human and forms; and, 5) the natural aspect, the components of earth, atmosphere, sun, water, flora and fauna.

In summary, notions of morphology emphasize aspects of the local forms as the correlations of spatial forms, socio-economic contexts and natural components, which manifest in multi-layered scales attached by social ideas, human actions and local references.

## 2.2.4 Principles of Local Forms

As discussed in the previous subsections, the local form is the socio-spatial structures that people perceive of their own social identities and continue shared experiences and history at multilayered scales and relations. These bases not only reflect spatial characteristics of forms but also address the psychological relations between human and the built environment. Various aspects of the local forms are defined with relevance to place, community and morphology as shown in Table 2.1.

Table 2.1 Aspects of Local Forms

| Key Aspects |   |
|-------------|---|
| Place       | <ol style="list-style-type: none"> <li>1. Social spaces or localised spaces reflecting local values, preferences and aspirations.</li> <li>2. Socially defined spaces influenced by a sense of place and belonging, power and control.</li> </ol> |
| Community   | <ol style="list-style-type: none"> <li>3. Social systems consisting of local areas, common ties and social interactions.</li> <li>4. Socio-spatial patterns that people perceive of their own personal and social identities.</li> </ol>          |
| Morphology  | <ol style="list-style-type: none"> <li>5. Socio-spatial relations between physical and socio-economic character.</li> <li>6. Locally based socio-spatial layers expressing locally constructed urban forms at multi-layered scales.</li> </ol>    |

With respect to the key aspects defined, ways in which sustainable urban form should be delivered as a local form are identified. Table 2.2 shows the principles to manifest sustainable urban form with reference to local significance as they are assessed in Table 2.1.

What Table 2.2 shows are the fundamental concepts to be used for considering how the sustainable urban form can be constructed as a cultural product of a place in the extent to which spatial patterns are bound up from social constructions. Three principles identified are that sustainable urban forms should be promoted as:

Table 2.2 Principles Manifesting Sustainable Urban Form as a Local Form

| Principles           |   |
|----------------------|---|
| Social Spaces        | <ol style="list-style-type: none"> <li>1. Sustainable urban form should promote places in relation to local values, preferences and aspirations.</li> <li>2. Sustainable urban form should provide a sense of place and belonging and give people power and control over their places.</li> </ol> |
| Social Systems       | <ol style="list-style-type: none"> <li>3. Sustainable urban form should be tied up by social systems of local spaces, ways of life and interactions.</li> <li>4. Sustainable urban form should let people to associate with their personal and social identities.</li> </ol>                      |
| Socio-Spatial Layers | <ol style="list-style-type: none"> <li>5. Sustainable urban form should reflect the relationship between physical and local socio-economic character.</li> <li>6. Sustainable urban form should respect locally based socio-spatial layers for subsequent urban form development.</li> </ol>      |

1. Locally Defined Social Spaces;
2. Locally Based Social Systems;
3. Locally Constructed Socio-Spatial Patterns.

These principles of the locally based socio-spatial structures are a platform to interrogate what is the sustainable urban form from a local perspective. Nonetheless, these concepts represent only the local expression attached to the physical forms which may still lack a local mechanism of form-production driven by the constraints of culture, society, economy and politics as discussed further in *2.3 Locality and the Process of Form-Productions*.

### **2.3 Locality and the Process of Form-Productions**

Although aspects of sustainable urban form in terms of local perspectives have been defined in the previous section, a real potential to attain those aspects depends on how people perceive and play their roles in form-production processes. Therefore, several influences drive ways in which the local form is shaped, reshaped and sustained are reviewed: 1) culture; 2) perception; 3) agent modes; 4) development process; and, 5)

market-state influences. All key factors are analysed in turn and the local process of form-production is summarised in this section.

### **2.3.1 Concept of Culture**

Culture can be simply defined as ‘ways of life’. Lim (2008) goes further, stating that culture can be considered as a complex matrix of collective experiences and knowledge that formulates a meaning of life; it includes systems of diverse factors such as law, politics, religion, kinship, economies and language. Knox and Pinch (2000, p.54) argue that culture is “the values that people hold, the rules and norms they obey and the material objects they use”. Crang (1998) supports that it is the sets of ‘value’ giving meaning to ways of life and producing material and symbolic forms.

How urban forms are shaped and reshaped, in this sense, depends on notions of ‘world-views’. Rapoport (2005, p.77) points out that ‘culture’ is not a ‘thing’ but an idea, a concept, a construct which is “a label for the many things people think, believe, and do and how they do them.” Three expressions of culture are: 1) the worldview which is the way members of a particular culture or group see the world; 2) the value which is expressed through ideals, images, schemata, meanings, and the like playing an important role of how people evaluate their environment; and 3) the lifestyle, which is the outcome of choices which leads to the specific activity and activity systems in given locations (ibid, p.96).

As shown in Figure 2.2, culture can be summed up as a system to create sets of social expressions such as kinship, family structure and social networks on the one hand and of specific cultural expressions including world-views, values and lifestyles on the other; both have influence over the built environment in local areas.

It should be noted that the cultural systems are various between groups and subgroups. It is the notion of cultural diversity and difference that dissimilar groups may have their own distinctive local cultures, known as ‘subcultures’ (Crang, 1998; Knox and Pinch, 2000). Lim (2006, p.22) emphasizes that “cultural differences occur because cultural environments are unique and particular to a culture”; therefore, developments are deferential to a variety of cultural systems in different local areas.

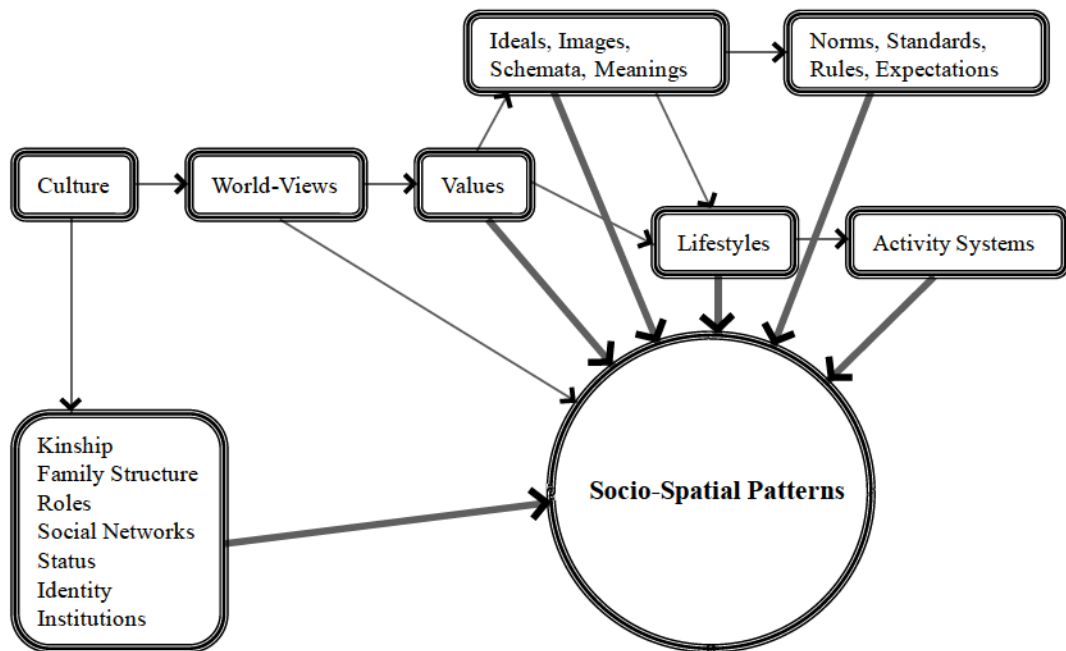


Figure 2.2 The Influence of Culture to Socio-Spatial Patterns  
Source: Adapted from Rapoport, 2005, p.98

### 2.3.2 Concept of Perception

*“The awareness and knowledge from signs is accessible through the process of interpretation. As the built environment is part of the world, it follows that all awareness and knowledge of the built environment is the product of interpretation.”*  
(Kropf, 1993, p.276)

Form-productions are influenced by human actions. Bentley (1999, p.27) writes that “[i]t is now surely clear that any useful explanation of the form-production process would have to put human action at its centre.”

Rapoport (1982, p.68) points out that “[h]uman behavior, including interaction and communication, is influenced by roles, contexts, and situation that, in turn, are frequently communicated by cues in the settings making up the environment.” However, there is a two-way man-environment interaction in which, on the one hand, people act appropriately following signs in the environment and, on the other hand, they shape their environment following what they want form the environment. Crang (1998, p.108) supports that “[p]laces were not just a set of accumulated data but involved human intentions as well.”

The relation from perception, interpretation to expectation is central in describing how and why people aspire to shape the environment and try to impose meaning on the world. What people do or do not do to the environment is driven by how they see, feel, like or dislike about their environments. It is the ‘environmental quality’, the ‘ideal environment’ or the meaning of ‘good’ environment that people have about their life and the appropriate setting for it (Rapoport, 1977). According to Rapoport, people make sense of their surrounding with attached meanings and expected behaviours and match these against their expectations with a series of reasons, choices and criteria influenced by their culture, images/schema and lifestyles.

The perceived environment (data) and the expected environment (choices) in this sense are not the real environment as they are but as they seem to be when people interpret them through the filters or criteria of cultural interest, personal interest and others (Nilufar, 1997). Figure 2.3 shows human interpretation for their environment in which people see, value and believe in the truth, depending on their filters.

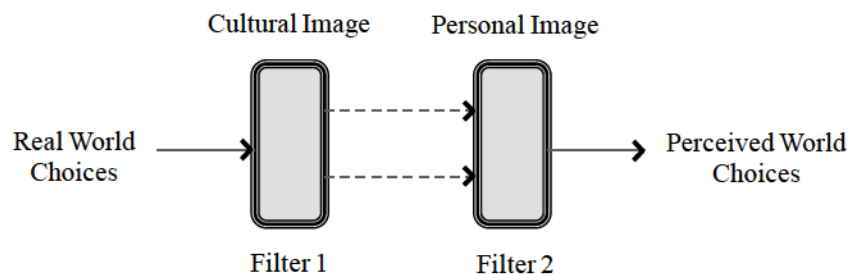


Figure 2.3 The Perception of the Environment  
Source: Adapted from Rapoport, 1977, p.38

Perception is central to clarifying the filters people use for values with respect to the environment. Although Rapoport (1977) terms ‘perception’ only for sensory experience of the environment, Ittelson (1978, cited in Carmona *et al.*, 2003, p.88) defines four dimensions of ‘perception’ as follows: 1) the cognitive, thinking about, organizing and keeping information; 2) the affective, feeling; 3) the interpretative, meaning; 4) the evaluative, determining of ‘good’ or ‘bad’.

The production of local forms is driven by how people perceive, evaluate and aspire for change, as well as sustainable urban forms. Crucially, the productions of forms are influenced by the ways in which actors see the environment and interpret environmental choices. This leads to further investigations of agent modes in development processes.

### 2.3.3 Concept of Agents

As discussed in the previous subsection, people perceive their world, define definitions and evaluate alternative solutions in various ways; this situation makes a major difference in form-productions. Knox and Ozolins (2000, p.4) points out that “[i]t is useful to think of the design and production of the built environment as a process that involves a variety of ‘actors’ or decision-makers, each with rather different goals and motivations.”

McGlynn (1993) defines three key agent groups in the process of urban development. They are: the suppliers including landowners and funders; the producers consisting of developers, public authorities and designers; and, the consumers as everyday users. CABA (2009a; 2009b and 2010) goes further, specifying six main groups involved in the development process: local authorities; developers; design teams; home and community agents; regional development agents; and, local clients.

However, “[s]ome agents may play more than one role at a time” (Knox and Ozolins, 2000, p.5). Rather than being classified into groups, key agents in form-production processes are studied as they are under different events and situations. Based on Adams (1994), Carmona *et al.* (2003) and Knox and Ozolins (2000), key agents are identified as follows: 1) landowners; 2) investors; 3) developers; 4) public authorities; 5) development professionals; and, 6) users and communities. Box 2.1 shows these key agents and their roles in the form-production processes.

As shown in Box 2.2, although what are key agent’s roles in the development process of local forms are defined, they can play various roles and interact with one another multifariously. The interplay between these actors is discussed further in 2.3.4 *Concept of Development Process* and 2.3.5 *Concept of Market-State Influences*.

### Box 2.1 Key Agents in the Process of Form-Productions

- **Landowners** who own land prior to the commencement of development, which can be divided into two groups: the active landowners – who try to make land more marketable and suitable for development and the passive landowners – who take no particular steps to development at any one time.
- **Investors** who invest resources (either short- or long-term finances) in urban development for profit purposes.
- **Developers** who builds on land or alter the existing land features by subdividing, amalgamating or speculating lands, by installing the infrastructure necessary for new purpose and by marketing the projects.
- **Public Authorities** who seek to regulate the development and use of land through the planning systems and also invest in the built environment in terms of infrastructures and services and of land assembly and development.
- **Development Professionals** who provide professional advice and services to developers and other development agents, such as consultants, planners, designers and engineers.
- **Users and Communities** who represent the demand side of development, such as households, industrialists, retailers and so on. They, however, may not react to the choice available by affecting specific development projects through citizen-group protests or by initiating community development through a ‘bottom-up’ approach.

Source: Adams, 1994; Carmona *et al.*, 2003; Knox and Ozolins, 2000

### 2.3.4 Concept of Development Process

The local built environment is the result of the power of social, economic and political realm embedded as the needs and the acts of accommodating those needs. As shown in Figure 2.4, Carmona *et al.* (2003) define the development process of public places and urban spaces as the consequences of: the design context including local, global, market and regulatory; the design process in relation to perceptual, social, visual, functional, temporal and morphological dimensions; to, the design implementation of development, control and actors’ communication.

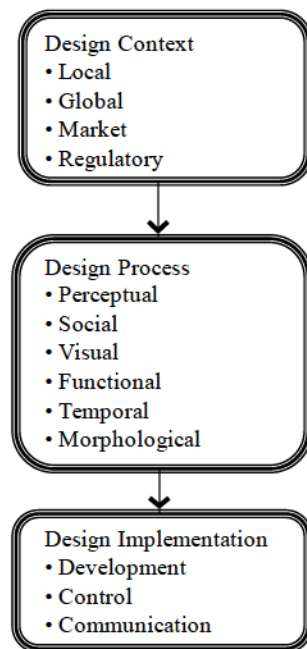


Figure 2.4 The Design Process of Form-Productions  
Source: Adapted from Carmona *et al.*, 2003, p.vi

Nevertheless, Knox and Ozolins (2000) argue that the crucial consideration of form-production is the role of the self in the interaction between society and environment. Figure 2.5 shows the interplay between key agents as a relation of messages between them. The built environment is shaped as the intended messages from producers and managers on the one hand; it is reshaped by the received message that consumers have as the feedback to modes of production on the other.

Barrett *et al.* (1978, cited in Adams, 1994, p.45-54) go further, arguing that the development process and the stakeholders' actions can be clarified as the event-based models of development. Figure 2.6 (p.79) shows the concept of a pipeline model influenced by three sets of events: 1) the development pressure and prospects including the aspects of taking stock, opportunity, aspirations, intentions and plans, which are generated by external factors shown in 'black boxes' such as economic growth; 2) the development feasibility tested in the bottom of the diagram (Figure 2.6), which covers the spectrum of subsequent events up to the beginning of construction; and, 3) the implementation comprises both the process of construction and the transformation to new uses and occupation.

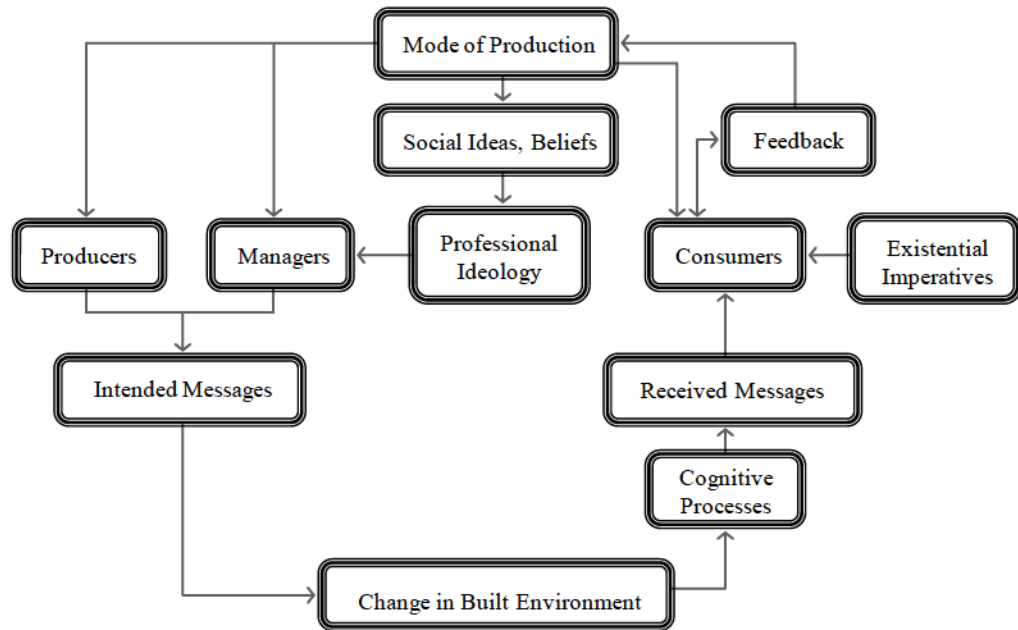


Figure 2.5 The Interaction between Society and Environment  
 Source: Adapted from Knox and Ozolins, 2000, p.274

Although the concept of the pipeline model include most of development processes and of key actors' roles as shown in the figure, the process of form-productions does not go in a totally harmonious fashion with all social structures and needs of actors. Giddens (1984, p. 25) argues that a structural and an agency-component are in the duality of structure; in other words, "[t]he constitution of agents and structures are not two independently given sets of phenomenon, a dualism, but represent a duality." Development processes in this case must be identified, not only as the sets of transformation relations organized by social systems but also as the relations between actors and constraints upon human agency.

Rather than being the friendly bustle of a marketplace, it is the 'battlefield' of negotiation between actors (Bentley, 1999; Crang, 1998). Particular actors might go with the flow of socio-economic functions or they might not want to do so because of their personal subjectivity (learned parts of actors' overall personalities), perceptions and inspirations. They may distort natural factors, deceive competitors, negotiate relationships, make whatever is necessary, just to impose their personal interest or even 'selfish interest' (Neiva, 2001, p.49). This situation results in that not all actors have control over a given form because the negotiations are driven by different levels of power such as economic and political power (Adam, 1994) or valued knowledge (Bentley, 1999).

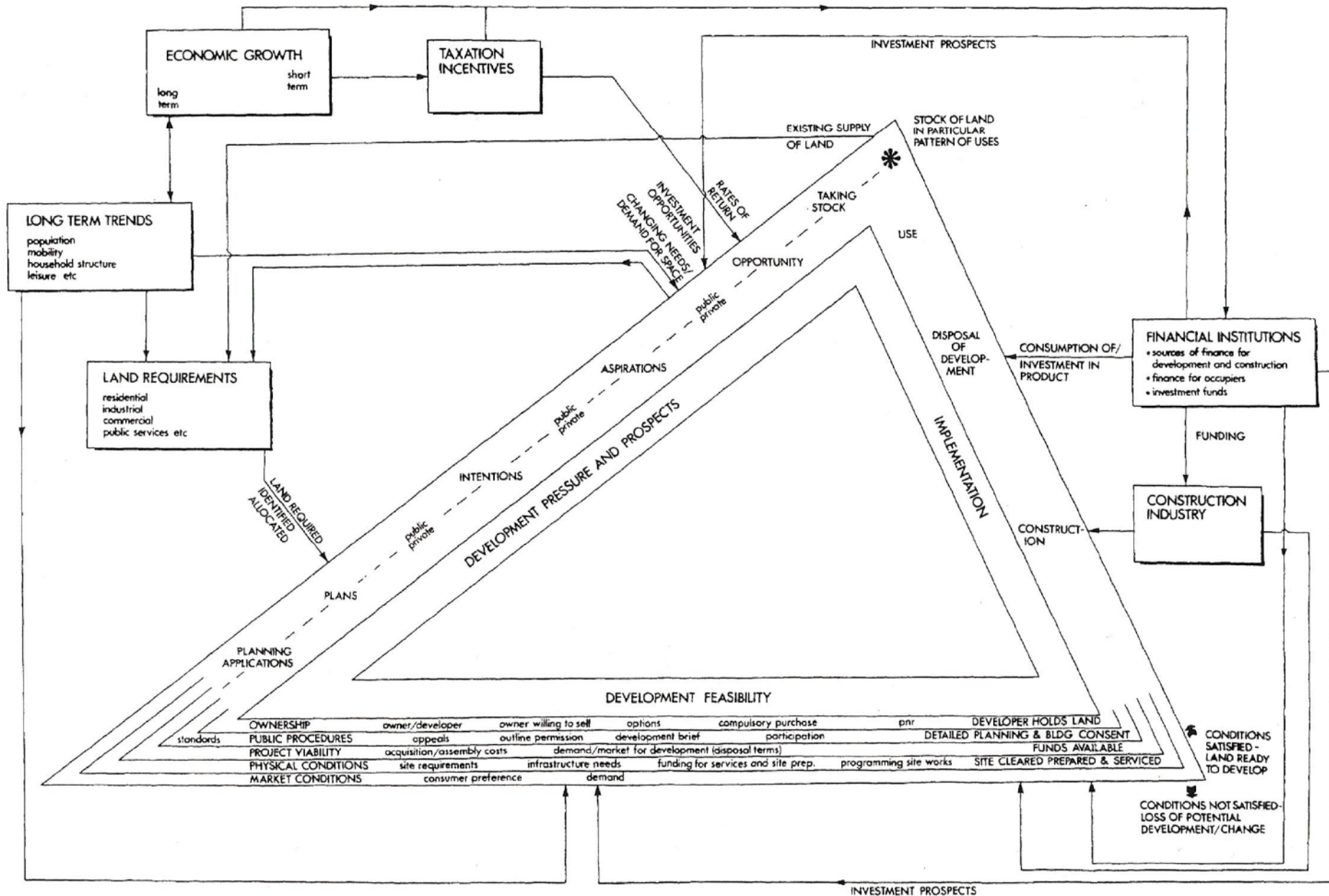


Figure 2.6 The Development Pipeline Model  
 Source: Barrett *et al.*, 1978, cited in Adams, 1994, p.46

What stakeholders perceive and aspire for their local forms are crucial in determining how the socio-spatial patterns are produced and why, as well as relevant local factors surrounding them. Nevertheless, market-state relations are central in understanding rules and conditions governing the continuity or transformation of social structures and of key actors' roles and interplays, as discussed further in the next subsection.

### 2.3.5 Concept of Market-State Influences

*“[P]lease, God, it wasn't me, Function and the Zeitgeist did it.” (Bentley, 1999, p.27)*

Actors' roles and interplays are kept in line not by individual force but by the external resources. Even though actors perceive and interpret choices of the built environment differently and try to impose their personal objectives into the negotiation, ways in which situations either do or do not occur are driven by the forces of the market and the relations between market and state.

In terms of market-state relations, Carmona *et al.* (2003) identify two concepts of form-productions. The 'hands-on' role of state in controlling the actions of public agencies to fulfill the public interest and to contextualize development projects into local context and conditions; and, the 'hands-off' role of the state by leaving urban transformations with a financial asset. Although an achievement of urban improvement is a long-term process in which all effort and good will are required from all actors, the long-term objectives normally decline with short-term electoral reasons in most cases. Importantly, this situation lets the market control how urban forms are shaped. Urban transformation proceeds within a context based on forces of supply and demand or forces of 'market signal' (Bentley, 1999).

A market exists when buyers and sellers involved in the production and consumption of the built environment as they come to agree and to undertake transactions. The demand is the quantity of land and property that buyers are willing to buy and the supply is the quantity of land and property that sellers are willing to sell. This approach of market seems to be a perfect mechanism for form-productions, but, “[i]n practice, the perfectly competitive market does not exist” (Adams, 1994, p.31).

According to Adams (*ibid.*), market imperfections occur when the conditions of perfect competition are violated or distorted by external influences. It occurs when only few available buyers or sellers go to the transaction because of high transaction cost which makes few transactions available on the market. Besides, failure of the market can occur when a negative spillover effect of a development project affects environmental quality, for which no payment is either made or received by producers and consumers. As a result of these situations, supply will never meet demand; in the other words, few choices are offered (to people).

There is a requirement for resolving the state's shorttermism and lack of strategic vision and of interest in environmental quality suitable for local context and conditions. Giddens (2001, cited in Carmona *et al.*, 2003, p.53-54) suggests that the development process should accept the intervention from government to moderate the negative impact of the market by encouraging local authorities to provide leadership, to enable a co-ordinated local approach and to encourage the creativity of the private and voluntary sectors.

### **2.3.6 Local Process of Form-Productions**

Based on the findings from previous subsections (the concepts of culture, perception, agent modes, development process, and market-state influences), this subsection presents the comprehensive process of form-productions.

The actual form of the local built environment can be explained as the power of society and the process of form-productions can be determined as the procedure by which various local needs and conditions are accommodated. Table 2.3 shows the summary of local contexts influencing the local process of form-productions. Based on the local contexts as assessed in Table 2.3, Figure 2.7 shows a function of collective procedure of several local factors involved in the change of local forms, the modification of morphological elements. Three fundamentals of this diagram are:

- 1) The local process of form-productions is seen as a structure by which several factors come to play their roles;
- 2) The structure is the result of collective rules, values and experiences; they influence one another collectively;

Table 2.3 Local Contexts Influencing Local Form-Production Processes

| Local Contexts          |   |
|-------------------------|---|
| Culture                 | 1) Sets of world-views, values and lifestyles, which govern meanings, norms, expectations and activities underpinning the built environment.  |
| Perception              | 2) Individual interpretation of environmental quality and choices, driven by cognition (understanding), affection (feeling), interpretation (meaning) and evaluation (determining).                                 |
| Agent Modes             | 3) Involvement of various actors or decision-makers including suppliers (landowners and investors), producers (developers, public authorities and development professionals) and consumers (users and communities). |
| Development Process     | 4) Process of and negotiation for development pressure and prospects, feasibility and implementation, which are influenced by external factors, personal interest and agents' roles and actions.                    |
| Market-State Influences | 5) Emphasis of the roles of state and market in initiating the environmental quality and choices available for all.   |

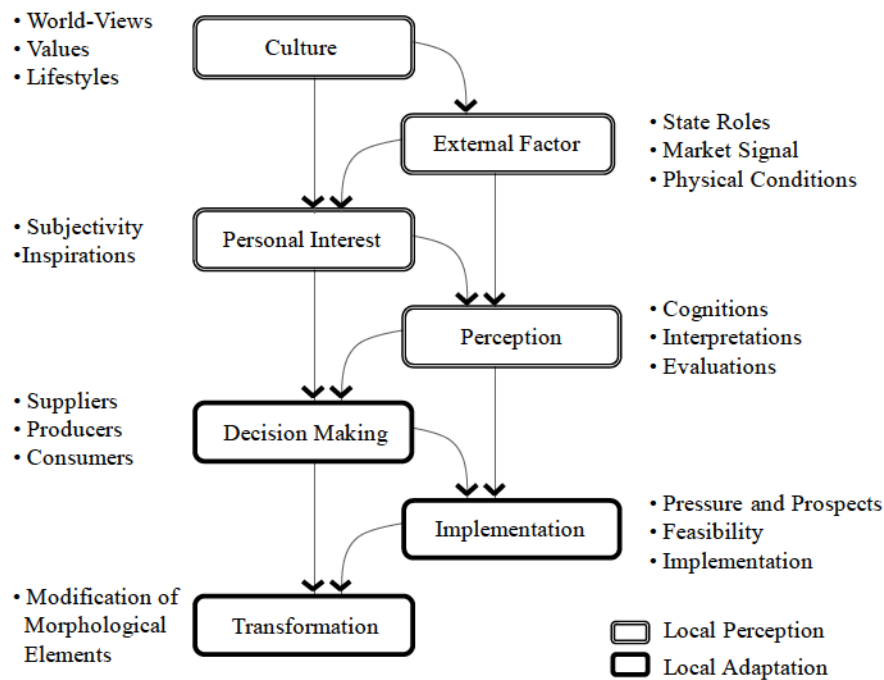


Figure 2.7 The Local Process of Form-Productions

- 3) The structure does not organize ‘out there’ beyond human actions as they are crucial in defining and producing locally based socio-spatial construction of the urban forms.

Significantly, what the diagram shows is the interconnection between the process of local perception and that of local adaptation.

The **local perception** includes both the sensory process and the interpretation for the environment, driven by several factors. As shown in the diagram (Figure 2.7), culture is the commencement of all processes. Sets of world-views, values and lifestyles have influence over external factors and human actions. Nonetheless, because people do not see the world as it is, but as it seems to be, all agents use their personal interest to filter signs of culture and of external factors during perceptions of the environment in order to make any decisions of form modifications.

Seeking more reasonable solutions, people consequently match their personal interest against the external factors including state roles, market signals and local contexts through perceptions, including a series of understanding, feeling, meaning and evaluating (Figure 2.7). It should be emphasized that all collective procedures up to this stage is the process of ‘local perception’ for the built environment.

The **local adaptation** is the process by which the environment is shaped, reshaped or sustained following what people perceive and evaluate. Figure 2.7 shows that, once personal choices have been made as regards the expected environmental quality, the decision making is undertaken in which various actors come to pursue their objectives, to embed their interest and to exercise their roles in the development process. Rather than being collaborative, it is the process of negotiation when actors have different roles and levels of power to control over a given form.

Thereafter, the process of implementation is influenced both by the statements derived from stakeholders’ negotiation and by individual perceptions to fulfill those statements. Figure 2.7 shows that the transformation of socio-spatial forms occurs as the settings implemented by and accommodated for various needs. Defined as a second part of the whole structure, this collective procedure is the process of ‘local adaptation’ for the built environment.

With reference to the diagram established, how the built environment is socially constructed as a cultural product is clarified. Importantly, this understanding is utilized for

further interpretation of the theoretical linkage between local forms and a local process of form-productions and the derivation of sustainable urban forms as a local form in the next section.

## 2.4 Notion of Local Appropriateness

Based on the key aspects of local forms and the processes of how they are locally built as described in the previous sections, Figure 2.8 shows the linkage between these two disciplines.

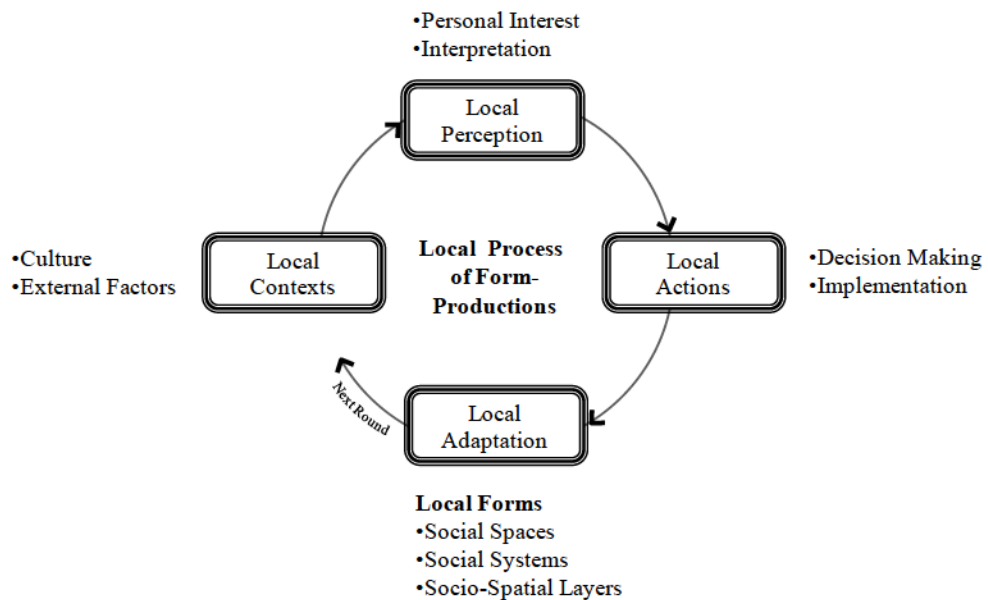


Figure 2.8 The Relationship between Local Process of Form-Productions and Local Forms

As shown in the diagram, the local forms are the socio-spatial patterns which are produced through the collective value of human perceptions and form modifications. To shape the local forms, world-views, values and lifestyles as well as state and market influence come to play a role through local perceptions defining what people think about and what they aspire for the environment. The diagram also shows that, comprising cultural, social, economic and political constraints, the perceptions are embedded into the local forms through local actions in which the negotiation between agents and the initiations for form-adaptations are undertaken. This process is ongoing until the modification of spatial

patterns has fulfilled most of the social aspirations and ideas to shape the built environment.

Viewed in this light, the built environment is produced as the locally based socio-spatial structures by the local process of form-productions with the pattern of appropriateness.

**Local appropriateness** is the responsiveness between human perceptions and form adaptations in defining the suitable modifications of forms. In terms of process of change, the appropriateness is the consistency between what people either do or do not do to the environment and the environmental choices people see, like or dislike. In the case of local forms, the appropriateness is the correspondence between the attachment of local reference, common ties and social identities and the forms of place, community and morphology. Importantly, it performs in various scales influenced by multilayered relations between perceptions and socio-spatial patterns.

## 2.5 The Conceptual Framework from a Local Perspective

With respect to the theoretical linkage between local forms and form-productions, the appropriateness between perceptions and adaptations is central in defining the built environment as well as sustainable urban forms. Figure 2.9 shows the conceptual framework “part two” for explaining sustainable urban forms from a local perspective.

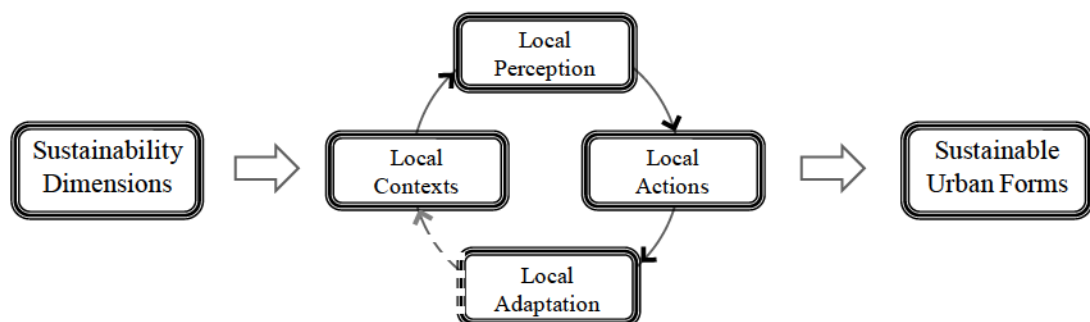


Figure 2.9 The Conceptual Framework Part Two: Explaining Sustainable Urban Forms from a Local Proposition

There is a correlation between sustainability dimensions and sustainable urban forms as defined by the conceptual framework “part one” (CH1), but the delivery of sustainable urban forms cannot be carried out without local capacity and local reference located in time and space. Crucially, they are influenced and indicated by the derivation of local forms. The conceptual framework “part two” shows that the process of form-productions with the reciprocal relations between the sustainability of people value and the modifications of forms they produce is instrumental to the process.

In point of local perspectives, sustainability dimensions are not a separate function from form-production processes. In contrast, they have to be integrated into local contexts and conditions as a resource for people to define, evaluate and interpret the environmental choices for everyday life. Sustainable urban forms have to be constructed as the cultural products which let people associate with their own social identities and to continue shared history through spatial patterns. Further, they have to be the outcome from the process by which various intentions, ambitions and aspirations are locally accommodated in order that the responsiveness between what people perceive for sustainability and what they aspire for the urban forms can be undertaken.

## **2.6 Conclusion**

In this chapter, two key issues were investigated in order to identify how sustainable urban forms can be built up from urban localities. They were the physical, social and psychological aspects of the local forms and the local process of form-productions.

Based on a review of concepts of place, community and morphology, the local built environment was defined as the socio-spatial structures that people perceive of their own social identities, territoriality and history. Three principles defining the key features of local forms are indicated.

1. Locally Defined Social Spaces
2. Locally Based Social Systems
3. Locally Constructed Socio-Spatial Patterns

Nonetheless, to produce the urban forms in accordance with these principles, several factors come to play their roles within form-production processes. Importantly, they perform and interact with one another as the relationship between:

1. Local Perception and;
2. Local Adaptation.

On the one hand, human perception is carried out with the flow of culture, external factors (state roles, market signals and physical conditions), personal interest and interpretation for the ideal environment. On the other hand, the adaptation of forms is influenced by the process of decision making, design implementation and urban transformation. All factors are the constraints of human choices and actions to shape their spatial patterns and to attach meanings to their places.

In relation to the findings of local forms and of form-productions, the notion of local appropriateness within form-production processes is demonstrated as a linkage between those disciplines. It is the correspondence between perceptions and adaptations in defining the suitable modifications of the local form where place, community and morphology are identified.

Based on the understanding of what are the local forms and how they are built and why, the conceptual framework “part two” for explaining sustainable urban forms from local propositions was consequently established. The framework demonstrates that sustainability cannot be delivered beyond human life, life styles and world-views because they are fundamental to define the locally based socio-spatial structures. As well, sustainable urban forms cannot be manifested outside common ties, social bonds and social interactions by which the modifications of the local built environment and the attachment of location, territoriality and identity proceed.

Regarding this conceptual framework along with the framework from global propositions established in CH1, the explanations for local sustainable urban forms and required actions to analyse them are formulated in the next chapter.

# Chapter Three

## Conceptual Framework Part Three: Identifying Locally Appropriate Sustainable Urban Forms

### **3.1 Introduction**

The aim of this chapter is to establish a conceptual framework for identifying locally appropriate sustainable urban forms with respect to global and local perspectives, replacing the third objective of the research.

As outlined in CH1 and CH2, the conceptual framework “part one” is developed to define what sustainable urban form is and how it can be delivered through spatial structures from a global perspective. The conceptual framework “part two” is formulated from a local notion, presenting that sustainable urban forms cannot be produced outside local perceptions and modifications of socio-spatial structures. Despite being derived from different disciplines, these foundations need integrating in order to identify locally appropriate sustainable urban forms.

To fulfill the chapter aim, key objectives are formulated.

1. To readdresses key findings from CH1 and CH2 in order to provide the standpoints for developing the conceptual framework.
2. To formulate the conceptual framework for identifying locally appropriate sustainable urban forms.
3. To define key actions and data required for an analysis of locally appropriate sustainable urban forms.

To deliver the chapter objectives, chapter structure is:

- 3.1 Introduction;
- 3.2 Standpoints for Conceptual Framework Development;
- 3.3 The Conceptual Framework for Identifying  
Locally Appropriate Sustainable Urban Forms;
- 3.4 Required Actions and Data;
- 3.5 Conclusion.

## **3.2 Standpoints for Conceptual Framework Development**

Sustainability is the philosophy of futurity and justice, which emphasizes a fair treatment for future generations as well as the current generation. Sustainable development therefore is the interplay between global ecological concern and local environmental quality although both are aimed to be achieved. As discussed in CH1, global and local agendas entail several dimensions of sustainable development and various degrees of development can be identified as sustainability depending on how all objectives are accommodated at the local scale.

To reconcile all sustainability objectives, a real capacity of locality is central. As summarized in CH2, the capacity to deliver sustainability is defined by how constraints of culture, environment, society, economy and politics are reconciled in the derivation of local forms. Sustainable urban form in this sense is not seen as a separate function from local reference, social interactions and everyday life. In contrast, it has to be synthesized into urban localities and formulated through the local process of socio-cultural productions.

Based on these arguments, Figure 3.2 shows the foundation for the development of conceptual framework “part three”. What the figure shows is, firstly, the framework for explaining sustainable urban forms from a global perspective developed in CH1 (p.60); in

addition, the framework for explaining sustainable urban forms from a local perspective derived from CH2 (p.85). The interaction between the two diagrams emphasizes the importance of sustainable urban forms and of form-production processes that have to be integrated for formulating a composite framework.

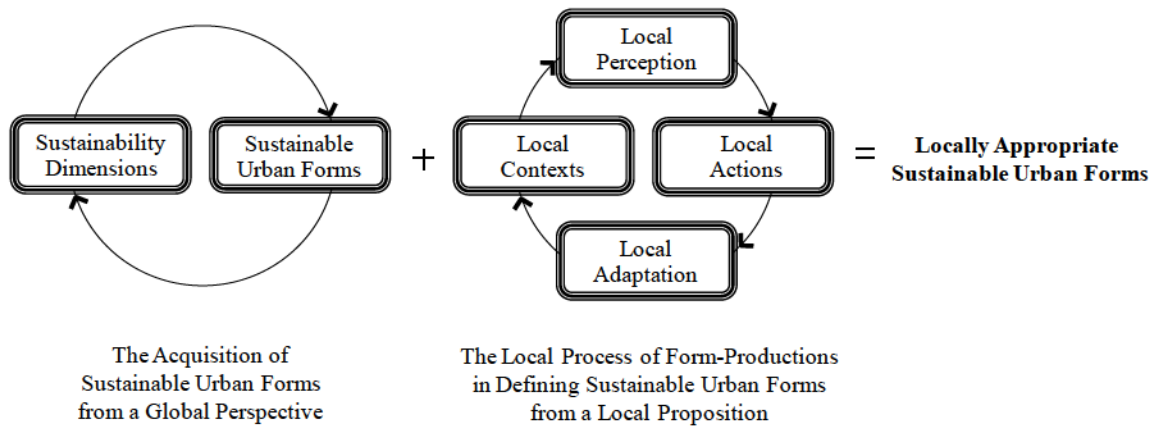


Figure 3.1 The Foundation for the Conceptual Framework Development

As shown in the figure, sustainable urban form is seen as part of locality, which does not exist outside human actions, ambitions, and needs (Bentley, 1999; Crang, 1998; Lafferty and Langhelle, 1999). A key to identify locally appropriate sustainable urban forms is to put humans at the centre of interpretations and interactions. How people design, shape and sustain their places, traditions and cultural significance is important to attaining sustainability (Zetter and Butina Watson, 2006).

Prioritizing human aspirations and actions for sustainability is a social, cultural and political process by which local conditions and needs are interrogated at the local scales. Although human perceptions and form modifications may reflect their own capacity to survive, they are central to a set of values of man-environment relations in continuing their own social identities and history while sustainability can be locally integrated into their socio-spatial patterns.

### 3.3 The Conceptual Framework for Identifying Locally Appropriate Sustainable Urban Forms

Based on the key issues analysed from CH1 and CH2 as discussed in the previous section, the conceptual framework for identifying locally appropriate sustainable urban forms is developed as shown in Figure 3.2.

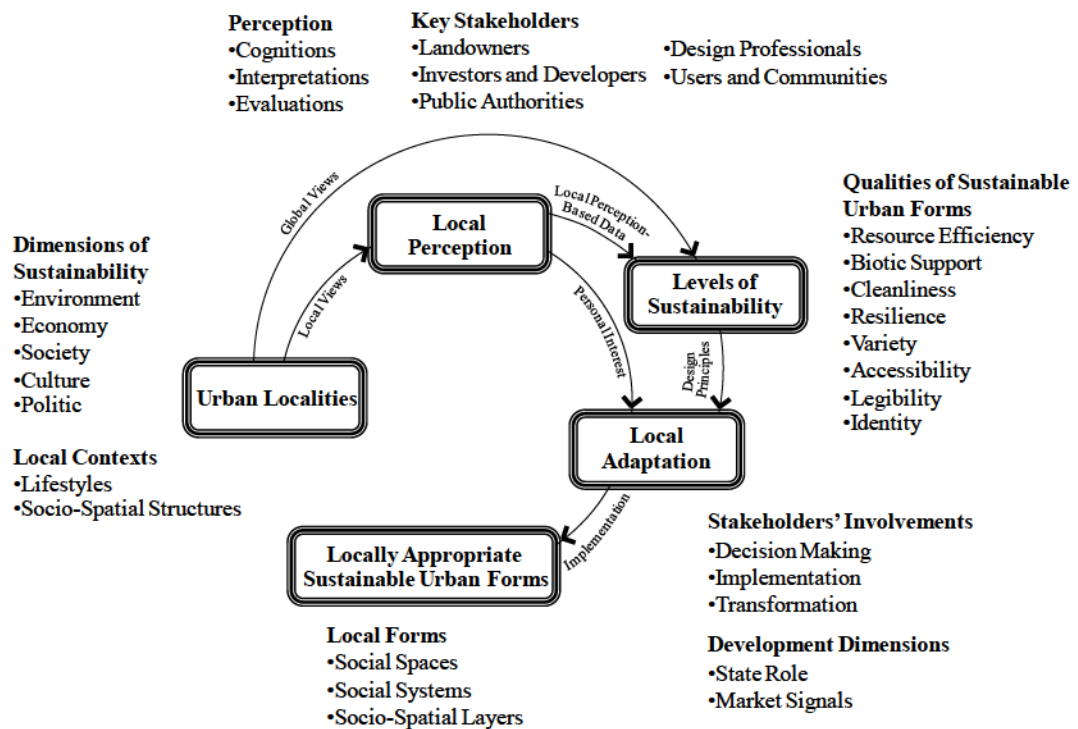


Figure 3.2 The Conceptual Framework Part Three:  
Identifying Locally Appropriate Sustainable Urban Forms

The conceptual framework shows the integration between key issues of sustainable urban forms from global perspectives and that of form-production processes defined as a pathway to achieve sustainability from local perspectives.

Because the local built environment is the socio-spatial structure where various values, needs and powers are accommodated, sustainability cannot be delivered outside human perceptions and actions. Rather than implemented at the end of development processes, sustainability has to be integrated into the local process of form-productions in order that local sustainability can be interpreted. As seen in the figure, including dimensions of

sustainable development and qualities of sustainable urban forms, the global aspects are included into ways in which the local forms are produced.

Within the local process of form-productions, what people recognize, know and decide for environmental choices is based on urban localities (CH2). They can be understood through distinctive socio-spatial patterns that people build and ways of life reflecting world-views and values of living or inhabiting that people have within those socio-spatial patterns. How people attach social identities to their places and what they aspire and accept for change is fundamental in examining degrees of development which are appropriate for form-adaptations and for delivering sustainability at the local level.

Defined in CH2, key actors involved in the productions of urban forms are: landowners; investors and developers; public authorities; design professionals; and users and communities. As shown in the conceptual framework (Figure 3.2), it is important to examine how they evaluate the environmental choices and how they embed their aspirations into the modifications of forms. Crucially, which key stakeholders present the perceptions for sustainability responsive to local culture and form are central in investigating appropriate patterns of sustainable urban forms.

However, sustainability can be reflected in various degrees of development depending on how dimensions of sustainability are accommodated (CH1). Hence, different levels of sustainability can be measured between places, as well as between a global view and a local position. To identify sustainable urban forms, global levels of sustainability have to be assessed in order to provide a foundation of how sustainable urban forms have been delivered in point of global views. Local levels of sustainability also have to be evaluated in order to define degrees of sustainability which are socially and culturally accepted in points of local perspectives.

Comparisons between two sets of sustainability levels shed light on the gap in defining sustainable urban forms; and the local levels themselves are a platform to identify sustainable urban forms at a given place. It should be emphasized that sustainability levels relate to qualities of sustainable urban forms as indicated in CH1: resource efficiency; biotic support; cleanliness; resilience; variety; accessibility; legibility; and identity (Figure 3.2).

Furthermore, stakeholders' involvement and development contexts are included in the framework as shown in Figure 3.2. Appropriate form pattern is a product of correspondence between human perceptions and modifications of form. Locally appropriate sustainable urban form is seen as the outcome of political processes by which various motivations, intentions and interest are associated. In other words, it has to be identified not only by what people perceive but also by how the urban forms can be shaped with respect to various stakeholders' aspirations.

In summary, the conceptual framework finalizes that local sustainable urban form has to be seen as a social and cultural product by which aspirations and actions interact reciprocally. Within the local process of form-productions, local levels of sustainability are crucial because they represent a capacity to deliver sustainability. As well, modifications of forms are instrumental in delivering local sustainability through spatial patterns, showing a real outcome of sustainable urban forms at the local level.

With regard to the conceptual framework of part three (as shown in Figure 3.2), Box 3.1 summarizes key issues of this framework.

**Box 3.1 Key Issues of the Preliminary Conceptual Framework for Identifying Locally Appropriate Sustainable Urban Forms**

1. Local sustainable urban form is seen as a cultural product derived from the local process of form-productions.
2. Sustainability dimensions are not a separate function from human perceptions and form-modifications influenced by local contexts and conditions.
3. To determine local contexts and conditions, distinctive socio-spatial patterns and ways of life are crucial.
4. Perceptions for sustainability with reference to socio-spatial patterns are a key to interrogate a real capacity to deliver sustainable urban forms.
5. Levels of sustainability can be various depending on a measurement and a capacity at the local scales.
6. Modifications of local forms are a process by which various ambitions and needs are accommodated into the process of change.
7. Locally appropriate sustainable urban form can be achieved by local capacity defined by social aspirations and modifications of forms.

### 3.4 Required Actions and Data

With reference to the key issues of the conceptual framework as they are summarized in Box 3.1, Box 3.2 shows the required actions for identifying locally appropriate sustainable urban forms. They are:

1. To analyse socio-spatial patterns;
2. To assess local perception-based data;
3. To evaluate global and local levels of sustainability;
4. To formulate design principles;
5. To establish implementation strategies.

#### Box 3.2 Required Actions to Identify Locally Appropriate Sustainable Urban Forms

1. **Distinctive socio-spatial patterns** have to be examined in order to provide a foundation to define sustainability located in time and space.
2. **Perceptions** for sustainability responsive to socio-spatial patterns have to be assessed so that local capacity to deliver sustainability can be interrogated.
3. **Levels of sustainability** have to be evaluated from both global and local propositions in order to shed light on the distinction of locally responsive sustainability.
4. **Design principles** have to be undertaken in accordance with local levels of sustainability in order that locally appropriate sustainable urban forms can be illustrated.
5. **Implementation strategies** have to be formulated together with key actors so that the involvement of stakeholders can be examined and a real outcome of local sustainable urban forms can be indicated.

In relation to the issues to be undertaken as shown in Box 3.2, key data for the identification of locally appropriate sustainable urban forms are shown in Table 3.1.

Table 3.1 Required Actions and Data for Identifying Locally Appropriate Sustainable Urban Forms

| Key Actions   | Required Data   |
|---|---|
| 1. To analyse socio-spatial patterns  | <ul style="list-style-type: none"> <li>• Historical Background of the Urban Forms</li> <li>• Records of Socio-Economic Development</li> <li>• Records of Physical Development (Street, Plot, Block, Building Fabric, and Land and Building Utilization)</li> <li>• Regional and Urban Plans</li> <li>• Microclimate Data</li> <li>• Traffic Data</li> <li>• Demographic Data</li> <li>• Behaviour and Travel Patterns</li> <li>• Patterns of Social Bond and Social Interactions</li> </ul> |
| 2. To evaluate global levels of sustainability                              | <ul style="list-style-type: none"> <li>• Distinctive Socio-Spatial Patterns (Derived from Key Action 1)</li> <li>• Criteria for Evaluating Global Levels of Sustainability (Developed in CH1)</li> </ul>  |
| 3. To assess perception-based data  | <ul style="list-style-type: none"> <li>• Distinctive Socio-Spatial Patterns (Derived from Key Action 1)</li> <li>• User Data</li> <li>• Recognitions for Human-Environment Relationships</li> <li>• Recognitions for Socio-Spatial Patterns</li> <li>• Attitudinal Data for Sustainability</li> <li>• Attitudinal Data for Form-Adaptations</li> </ul>  |
| 4. To modify local indicators for evaluating local levels of sustainability | <ul style="list-style-type: none"> <li>• Distinctive Socio-Spatial Patterns (Derived from Key Action 1)</li> <li>• Global Criteria and Levels of Sustainability (Derived from Key Action 2)</li> <li>• Local Perception-Based Data (Derived from Key Action 3)</li> </ul>   |
| 5. To evaluate local levels of sustainability of the urban forms            | <ul style="list-style-type: none"> <li>• Distinctive Socio-Spatial Patterns (Derived from Key Action 1)</li> <li>• Local Criteria (Derived from Key Action 4)</li> </ul>  |
| 6. To formulate design principles   | <ul style="list-style-type: none"> <li>• Distinctive Socio-Spatial Patterns (Derived from Key Action 1)</li> <li>• Local Levels of Sustainability (Derived from Key Action 5)</li> <li>• Regional and Urban Plans</li> <li>• Existing Regulations and Design Guidance</li> <li>• Ownership and Community Patterns</li> </ul>  |
| 7. To test and refine the design principles                                 | <ul style="list-style-type: none"> <li>• Proposed Design Principles (Derived from Key Action 6)</li> <li>• Local Agreement to Alternative Solutions for Form-Modifications</li> </ul>   |

Continued

Table 3.1 Continued

| Key Actions  | Required Data   |
|--|---|
| 8. To assess local levels of sustainability of the refined design principles | <ul style="list-style-type: none"> <li>• Local Criteria (Derived from Key Action 4)</li> <li>• Refined Design Principles (Derived from Key Action 7)</li> </ul>   |
| 9. To establish implementation strategies                                    | <ul style="list-style-type: none"> <li>• Refined Design Principles (Derived from Key Action 7)</li> <li>• Existing Regulations and Design Guidance</li> <li>• Existing Mechanisms for Design Implementations</li> <li>• Patterns of Key Actors' Roles and Interplay in the Process of Form-Productions</li> <li>• Patterns of Participation</li> <li>• Local Agreement to Design Implementations</li> </ul> |

Based on the required actions and data demonstrated in this section, techniques for data collection and methods for analysis are presented as the fieldwork methodology in the next chapter.

### 3.5 Conclusion

By synthesizing key findings from CH1 and CH2, the integrated conceptual framework for identifying locally appropriate sustainable urban forms was established in this chapter. A key to synchronize global and local perspectives of sustainable urban forms is to view sustainable urban forms as a product which is derived from a cultural process by which various local factors play a role.

Global perspectives of sustainable urban forms are comprised into local notions of how the built environment is constructed through the local process of form-productions. Dimensions of sustainable development, therefore, are included into the framework in order to be investigated through urban capacity which people's perceptions of the local form and acceptance for change define. Based on these social perceptions, local sustainability have to be assessed, showing capacity to achieve sustainability at the local level.

However, local appropriateness is influenced by ways in which people evaluate environmental choices and how they shape the environment locally. The actions of, and negotiations between, actors are included in the conceptual framework in order that the

interactions of various aspirations and development dimensions can be examined and how they can be accommodated to shape locally appropriate sustainable urban forms can be interrogated.

In accordance with the conceptual framework developed, key actions to identify sustainable urban forms at the local level are:

1. To analyse socio-spatial patterns;
2. To assess local perception-based data;
3. To evaluate global and local levels of sustainability;
4. To formulate design principles;
5. To establish implementation strategies.

Data required for an analysis of locally appropriate sustainable urban forms were also discussed, influencing the development of the fieldwork methodology for testing the preliminary conceptual framework and to assess empirical data to be used for consolidating it in the following chapters.

# Chapter Four

## Methodologies for the Analysis of Locally Appropriate Sustainable Urban Forms

### **4.1 Introduction**

The aim of this chapter is to formulate fieldwork methodologies in order to apply the preliminary conceptual framework developed in CH3 to analyse locally appropriate sustainable urban forms in a case study, informing the fourth research objective. To achieve this aim, frameworks and research tools to collect data and ways in which they are analysed are established with relevance to the morphological patterns of inner Bangkok. It should be noted that an analysis of local sustainable urban forms and outcome of the research in the following chapters are driven by these methodologies.

To fulfill the chapter aim, key objectives are formulated as follows.

1. To identify the field procedure for an analysis of locally appropriate sustainable urban forms.
2. To define data collection techniques and analysis methods.

3. To establish criteria for site selection with respect to the morphological patterns of inner Bangkok.

Following the chapter objectives, thesis structure is formulated.

- 4.1 Introduction
- 4.2 Field Procedure
- 4.3 Data Collection Techniques and Instruments
- 4.4 Analysis Methods
- 4.5 Recruitment of Participants
- 4.6 Criteria for Site Selection
- 4.7 Conclusion

## **4.2 Field Procedure**

Local sustainable urban form is driven by various factors including global ecological dimensions of sustainability and local constraints of needs, identities and development dimensions. To identify it, both global and local requirements have to be accommodated through socio-cultural processes of form-derivations at the local level, defining appropriate degrees of sustainable development and responsive qualities of sustainable urban forms.

As demonstrated by the preliminary conceptual framework in CH3, key actions for an analysis of locally appropriate sustainable urban forms influence the fieldwork implementations. Figure 4.1 shows the field procedure presenting implementation stages.

1. Analyzing the case study's socio-spatial patterns which are a foundation of local contexts and conditions; interviews with users about human-environment relationships are incorporated to analyse the urban forms.
2. Evaluating global levels of sustainability of the case study's urban form; the literature-based indicators for evaluating sustainable urban forms developed in CH1 are utilized.
3. Examining which stakeholders perceive sustainability with responsive to local form and assess their perceptions for form-adaptations representing acceptance for change and acceptable degrees of sustainable development.

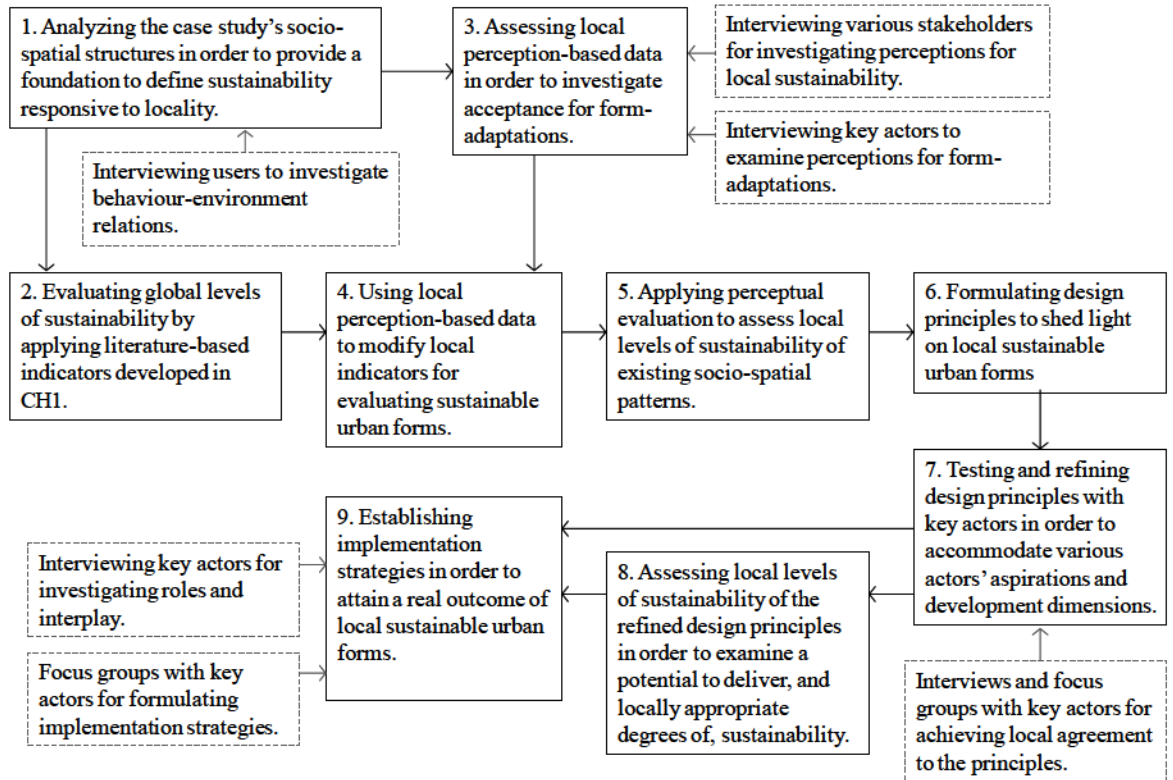


Figure 4.1 Field Procedure

4. Using perception-based data to examine local capacity to deliver sustainability through the modification of local indicators for evaluating sustainability.
5. Applying the local indicators to assess local levels of sustainability of the case study's patterns of form.
6. Formulating design principles to shed light on the case study's locally appropriate sustainable urban forms.
7. Testing and refining the design principles with key actors in order to accommodate various aspirations and development dimensions within the process of form-modifications.
8. Assessing local levels of sustainability of the refined design principles in order to indicate the case study's potential to deliver, and locally appropriate degrees of, sustainability.
9. Establishing implementation strategies with reference to key actors' roles and interplay and acceptance to the strategies, presenting a real outcome of locally appropriate sustainable urban forms.

### 4.3 Data Collection Techniques and Instruments

Based on the field procedure presented in the previous section, Table 4.1 shows data collection techniques and analysis methods utilized for analyzing locally appropriate sustainable urban forms in a case study. It should be noted that they also relate to the key actions and data required from the conceptual framework developed in CH3 (p.95).

Table 4.1 Required Actions and Data, Data Collection Techniques and Analysis Methods

| Required Actions                               | Required Data   | Data Collection Techniques          |                                    |   |            |              |  |                     | Analysis Methods     |                       |                       |                |  |
|--|---|-------------------------------------|------------------------------------|---|------------|--------------|--|---------------------|----------------------|-----------------------|-----------------------|----------------|--|
|  |   | Documentations and Archival Records | Site Survey and Direct Observation | Photograph, Annotated Diagrams and Drawings | Interviews | Focus Groups | Morphological and Typological Analysis | Physical Evaluation | Qualitative Analysis | Quantitative Analysis | Perceptual Evaluation | Design Inquiry |  |
| 1. To analyse socio-spatial patterns           | Historical Background of the Urban Forms  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Records of Socio-Economic Development   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Records of Physical Development (Street, Plot, Block, Building Fabric, and Land and Building Utilization) |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Regional and Urban Plans  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Microclimate Data   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Traffic Data  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Demographic Data  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Behaviour and Travel Patterns   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
| 2. To evaluate global levels of sustainability | Patterns of Social Bond and Social Interactions   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Distinctive Socio-Spatial Patterns (Derived from Key Action 1)  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
| 3. To assess perception-based data             | Criteria for Evaluating Global Levels of Sustainability (Developed in CH1)                                |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Distinctive Socio-Spatial Patterns (Derived from Key Action 1)  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | User Data   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Recognitions for Human-Environment Relationships  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Recognitions for Socio-Spatial Patterns   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
| 4. To modify local indicators                  | Attitudinal Data for Sustainability   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Attitudinal Data for Form-Adaptations   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Distinctive Socio-Spatial Patterns (Derived from Key Action 1)  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Global Criteria and Levels of Sustainability (Derived from Key Action 2)                                  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Local Perception-Based Data (Derived from Key Action 3)   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |

(Continued)

Table 4.1 Continued

| Required Actions   | Required Data  | Data Collection Techniques          |                                    |   |            |              |  |                     | Analysis Methods     |                       |                       |                |  |
|--|--|-------------------------------------|------------------------------------|---|------------|--------------|--|---------------------|----------------------|-----------------------|-----------------------|----------------|--|
|  |  | Documentations and Archival Records | Site Survey and Direct Observation | Photograph, Annotated Diagrams and Drawings | Interviews | Focus Groups | Morphological and Typological Analysis | Physical Evaluation | Qualitative Analysis | Quantitative Analysis | Perceptual Evaluation | Design Inquiry |  |
| 5. To evaluate local levels of sustainability                                | Distinctive Socio-Spatial Patterns (Derived from Key Action 1)                 |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Local Criteria (Derived from Key Action 4)                                     |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
| 6. To formulate design principles  | Distinctive Socio-Spatial Patterns (Derived from Key Action 1)                 |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Local Levels of Sustainability (Derived from Key Action 5)                     |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Regional and Urban Plans   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Existing Regulations and Design Guidance                                       |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Ownership and Community Patterns   |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
| 7. To test and refine the design principles                                  | Proposed Design Principles (Derived from Key Action 6)                         |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Local Agreement to Alternative Solutions for Form-Modifications                |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
| 8. To assess local levels of sustainability of the refined design principles | Local Criteria (Derived from Key Action 4)                                     |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Refined Design Principles (Derived from Key Action 7)                          |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
| 9. To establish implementation strategies                                    | Refined Design Principles (Derived from Key Action 7)                          |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Existing Regulations and Design Guidance                                       |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Existing Mechanisms for Design Implementations                                 |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Patterns of Key Actors' Roles and Interplay in the Process of Form-Productions |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Patterns of Participation  |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |
|  | Local Agreement to Design Implementations                                      |                                     |                                    |   |            |              |  |                     |                      |                       |                       |                |  |

Note: Required actions and data are defined in CH3.

Based on the table, data collection techniques and instruments are discussed as follows.

**Data Collection Techniques for Analyzing Socio-Spatial Patterns**

Distinctive socio-spatial patterns of the case study have to be examined because they represent urban locality which is a foundation to identify sustainable urban forms. As shown in Table 4.1, methods of documentation and archival records are employed to gather information about historical background, physical development, demographic data, and urban plans and regulations, for instance. These resources are collected from departments of city planning, district administration offices, and relevant government

institutions. In addition, observation techniques and physical surveys are incorporated in the field study for collecting the nature of spatial conditions, social events and human behaviour and activities (Bernard, 2006; Denscombe, 2003).

The table also shows that face-to-face semi-structured interviews are utilized with users for collecting behaviour-environment data such as how people use the environment, how they change the environment, and what takes place in particular settings (Rapoport, 1982; Zeisel, 2006). *Appendix B* (p.350) presents the questions used in the interview. Photographs, annotated diagrams and drawings are included for recording physical forms and social relevance.

### **Data Collection Techniques for Evaluating Global Levels of Sustainability**

Global levels of sustainability have to be assessed in order to shed light on degrees of sustainability and to provide a foundation of how sustainable urban form should be shaped from a global view. To evaluate these levels, required resources have been assessed from the previous implementation stage, which are data of the case study's patterns of form collected and analysed from the former process (Table 4.1), the literature-based indicators for evaluating sustainable urban forms have been developed in CH1.

### **Data Collection Techniques for Assessing Perception-Based Data**

As defined in CH3, local perception in relation to place and sustainability is crucial to interrogate local capacity to deliver sustainable urban forms. To collect this information, methods of documentations and site surveys are important in defining key user groups who live or inhabit in the case study area. Both qualitative and quantitative data of the population are collected from national statistical offices and district administration offices.

As shown in Table 4.1, face-to-face semi-structured interviews are also implemented to gather various actors' attitudes for sustainability and for form-adaptations in relation to it. Presented by Arksey and Knight (1999), interviews are employed for enabling interviewees to recognize their experience and express their opinion underpinning local sustainable urban forms. By this instrument, which gives informants' priorities, the depth, insights and validity of information can be achieved (Denscombe, 2003). Open and closed questions are incorporated (Fink, 1995b).

*Appendixes C and D* present two sets of questions used in the interviews. *Appendix C* (p.351) is to collect stakeholders' attitudes for sustainability; this is to assess different interpretations of sustainability and to identify key actor who perceive sustainability with responsive to the locality. *Appendix D* (p.353) is to gather perceptions for the urban form and aspirations for form-adaptations from the actors defined.

### **Data Collection Techniques for Modifying Local Indicators**

In order to ascertain local acceptance for change representing how global qualities of sustainable urban forms can be accommodated with local contexts and conditions, local levels of sustainability are fundamental. Crucially, they have to be assessed by local indicators. To establish these local criteria, key resources collected and analysed from the previous fieldwork implementations are utilized; they are: distinctive form patterns; global criteria and levels of sustainability; and perception-based data.

### **Data Collection Techniques for Evaluating Local Levels of Sustainability**

Again, key resources required for undertaking this procedure are the outcomes of previous fieldwork implementations. As shown in Table 4.1, the local indicators established from the previous stage are applied for evaluating the socio-spatial patterns of the case study through the perceptual evaluation as presented in *4.4 Analysis Methods*.

### **Data Collection Techniques for Formulating Design Principles**

Design principles are formulated in order to illustrate locally appropriate sustainable urban forms; to achieve this aim, various techniques for data collections are required. It is a fact that data of distinctive form patterns have been collected and local levels of sustainability have been assessed from previous procedures. However, to formulate the design principles, methods of documentations and archival records are required for gathering particular data about urban plans and existing regulations and design briefs relating to the case study area. Combined techniques are employed for collecting data of ownership and community patterns, defining ways in which the design proposal can be developed, including documentations, annotated diagrams and direct observations (Bernard, 2006; Denscombe, 2003; Walliman, 2008).

---

### **Data Collection Techniques for Testing and Refining the Design Principles**

After having been established, the design principles have to be tested and refined so that various aspirations and development dimensions can be accommodated. This is identified as part of the local process of form-productions delivering locally appropriate sustainable urban forms (see CH3). Hence, local agreements to the proposed design principles are the key data as shown in Table 4.1. Focus group discussions with communities (Morgan, 1998a, b) and face-to-face semi-structured interviews with various stakeholders are required to be conducted in the field study. *Appendix E* (p.361) presents instruments used for testing the design principles.

### **Data Collection Techniques for Assessing Local Levels of Sustainability of the Refined Design Principles**

As defined in *4.2 Field Procedure*, local levels of sustainability of the refined design principles need evaluating in order to indicate the case study's potential to deliver, and locally appropriate degrees of, sustainability. Key resources have been gathered from the previous procedures: the local criteria for evaluating local levels of sustainability; and, the refined design principles.

### **Data Collection Techniques for Establishing Implementation Strategies**

The last stage of the field procedure is to establish key implementation strategies for the refined design principles, showing a real outcome of sustainable urban forms appropriate with locality. Methods of documentations and archival records are utilized for gathering data of existing regulations, design implementations and involvement and participation. The patterns of involvement are also required to be collected from primary sources; e.g. interviews with various actors are employed. *Appendix F* (p.375) presents the instrument.

Acceptance to implementation strategies has to be gathered from the field study. Methods of focus group discussions are implemented. As suggested by Morgan (1998a), the single large focus group is conducted for establishing the key implementation strategies. The reasons are: 1) the content of the discussion could not be separated from the dynamics of key actors' involvement and their interplay; 2) a wide range of suggestions from all key stakeholders have to be collected as a "brainstorming" of the group; and, 3) the realities of recruiting participants make a large group regarding key stakeholder lists in the form-

production processes. Implemented in the focus group, *Appendix G* (p.378) presents instruments for data collection.

#### **4.4 Analysis Methods**

In order to analyse locally appropriate sustainable urban forms, various methods of analysis are incorporated. Key methods are presented in Table 4.1 (p.101).

1. Morphological and Typological Analysis Methods
2. Methods of Physical Evaluation
3. Qualitative Methods of Analysis
4. Quantitative Methods of Analysis
5. Methods of Perceptual Evaluation
6. Design Inquiry Methods

##### **Morphological and Typological Analysis Methods**

Morphological and typological analysis methods are implemented in order to analyse the socio-spatial patterns of the case study. As a platform of local contexts and conditions the case study's urban form is a foundation for examining various topics for identifying sustainable urban forms appropriate with locality.

Morphological analysis is the study of the urban form through three element complexes including street system, plot and block pattern (Conzen, 1969). Figure 4.2 shows an example of the study of urban form in which streets, plots and blocks are examined. Further, the analysis of town plan (or ground plan) which is the arrangement of those elements forming the built environment results in the identification of the plan-unit, unity of a town plan which is morphologically different from its surroundings (Jones and Larkham, 1989).

Making up a townscape's history, relationships of town plan, building fabric, and land and building utilization are instrumental (Larkham, 1996; Whitehand, 2001). How the history is shaped and reshaped can be understood through those relations by identifying formations, modifications and consolidations of the morphological frame, an antecedent plan feature, outline or set of outlines promoting subsequent change (Jones and Larkham, 1989). Defining the process of change, morphological frames are analysed with respect to

morphological periods in which the history of urban development is divided (Whitehand, 2009). This is exemplified by Figure 4.2 where the change of morphological elements is taken into account in morphological analysis. Notably, cycles of socio-economy, constructions (Conzen, 2009) and actions of agents (Larkham, 1986 and 1996) are also included in revealing periods of morphological change.

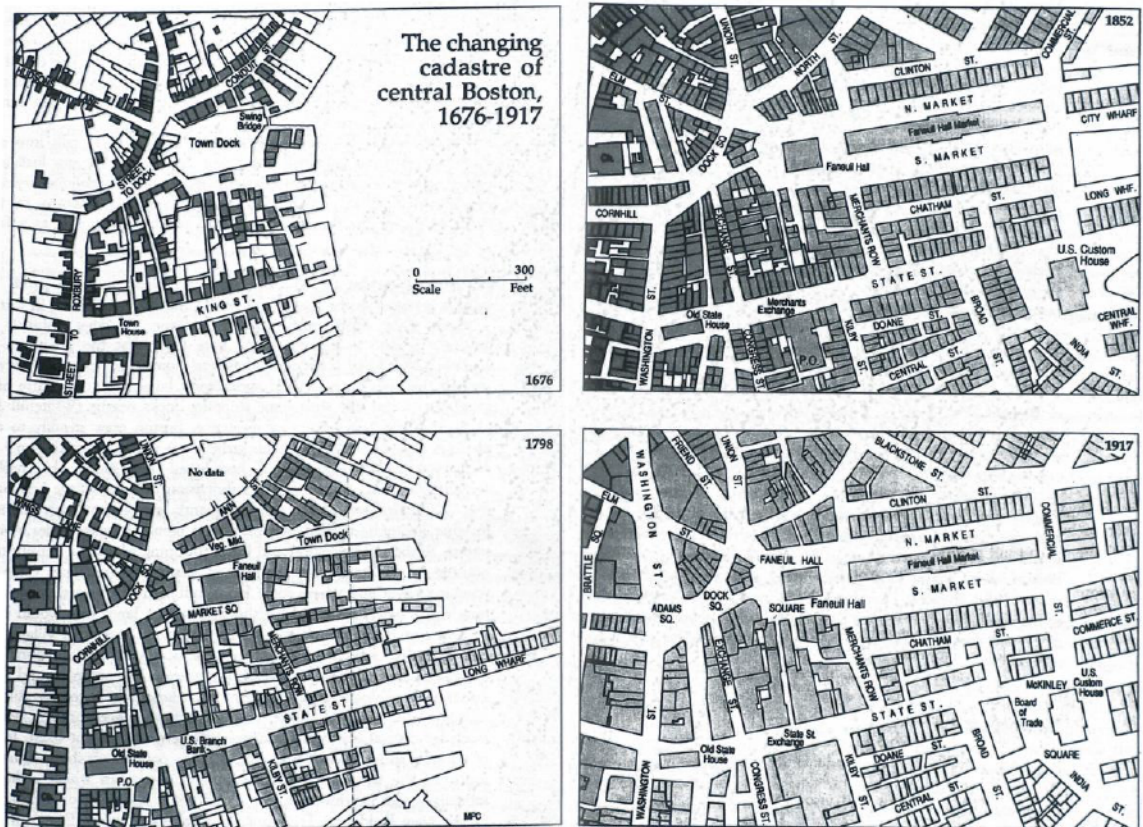


Figure 4.2 Example of Morphological Study, Presenting the Change of Streets, Plots, Blocks and Buildings of Central Boston

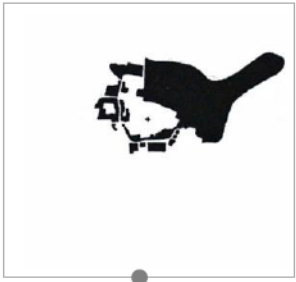


Source: Conzen, 1990, p.150

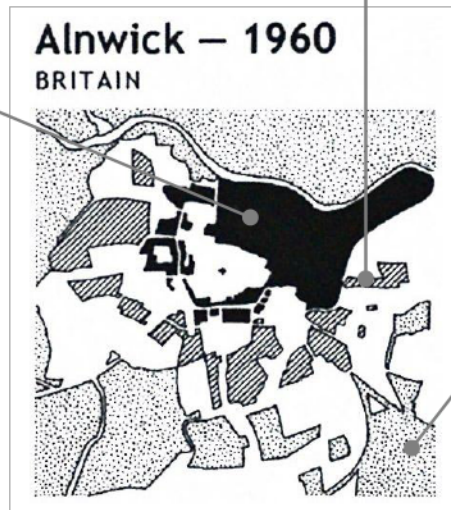
Inevitably, to identify distinctive urban forms, classifications of types or categorizations of phenomena have to be carried out. Developed through time, the socio-spatial patterns can be categorized as types relating to cultural entities rooted in the local process of development (Kropf, 2009). In other words, there is a link between morphological periods and typological process (Whitehand, 2001). Therefore, both morphological and typological analysis methods are combined in the analysis of the case study's urban form.

Table 4.2 shows the framework for analyzing socio-spatial patterns. What the table shows is the record of physical development which needs examining: street, block, plot, building

and use. They have to be analysed in an evolutionary approach in which the historico-geographical change is in focus. The table shows that different typologies have to be identified regarding periods of change, representing distinctive characteristics of the urban form.

Table 4.2 Framework for Analyzing Socio-Spatial Patterns of Locally Appropriate Sustainable Urban Forms

| Spatial Elements | Socio-Spatial Patterns  |  |   |
|------------------|---|--|---|
|                  | Type A  | Type B   | Type C  |
| Street           |  |  |  |
| Block            |   |  |   |
| Plot             |   |  |   |
| Building         |   |  |   |
| Use              |   |  |   |



Source: Illustrations adapted from Conzen, 2009, p.40

**Methods of Physical Evaluation in Relation to Sustainable Urban Forms**

Showing degrees of sustainability from a global viewpoint, global levels of sustainability can be assessed by the methods of physical evaluation. To analyse these levels, the urban forms of the case study are evaluated by using the literature-based indicators for evaluating sustainable urban forms developed in CH1. It should be noted that they are presented as a work sheet in *Appendix J* (p.395).

Figure 4.3 shows the methods of physical evaluation. Based on the 30 literature-based indicators, the physical evaluation of sustainable urban forms is carried out by analyzing the case study's morphological components (street, block, plot, building and use) following the descriptions of each indicator. At each indicator, different parameters have been established to clarify good [3], moderate [2] and poor [1] manifestations of the urban forms in terms of sustainability (CH1). Following these parameters, form patterns are evaluated and the score can be rated from each indicator as shown in the figure.

It should be noted that 30 scores are rated from the 30 indicators at each typology (Types A, B, and C for instance) which is the result of *Morphological and Typological Analysis Methods*.

Thereafter, because sustainability qualities are delivered through socio-spatial components and connections in a complex way, they are indicated by different sets of indicators used in a judgement. To assess levels of sustainability qualities, the results assessed from the 30 literature-based indicators have to be categorized into particular sets for defining levels of sustainability qualities as demonstrated in CH1. Figure 4.3 shows that the 30 scores are rearranged to evaluate the qualities of: resource efficiency; biotic support; cleanliness; resilience; variety; accessibility; legibility; and identity. With reference to the scores rated, the average score is consequently calculated in order to present the results of the physical evaluation at each sustainability quality as shown in Figure 4.3.

The numeric results from eight qualities of sustainable urban forms are further interpreted into another range of represented values in order to indicate levels of sustainability. Following the possibility of the lowest score (1.0) and the highest score (3.0) indicated by the parameters, the range of sustainability is divided into five levels with ten frequency scales as follows.

1. Very Low (Lower Part-Scores 1.0-1.2 and Upper Part-Scores 1.3-1.4)
2. Low (Lower Part-Scores 1.5-1.6 and Upper Part-Scores 1.7-1.8)
3. Moderate (Lower Part-Scores 1.9-2.0 and Upper Part-Scores 2.1-2.2)
4. High (Lower Part-Scores 2.3-2.4 and Upper Part-Scores 2.5-2.6)
5. Very High (Lower Part-Scores 2.7-2.8 and Upper Part-Scores 2.9-3.0)

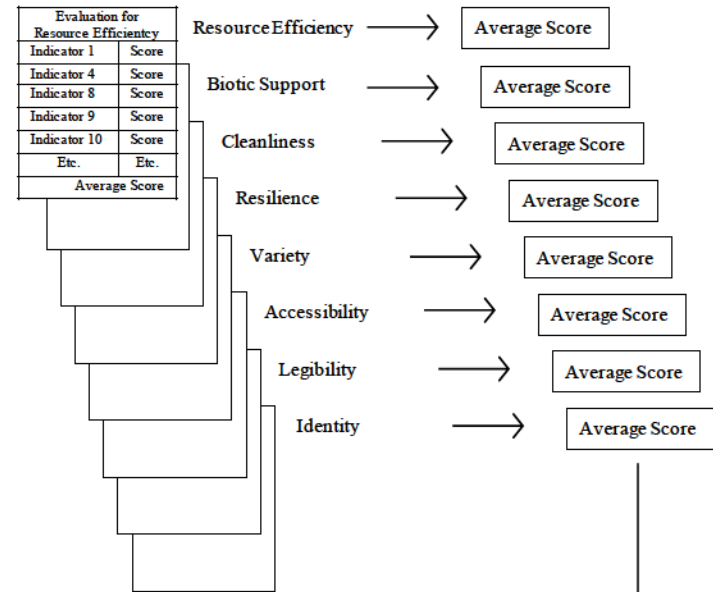
Implementing the 30 Literature-Based Indicators Developed in CHI to Analyse the Urban Form

| Indicators       |              |  |
|------------------|--------------|--|
| Street and Space | 1            | Linkage between Centres of High Activities                     |
|                  | 2            | Linkage of Public and Private Open Space as Green Corridors    |
|                  | 3            | Linked Green Corridors as Natural Networks                     |
|                  | 4            | Planting and Renewing Street Trees                             |
|                  | 5            | Reduced Hard Surfaces and Run-Off                              |
|                  | 6            | Visually Imaginable Networks of Space                          |
|                  | 7            | Public Transport as an Integral Part of the Street Layout      |
| Block            | 8            | Fine Grained Street and Block                                  |
| Plot             | 9            | Fine Grain of Land Subdivisions and Buildings                  |
| Building         | 10           | Density of Built Components                                    |
|                  | 11           | Active Frontages   |
|                  | 12           | Mixed Building Types, Ages and Tenures                         |
|                  | 13           | Visually Interesting Buildings                                 |
| Use              | 14           | Locally Distinctive Building Groups and Spaces                 |
|                  | 15           | Density of Population  |
|                  | 16           | Mixed Communities  |
|                  | 17           | Employment and Economic Activities                             |
|                  | 18           | Public Transport Infrastructure                                |
|                  | 19           | Layout of Transport Stations as an Integral Part of the Street |
|                  | 20           | Multi-Modes of Movement  |
|                  | 21           | Walking and Cycling Priority                                   |
|                  | 22           | Restricted Vehicle Circulation and Speeds                      |
|                  | All Elements | 23   |
| 24               |              | Greenery Display and Soft Landscape                            |
| 25               |              | Gradual Change of Spatial Configuration                        |
| 26               |              | Legible Settlement through Active Use                          |
| 27               |              | Legibility through Landmark and Space Disposition              |
| 28               |              | Positive Identity and Landscape Character                      |
| 29               |              | Preserving Significant Public Realm                            |
| 30               |              | Personalisation of Communities                                 |

Rating 30 Scores for Each Typology

| Type A           |              |       |
|------------------|--------------|-------|
| Street and Space | 1            | Score |
|                  | 2            | Score |
|                  | 3            | Score |
|                  | 4            | Score |
|                  | 5            | Score |
|                  | 6            | Score |
|                  | 7            | Score |
| Block            | 8            | Score |
| Plot             | 9            | Score |
| Building         | 10           | Score |
|                  | 11           | Score |
|                  | 12           | Score |
|                  | 13           | Score |
| Use              | 14           | Score |
|                  | 15           | Score |
|                  | 16           | Score |
|                  | 17           | Score |
|                  | 18           | Score |
|                  | 19           | Score |
|                  | 20           | Score |
|                  | 21           | Score |
|                  | 22           | Score |
|                  | All Elements | 23    |
| 24               |              | Score |
| 25               |              | Score |
| 26               |              | Score |
| 27               |              | Score |
| 28               |              | Score |
| 29               |              | Score |
| 30               |              | Score |

Rearranging the Scores for Evaluating Each Sustainability Quality



Note: Combinations of indicators for evaluating qualities of sustainable urban forms are identified in CHI. Eight qualities are evaluated for each typology.

Calculating the Average Score for Each Quality

Presenting Levels of Sustainability

Global Levels of Sustainability for Typology A

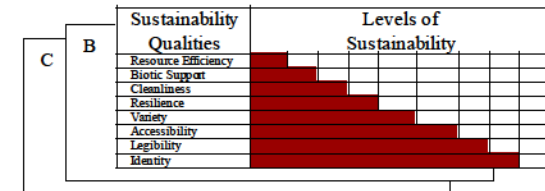


Figure 4.3 Methods of Physical Evaluation

Based on the average scores assessed, the levels of sustainability can be ranked from very high, high, moderate, low and very low.

In order to present these levels into a visual form, the numeric levels of sustainability are turned into bar charts. The framework for presenting sustainability levels is shown in Table 4.3; an example of average scores highlighted as bar charts is also presented.

Table 4.3 Framework for Presenting Levels of Sustainability

| Sustainability Qualities | Levels of Sustainability |         |         |         |          |         |         |         |           |         |
|--------------------------|--------------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low                 |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2                  | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      | Average Score<br>1.3     |         |         |         |          |         |         |         |           |         |
| Biotic Support           |                          |         | 1.6     |         |          |         |         |         |           |         |
| Cleanliness              |                          |         |         | 1.7     |          |         |         |         |           |         |
| Resilience               |                          |         |         |         | 1.9      |         |         |         |           |         |
| Variety                  |                          |         |         |         |          | 2.2     |         |         |           |         |
| Accessibility            |                          |         |         |         |          |         | 2.4     |         |           |         |
| Legibility               |                          |         |         |         |          |         |         | 2.5     |           |         |
| Identity                 |                          |         |         |         |          |         |         |         | 2.8       |         |

It should be emphasized that, regarding typologies of the urban form which could be identified, sets of levels of sustainability can be assessed. This is to identify various capacities in achieving sustainability in the case study area.

### Qualitative Methods of Analysis

Because sustainable urban forms have to be defined through the local process of morphological formations in which human perceptions, aspirations and actions are fundamental (see CH3), qualitative methods of analysis are utilized in many stages of the fieldwork procedure.

Originally developed by Wolcott (1994), an inquiry for describing, analyzing and interpreting intentions of people, reflecting factors influencing those intentions, and revealing the focus in communication is implemented to examine human-environment relationships and perceptions for sustainability and for desired modifications of forms. Content analysis methods (Weber, 1990) are incorporated to assess these data from open-ended questions used in the interview and from interactions between actors in the focus groups. Further, a local framework presenting social aspirations for form-adaptations is

interpreted by using qualitative analysis methods to identify the focus in communication content regarding desired patterns for change.

Methods and scenarios in regard to participation and focus group discussions (Sanoff, 2000; Wates, 2000) are implemented to analyse the results both of agreement to design principles and of acceptance to implementation strategies. Key actors' roles and interplay in the form-production processes are also investigated through the focus groups by applying inquiry for planning the groups, moderating the communications and analysing the discussions in the analysis (Morgan, 1998a, b).

### **Quantitative Methods of Analysis**

Providing the measurement of, and the connection between, data, quantitative analysis methods are utilized to describe, compare and analyse people's responses to the closed questions used in the interview (Fink, 1995a).

Percentages of responses define the means of people's attitude with relation to form-adaptations such as frequency in the use of transports, desired distances to access places, density levels of built forms perceived by people. This numeric measurement indicates the key factors of sustainable urban form appropriate with locality from the large number of relevant factors, encouraging 'a specified degree of confidence' of findings from the field study (Abeyasekera, 2013).

Quantitative methods are also utilized in defining local agreement to the design principles. Data collected from ordinal questions are analysed to describe levels of agreement to alternative solutions proposed for the case study area. Again, reliability of the design principles is indicated from mathematical percentages of acceptance from various stakeholders.

### **Methods of Perceptual Evaluation in Relation to Sustainable Urban Forms**

While global levels of sustainability are evaluated from the physical evaluation based on global acquisitions of sustainable urban forms, local levels of that have to be assessed from the methods based on acceptable degrees of development influenced by local perspectives for change. Perceptual evaluation, therefore, is established as the analysis method to evaluate local sustainability.

Figure 4.4 shows the methods of perceptual evaluation in relation to sustainable urban forms. Firstly, derived from the field study, individual perceptions and social aspirations for future form-adaptations have to be assessed through spatial components including street, plot, block, building and use. How these structures have been built and should be built in point of local views are identified, representing capacity for change.

Consequently, the responsiveness of the literature-based indicators (see CHI) to acceptance for change (defined by perceptions of form-adaptations) is interrogated, resulting in the modifications of local indicators. Figure 4.4 shows that three activities for modifying the indicators are: denying the literature-based indicators which do not correspond to acceptable levels of change; retaining the applicable ones; or, correcting the indicators with respect to degrees of development accepted by people.

The modified indicators are exemplified and highlighted in Figure 4.4 by blue. Both qualitative and design inquiry methods are utilized for interpreting the definitions and scales of the indicators modified with respect to the perception-based data (design inquiry methods are discussed in the following topic).

Once the local indicators have been established, local levels of sustainability can be evaluated. To ascertain these levels, the case study's urban form is evaluated using the local perception-based indicators in which sustainable urban forms in point of global perspectives have been accommodated with local capacity for change. Following the procedure of the physical evaluation in terms of the implementation of indicators and the interpretation of sustainability levels (see *Methods of Physical Evaluation*), scores are rated for all indicators and they are consequently rearranged to the particular sets for evaluating sustainability qualities. At each quality, the average score is calculated and interpreted into the range of represented values for indicating levels of sustainability. A visual form of local levels of sustainability is consequently presented (see Table 4.3, p.111).

Again, it should be noted that various sets of levels of sustainability could be found regarding typologies of the urban form. In terms of local perspectives, they represent various capacities in delivering sustainability responsiveness to urban localities.

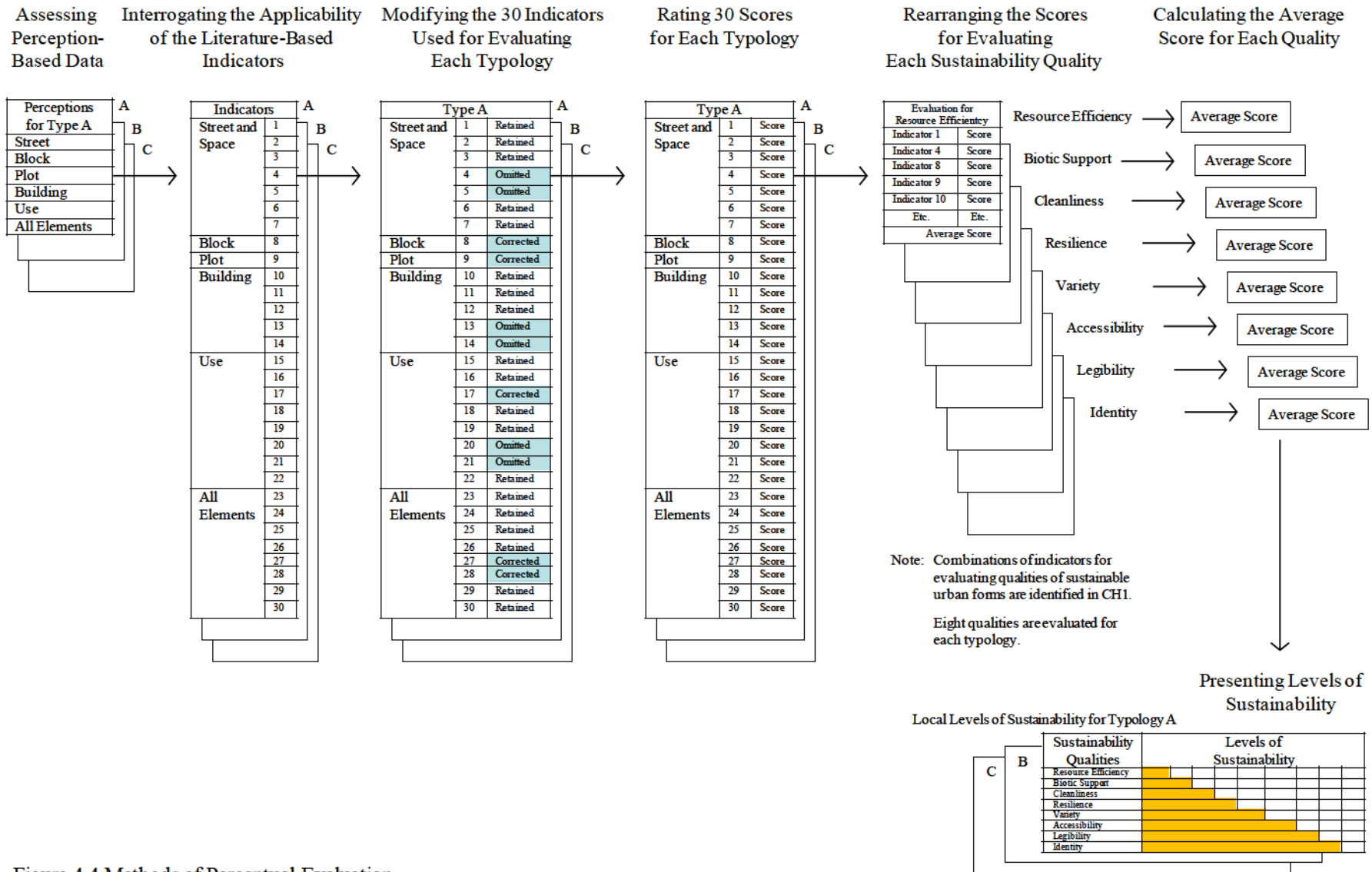


Figure 4.4 Methods of Perceptual Evaluation

## **Design Inquiry Methods**

Introduced by Zeisel (2006), design inquiry methods are central in the fieldwork implementation. They define the study of the human and environment, the investigation of physical traces and which requirements are in the analysis of behaviour-environment relations.

Methods of design inquiry are implemented to identify the reciprocity between socio-spatial patterns and what people perceive for sustainability in relation to their places. Crucially, the modification of the local indicators for evaluating levels of sustainability is undertaken with respect to those relationships. Local sustainable urban forms are assessed following the information of what users perceive and expect for the local form and by going beyond the information as the conceptual shifts to develop the design principles for sustainable urban forms appropriate with locality.

Moreover, by using design inquiry methods, ‘how well a product is adapted to its environment and how coherent constituent parts of the product are with one another’ (ibid., p.22) are tested and verified with various stakeholders in the field study. A domain of acceptable responses is analysed through key stakeholders’ agreement to the principles and the extent to which all aspirations can be accommodated is also interrogated. Development of the design principles is proceeded through linked cycles by utilizing key actors’ agreement to refine them. Inquiry for interviews and focus groups are incorporated as discussed in the previous analysis methods.

To establish implementation strategies, design inquiry is utilized to identify the consistency between existing mechanisms and involvement and the refined design principles. As well, local agreement to the strategies is also assessed and employed to formulate the design implementations exhibiting a real outcome of locally appropriate sustainable urban forms.

## **4.5 Recruitment of Participants**

The recruitment of participants are undertaken in six stages of fieldwork implementation as shown in Figure 4.1 (p.100). The methods of recruiting participants are described as follows.

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### **To collect information about behaviour-environment relations by conducting interviews with users**

Face-to-face semi-structured interviews with users are important in the analysis of socio-spatial patterns because qualitative aspects of spatial patterns can be integrated into the study of urban form. To select interviewees, snowball techniques (Creswell, 1998; Fink, 1995c) are utilized for recruiting residents through leaders of communities; the leaders are recruited by using a theoretical sampling method to identify them from official registers (Silverman, 2005; Walliman, 2008). The small size of the sample is controlled in relation to insights required from the interviews (Denscombe, 2003). (12 residents participated in this data collection.)

### **To collect stakeholders' attitude of local sustainability from interviews**

Because people see the environment in a different way through their personal filters (see CH2), what they understand by the term 'sustainability' has to be assessed in order to illustrate local interpretation of sustainability.

To recruit interviewees, the theoretical sampling method is utilized by identifying them from official registers, government organization registers and directories of consultants who get involved with form-production processes of the case study. They are investors and developers, public authorities, design professionals, and leaders of communities. It should be noted that residents are recruited by the snowball techniques as discussed in the previous fieldwork implementation. Again, the small size of the sample is controlled regarding the depth of information required from the interviews. (16 representatives from various stakeholders participated in the interviews.)

### **To collect users' perceptions for form-adaptations from interviews**

In order to identify sustainable urban forms from a local perspective, perceptions for appropriate degrees of development have to be assessed from key actor who perceives sustainability with responsive to local culture and form. Identified from the field study, users' perceptions are crucial and need investigating for this issue (CH7).

The multistage sampling methods are applied for getting a representative sample from a large population (Leedy and Ormrod, 2001). The techniques are: dividing primary areas from the case study area; selecting prime locations randomly from primary areas; defining smaller boundaries from prime locations; and, specifying segments from those boundaries.

To collect information, convenience and quota sampling techniques are combined for recruiting interviewees who arrived on the scene by mere happenstance on those defined segments of the case study area, while being selected in the same proportions for different age and sex (Bernard, 2006; Fink, 1995c; Leedy and Ormrod, 2001; Walliman, 2008).

It is a fact that a large sample can provide greater accuracy (deVaus, 1996), but, if the research is one of 'discovery' rather than the testing of hypotheses, sampling can be used in small-scale research involving between 30 and 250 cases (Denscombe, 2003). The size of the sample has to be kept as large as possible, while limited to secure the amount of detail required for in-depth interviews about locally appropriate sustainable urban forms. As well, it was constrained by time, cost and access of the research (Arksey and Knight, 1999). (88 participants collaborated in this data collection.)

#### **To collect stakeholders' agreement to the design principles from interviews and focus groups**

The agreement to the design principles has to be gathered in order to accommodate various ambitions and development dimensions into form-production processes. For the interview, key stakeholders including public authorities, design professionals, leaders of communities, investors and developers are recruited by the theoretical sampling method. Landowners and small scale traders, nonetheless, are recruited by using the snowball technique through leaders and members of communities. (The small scale trader is indicated as a key actor in CH8, contributing to the local economy to the case study area, and was required to participate in this design evaluation.) For focus group discussions with residents, snowball techniques are utilized to recruit participants through leaders of communities.

Regarding face-to-face semi-structured interviews, the small size of the sample is undertaken in relation to the number of questions asked (Walliman, 2008). Conducted with residents, large focus groups are undertaken because numerous brief suggestions from participants need to be collected as 'a brainstorming of the groups' (Morgan, 1998a) to the design principles. (21 representatives from various stakeholders participated in the interviews and 40 residents participated in the focus groups.)

**To collect information about key actors' roles and interplay by conducting interviews with various stakeholders**

To establish implementation strategies for the design principles, key actors' roles and their interplay are crucial in defining key mechanisms and delivery partners. Again, the theoretical sampling method (Silverman, 2005; Walliman, 2008) is employed to define key stakeholders from official registers and directories of consultants. The small size of the sample is carried out in order to collect information on existing mechanisms and stakeholders' constraints in the implementation processes. (16 representatives from various stakeholders participated in this discussion.)

**To gather stakeholders' agreement to the design implementations from focus group discussion**

All key actors who have participated in the design evaluations are invited to participate in the focus group for defining key implementation strategies. They are public authorities, design professionals, investors and developers, land owners, small scale traders, leaders of communities, and representatives of residents. (15 participants collaborated in this data collection.)

## **4.6 Criteria for Site Selection**

The case study is aimed to be the best example for the analysis of local sustainable urban forms which can be generalized to other examples in Bangkok and to other critical cases in terms of sustainable urban forms. Therefore, defined from the conceptual framework part three (see CH3), three relevant factors were analysed for the development of the criteria.

Table 4.3 shows a set of criteria comprising: key features of inner Bangkok's urban forms; resources driving the local process of form-productions; and issues of sustainability found in Bangkok.

As shown in the table, on the one hand, key characteristics of inner Bangkok's urban forms are employed to select a case, defining distinctive patterns of the local form. *Appendix A* (p.342) presents the study of Bangkok's urban forms which provide the criteria for site selection in terms of socio-spatial patterns. Further, sustainability issues in Bangkok are also discussed in *Appendix A*, utilized for selecting a case in terms of sustainability. On the other hand, because locally appropriate sustainable urban form is the product of the process

by which various perceptions and actions take place, issues of form-derivations demonstrated in the conceptual framework (CH3) are also implemented to select a case study.

Table 4.4 Criteria for Site Selection

| Criteria for Site Selection   |   |   |
|---|---|---|
| Urban Forms*  | Form-Productions**  | Sustainability*   |
| <ul style="list-style-type: none"> <li>• The site has to be located in inner Bangkok, representing a large land area of the city.</li> <li>• The pattern of the site has to be superblock pattern representing a modern area of Bangkok's urban forms.</li> <li>• The site's superblock should include tissue of traditional neighbourhoods located on local streets, defining a variety of social classes and a pattern of mixed uses representing unique characteristics of Bangkok.</li> </ul> | <ul style="list-style-type: none"> <li>• The site should contain various user groups and classes in order that various perceptions can be investigated.</li> <li>• The site should cover major urban cores concentrated by state initiatives, development and market signals.</li> <li>• The site's urban core should be one of the most attractive locations where various stakeholders are involved.</li> </ul> | <ul style="list-style-type: none"> <li>• The site should represent urban problems in terms of sustainability. They are land pressures, congestion, inadequate housing, lack of public open space, squatter settlement, urban heat island and pollution, for example.</li> </ul> |

\* Criteria are based on the study of Bangkok's urban forms presented in *Appendix A*.

\* and \*\* Criteria are based on key issues indicated by the conceptual framework (CH3).

## 4.7 Conclusion

In this chapter, several frameworks and methodologies for an analysis of locally appropriate sustainable urban form were established for use in the case study. With respect to the conceptual framework and required actions and data identified in CH3, field procedure was formulated.

1. Analyzing the case study's socio-spatial patterns.
2. Evaluating global levels of sustainability.
3. Examining perceptions for sustainability and form-adaptations.
4. Using perception-based data to modify local indicators.
5. Applying the local indicators to assess local levels of sustainability.

6. Formulating design principles to shed light on locally appropriate sustainable urban forms.
7. Testing and refining the design principles in order to accommodate various aspirations and development dimensions.
8. Assessing local levels of sustainability of the refined design principles.
9. Establishing implementation strategies presenting a real outcome of locally appropriate sustainable urban forms.

Crucially, this procedure presents implementation stages of the fieldwork, which requires various collection techniques and methods of analysis. Techniques for data collections are:

1. Documentation and Archival Records;
2. Site Survey and Direct Observation;
3. Use of Photograph, Annotated Diagrams and Drawings;
4. Interviews;
5. Focus Group Discussion.

It should be noted that the instruments to collect data were also formulated. They are presented in *Appendixes B to G*.

To analyse data, methods of analysis were specified:

1. Morphological and Typological Analysis Methods;
2. Methods of Physical Evaluation in Relation to Sustainable Urban Forms;
3. Qualitative Methods of Analysis;
4. Quantitative Methods of Analysis;
5. Methods of Perceptual Evaluation in Relation to Sustainable Urban Forms;
6. Design Inquiry Methods.

To analyse sustainable urban forms appropriate with locality, human perceptions, aspirations and actions have to be investigated. Various stakeholders therefore are involved in many stages of the field study. Sampling techniques were delineated to recruit participants, aiming to secure the amount of detail, depth of information and insights required for the analysis.

Criteria for site selection were established, following key issues presented in the conceptual framework established in CH3. These include perceptions, state-market

relations and involvement, key factors driving the process of form-productions are utilized as a set of criteria for site selection. Further, based on *Appendix A*, key features of Bangkok's urban forms and their sustainability issues are also incorporated in the development of the criteria.

All frameworks and research tools to collect data and ways in which they have to be analysed, formulated in this chapter are crucial to the identification of sustainable urban forms at the local level. By using these methodologies, the preliminary conceptual framework developed in CH3 is applied in the analysis of the case study, entailing empirical data and practical findings to consolidate an explanation for locally appropriate sustainable urban forms in the following chapters.

# Chapter Five

## Morphological Analysis of Sukhumvit

### 5.1 Introduction

As demonstrated in the fieldwork methodologies for analyzing locally appropriate sustainable urban form developed in the previous chapter, the distinctive characteristics of the case study's urban forms have to be identified as the foundation for consequent analyses of levels of sustainability. Therefore, the aim of this chapter is to analyse the case study's socio-spatial patterns in order to be used for interrogating local sustainable urban form in the following chapters, identifying objective five of the research.

To fulfil this aim, chapter objectives are formulated.

1. To analyse the urban form of the case study.
2. To identify the distinctive socio-spatial pattern of the case study.

By implementing the criteria for site selection established in CH4, Sukhumvit is selected as the case study because it corresponds to all criteria. Figure 5.1 shows the location of Sukhumvit in Bangkok.

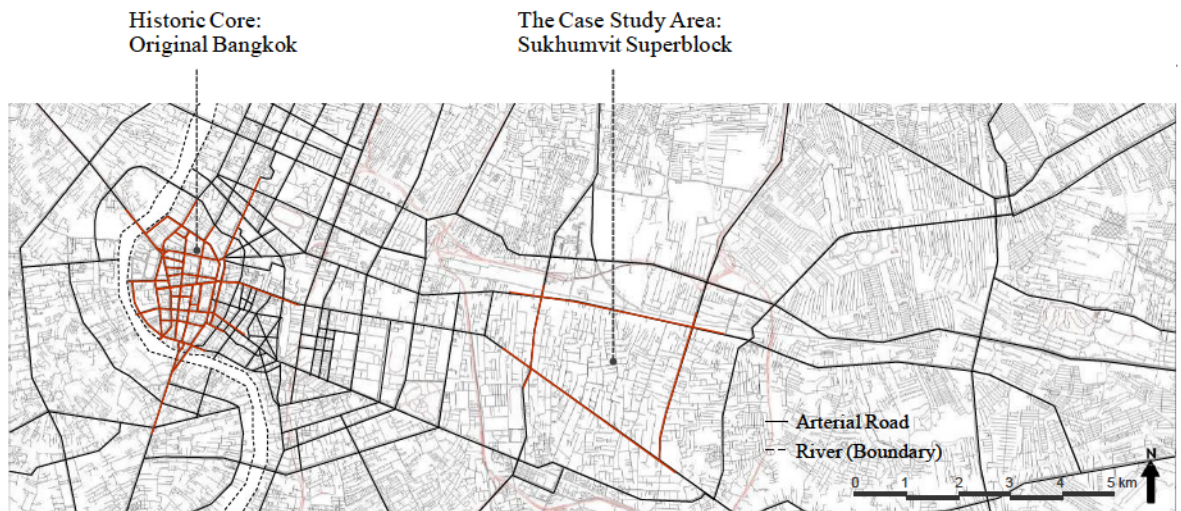


Figure 5.1 Location of the Case Study Area in Bangkok  
Source: Adapted from DCP, 2001

Sukhumvit is chosen as a single case with respect to its specific features based on inquiry for case study selection (Yin, 1994).

1. Sukhumvit best represents inner Bangkok's urban forms which can be generalized to other examples of superblocks with similar types of through access (see *Appendix A*).
2. Sukhumvit is the critical case of superblock pattern defining sustainability problems of the city, such as land pressures, congestion, inadequate housing, lack of public open space, squatter settlement, urban heat island and pollution.
3. Sukhumvit is one of most attractive locations in terms of urban development in which state initiatives, market signals and various stakeholders are involved.
4. Sukhumvit is a particular case in which few researchers had previously investigated.
5. Sukhumvit contains embedded case studies because of its multilayered tissues of socio-spatial patterns within the large land area of its superblock (6.5 sq.km).

According to the last feature as stated above, Figure 5.2 shows socio-spatial patterns of Sukhumvit. They are the multilayered regions presenting formations and subsequent

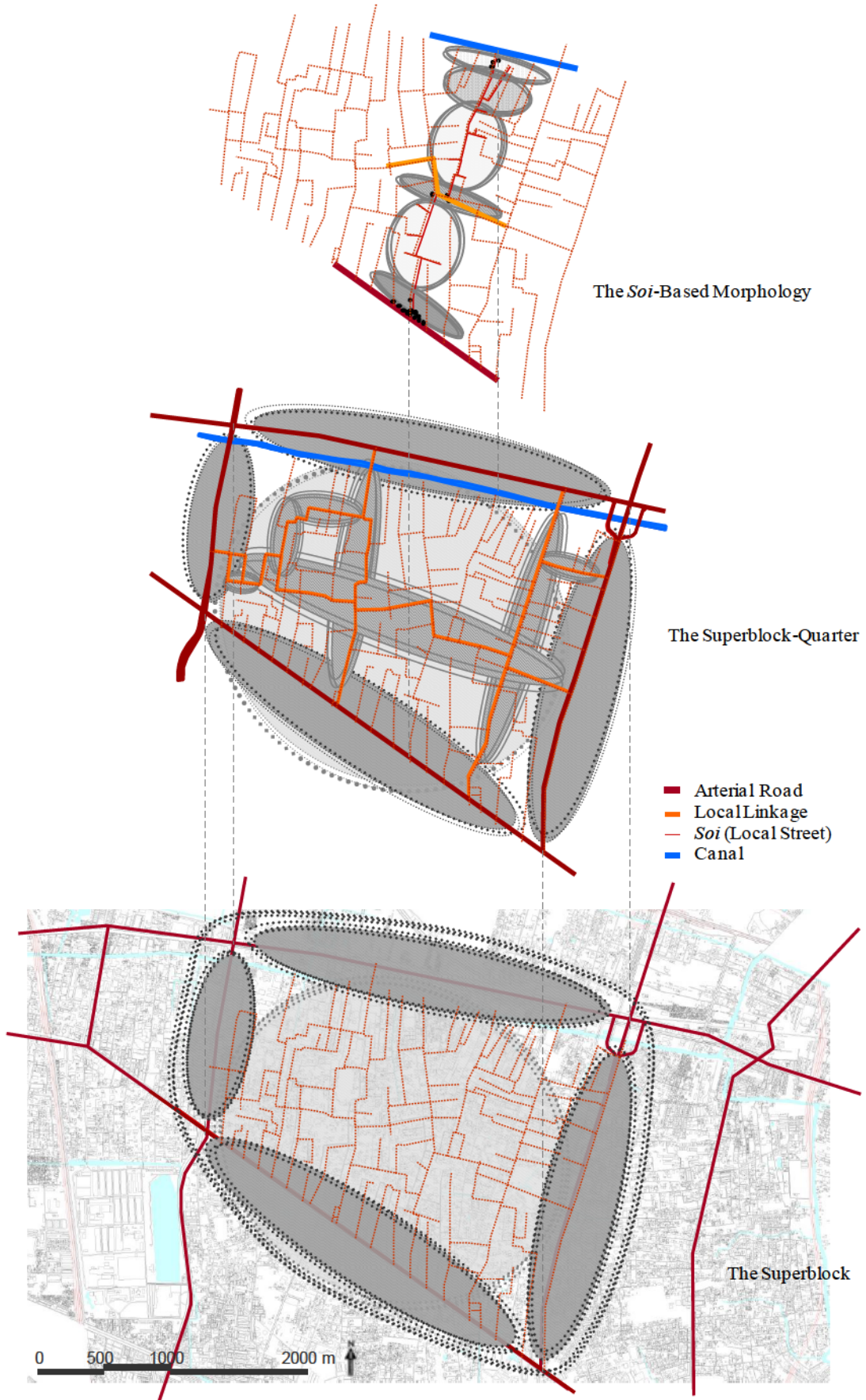


Figure 5.2 Multilayered Morphological Patterns of Sukhumvit, 2011  
 Source: Field Survey, 2011

modifications of forms: the *soi*-based morphology; the superblock morphology; and the superblock-quarter morphology.

These morphologies were locally shaped in relation to socio-economic cycles in which four periods of change are determined from the settlement experience. They are rural, suburban, urban and mature urban phases of Sukhumvit development (Cohen, 1985, cited in Askew, 1994b, p.108-112). Crucially, this time line is utilized as a platform to develop the chapter structure fulfilling chapter objectives.

- 5.1 Introduction
- 5.2 Rural Period (Before 1950s)
- 5.3 Suburban Period (1950s-1960s)
- 5.4 Urban Period (1970s-1980s)
- 5.5 Mature Urban Period (1990s-2012)
- 5.6 Distinctive Socio-Spatial Patterns
- 5.7 Conclusion

## **5.2 Rural Period (Before 1950s)**

The rural period is the phase of development defining Sukhumvit's first settlement where people undertook the land for establishing a community and for cultivating rice supplying the city.

### **5.2.1 The Riverine Neighbourhood**

Sukhumvit had been a rural area functioning as part of the largest surrounding rice fields for providing food to an original Bangkok, known as Tung Bangkokpi. A group of Thai Muslims migrating from the south of Thailand developed the first settlement along Sansab canal for establishing a community before 1840 (Miftahbandon, 2010). Figure 5.3 shows the assumed area of the first settlement in Sukhumvit.

Shown in the figure, while the rice fields were located on inland areas, the community was located along the canal's strip. Generalized to most traditional settlements in the central region of Thailand including the case study area, communities were located nearby canals or rivers because 'the livelihood of their inhabitants depended on water for domestic and agricultural use as well as for communication' (Chaichongrak, 2002, p.20).

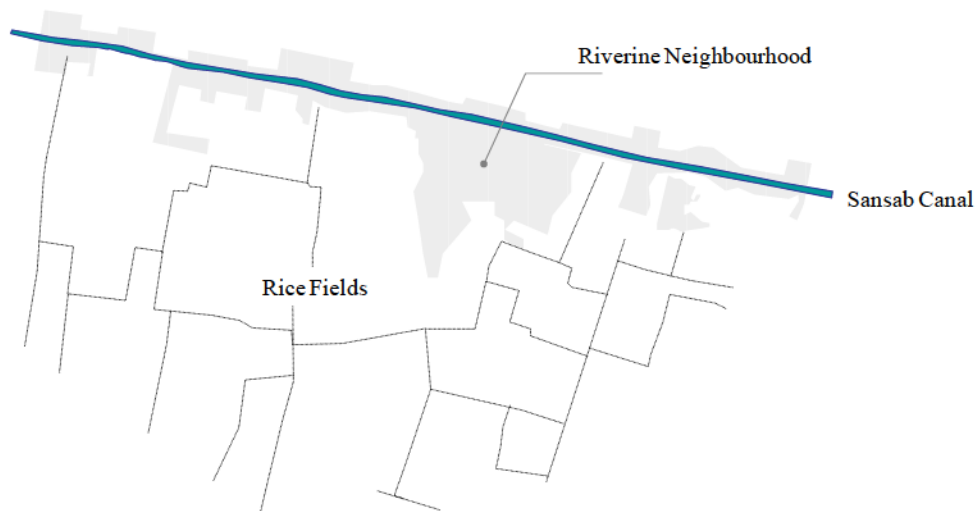


Figure 5.3 The Assumed Settlement of Riverine Neighbourhood, Sukhumvit  
Source: Miftahbandon, 2010

Figure 5.4 shows a drawing of a Thai house from the Ayutthaya period, representing a relationship of life style, traditional house and water way in the central region of Thailand where Sukhumvit is located.



Figure 5.4 A Drawing by a Western Artist of a Thai House from the Ayutthaya Period  
Source: Chaichongrak *et al.*, 2002

As shown in Figure 5.5, houses are settled alongside canals as common features of the traditional neighbourhood (Reukbrutetree and Akkraseranee, 2001); this characteristic is identified as ‘ribbon-type villages’ (Chaichongrak, 2002). However, reflecting the

relationships between the settlement and the water way, the riverine neighbourhood is used to describe this morphology.



Figure 5.5 A Drawing of a Traditional Neighbourhood Located along the Canal  
Source: Reukbrutetree and Akkraseranee, 2001

The settlement located with respect to the canal is noticed in Sukhumvit. Figure 5.6 shows the assumed plot and building patterns of the riverine neighbourhood settled along the Sansab canal.



Figure 5.6 Plot and Building Patterns Representing the Original Settlement of Sukhumvit  
Source: Adapted from DCP, 2006 and 2001 and Field Survey 2010

The traditional plots for houses and also land parcels for rice fields could be any form depending on land reservations of settlers who took the first settlement. Although the structures of streets, plots, blocks, buildings and use patterns are not chronologically recorded in Sukhumvit, the original plots of the riverine neighbourhood can be defined from the pattern with long and narrow shapes arranged perpendicularly to the Sansab canal. This spatial pattern reflected the relationship between houses and canal by which the plot heads faced towards the canal where the main mode of transport was by boat, as shown in Figure 5.6.

Influenced by the long and narrow shapes of plots, the pattern of building was developed as a collection of waterfront buildings located densely along Sansab canal. Figure 5.7 shows the waterfront houses found in Sukhumvit. It should be emphasized, however, that the traditional pattern of Thai houses was a raised floor in which the area on the ground floor was opened for multi-purpose uses and for flood evasion regarding low-lying areas of Bangkok (Chaichongrak, 2002) (Figure 5.4, p.126). Found in most areas along the canal's strip as shown in Figure 5.7, two-storey houses are not the original form but the result of house adaptations influenced by the change of transport from canal to road (Nimsamer, 2012). (This occurred during the suburb phase of development as discussed further in the next section.)



Figure 5.7 Waterfront Houses along Sansab Canal, Sukhumvit, 2010  
Source: Author, 2010

A waterfront walkway is normally found as a key path connecting waterfront shops (Reukbrutetree and Akkraseranee, 2001); it is also found as a key component of the public realm of the traditional neighbourhood in Sukhumvit. With a metre width, the waterfront walkway was developed along the canal and the original walkway-line still persists as shown in Figures 5.8. Plot heads and building frontages were linked to this public realm used for accessing all houses, for meeting neighbours and for going to ports for economic activities. In this sense, the waterfront walkway defined ways in which the riverine neighbourhood was formed in the case study area, as well as the Sansab canal.



Figure 5.8 Waterfront Walkway along Sansab Canal, Sukhumvit, 2010  
Source: Author, 2010

The rural period of Sukhumvit was reflected by the morphology both of the neighbourhood and of the rice fields. A strong tradition of rice production played a central role in the man-made environment shaped to the purpose of cultivating rice. Figure 5.9 shows an example of a rice field and irrigation basin patterns. When water needed applying and storing within the areas of the field crops, compositions of the rice fields were arranged perpendicularly to the canal. Besides, as a metaphor for wealth in the cultural value of Thai farming, farmers were willing to construct basin irrigation as large as the utmost capability of farming practice (Ruaysungnoen, 2008). As assumed in Figure 5.3 (p.126), large basin

irrigations arranged perpendicularly to the main water body were developed in the case study area and became one of morphological frames influencing subsequent urban forms.



Figure 5.9 Thai Rice Field and Irrigation Basin Patterns Developed in Relation to Geography, Water Supply and Land Right and Reservation

Source: Ckaikrac, 2012

### 5.3 Suburban Period (1950s-1960s)

The suburban phase of settlement is the period of the development of motor car villages influenced by rapid urban growth and the urban sprawl of Bangkok after the Second World War.

#### 5.3.1 Low-Income Neighbourhoods

Bangkok expanded its area from 13 sq.km in 1900 to 124 sq.km in 1960 and the population of Bangkok increased at 6 percent annual growth and reached over 2 million in 1960 (Dutt *et al.*, 1994). Its built up area was not limited only within the original Bangkok, but many communities and centres were settled through the rice fields and surrounding areas.

The name Sukhumvit was given to the case study area when Sukhumvit Road was officially constructed to be the key arterial road connecting Bangkok to the east of Thailand in the mid 1950s (DCP, 2004). Encouraged by rapid urban growth, road construction and the change of transport mode from boat to car, a large area of the case study was collected by A.E. Nana, the Indian Muslim businessman (Janekankit, 2004), in order to be developed for suburban villages supplying the growth of Bangkok.

However, during the phase of land holding before land development, another neighbourhood type had emerged. With reference to migration of the rural poor, the low-income neighbourhoods were settled, including small bungalows, wooden townhouses and slum housings, as shown in Figure 5.10.

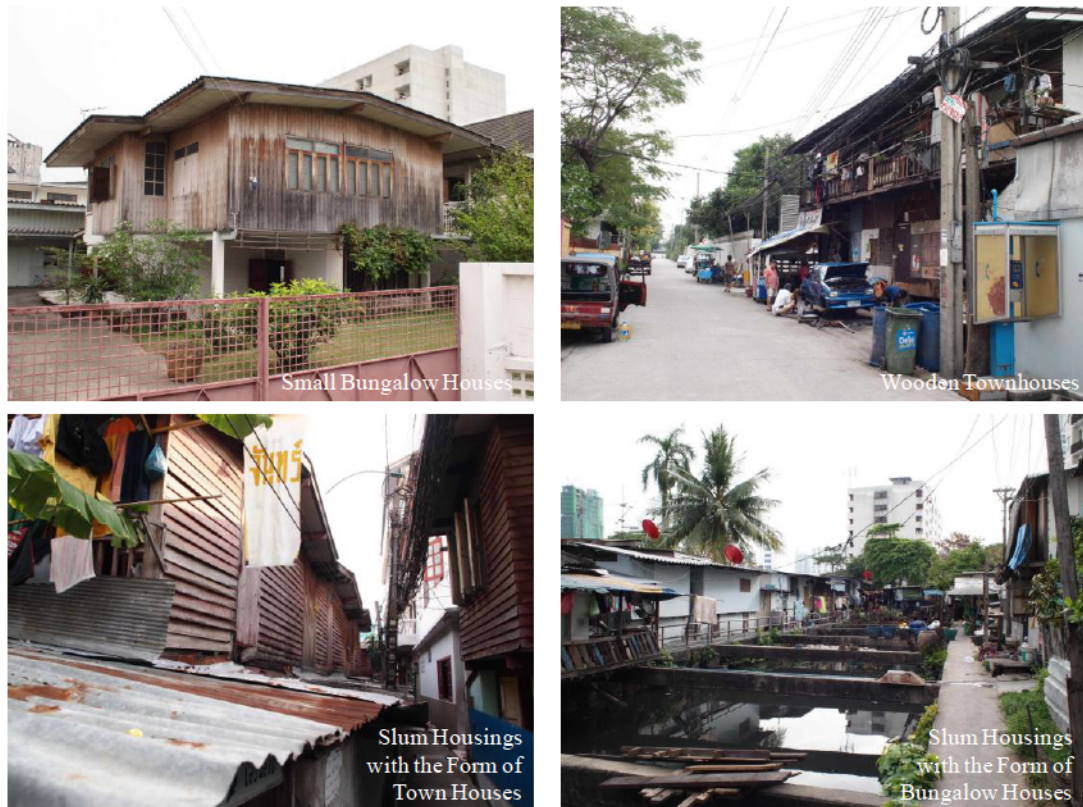


Figure 5.10 Building Characteristics in the Expansion Areas of the Traditional Neighbourhood, Sukhumvit, 2010  
Source: Author, 2010

Figure 5.11 shows that they were located on the land rented as the expansion from the riverine neighbourhood. Connected to the previous settlement from the rural period, several patterns of plots and buildings were developed. While small long and narrow shapes of plots were settled for wooden townhouses (4x10 metre for example), rectangular shapes were developed for small bungalows (10x10 metre for example). Nevertheless, plot patterns for slum housings were smaller. They could be any form in which the building patterns are both of townhouses and bungalows; plots could be as small as 2x4 metre for townhouses and 5x5 metre for bungalows.



Figure 5.11 Outlines Showing Expansions of the Traditional Neighbourhood in Sukhumvit  
Source: Adapted from DCP, 2006 and 2001 and Field Survey 2010

Although the settlement from rural period and the low-income settlements are different in terms of social classes, the riverine neighbourhood and the expanded areas were physically connected by a fabric of small alleyways. Figure 5.12 shows small alleyways where plot heads and building frontages were located. All houses were linked to the branches of alleyways which were the public realm connecting and integrating both settlements. This public space was used for multi-functions such as accessing all houses and even being playgrounds for children.

### 5.3.2 *Mubanjatsons*

Mixed neighbourhoods advanced further when the case study area had transformed to a suburban area of Bangkok. Figure 5.13 shows the development of suburban villages in the case study area. Influenced by the role of estate markets, *mubanjatson*, the housing estate of motor car suburban villages, was fundamental. A key characteristic of *mubanjatson* was a mix of housing types: modern bungalow; modern town house; and shophouse.



Figure 5.12 Small Alleyways in Sukhumvit, 2010  
 Source: Author, 2010

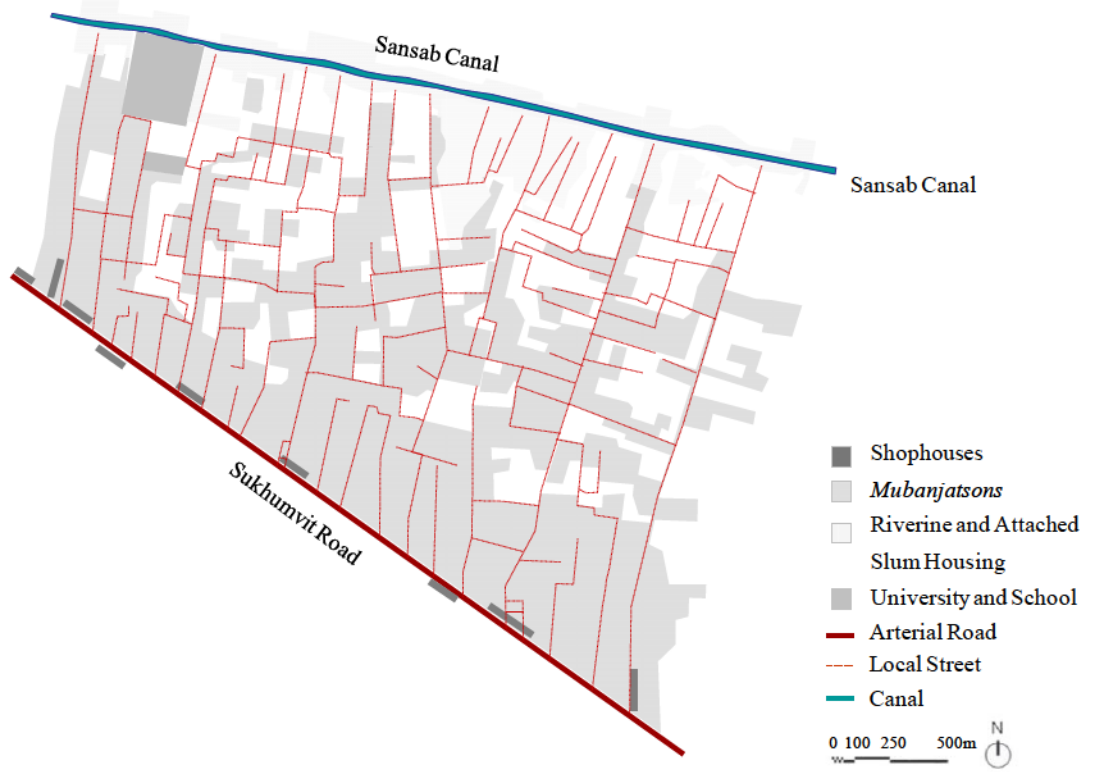


Figure 5.13 Sukhumvit Settlement, Showing the Development of *Mubanjatsons* in Sukhumvit, 1958  
 Source: Janekankit, 2004; Kongsawang, 1992

In the 1960s, moving out of the older inner city, a number of middle class households and upper class officials and business families extensively occupied subdivided lands settled next to the riverine and low-income neighbourhoods. Figure 5.14 shows plot and building patterns of bungalows produced for the suburb villages. Various plot sizes are found such as 15x20 and 30x40 metre; and can be as large as 50x80 metre or 4,000 sq.m in size (Varavarn, 2007). Based on this configuration, a number of luxury bungalows with large front display gardens were developed and caused Sukhumvit to be known as Thai Beverly Hills for foreigners as shown in Figure 5.15. Until now, bungalow housing occupy the largest land portion of Sukhumvit and their front gardens still remain as a key contribution to natural features of the case study area.



Figure 5.14 Plot and Building Patterns of Bungalow Housings in Sukhumvit  
Source: Adapted from DCP, 2006 and 2001



Figure 5.15 Wealthy Bungalows in Sukhumvit, 2011  
Source: Author, 2011

Although the development of bungalows continued the pattern of residential use, yet they were not socially integrated into the pre-existing settlement. This argument is supported by different spatial structures of the building fabrics. Although narrow frontages of waterfront houses and low-income housings shown sign of life along the waterfront walkway and the small alleyways, the model of the bungalow type with a large private garden designed for new motor car suburbs influenced each of the households privately, disconnected from others.

Moreover, another key feature produced from the suburban period is the large size and shapes of plots located within large street blocks. In the case study area, the local streets were planned neither by the Department of City Planning nor by the Department of Highways but were developed by land owners following their land rights and property boundaries. These streets were private access but many of them were given as public access after lands were subdivided for housing development. Importantly, regarding the rural settlement of Sukhumvit, it would be reasonable to assume that the pattern of these

local streets overlaid many parts of the previous large basin irrigation patterns of Sukhumvit's rice fields influencing today's large street blocks.

Figure 5.16 shows patterns of local streets in Sukhumvit. As discussed in the previous section, compositions of large basin irrigations were developed and arranged perpendicularly with the canal. Importantly, the consistency between the basin irrigation patterns and Sukhumvit's street patterns is noticeable. As shown in the figure, street-lines can be found at right angle to Sansab canal at the north, rather than Sukhumvit Road at the south regarding the previous purpose for applying water to crops. Developed upon large basin irrigation patterns shaped by settlers, the complex flow of circulation is found throughout the case study area on the one hand. Extensive blocks with long narrow shapes reaching to the canal are noticeable on the other. The street blocks of Sukhumvit can be as large as 450x700 metre and as long as 150x1,000 metre.

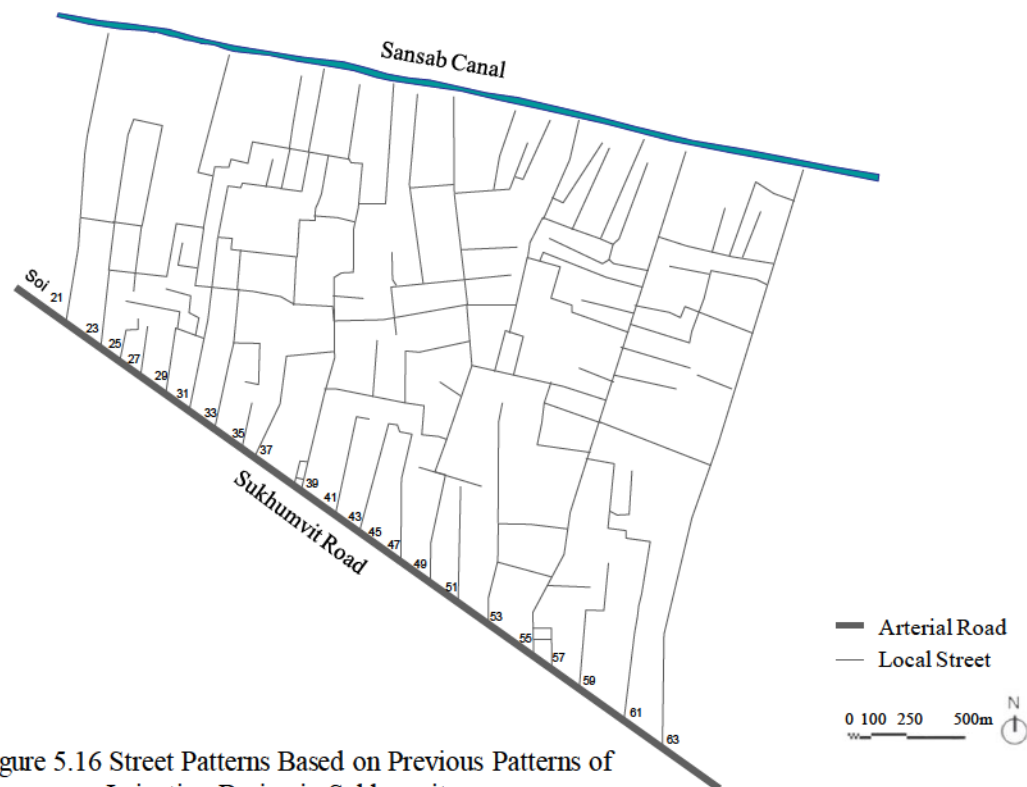


Figure 5.16 Street Patterns Based on Previous Patterns of Irrigation Basins in Sukhumvit  
Source: Adapted from DCP, 2001

Within the suburban phase of Sukhumvit development, it should be emphasized that other types of housing were also developed. Integrated as part of *mubanjatsons* (the housing

estates), few groups of modern townhouses were supplied for middle-income groups by locating together with wealthy bungalows as shown in Figure 5.17. Figure 5.18 shows that, with 5x16 metre in size for example, townhouses were developed with two or three storeys. A front parking space and a back terrace used for laundry were provided for each house.

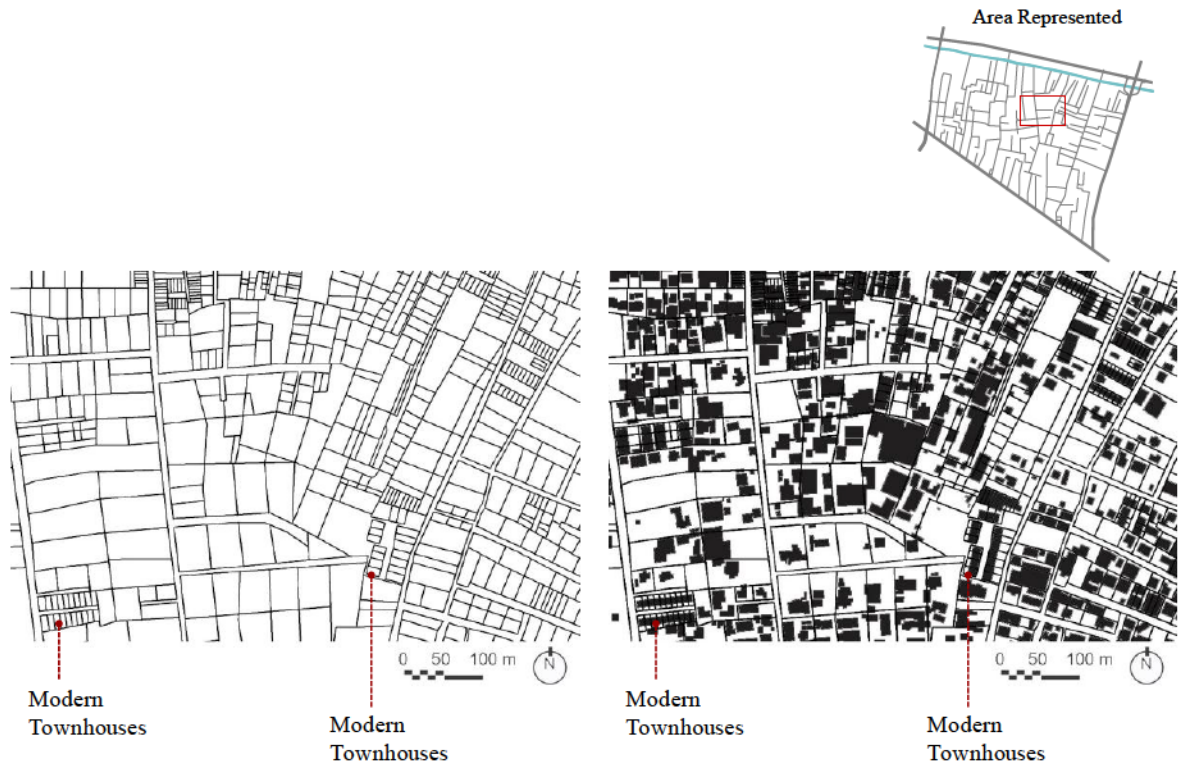


Figure 5.17 Plot and Building Patterns of Modern Townhouses Located in Sukhumvit  
Source: Adapted from DCP, 2006 and 2001



Figure 5.18 Modern Townhouses in Sukhumvit, 2010  
Source: Author, 2010

In contrast, as shown in Figure 5.19, shophouses were developed along Sukhumvit Road with full construction on their sites with no open space, functioning both as residential and business activities. With the dual-function between residential and commercial use and the low cost of construction, shophouses became the built form that a number of merchants, particularly European, Chinese, and Indian traders, have occupied.



Figure 5.19 Shophouses in Sukhumvit, 2010  
Source: Author, 2010

Developed during the suburban period when the main mode of transport was fully functioning roads in Bangkok, as shown in Figure 5.20, a series of shophouses along Sukhumvit Road illustrated an emergence of a ribbon-type development that extended from a city core to the case study area. The pattern of plots were defined by long and narrow shapes with 4x16 and 5x16 metre for example and the buildings with three or four storeys close to the road for interacting with pedestrians on the main road as shown in the figure.

The original use of shophouses was a residence mixed with a retail shop; the ground floor was for selling goods and the upper floors were for living. Nevertheless, shophouses were adapted for multi-functional use such as a business enterprise, a small hotel and an industry. As shown in Figure 5.21, tourist-orientated functions such as restaurants, pubs and hotels were supplied for the economic growth of the tourist industry within the type of shophouses along Sukhumvit's strips and also the areas around the ends of local streets connecting to Sukhumvit Road.



Figure 5.20 Plot and Building Patterns of Shophouses Located along the Strips of Sukhumvit Road  
 Source: Adapted from DCP, 2006 and 2001



Figure 5.21 Shophouses Utilized for Tourist-Oriented Development in Sukhumvit, 2010  
 Source: Author, 2010

### 5.3.3 The *Soi*-Based Morphology

Although social structures of the case study were mixed, which can be defined by mixed communities, rather than breaking down the prior settlement patterns, the consequent typologies were settled collectively and still remain as shown in Figure 5.22. Cohen (1985, cited in Askew, 1994b, p.108-112) points out that, in Sukhumvit, these different spatial forms used by different social groups and classes share the same local street and join as the lateral urban expansions.

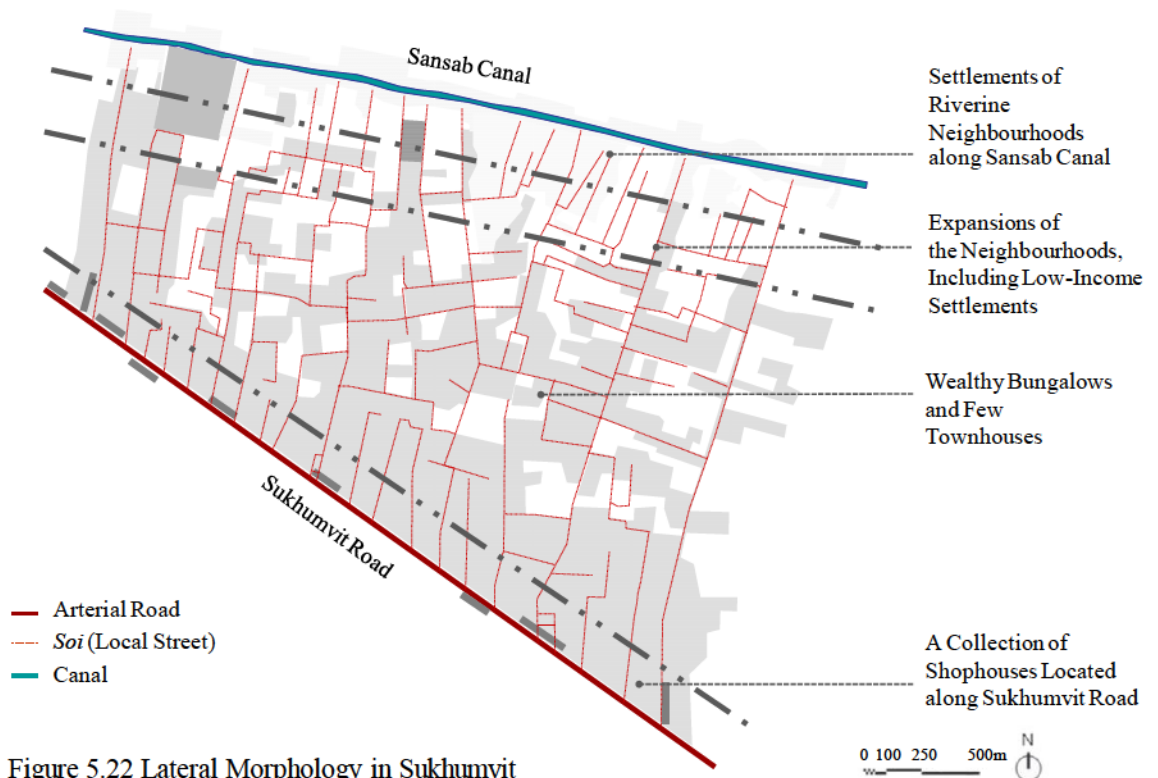


Figure 5.22 Lateral Morphology in Sukhumvit  
 Source: Adapted from DCP, 2001

*Soi*, a Thai term recalling the local street accessing lands and buildings from the major road, is the backbone defining how all settlements derived from the rural and suburban periods were mixed as the lateral morphological pattern. Figure 5.23 shows an example representing the typical characteristics of *sois* in Sukhumvit. Since the suburban era, *sois* were developed for providing north-south movement in the case study area in order to provide accesses for the *mubanjatsons* developed in the middle part of the case study area and for the low-income and riverine neighbourhoods accumulated around the canal strip

(see Figure 5.23). It should be emphasized that this morphology is common across inner Bangkok (Askew, 1993; 1994a).

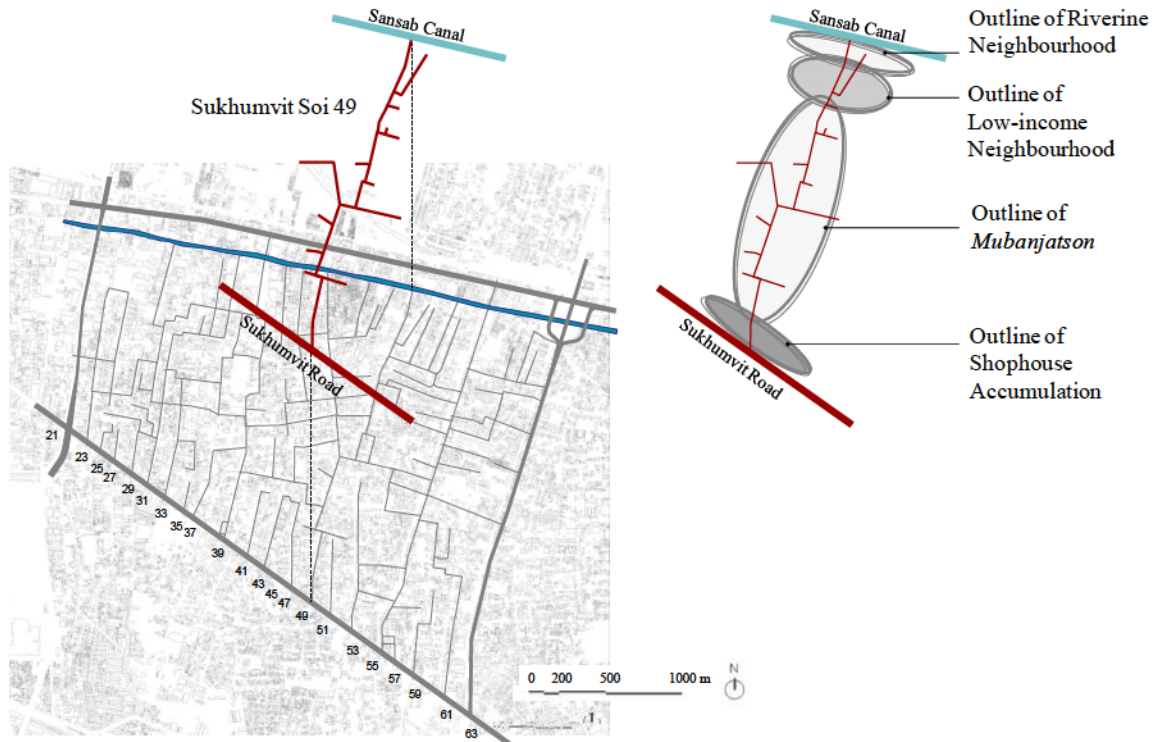


Figure 5.23 An Example Outline of a *Soi* in Sukhumvit, Showing the Lateral Morphology Where Traditional Morphologies Locate and Share the Same Public Realm of *Soi*  
Source: Adapted from DCP, 2001

Figure 5.24 shows that each *soi* was simply used for accessing from *paksoi*, the entrance of *soi* connected to Sukhumvit Road on the south, upwards to *klangsoi*, the middle part of *soi*, to *taysoi*, the end of *soi* at Sansab canal strip, where the existing riverine and slum housings were settled. These are Thai terms recalling parts of the *soi*-based morphology, defining intermixed neighbourhoods for each *soi*.

The *soi*-based morphology is the outcome of rural and suburban periods of development, representing the local tissue of traditional settlements in the case study area. Various plot and building patterns were integrated by sharing the same *soi*, the key public realm of mixed communities, as shown in Figures 5.25 and 5.26.

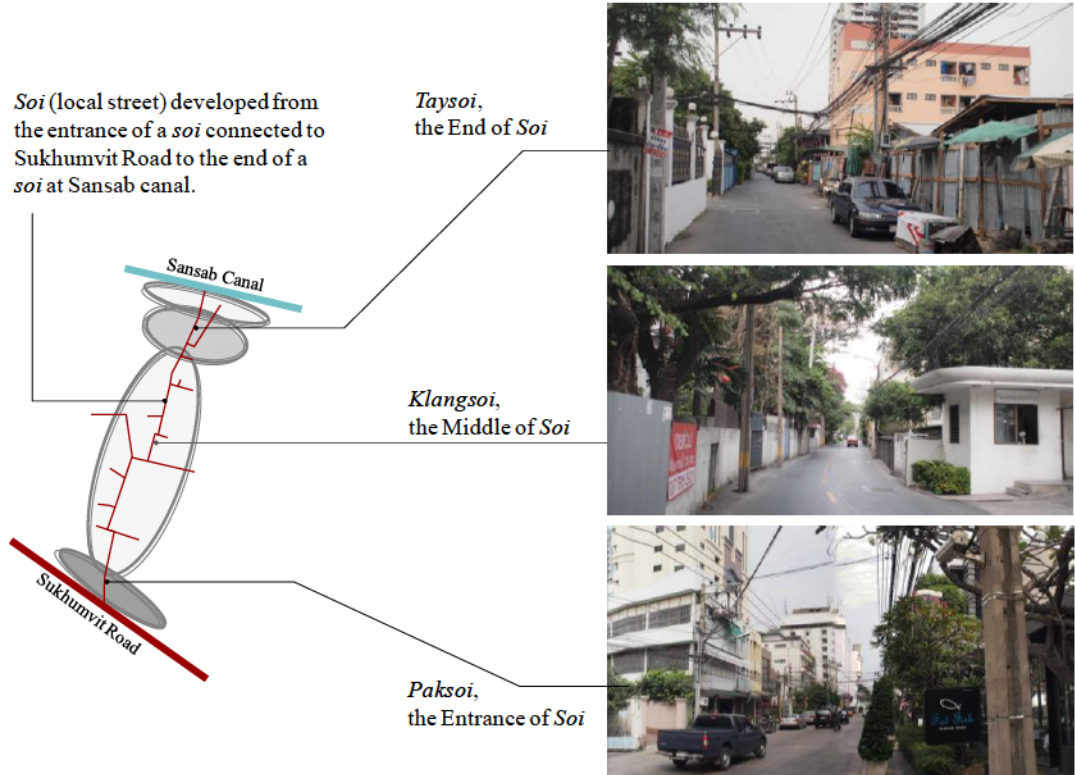


Figure 5.24 *Soi*, the Local Street, in Sukhumvit, 2011  
 Source: Author, 2011

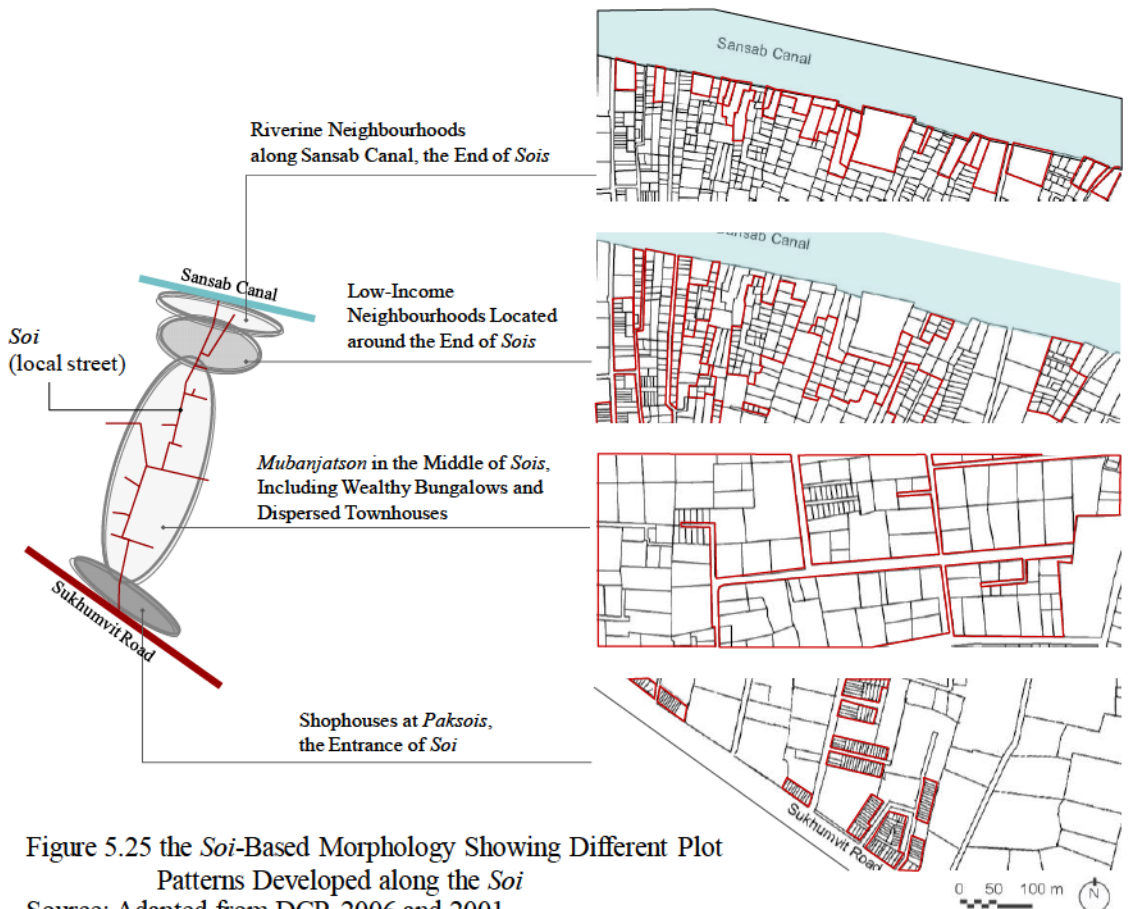


Figure 5.25 the *Soi*-Based Morphology Showing Different Plot Patterns Developed along the *Soi*  
 Source: Adapted from DCP, 2006 and 2001



Figure 5.26 the *Soi*-Based Morphology Showing Different Building Patterns Developed along the *Soi*  
 Source: Adapted from DCP, 2006 and 2001

Figure 5.27 (p.144) shows that shophouses, bungalows and modern townhouses were developed on the continuous space of *sois* which were linked to the alleyway neighbourhoods of the working class and to the riverine neighbourhood settled as the first settlement along the Sansab canal. All formed the heterogeneity of Sukhumvit's traditional settlement with the pattern of the *soi*-based morphology.

## 5.4 Urban Period (1970s-1980s)

Urban phase of Sukhumvit development is the period of extensive change of the case study area because it was affected by the urban expansion including road constructions and the development of modern districts when Bangkok's built up area extended through many parts of five surrounding provinces, known as Bangkok Metropolitan Area and also Greater Bangkok.

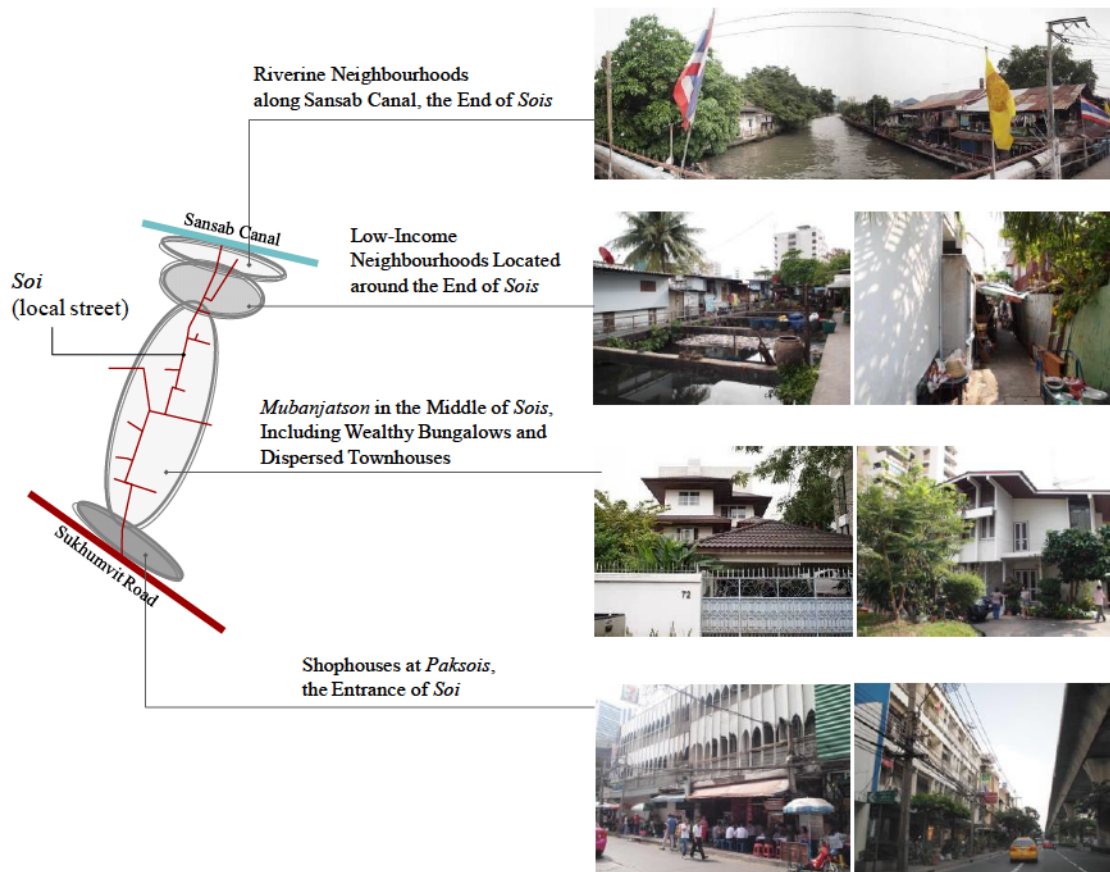


Figure 5.27 the *Soi*-Based Morphology Showing Different Built Forms Developed along the *Soi*

Source: Author, 2010

### 5.4.1 Development of Road Networks

Sukhumvit's modern settlement was the consequence of an urban expansion from an urban core to peripheries, catching the radius pattern of road networks. Several arterial roads were developed throughout the city. Figure 5.28 shows the development of roads in Sukhumvit during 1962-1987.

As shown in the figure, when Bangkok's road networks were developed by lengthening outwards from a city core, some existing local streets were widened and extended to join the connection of those arterial roads. In other words, roads were constructed by filling in the existing local streets.

1. Petchaburi Road was developed to the north of Sansab canal.
2. Soi Ekamai (Sukhumvit Soi 63) was widened and extended on the east of the case study area in order both to unite Petchaburi Road and to reach northeast Bangkok.

3. Soi Asoke (Sukhumvit Soi 21) was widened and extended on the west, being linked into the system of Ratchadapisek Road, the inner ring road of Bangkok.



Figure 5.28 Development of Road Networks Defining the Superimposition of the Superblock in Sukhumvit  
Source: Kongsawang, 1992; Janekankit, 2004

It should be noted that local streets changed to arterial roads and have been subsequently renamed from Soi Ekamai to Ekamai Road and from Soi Asoke to Asoke Road. Figure 5.29 shows these arterial roads.

Based on these road constructions, accompanied by the existing Sukhumvit Road on the south of the case study area, an illustration of the superblock emerged from the framework of road connections in which Sukhumvit's accessibility linked with the urban movement network of the city. Crucially, based on this configuration, several segments of the traditional settlements were overlaid by the coarse-scale connection of road networks on the one hand; the rest of the traditional settlements were encircled by the new roads on the other.



Figure 5.29 Arterial Roads in Sukhumvit, 2011  
Source: Author, 2011

### 5.4.2 The Superblock Morphology

Along the arterial roads, Sukhumvit became one of the urban zones recognised as a modern, international frontier of urban development. When the demand for business and residential use increased in the inner city and Sukhumvit's land prices dramatically escalated, a significant socio-spatial transformation took place with the development of office buildings and the condominium boom in the late 1980s. Influenced by the laws allowing foreigners to be the partial landowners in multiple ownership titles of constructions and of single land blocks, not only Thai households but also expatriate employees contributed to an increase in demand for modern housing.

Accompanied by changes in patterns of consumption and in trends of modern life, the white-collar work force, with expanding incomes, energised the development of suburbs towards 'one stop living concept' with the form of a 'self-contained luxury residential community' (Askew, 1993; 1994a; 2002). In this context, the Thai new middle class as well as Western and Japanese expatriates were constantly relocating into Sukhumvit since

the value of land was among the highest in Bangkok and the trading of that was more desirable for indigenous people.

The rate of office spaces and housing constructions dramatically increased and the high rate of tourist-orientated growth continued to strengthen by locating along the roads' strips. Askew (2002) describes that, following the oil crisis of the mid 1970s, hotels, commercial plazas, and other tourist services were taken over by Saudi investors who continued the progress of tourism, despite the economic slow down. The tourist industry has mixed and diversified with German, Swiss and English, accelerating the numbers of luxury hotels, service apartments, and small tourist ventures ranging from international restaurants, travel agencies, and beer gardens to go-go bars.

Figures 5.30 and 5.31 show that a number of office buildings, condominiums and hotels were developed and integrated as new urban districts, with a pattern of ribbon development along the strips of modern roads. The change to mixed use patterns proceeded further when a few governmental, educational, and industrial uses were extended from the congested city core and located in Sukhumvit.



Figure 5.30 High-Rise and Large Footprint Buildings Developed on Arterial Roads' Strips in Sukhumvit, 2011

Source: Author, 2011



Figure 5.31 Sukhumvit Settlement Showing Mixed Commercial and Residential Use Developed along the Arterial Roads' Strips in 2002  
Source: Janekankit, 2004; Kongsawang, 1992

With reference to the development of office buildings, hotels, service apartments, condominiums and complex shopping malls along the roads' strips, Figures 5.32 and 5.33 show the plots amalgamated for their development. Large plots are identified, such as 40x60 metre (2,400 sq.m) in size and modern types of buildings were developed, forming the global tissue of urban development.

The superblock morphology is defined by the global fabric with the forms of modern high-rise and large footprint buildings and mixed use located along the road's strips. Figures 5.34 and 5.35 shows the ribbon development of high density buildings accumulating along arterial roads representing the formation of the superblock pattern.



Figure 5.32 Plot and Building Patterns along Sukhumvit Road, Defining the Sukhumvit Superblock  
 Source: Adapted from DCP, 2006 and 2001

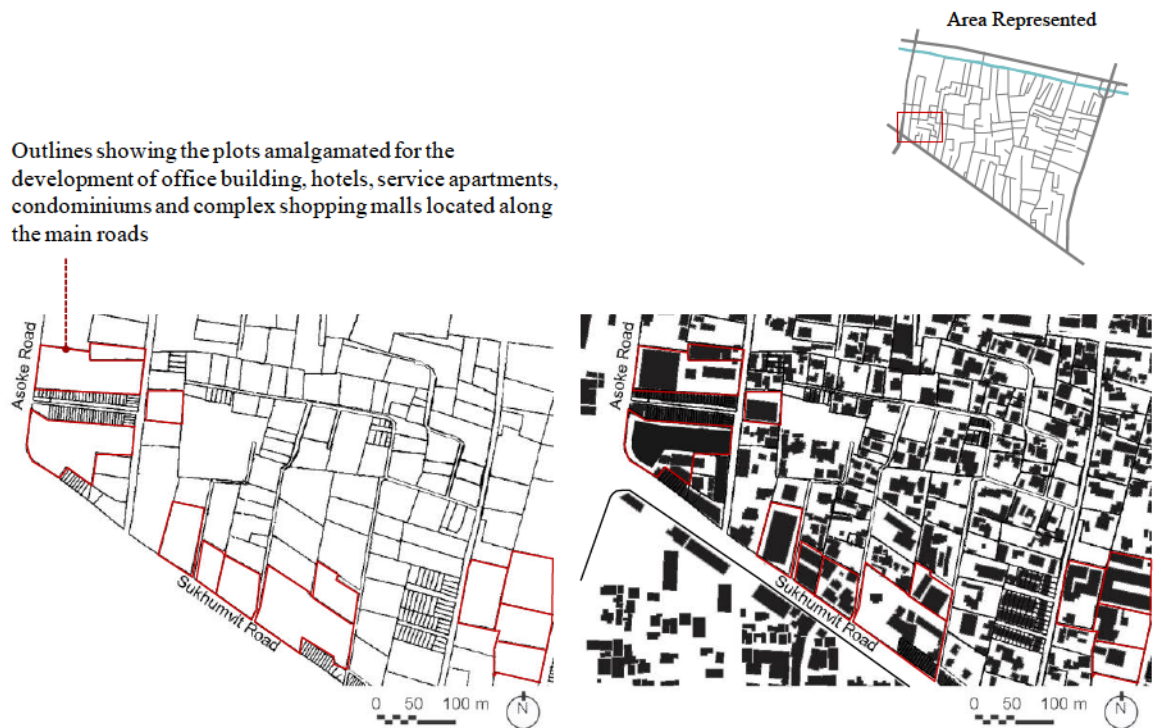


Figure 5.33 Plot and Building Patterns along Sukhumvit Road and Asoke Road,  
 Defining the Sukhumvit Superblock  
 Source: Adapted from DCP, 2006 and 2001



Figure 5.34 Accumulation of High-Rise and Large Footprint Buildings Located along Arterial Roads' Strips, Seen from Inner Area of the Sukhumvit Superblock, 2011

Source: Author, 2011



Figure 5.35 Built Forms of the Superblock Morphology, Sukhumvit, 2010

Source: Author, 2010

Figure 5.36 shows building heights, emphasizing the spatial pattern of the superblock in which many buildings developed along the roads are over five storeys in height and they can be found as high as over 51 storeys (DCP, 2009). Figure 5.37 shows that the average floor area ratios (FARs) of the superblock's perimeter areas are 3.00-3.99 but they can be as high as 6.00-6.99 FARs in some areas (ibid.).

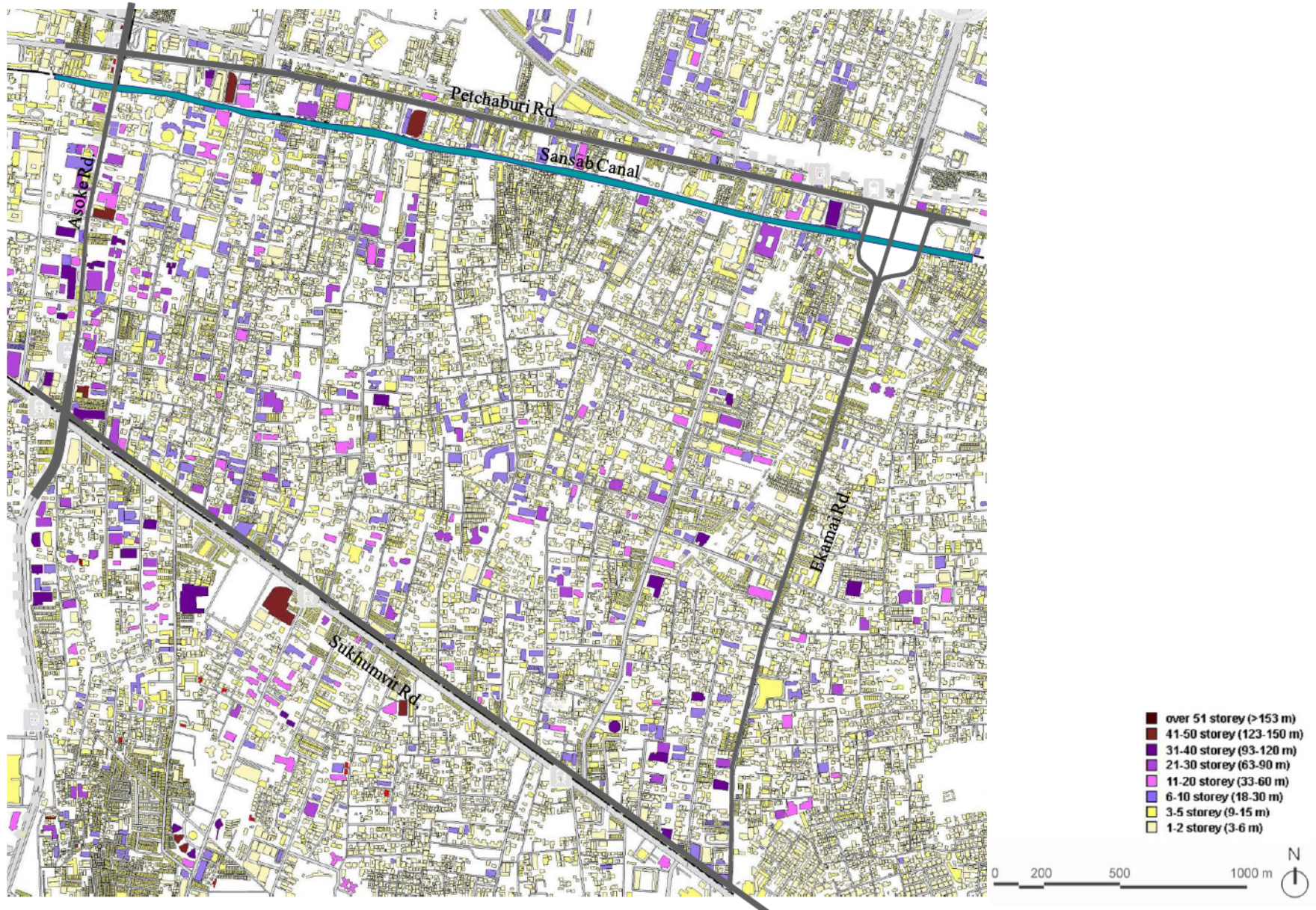


Figure 5.36 Building Heights Showing High-Rise and Large Footprint Buildings Forming the Sukhumvit Superblock, 2009  
Source: DCP, 2009

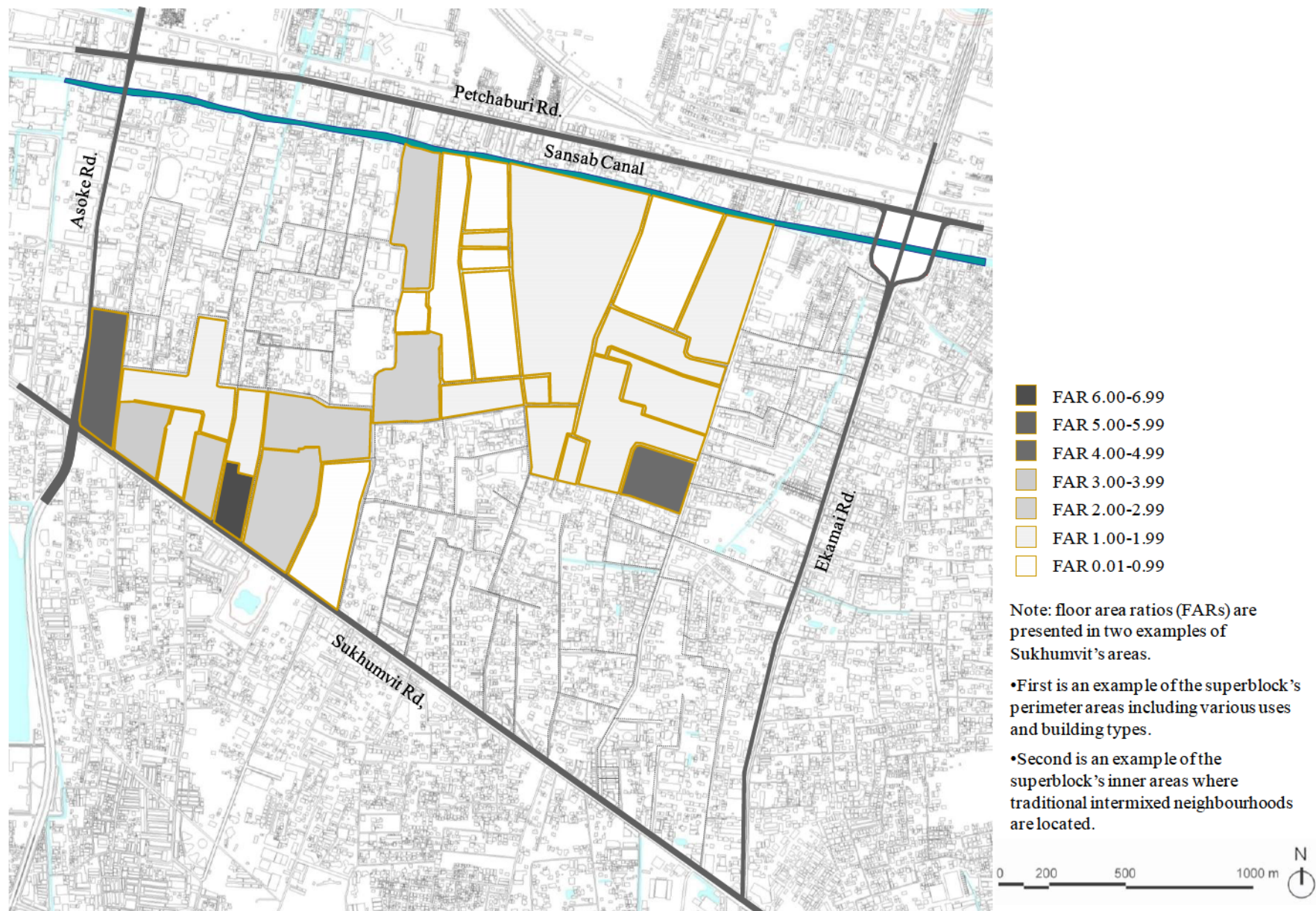


Figure 5.37 Floor Area Ratio Showing High Density Areas Encircling Low Density Areas inside the Sukhumvit Superblock, 2009  
 Source: Based on DCP, 2009

In contrast, the superblock's inner areas where the traditional settlements remain are normally low density with 2 FAR and under. This feature results in a ring-like pattern when the long fabric of high density areas encompasses the low density areas.

However, more and more land parcels have been subdivided, which makes it harder to deal with the complex land tenures involved. Because many long and narrow land parcels have been divided and a great number of shophouses have been developed on the strips of Sukhumvit Road, modern buildings are less usual than on the strips of other arterial roads.

The intermixed neighbourhoods had been settled as traditional settlements; these socio-spatial structures seemed not to be erased but rather integrated with the superimposition of the superblock morphology. In other words, rather than there being a process of deconstructing and re-constructing new forms in their places, a diverse pattern is reconciled whereby a variety of social classes and groups locate as complex morphological patterns.

### 5.4.3 Change of *Yan*

Originally defined as 'district', the Thai term *yan* recalls "a premodern identification of the city as a conglomeration of centres of particular activities or people, often both" (Askew, 2002, p.109). However, the definition of *yan* has been changed by the impact of the superblock morphology. Figure 5.38 shows that new road construction allows modern districts to emerge and encompass the traditional Sukhumvit district. This modern tissue becomes a new morphological frame of Sukhumvit overlaying upon several traditional neighbourhoods and stimulating changes in terms of size and definition of *yan*.

*Yan*, as shown in Figure 5.39, can be identified as neither 'district' nor 'town' in a classical category of urban morphology. This is apparently exhibited when people use the term *yan* not only for the traditional Sukhumvit district as it individually was for the agglomeration of traditional neighbourhoods, but also for a new larger fabric of several districts belonging to the superblock morphology.

The Sukhumvit superblock, therefore, is defined both by the coarse-scale connection of modern road networks and by the superimposition of modern districts overwriting upon the traditional settlement. As a consequence of the superblock, all settlements unite and the dualism of *yan* occurs between the traditional settlements and the whole superblock in recognition for Sukhumvit.

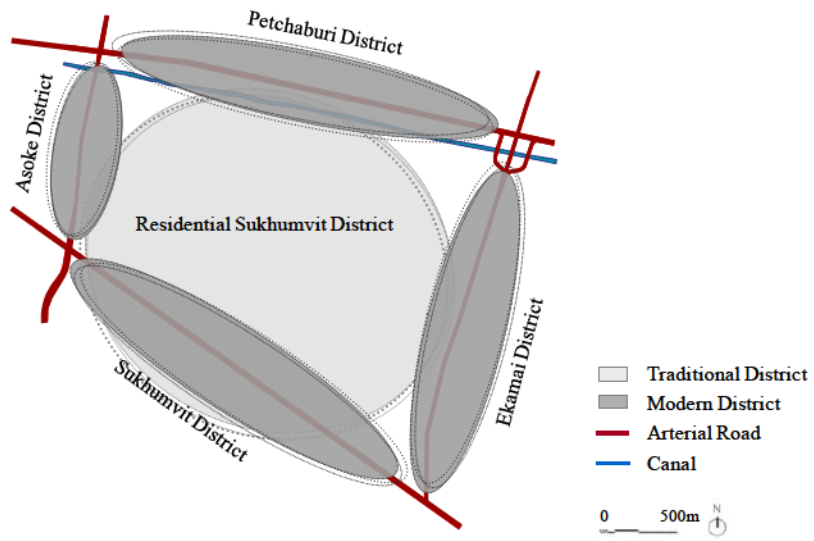


Figure 5.38 The Traditional Sukhumvit District and Surrounding Modern Districts in 2011  
 Source: Field Survey, 2011

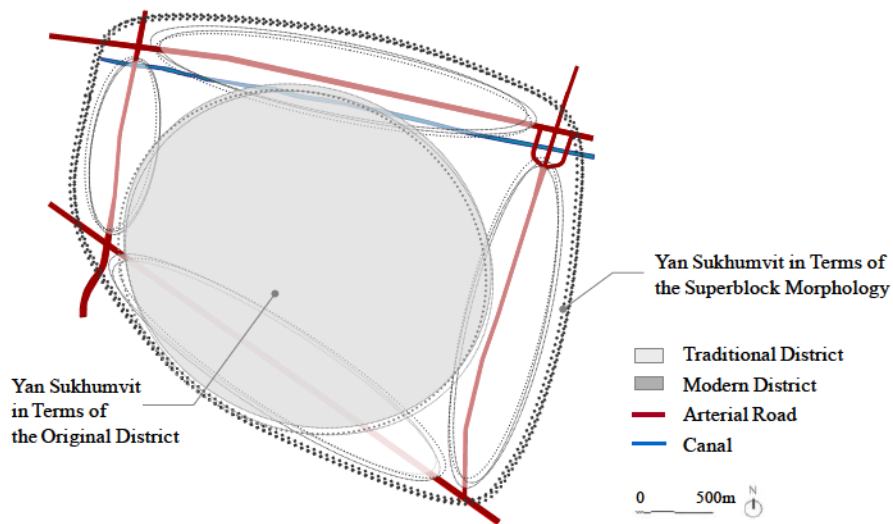


Figure 5.39 Two Morphological Categories of *Yan Sukhumvit* in 2011  
 Source: Field Survey, 2011

## 5.5 Mature Urban Period (1990s-2012)

Mature urban period of development is the time that subsequent modifications of the traditional settlements occurs by the influence of the superblock morphology, the allowance for more density and the development of local linkage.

### 5.5.1 Acceleration of Growth

Despite being designated as a low density residential area in the first Bangkok comprehensive plan in 1960, Sukhumvit was redesigned to medium density residential area in 1971 and to high density residential area in 2006 by the Department of City Planning, Bangkok, reflecting a great demand of commercial and residential areas in urban areas (CU, 2010). Figure 5.40 shows that, in 2006, the Bangkok land use plan has readjusted Sukhumvit to commercial use with a floor area ratio allowance (FAR) of 10 on the west of the case study area and to high density residential area with FARs of 8 and 7 for the rest (DCP, 2006a). At current, the case study area’s net density is 216 persons/ha (VDA, 2009) which is higher than Bangkok Metropolitan’s net density, 77 persons/ha (SED, 2011).

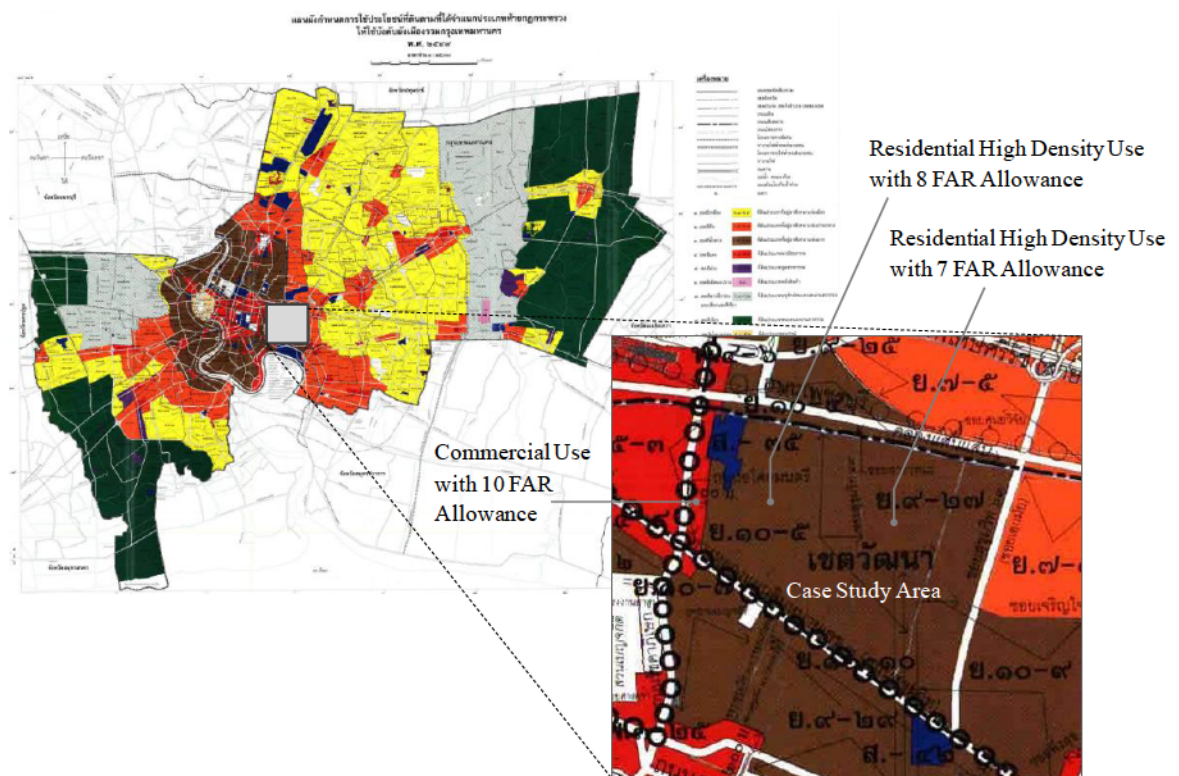


Figure 5.40 The 2006 Bangkok Land Use Plan, Showing High Density Initiation in Sukhumvit  
Source: Adapted from DCP, 2011

On the other hand, the change of Sukhumvit is stimulated when a ring-like pattern of the superblock morphology is strengthened by multi-modes of public transport. Functioning in 1999 and 2004, sky train and underground train links were developed along arterial roads as shown in Figure 5.41. Figure 5.42 shows, moreover, that the large span of elevated railway construction with 15 metre height above Sukhumvit Road consolidates the pattern of high density built forms encompassing lower density areas of the Sukhumvit superblock. Crucially, these modes of public transport not only support the superblock morphology but also entail the high demand for residential development throughout all areas of Sukhumvit.



Figure 5.41 Modes of Public Transports in Sukhumvit, 2011

Source: Field Survey, 2011



Figure 5.42 The Large Span of Elevated Railways above Sukhumvit Road,  
Encouraging the Outlines of the Superblock Morphology, 2010  
Source: Author, 2010

### 5.5.2 Modifications of the Local Linkage

With relation to the allowance for higher density buildings and the development of public transport, intensifications of commercial and residential uses are increasingly undertaken in Sukhumvit. Crucially, the change occurs in relation to the key access of the superblock's inner areas.

As a movement network is needed between social spaces, linkage is required within a large land area of the superblock. Within 6.5 sq.km of the case study area defined by the connection of arterial roads, not only is the traditional settlements included into the new morphological frame of the superblock, but also a number of *sois*, the local streets, are locally synchronised into the urban movement network linking modern districts of the case study area. Figure 5.43 shows the use of local streets as a key movement network.

Despite not being planned to be the main circulation for the city, *sois* are used both for accessing lands and buildings and for reaching all surrounding districts. Although each *soi* had been simply used from *paksoi*, the entrance of *soi* connected to arterial roads, to the end of it (5.3.3 *The Soi-Based Morphology*); the complex pattern of circulation, however, happened when the continuous spaces of *sois* were used as through traffic routes for the

privilege of car users of modern Bangkok. Some of them were subsequently utilized as the main ones.



Figure 5.43 Traffic in *Sois* Undertaken as the Local Linkage inside the Sukhumvit Superblock, 2011  
Source: Author, 2011

As shown in Figures 5.44 and 5.45, initially, Soi Prompong (Sukhumvit Soi 39) and Soi Thonglor (Sukhumvit Soi 55) were officially shaped to be secondary roads by widening and lengthening over Sansab canal to provide main north-south access to the superblock. Nonetheless, there was no road modification for the east-west side regarding the condition of large and long narrow street-blocks developed in a north-south direction following irrigation basin patterns (see 5.2 *Rural Period*).

Because of the absence of an east-west linkage, the through traffic routes which can be utilized for accessing *paksois* in the east-west direction actually have more priority than those in the north-south direction. The ability to reach the east-west arrangement of *sois*, therefore, becomes the noteworthy short cut in a through traffic system.

While the need for short cuts for east-west linkages is considerable, the need for shorter circuits is also instrumental in identifying the main through traffic routes of the superblock. From this point of view, although there are many through traffic routes in Sukhumvit as shown in Figures 5.46 (p.160), the main routes are defined from the shortest-linked up pattern in which they perform, together with the secondary roads to provide the local linkage within local inner areas of the Sukhumvit superblock as shown in Figure 5.47 (p.160).

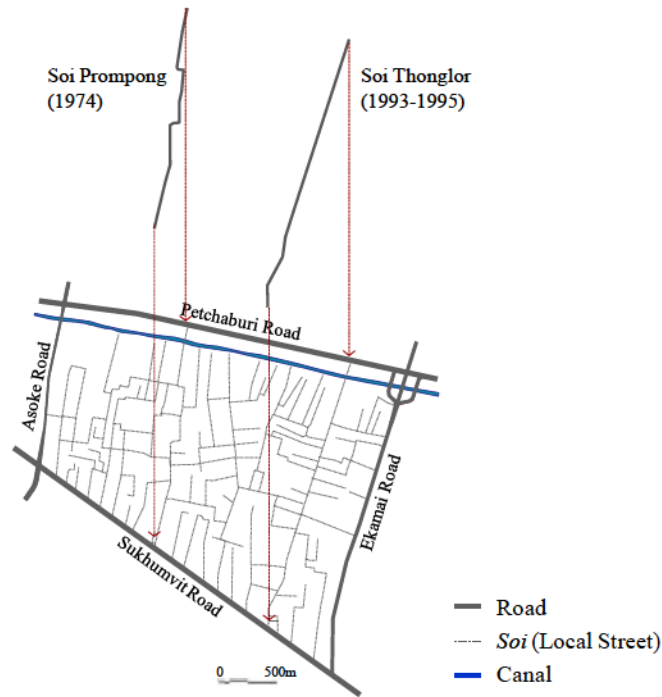


Figure 5.44 Development of Secondary Roads in Sukhumvit  
 Source: Kongsawang, 1992; Janekankit, 2004



Soi Prompong (Sukhumvit Soi 39)



Soi Thonglor (Sukhumvit Soi 55)

Figure 5.45 Secondary Roads in Sukhumvit, 2010  
 Source: Author, 2010



Figure 5.46 Secondary Roads and Through Traffic Routes in Sukhumvit, 2011  
 Source: Field Survey, 2011

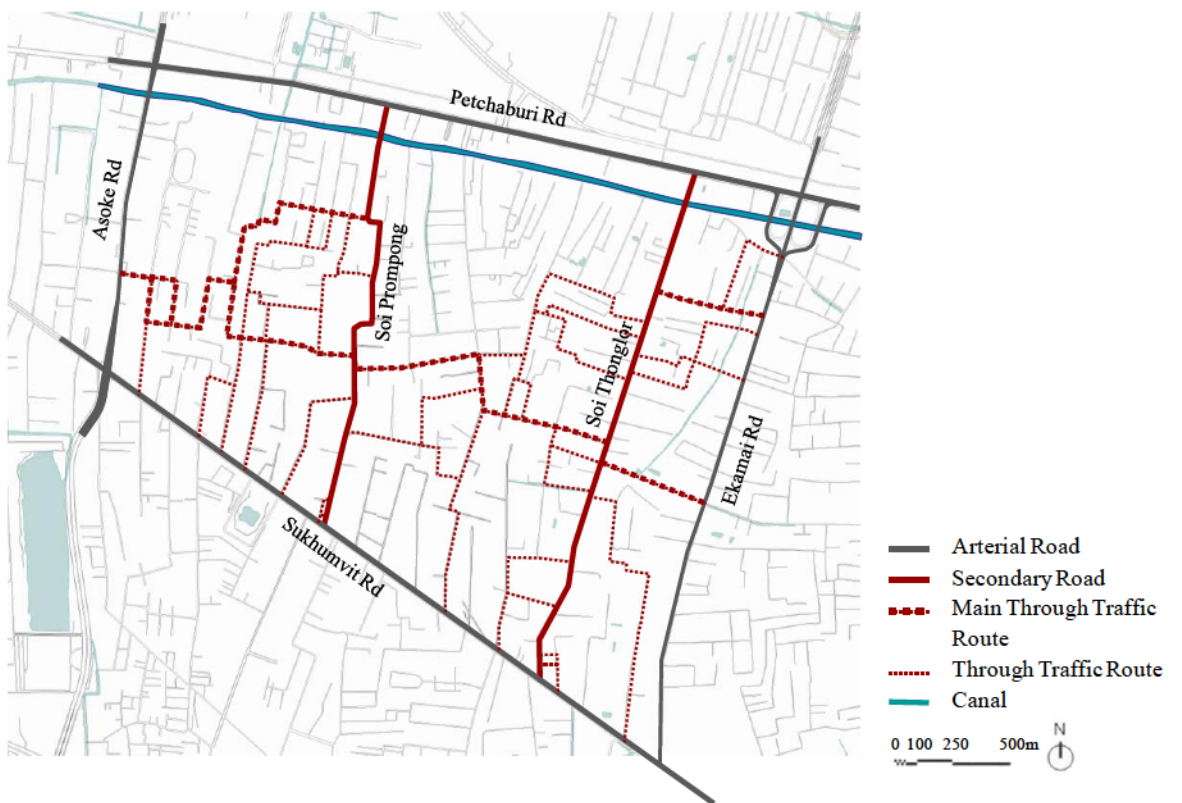


Figure 5.47 Local Linkage in Sukhumvit, 2011  
 Source: Field Survey, 2011

It should be noted, however, that, taking short cuts from numerous *sois*, the local linkage is not visually imageable networks of space. While indigenous people may recognize many routes well within the case study area, many commuters cannot orientate themselves and have to rely on the traffic signs when navigating Sukhumvit's through traffic system as shown in Figure 5.48.



Figure 5.48 Traffic Sign Navigating the Local Linkage in Sukhumvit, 2010  
Source: Field Survey, 2010

In the case of Sukhumvit, *sois* are the main open spaces where intermixed homes are located and united as multilayered neighbourhoods; however, since the local linkage within the superblock has been locally adapted, the rate of local daily traffic dramatically increases. Table 5.1 shows that traffic in an example of *sois* utilized as the main through traffic route between 7am to 7pm is 6,521 (543 vehicles per hour), which is half of the traffic rate in Ekamai Road, one of main routes encircling the superblock. Further, in order to reduce congestion on the arterial roads, some parts of several *sois* are regulated by the state with one-way high-speed traffic systems for allowing through traffic inside the superblock.

The ways in which people access the areas inside the superblock, in this case, are more complex than the traditional way by taking short cuts on the local streets in several directions. However, this local linkage has never coped with a high level of private vehicle use. In other words, the more people who use the local linkage for avoiding the traffic jams on arterial roads, the higher the level of congestion there is in all secondary and main through traffic routes within the superblock.

Table 5.1 Daily traffic from 7am to 7pm in Sukhumvit, 2009

| Route Type    |  | Route Name          | Time       | Vehicle Number | Total Number |
|---------------|--|---------------------|------------|----------------|--------------|
| Arterial Road | Sukhumvit Road<br>(Junction at Soi 33)       |                     | 7am to 9am | 5,176          | 35,064       |
|               |  |                     | 9am to 4pm | 22,151         |              |
|               |  |                     | 4pm to 7pm | 7,737          |              |
|               | Petchburi Road<br>(Junction at Soi Prompong) |                     | 7am to 9am | 7,903          | 50,521       |
|               |  |                     | 9am to 4pm | 30,094         |              |
|               |  |                     | 4pm to 7pm | 12,524         |              |
|               | Asoke Road<br>(Junction at Asoke Soi 1)      |                     | 7am to 9am | 4,688          | 27,464       |
|               |  |                     | 9am to 4pm | 17,123         |              |
|               |  |                     | 4pm to 7pm | 5,653          |              |
|               | Ekamai Road                                  |                     | 7am to 9am | 1,724          | 12,166       |
|               |  |                     | 9am to 4pm | 7,163          |              |
|               |  |                     | 4pm to 7pm | 3,279          |              |
| Local Linkage | Secondary Road                               | Soi Prompong        | 7am to 9am | 2,338          | 11,086       |
|               |  |                     | 9am to 4pm | 5,474          |              |
|               |  |                     | 4pm to 7pm | 3,274          |              |
|               |  | Soi Thonglor        | 7am to 9am | 2,080          | 8,103        |
|               |  |                     | 9am to 4pm | 3,478          |              |
|               |  |                     | 4pm to 7pm | 2,545          |              |
|               | Main Through<br>Traffic Route                | Sukhumvit 21 Soi 1* | 7am to 9am | 1,256          | 6,521        |
|               |  |                     | 9am to 4pm | 3,752          |              |
|               |  |                     | 4pm to 7pm | 1,513          |              |
| Local Street  | Sukhumvit Soi 33                             | 7am to 9am          | 348        | 2,802          |              |
|               |  | 9am to 4pm          | 1,712      |                |              |
|               |  | 4pm to 7pm          | 742        |                |              |

\*A main through traffic route nearby the case study area

Source: TTD, 2009

Supplying the access for a large land area of Sukhumvit, a few modes of transport have been developed on the local linkage. While the mass transport systems are developed only along the arterial roads encircling the superblock such as trains and buses, walking and cycling are not encouraged by the local linkage due to traffic and pollution. In this case, various user groups access inner areas of the superblock by an informal transport provision in the form of mini buses and motorcycle taxis, as shown in Figure 5.49. Although neither have any defined routes, times of service, and official stations on which the customers can rely, at least these systems fulfill the needs of different income groups and supply access to local amenities for a diversity of needs.

The local linkage is the change of movement patterns in the case study area, which results both in ways in which the streets are used and in strengthening the connection between Sukhumvit's centres of high activities. In turn it gradually fragments the *soi*-based morphology and the superblock morphology by dividing them into several parts with the form of superblock-quarters.



Mini Buses

Motorcycle Taxis

Figure 5.49 Informal Transport Sectors Running through the Local Linkage in Sukhumvit, 2011  
Source: Author, 2011

### 5.5.3 Superblock-Quarter Morphology

The superblock-quarter morphology is the most complex and newest morphology of Sukhumvit, defined as a multi-ring-like pattern by a mix of building types and uses developed along the local linkage inside the superblock.

The superblock-quarter is being consolidated by modern buildings and use patterns inserted into the traditional settlements. While most land parcels along the roads' strips have been developed, areas inside the superblock along the local linkage lines becomes prime locations encouraging up-market residential and commercial development with high-end condominiums, lifestyle centres, boutique malls, fashionable retailers, bars and night clubs as shown in Figure 5.50.

Sukhumvit has changed from the traditional neighbourhood, through a modern area of commercial and residential development to a sophisticated place of urban activities. "Just only having J-Avenue, I need nothing else for living here" said a young adult resident in Sulhumvit. Figure 5.51 shows J-Avenue which is the most famous lifestyle centre in Soi Thonglor (one of the secondary roads in the case study area). Together with the upper class residents and expatriates, visitors substantially share activities in the case study area since Sukhumvit has been famous for in-trend activities located on the local linkage's strips; four

main reasons for visiting Sukhumvit found from interviews with visitors are: eating (34.8%); meeting (30.4%); shopping (26.1%); and doing other activities (8.7%).



Figure 5.50 Up-Market Residential and Commercial Development along the Local Linkage in Sukhumvit, 2011  
Source: Author, 2011



Figure 5.51 J-Avenue, the Most Famous Lifestyle Centre in Soi Thonglor, Sukhumvit, 2011  
Source: Author, 2011

Because the superbloc-quarters were initially formed by the local linkage in which many *sois* take part, land parcels of bungalows located in many parts of *sois*, therefore, attracts the land amalgamation managements for developing new commercial and residential uses. Figure 5.52 shows that large land amalgamations such as 40x60 metre in size and large footprint buildings are developed along the strips of the local linkage defining the superbloc-quarter morphology.

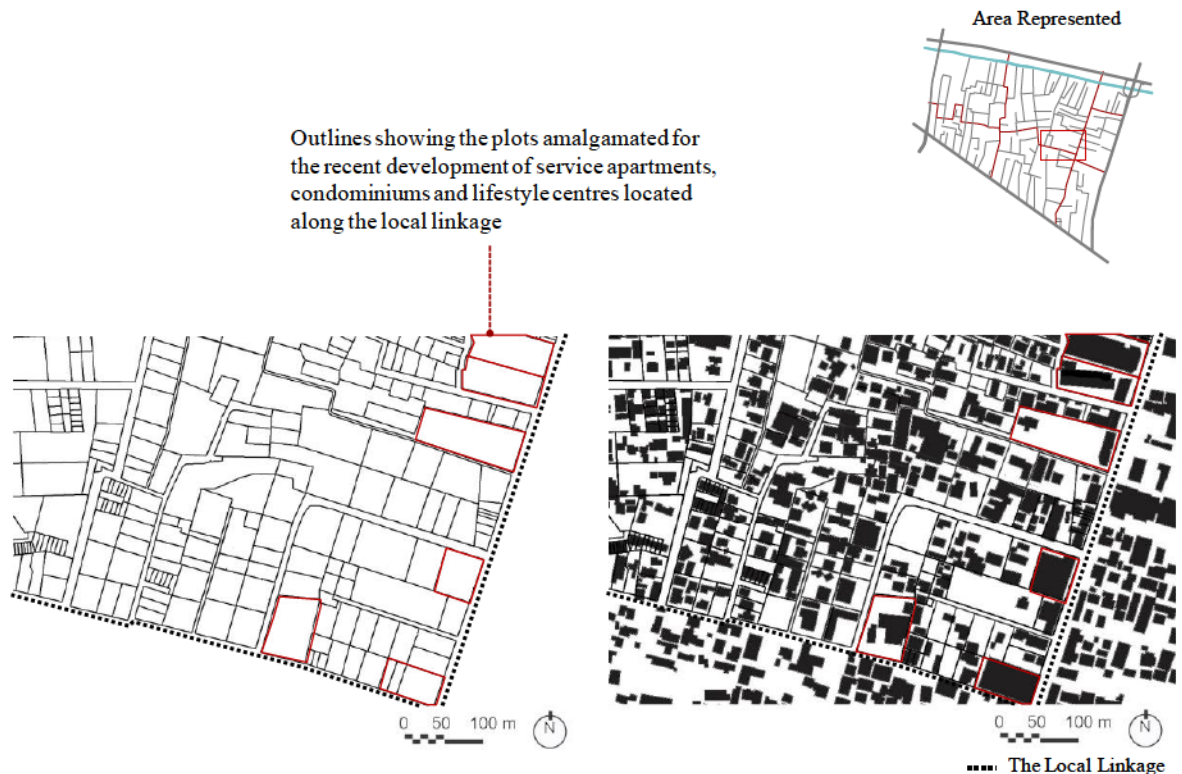


Figure 5.52 Plot and Building Patterns along the Local Linkage Inside the Sukhumvit Superblock  
Source: Adapted from DCP, 2006 and 2001

This argument is consolidated by the fact that the largest land parcel with 80x120 metre is arranged at the centre of the case study area which is the local linkage's key intersection, as shown in Figure 5.53. The higher rate of floor area ratios than other inner areas of the superbloc is developed at the same location. FAR up to 2.99 is noted along the strips of local linkage while FARs under 2.00 are found for other areas inside the superbloc (see Figure 5.37, p.152).

It should be noted that, rather than being high density buildings throughout the superbloc-quarter morphology where many plots are amalgamated, a few commercial centres are developed with medium and low density incorporating large green spaces for emphasizing

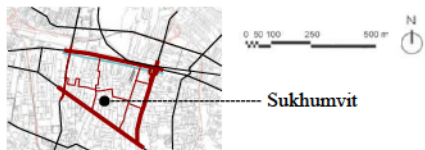
their high-end lifestyle centres or boutique malls (shopping centres oriented towards upscale consumers).



Figure 5.53 Plot and Building Patterns along the Local Linkage Inside the Sukhumvit Superblock  
Source: Adapted from DCP, 2006 and 2001

Nevertheless, the contrasting pattern of building heights is noticed between new forms and traditional neighbourhoods. It does not only occur at the superblock's edges but also emerges as a multi-ring-like pattern inside the superblock. While a ring-like pattern of global development defines the characteristics of the superblock as discussed in the previous section, a multi-ring-like pattern influenced by the sub-divisions of the superblock specifies the superblock-quarter morphology. Crucially, the inner areas of the superblock are being accumulated by both new building types and ones developed for mixed use, developed along the local linkage.

Figure 5.54 shows existing uses in Sukhumvit in 2002 demonstrating the ring-like pattern of the superblock morphology illustrated by commercial uses (red colour) encompassing residential uses (yellow colour); as well as the multi-ring-like pattern of the superblock-quarter morphology, demonstrated by a mix of commercial and residential uses along the local linkage inside the superblock.



Sukhumvit

- |  |   |
|--|---|
|  Residential Buildings                |  Educational Buildings               |
|  Commercial Buildings                 |  Religious Buildings                 |
|  Residential and Commercial Buildings |  Reserved Art and Cultural Buildings |
|  Industrial Buildings                 |  Agricultural Reservations           |
|  Warehouses                           |  Recreational Reservations           |
|  Governmental Buildings               |  Others                              |
|  Facilities                           |   |

Figure 5.54 Existing Use in Sukhumvit and Surrounding Area, 2002  
 Source: DCP, 2002

Based on the outlines of roads and canal, the local linkage, the mix of building types and the intensification of uses, twelve superblock-quarters can be identified in Sukhumvit as shown in Figure 5.55. Figure 5.56 also shows the relationships of those factors in defining the superblock-quarter morphology.

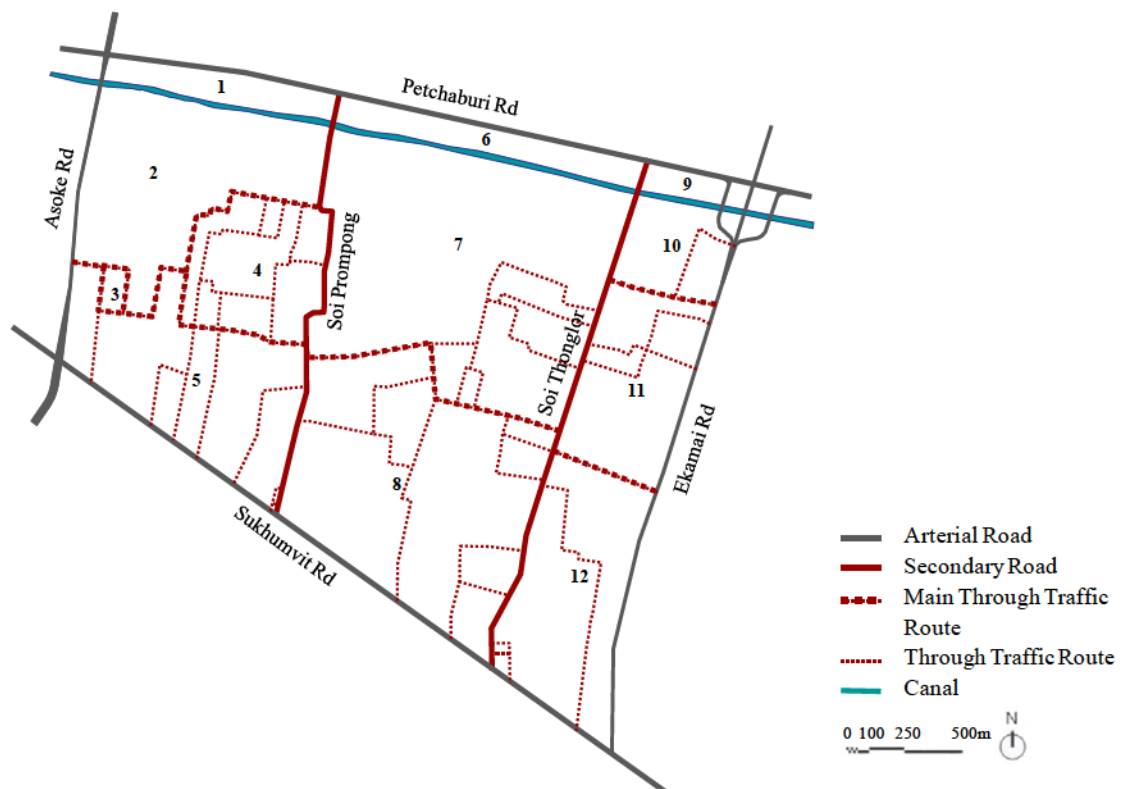


Figure 5.55 Twelve Superblock-Quarters in Sukhumvit, 2011  
Source: Field Survey, 2011

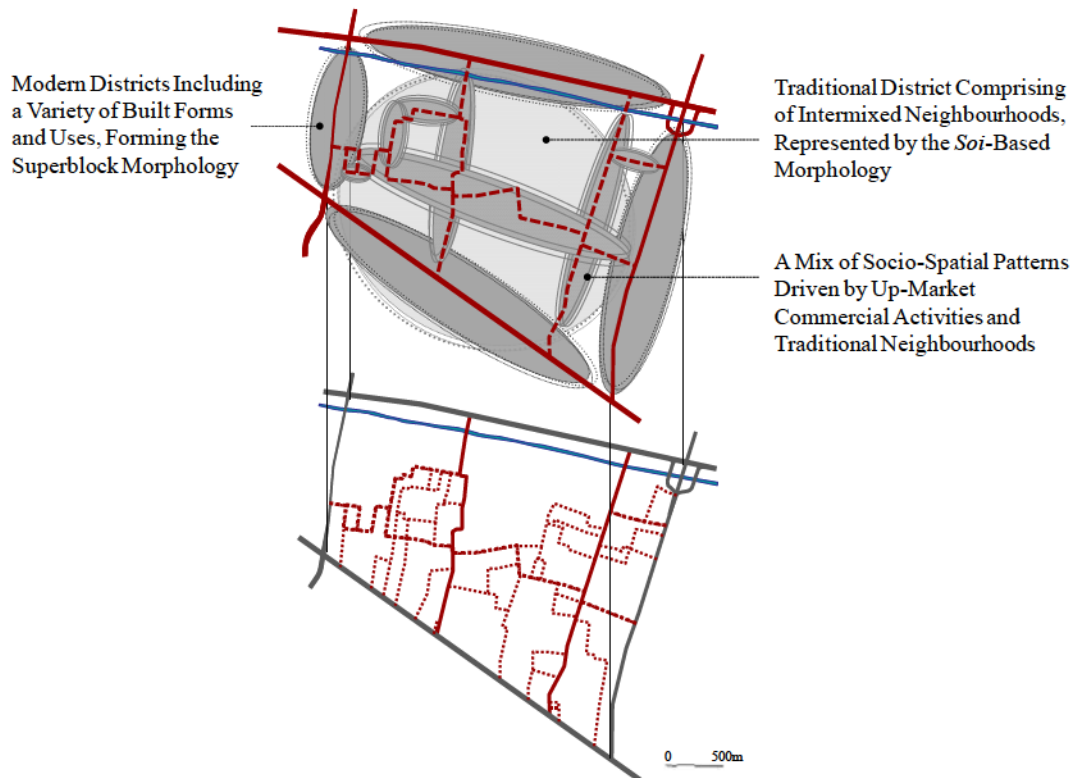


Figure 5.56 Morphological Frames Outlining The Superblock-Quarter Morphology in Sukhumvit, 2011  
Source: Field Survey, 2011

It should be noted, however, that not all areas in the superblock-quarter morphology have new buildings. Although the high rates of FARs have been initiated in Sukhumvit, a special large-scale building with total floor areas over 10,000 sq.m or over 23 metre height is able to be constructed only on the land parcel that is closest to the routes with at least 10 metre width (DPT, 1979). By this control, yet several original land parcels of bungalows located in narrow *sois* have not been collected by speculators. Accompanied by land holding patterns and increasing land price, many traditional built forms still endure.

Nevertheless, some remaining numbers of bungalows settled along the local linkage's strips are no longer used for the original purpose of residence but are employed as properties let for small business enterprises. Proceeding under the built form of bungalow type, new use patterns occur whether new arrangements of land parcels and new building types have not yet been implemented, such as international restaurants, trendy shops, showrooms, pubs and bars as shown in Figure 5.57. Significantly, this characteristic in turn plays an important role in encouraging the uniqueness that people recognize for Sukhumvit's international, fashionable and lifestyle place in the areas inside the superblock.



Figure 5.57 Commercial Use under the Built Form of Bungalows, 2010  
Source: Author, 2010

#### 5.5.4 Change of the *Soi*-Based Morphology

The *soi*-based morphology has changed since the superimposition of the superblock overwrote upon the traditional settlement (see 5.4 *Urban Period*); however, it transforms further when the modern thread of commercial and residential use is developed along the strips of the local linkage. Fragmentation of the *soi*-based morphology occurs, as well as the intervention of the new socio-spatial patterns. Figure 5.58 shows where the change of the *soi*-based morphology occurs.

On the one hand, in the *soi*-based morphology, congestion and pollution from the local linkage are not only consequences, but the excessive traffic itself discourages community interactions, a sense of space ownership, and a walking and cycling priority when traffic cuts through the middle part of many *sois* and people cannot use streets without intimidation from traffic as shown in Figure 5.59.

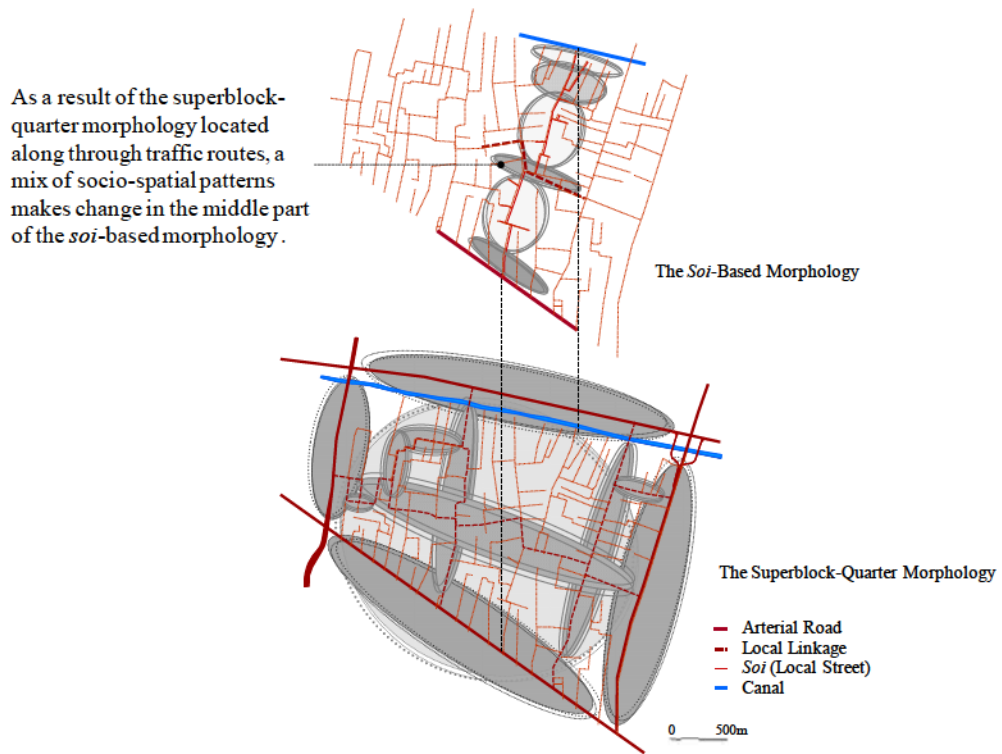


Figure 5.58 Change of the *Soi*-Based Morphology in Sukhumvit, 2011  
 Source: Field Survey, 2011



Traffic cutting through traditional neighbourhoods



Solid fences built to clearly separate public and private spaces

Figure 5.59 Change in the Use of Streets and Built Forms in the *Soi*-Based Morphology, Sukhumvit, 2010  
 Source: Author, 2010

Figure 5.59 also shows that the relationship between public and private spaces is dramatically decreased in relation to the high rate of traffic flow in many *sois*. Although a great number of private open spaces with the form of plentiful gardens, especially from

bungalow house type, still remain, they cannot be seen from the street. Permeable fences are being replaced by denser and higher fences to make a clear demarcation between private and public spaces, essentially for the aim of increasing safety. It should be emphasized that this situation decreases the natural features of the case study area where the few public parks are located only on the superblock's perimeters and street trees are rarely planted in Sukhumvit.

On the other hand, the intensification of uses also makes changes to the *soi*-based morphology. As discussed in the previous subsection, new building types and use replaces several areas of the traditional neighbourhoods, particular in the areas along the local linkage's strips; in other words, the middle parts of many *sois*. Figure 5.60 shows an outline of commercial and residential uses developed in the middle part of a *soi*.

Figure 5.60 also shows that, because middle income and working class residents, workers, and students increasingly locate in Sukhumvit, a great number of street vendors come to play a role in supplying local services and facilities for these groups. They accumulate more around *paksois* (the entrances of *sois*) which now belong to the global tissue of the superblock morphology as shown in Figure 5.61 (p.174). Figure 5.62 (p.174) also shows that, currently, it is common to notice street vendors accumulating together with motorcycle taxis and mini buses around *paksois* and *klangsois* (the middle parts of *sois*) where the superblock-quarter morphology takes place. In addition, they also settle around *taysois* (the ends of *sois*) where residents, workers, and students reside increasingly.

In terms of building fabric, the change of the *soi*-based morphology occurs in several parts. While condominiums, lifestyle centres, pubs and bars are accumulating around *klangsois*, several low cost apartments have developed in the riverine and low-income neighbourhoods at *taysoi* as shown in Figure 5.63 (p.175). This change is the result of the case study's rapid development, attracting migration of the rural poor and working class.

Figure 5.64 (p.175) shows the pattern of plots and buildings of new apartments located in *taysois*. With 40x60 metre for instance, large plot sizes have been amalgamated in the traditional neighbourhoods. Large footprint buildings with four to five storeys have developed; they can be found as high as 10 storeys as shown in Figure 5.65 (p.176). Crucially, this new spatial pattern goes against the uniqueness and community experiences of the traditional neighbourhoods and lateral shapes of the *soi*-based morphology.

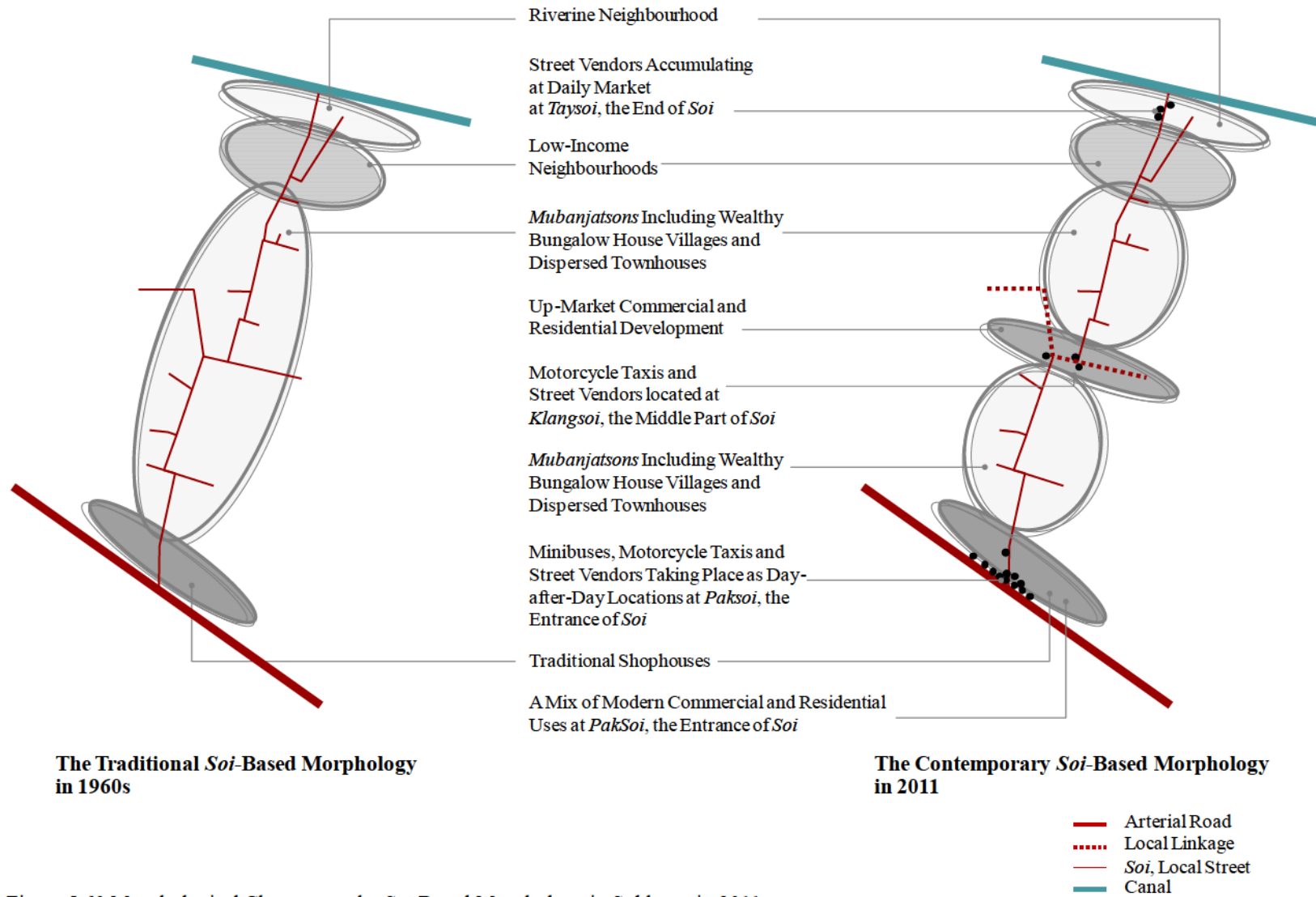


Figure 5.60 Morphological Changes on the *Soi*-Based Morphology in Sukhumvit, 2011  
 Source: Field Survey in Sukhumvit, 2011



Figure 5.61 Street Vendors Accumulating along the Arterial Roads' Strips, Sukhumvit, 2012  
Source: Author, 2012



Figure 5.62 Street Vendors, Motorcycle Taxis and Mini Buses Accumulating around *Paksois* and *Klangsois*, Sukhumvit, 2011  
Source: Author, 2011



Figure 5.63 Low-Income Apartments Developed in the Traditional Neighbourhoods in Sukhumvit, 2010  
 Source: Author, 2010



Figure 5.64 Outlines Showing the Change of Plot and Building Patterns in the Traditional Neighbourhoods  
 Source: Adapted from DCP, 2006 and 2001



Figure 5.65 Low-Income Apartments Developed in the Traditional Neighbourhoods in Sukhumvit, 2010

Source: Author, 2010

## 5.6 Distinctive Socio-Spatial Patterns

Sukhumvit is best described as a place of diversity defined by a mix of users, social spaces and socio-spatial systems. In many respects, it is one of the most complex areas with various built forms and use patterns locally shaped over time as shown in Figure 5.66.

Based on Figure 5.66, Table 5.2 shows the distinctive socio-spatial patterns of the case study area. What the table shows are the record of physical development driven by social change, economic cycles and global-local relations in Sukhumvit. Element complexes of town plan (street, block and plot), building type and use pattern influencing the construction of morphological regions (the superblock, the superblock-quarter and the *soi*-based morphology) are summarized.

It should be emphasized that Table 5.2 is the key database to be evaluated from the literature-based indicators for assessing global levels of sustainability in CH6 and from the local indicators for ascertaining local levels of sustainability in CH7. In other words, these distinctive form patterns are provided as the foundation for identifying sustainable urban forms in the following chapters.

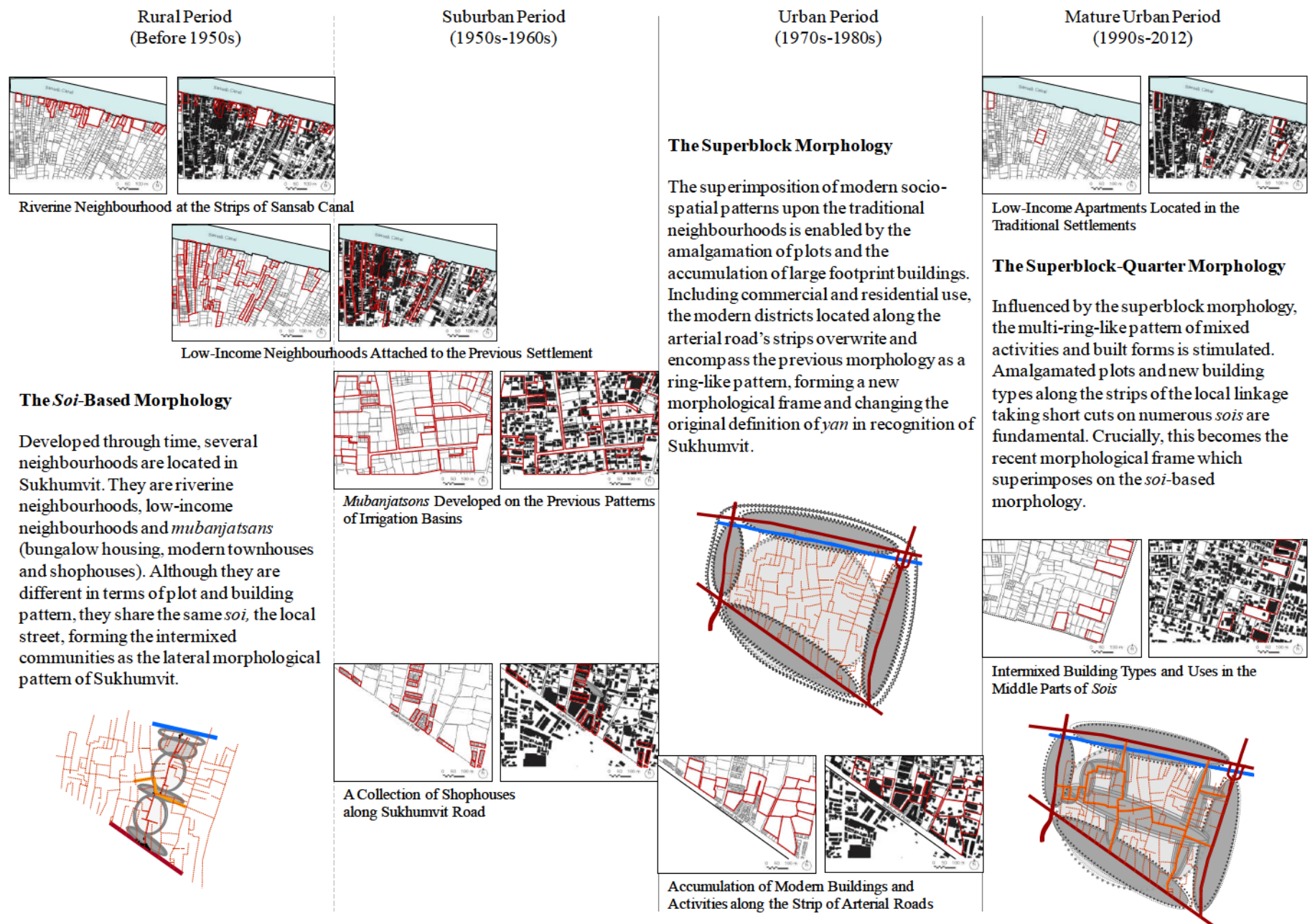


Figure 5.66 Time Span of Sukhumvit's Multilayered Morphological Patterns  
 Source: Adapted from DCP, 2006 and 2001

Table 5.2 Sukhumvit's Distinctive Socio-Spatial Patterns

| Elements              | Socio-Spatial Patterns  |   |   |
|-----------------------|---|---|---|
|                       | Superblock Morphology   | Superblock-Quarter Morphology   | Soi-Based Morphology  |
| Street and Open Space | <ul style="list-style-type: none"> <li>The superblock morphology is outlined by urban movement networks linking important nodes of the city.</li> <li>Important routes can be seen as a visible choice of destinations.</li> <li>Soft landscape is not developed along main roads.</li> <li>Street trees are planted on some areas.</li> <li>Hard surfaces are noticed from most spaces along the roads.</li> </ul> | <ul style="list-style-type: none"> <li>Taking short cuts from numerous <i>sois</i>, the local linkage is a short linked-up pattern.</li> <li>The local linkage cannot be visually noticed from other <i>sois</i>.</li> <li>Soft landscape is rarely found, as well as street trees.</li> <li>Hard surfaces are noticed from most spaces along the streets.</li> </ul> | <ul style="list-style-type: none"> <li><i>Soi</i> is the local street, which is a key public realm where traditional neighbourhoods locate.</li> <li>All <i>sois</i> are linked but a short linked-up pattern cannot be found.</li> <li>Based on basin irrigation patterns, <i>sois</i> are developed in a complex direction.</li> <li>Soft landscaping connection is rarely found along <i>sois</i>.</li> <li>Sansab canal is the key natural drainage and absorption to which <i>sois</i> connect.</li> </ul>   |
| Street and Block      | <ul style="list-style-type: none"> <li>Widths of blocks are included in this morphology in which <i>paksois</i> (the entrances of local streets) tend to connect the main roads.</li> <li>With average 120m., the distances between several <i>paksois</i> present fine grained streets to this morphology.</li> </ul>  | <ul style="list-style-type: none"> <li>Regarding the short linked-up pattern of the local linkage, widths of blocks (less than 120m. width) are taken into account of this morphology.</li> </ul>   | <ul style="list-style-type: none"> <li>Street blocks are large with long and narrow shapes.</li> <li>Lengths of blocks found longer than 120m. are taken into account of this morphology when a <i>soi</i> is developed in a north-south direction from which a <i>soi</i>-based morphology is developed.</li> </ul>  |
| Plot and Building     | <ul style="list-style-type: none"> <li>Various plot sizes are found; small plots are developed in the locations of shophouses (5x16 m. for instance), and large plots are also amalgamated for new buildings (40x60 m. for example).</li> <li>Coarse grain of built forms is defined from both shophouses and modern large footprint buildings.</li> </ul>  | <ul style="list-style-type: none"> <li>Mix of plot sizes is influenced by 30x40 m. developed for bungalows and 40x60 m. amalgamated for the development of new buildings, for instance.</li> <li>A mix of grain is found from various types of buildings such as bungalows, lifestyle centres and condominiums.</li> </ul>  | <ul style="list-style-type: none"> <li>Numbers of small plots is found: for example, 10x40 m. for the riverine neighbourhood; 4x10, 10x10 and 5x5 m. for low-income neighbourhoods; and 30x40 and 5x16 for <i>mubanjatson</i>.</li> <li>Large plots are amalgamated around <i>paksois</i>, <i>klangsois</i> and <i>taysois</i>, 40x60 m. for example, regarding the process of change.</li> <li>Coarse grain of built forms is found in the riverine and low-income neighbourhoods and the locations of shophouses and townhouses.</li> <li>Fine grain of built forms is defined by bungalows, but each house locates privately in the middle of open space.</li> </ul> |

(Continued)

Table 5.2 Continued

| Elements        | Socio-Spatial Patterns  |   |   |
|-----------------|---|---|---|
|                 | Superblock Morphology   | Superblock-Quarter Morphology   | Soi-Based Morphology  |
| Building Fabric | <ul style="list-style-type: none"> <li>• A ring-like pattern of high, long structures encompassing low density areas is defined by FARs at 3.00-3.99 (some areas can be found as high as 6.00-6.99 FARs).</li> <li>• A large span of elevated railways above Sukhumvit Road strengthens the high long structures of this layer.</li> <li>• The public realm is concentrated by interesting building groups.</li> <li>• New building groups and spaces overlay traditional townscape.</li> <li>• Visual interaction can be observed from small frontages of shophouses.</li> </ul>   | <ul style="list-style-type: none"> <li>• A multi-ring-like pattern of high long structures defined by FARs at 2.00-2.99 encircles lower density areas.</li> <li>• A mix of building fabrics is noticed from remaining bungalows and new building types.</li> <li>• Various footprint buildings and frontage widths are found from those various building types.</li> <li>• Visually interesting buildings can be found from new built forms.</li> <li>• New shops and restaurants face public realm.</li> </ul>                     | <ul style="list-style-type: none"> <li>• FARs at 1.00-1.99 are found in most parts of the traditional neighbourhoods although higher density is noticed in <i>paksois</i> and <i>klangsois</i> where the other morphologies overwrite.</li> <li>• Locally residential buildings and spaces still remain.</li> <li>• Visual interaction is encouraged by many types of houses, but it cannot be observed from bungalows.</li> <li>• Although a mix of building types, ages and tenures are found, a similarity of landscape and housing types between <i>sois</i> is noticed.</li> </ul> |
| Use Pattern     | <ul style="list-style-type: none"> <li>• Average 216 persons/ha is recorded for all areas in Sukhumvit.</li> <li>• Global tissue of development results in mixed uses developed along the roads' strips.</li> <li>• Most everyday uses and a wide range of economic exchanges are found.</li> <li>• Although a wide range of land uses is found, a few types of residences are observed.</li> <li>• All public transport infrastructures are developed on all roads.</li> <li>• A variety of transport options are found.</li> <li>• Arterial roads are not designed for traffic calming.</li> <li>• Lack of vehicle restriction.</li> <li>• Excessive traffic along arterial roads.</li> </ul> | <ul style="list-style-type: none"> <li>• Mixed use patterns are developed along the strips of the local linkage.</li> <li>• Various uses and facilities and economic exchanges are included in the areas where new development accumulates.</li> <li>• Public transport infrastructures are not located.</li> <li>• Few transport options are noticed such as private vehicles, mini buses and motorcycle taxis.</li> <li>• Lack of vehicle restriction.</li> <li>• Congestion along the local linkage during peak time.</li> </ul> | <ul style="list-style-type: none"> <li>• Although intermixed residential types are found, a mix of uses and facilities and economic exchanges is not developed.</li> <li>• Public transport infrastructures are not located at this layer.</li> <li>• Few transport options are noticed.</li> <li>• No traffic calming on all <i>sois</i>.</li> <li>• Lack of vehicle restriction.</li> <li>• Traffic cuts through neighbourhoods along the local linkage.</li> </ul>   |

(Continued)

Table 5.2 Continued

| Elements                    | Socio-Spatial Patterns  |   |  |
|-----------------------------|---|---|--|
|                             | Superblock Morphology   | Superblock-Quarter Morphology   | Soi-Based Morphology   |
| Relations from All Elements | <ul style="list-style-type: none"> <li>• Traditional townscape has been replaced by new buildings.</li> <li>• Most active uses are found on arterial roads' strips.</li> <li>• Landmarks and focal points can be found from accumulations of modern buildings.</li> <li>• New pattern of built forms is distinctive.</li> <li>• Arterial roads are developed and remained as prime permeable channels defining the superblock.</li> <li>• The distinctiveness of modern districts is noticed in important nodes.</li> </ul> | <ul style="list-style-type: none"> <li>• Traditional building groups and spaces are mixed with new development.</li> <li>• All active use are settled along the local linkage.</li> <li>• Influenced by new development, landmarks and focal points are found along the local linkage.</li> <li>• A contrast of new development and traditional landscape is noticed.</li> <li>• Traditional prime permeable channels are superimposed by new movement network.</li> <li>• The uniqueness of a mix of modern and traditional built forms and activities is found in several locations.</li> </ul> | <ul style="list-style-type: none"> <li>• A number of traditional housings and spaces still remain in most parts.</li> <li>• Intensity of activities is settled in <i>paksois</i>, <i>klangsois</i> and <i>taysois</i> to accommodate change from the other morphological layers</li> <li>• The local linkage overlays upon the middle parts of <i>sois</i> as a new connectivity.</li> <li>• The distinctive pattern of intermixed neighbourhoods proceeds by sharing on each <i>soi</i>.</li> <li>• Nonetheless, a similarity is found between <i>sois</i> in which a <i>soi</i> cannot be distinguished from other <i>sois</i>.</li> </ul> |

## 5.7 Conclusion

The case study's urban form patterns were analysed in this chapter in order to provide the basis for identifying locally appropriate sustainable urban forms. By using Sukhumvit as the case study area, a set of outlines defining socio-spatial patterns was investigated, as well as the process of change.

Key conclusions are that Sukhumvit is one of Bangkok's inner areas that is socially and locally constructed in a complex way. The transformation of socio-cultural patterns and spatial structures has been undertaken through several phases of land development: rural, suburban, urban and mature urban periods. Crucially, the traces of multilayered morphological components still persist. A series of morphological layers were found as follows:

1. *The Soi-Based Morphology*, A lateral morphological pattern where traditional intermixed neighbourhoods are located by sharing the same *sois*, the local streets, as lateral expansions of socio-spatial patterns.
2. *The Superblock Morphology*, The imposition of modern commercial and residential districts developed along the arterial road strips, which overwrites and encompasses the traditional neighbourhoods as a ring-like pattern.
3. *The Superblock-Quarter Morphology*, The multi-ring-like pattern of highly mixed activities and patterns of built forms consolidated along the strips of the local linkage, taking short cuts on numerous *sois* inside the superblock.

Although each morphological layer has a unity in respect of its physical form and social construction, it does not exist as separate entities. In contrast, these three morphological layers are socially and locally shaped and reshaped in order to accommodate other changes. They interconnect in terms of the layout and configuration of physical forms and spaces and overlap in case of social spaces and systems. The complexity of forms in this sense is influenced by the socio-economic cycles and the process of localisation and globalisation driving the transformation and subsequent modifications of forms in Sukhumvit.

In the following chapters, these defined socio-spatial patterns will be utilized for interrogating sustainability and sustainable urban forms in Sukhumvit. Global levels of sustainability are examined in CH6 and local levels are evaluated in CH7.

# Chapter Six

## Physical Evaluation for Sustainable Urban Forms

### 6.1 Introduction

With reference to research objective five, the aim of this chapter is to evaluate global interpretations of sustainability of the case study's urban forms. This process takes part in the analysis of sustainable urban forms by applying the methods of physical evaluation developed in CH4 and the literature-based indicators established in CH1 to assess the case study area's levels of sustainability. These levels are to demonstrate the capacity in achieving sustainability through spatial patterns and to provide a foundation to examine local levels of sustainability in the next chapter.

To fulfil the aim of this chapter, chapter objectives are thus formulated:

1. To apply the methods of physical evaluation established in CH4 to analyse Sukhumvit's urban forms;
2. To assess levels of sustainability by using literature-based indicators established in CH1.

In this chapter, Sukhumvit's patterns of urban form are evaluated with respect to a global perspective of how sustainable urban forms can be delivered through morphological components and their relations. As demonstrated in the fieldwork methodologies (see CH4), two key resources required for identifying global levels of sustainability are the distinctive socio-spatial patterns and the literature-based indicators. Sukhumvit's urban forms analysed in CH5 are evaluated by the literature-based indicators presented in *Appendix J*. Following the descriptions and parameters of the indicators, scores are rated from the 30 indicators and are rearranged into the particular sets for defining levels of sustainability as they are specified in CH1.

Informing the chapter objectives, chapter structure is established in accordance with the methods of physical evaluation and the implementation of indicators (as summarised above).

- 6.1 Introduction
- 6.2 Evaluation of Sukhumvit's Urban Forms
- 6.3 Sustainability Scores for Defining Sustainability Qualities
- 6.4 Sukhumvit's Levels of Sustainability
- 6.5 Conclusion

## **6.2 Evaluation of Sukhumvit's Urban Forms**

In this section, the 30 literature-based indicators presented as a work sheet in *Appendix J* (p.395) are implemented to evaluate Sukhumvit's morphological components developed as the key database in CH5 (p.178-180). The case study's streets, blocks, plots, buildings, use and relationships between elements are evaluated following the indicators' parameters (good [3], moderate [2] and poor [1] manifestations of the urban forms in terms of sustainability) as they are presented in *Appendix J*. Following this process, the sustainability score is rated for each indicator, and all scores will be utilized for assessing global levels of sustainability in the following sections.

Seven subsections are identified as follows.

- 6.2.1 Street and Open Space
- 6.2.2 Street and Block
- 6.2.3 Plot and Building
- 6.2.4 Building Fabric

## 6.2.5 Use Pattern

## 6.2.6 Relationships of All Elements

## 6.2.7 Summary of Physical Evaluation

### 6.2.1 Street and Open Space

The literature-based indicator numbers 1 to 6 (Table 6.1) are implemented to evaluate the case study area in this subsection. Street and open space of Sukhumvit's three morphological layers as analysed in CH5 are reviewed following the parameters of the indicators and the sustainability scores are defined, shown in Table 6.1.

Table 6.1 Sustainability Scores of Sukhumvit's Street and Open Space from a Global Perspective

| Literature-Based Indicators |   |   | Scores*    |                    |     |
|-----------------------------|---|---|------------|--------------------|-----|
|                             |   |   | Superblock | Superblock-Quarter | Soi |
| Street and Open Space       | 1 | Linkage between Centres of High Activities                  | [3]        | [3]                | [2] |
|                             | 2 | Linkage of Public and Private Open Space as Green Corridors | [1]        | [1]                | [1] |
|                             | 3 | Linked Green Corridors as Natural Networks                  | [1]        | [1]                | [1] |
|                             | 4 | Planting and Renewing Street Trees                          | [2]        | [1]                | [1] |
|                             | 5 | Reduced Hard Surfaces and Run-Off                           | [1]        | [1]                | [2] |
|                             | 6 | Visually Imaginable Networks of Space                       | [3]        | [1]                | [1] |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating the database of urban forms developed in CH5, following the parameters of the literature-based indicators established in Appendix J.

As discussed in CH1, street and open space can encourage physical, visual and natural permeability in which degrees of connectivity, legibility and naturality can be strengthened (Bentley, 1999; Lynch, 1960; Cooper, 2000). However, different features of streets and spaces are identified in the case study area. Figure 6.1 shows street patterns, outlining morphological layers of Sukhumvit as they are analysed in CH5.

Because the Sukhumvit superblock is defined by the connection of modern roads, its accessibility has interlocked well with the urban movement network and all main roads can be seen as a visible choice of destinations. Figure 6.1 also shows that the superblock-quarter morphology is located along the local streets, providing access to local areas inside the superblock and connects them to the larger web of the city with a short linked-up pattern. The pattern of street found in these two layers show a good example in the case of linkage between centres of high activities, as evaluated in Table 6.1. However,

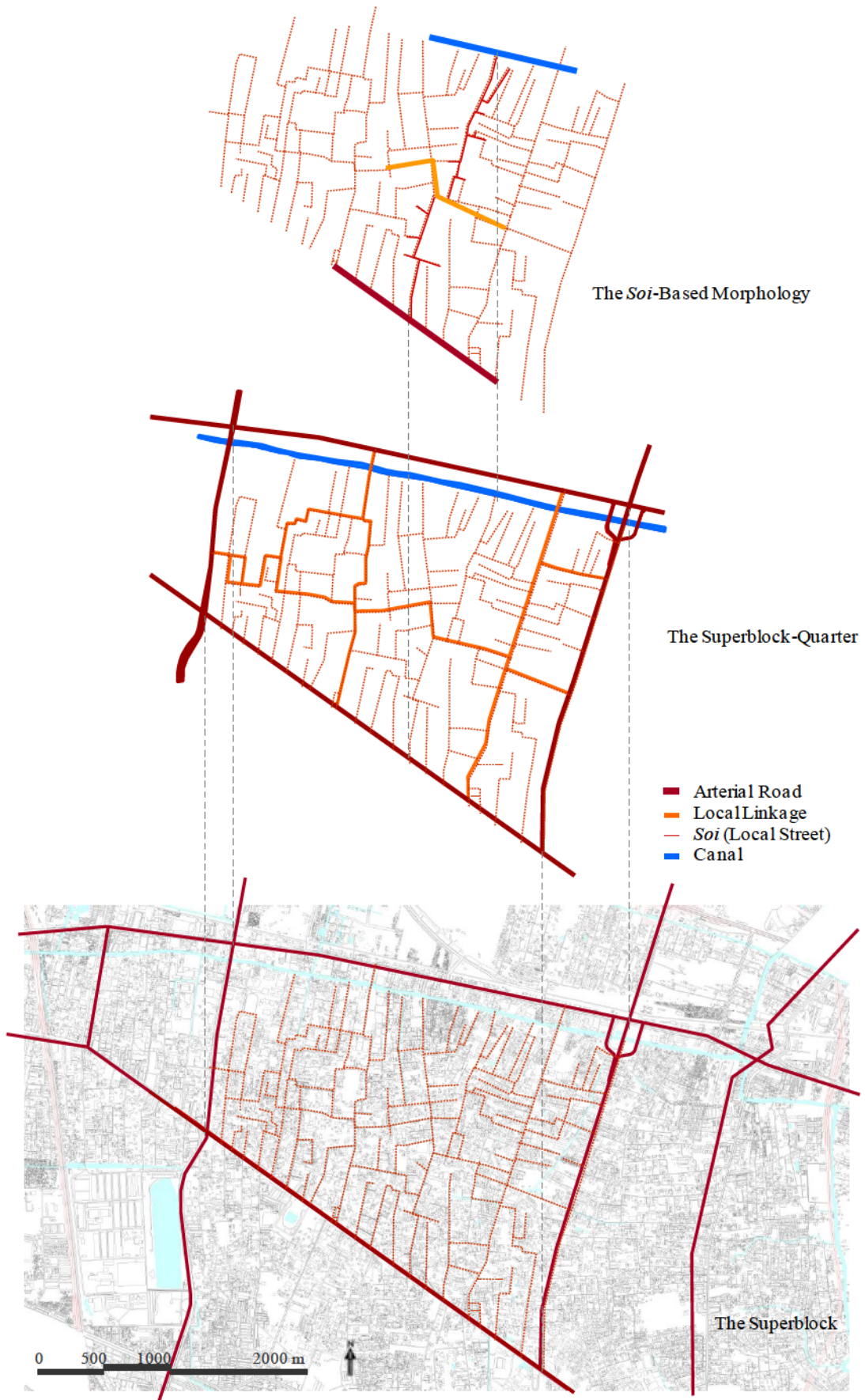


Figure 6.1 Multilayered Morphological Patterns of Sukhumvit, Showing Street Patterns, 2011  
Source: Field Survey, 2011

initially developed upon a complex network of *sois*, yet the local linkage defining the superblock-quarter is not easily read. For the *soi*-based morphology where traditional neighbourhoods meet, the complex pattern of streets also discourages connectivity and legibility along continuous spaces of *sois*.

In relation to street space, all public open spaces seem to be networked when a number of local streets run throughout the case study area, public parks and the Sansab canal. However, poor examples in terms of green corridors and natural networks are identified for Sukhumvit. This is shown in Figure 6.2 whereby the three existing public parks cannot cope with the large land area of Sukhumvit, regarding the fact that people need to be within a 1,000 metre radius to access a public park (Barton *et al.*, 2003).

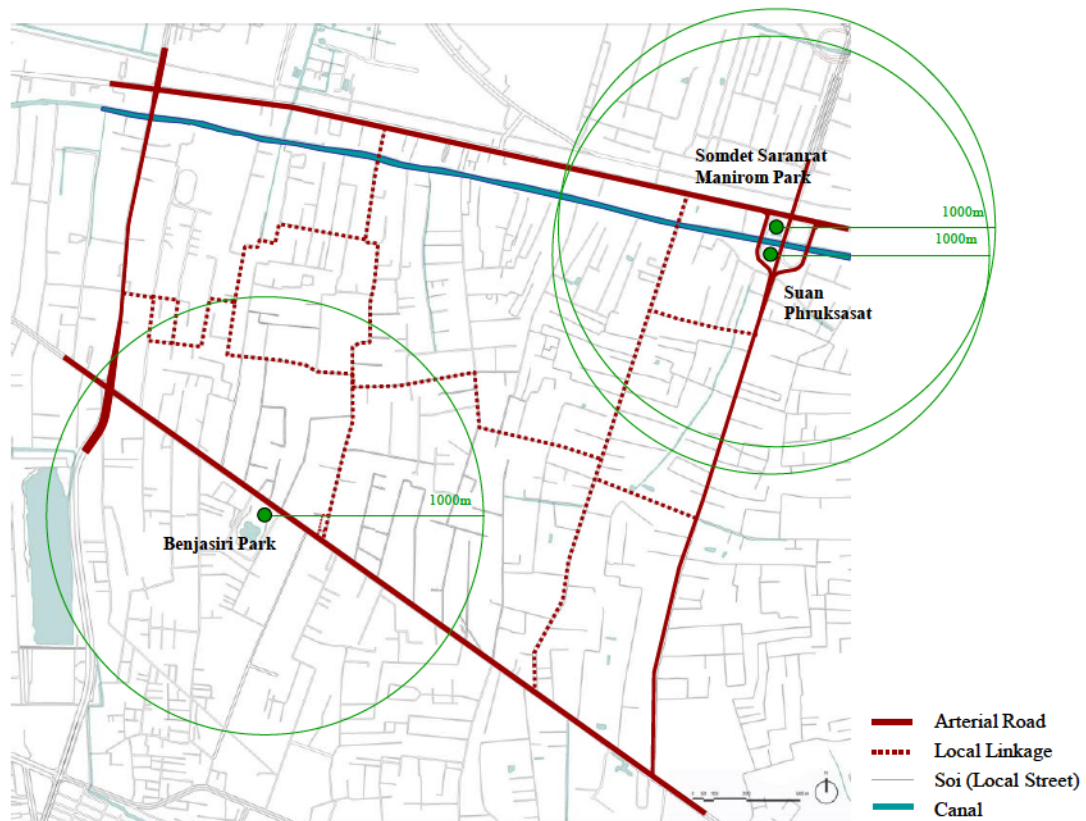


Figure 6.2 Public Parks and Appropriate Distance to Access, Sukhumvit, 2011

Source: Adapted from DCP, 2001; Field Survey, 2011; Access Standards Cited from Barton *et al.*, 2003

Moreover, in Sukhumvit, the channel of streets cannot be defined as a natural linkage when it never unites public and private open spaces as green corridors. As shown in Figure 6.3, while street trees are planted along a few strips of roads and are rarely found in the local areas, soft landscapes contributed from private gardens are not connected as a natural

network. As discussed in CH5, the amount greenery from houses is decreasing along *sois*, because denser and higher fences have been built to reduce the effect of traffic cutting through neighbourhoods, discouraging permeability in terms of natural features and feel of green space in local areas. In this context, poor examples in terms of green networks are identified for all morphological layers as shown in Table 6.1 (p.185).



Figure 6.3 Examples of Street Trees and Greenery Seen from Streets in Sukhumvit, 2011  
Source: Field Survey, 2011

Finally, land features of natural drainage are rarely found throughout the case study area although the advantage from the Sansab canal can be identified for the *soi*-based morphology where *taysois* tend to connect.

## 6.2.2 Street and Block

In regard to the literature-based indicator number 7, *Fine Grained Street and Block*, the sustainability scores are assessed as shown in Table 6.2.

Table 6.2 Sustainability Scores of Sukhumvit's Street and Block from a Global Perspective

| Literature-Based Indicators |   |                               | Scores*    |                    |            |
|-----------------------------|---|-------------------------------|------------|--------------------|------------|
|                             |   |                               | Superblock | Superblock-Quarter | <i>Soi</i> |
| Street and Block            | 7 | Fine Grained Street and Block | [2]        | [2]                | [1]        |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating the database of urban forms developed in CH5, following the parameters of the literature-based indicators established in Appendix J.

In terms of sustainable urban forms, the size of street blocks is crucial to promote well-connected movement networks and high levels of pedestrian flow (DETR, 2000; URBED, 1996). Instrumentally, a 50 metre width is advised for a minimum block depth determined by the depth of two parallel terraces of dwellings and the space between them; a 120 metre length is proposed for a maximum block depth identified by the need for pedestrian permeability (Barton *et al.*, 2003; Rudlin and Falk, 1999).

In contrast, as analysed in CH5, the street blocks of Sukhumvit can be as large as 450x700 metre and as long as 150 x 1,000 metre because they are developed by overlaying large parts of irrigation basins. Nevertheless, configurations of blocks make different effects to the local areas when morphological layers are outlined by different parts of streets. Figure 6.4 shows the relationships between street blocks and street patterns driving the formation of the superblock, the superblock-quarter and the *soi*-based morphology.

Figure 6.4 shows that, with an average width of 120 metre, street blocks are taken into account by the superblock and the superblock-quarter; high levels of pedestrian flow can be encouraged, as well as natural ventilation (Bentley, 1999). In contrast, the lengths of block (longer than 120 metre) are included into configurations of the *soi*-based morphology in which each *soi* is developed and used in a north-south direction for each intermixed neighbourhoods as shown in the figure; neither physical nor natural permeability can be promoted.

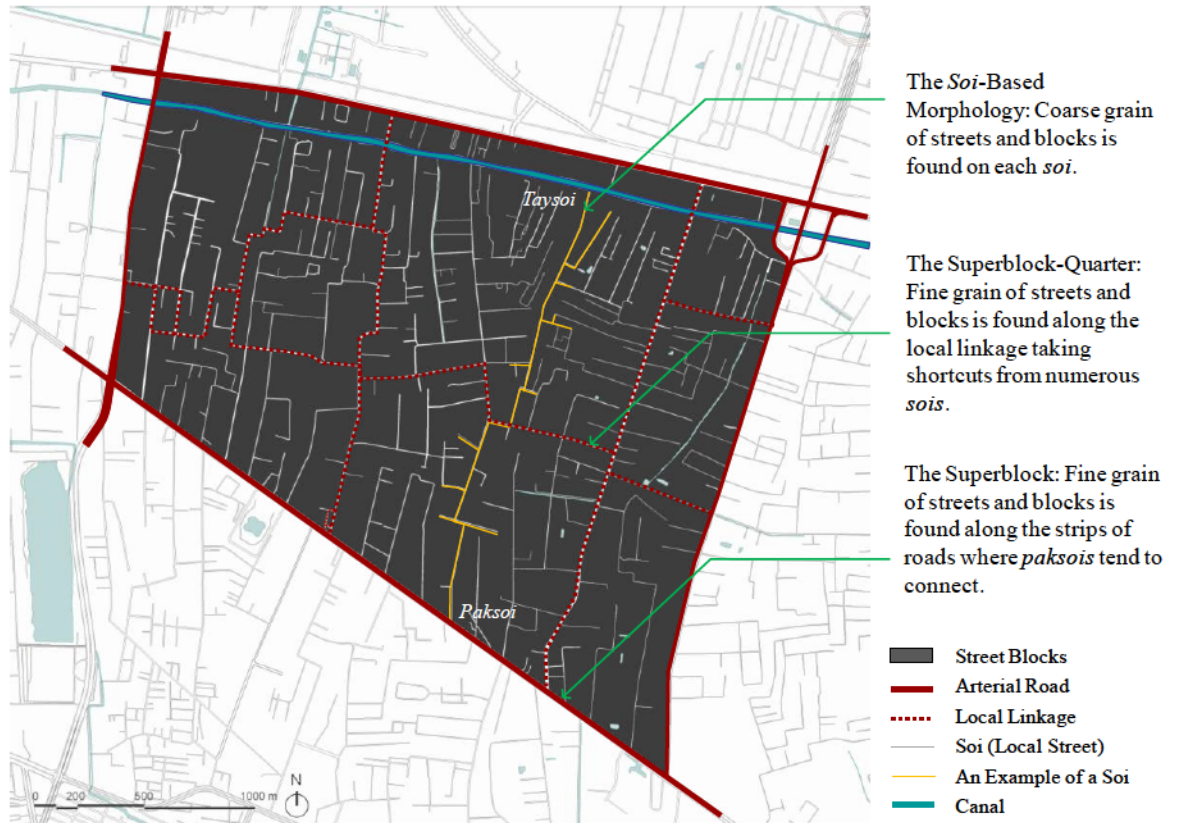


Figure 6.4 Street Blocks in Sukhumvit, 2001  
 Source: Adapted from DCP, 2001

### 6.2.3 Plot and Building

Table 6.3 shows the result of evaluation by using the literature-based indicator number 8, *Fine Grain of Land Subdivisions and Buildings*, to evaluate plot and building of the case study area.

Table 6.3 Sustainability Scores of Sukhumvit’s Plot and Building from a Global Perspective

| Literature-Based Indicators |              |   | Scores*    |                    |     |
|-----------------------------|--------------|---|------------|--------------------|-----|
|                             |              |   | Superblock | Superblock-Quarter | Soi |
| Plot and Building           | <sup>8</sup> | Fine Grain of Land Subdivisions and Buildings | [1]        | [2]                | [3] |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating the database of urban forms developed in CH5, following the parameters of the literature-based indicators established in Appendix J.

As analysed in CH5, coarse grain of shophouses and modern large footprint buildings defines the superblock morphology, although a mix of plot sizes is found along the roads’

strips such as 5x16 and 40x60 metre for example. This feature cannot be identified as a good example in terms of fine grain of plots and buildings as shown in Table 6.3.

In contrast, various sized footprints are found from bungalows and new building types in the superblock-quarter and a mix of plot sizes is also noticed; for instance, 30x40 and 40x60 metre.

The *soi*-based morphology includes finer grain of plots than the other morphologies which results in the best manifestation versus the others as shown in Table 6.3. As analysed in CH5, various plot sizes are laterally developed; for example: 10x40 metre for the riverine neighbourhood; 4x10, 10x10 and 5x5 metre for the low-income neighbourhoods; and 30x40 and 5x16 metre for *mubanjatson*; and 40x60 metre for a few areas where new buildings located in *paksois*, *klangsois* and *taysois* (the entrances, the middle parts and the ends of *sois*).

It should be noted that other features in the case of building fabric are evaluated further in the next subsection.

#### 6.2.4 Building Fabric

The literature-based indicator numbers 9 to 13 are identified to evaluate Sukhumvit's building fabric in this subsection. The sustainability scores are shown in Table 6.4.

Table 6.4 Sustainability Scores of Sukhumvit's Building Fabric from a Global Perspective

| Literature-Based Indicators |    |  | Scores*    |                    |            |
|-----------------------------|----|--|------------|--------------------|------------|
|                             |    |  | Superblock | Superblock-Quarter | <i>Soi</i> |
| Building                    | 9  | Density of Built Components                    | [3]        | [2]                | [1]        |
|                             | 10 | Active Frontages                               | [2]        | [2]                | [2]        |
|                             | 11 | Mixed Building Types, Ages and Tenures         | [2]        | [3]                | [3]        |
|                             | 12 | Visually Interesting Buildings                 | [2]        | [2]                | [1]        |
|                             | 13 | Locally Distinctive Building Groups and Spaces | [2]        | [2]                | [3]        |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating the database of urban forms developed in CH5, following the parameters of the literature-based indicators established in Appendix J.

High density is one of the prerequisites for delivering the efficient use of land and the capability of employment, key services and facilities (Jenks *et al.*, 1996; Williams *et al.*, 2000; Jenks and Dempsey, 2005). Figure 6.5 shows floor area ratio (FAR) presenting building density in Sukhumvit as they are analysed in CH5. Based on Nozzi (2010), FARs at 3.00-3.99 found in the superblock morphology and FARs at 2.00-2.99 found in the

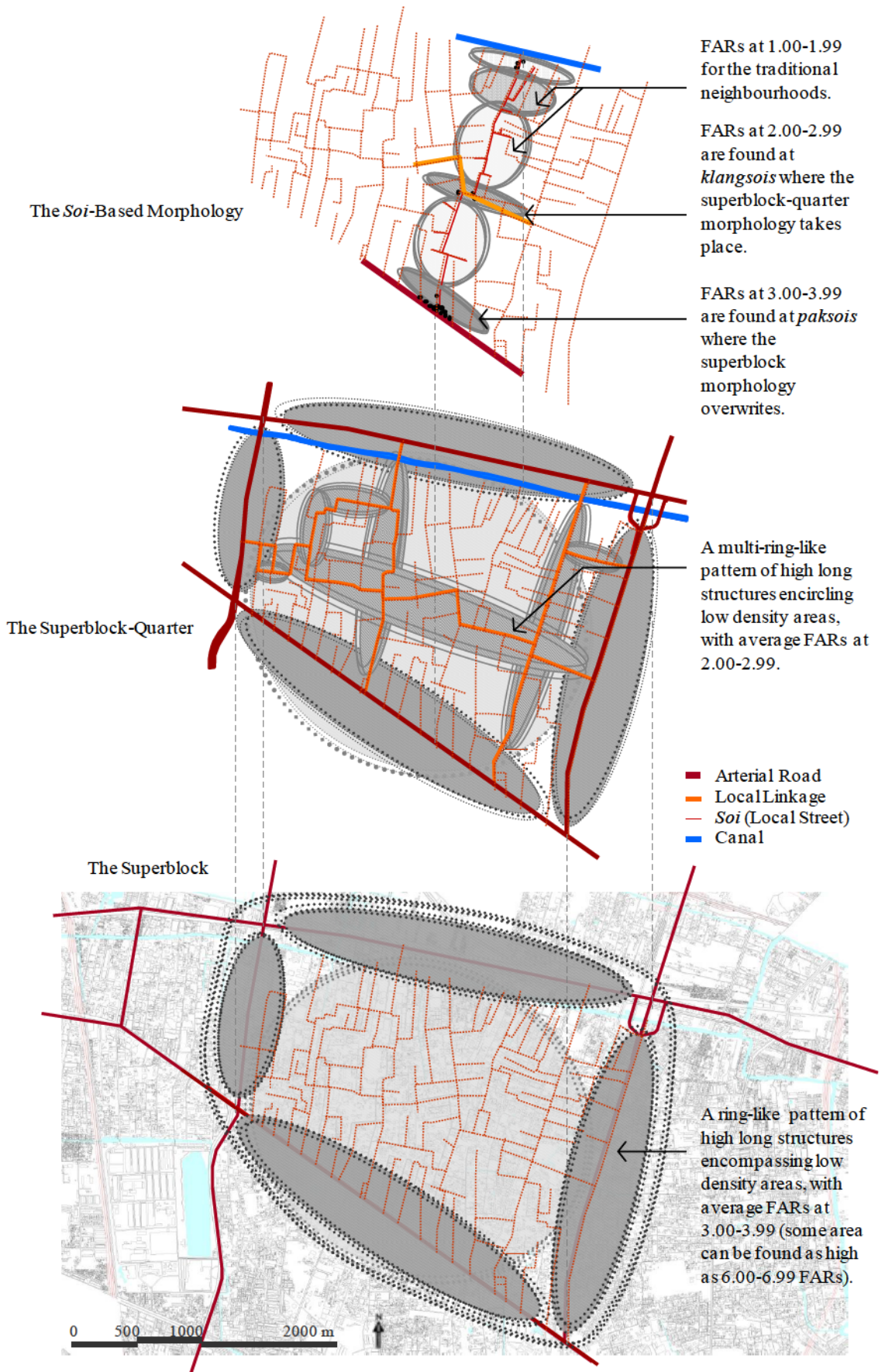


Figure 6.5 Building Fabric of Sukhumvit, 2011  
 Source: Field Survey, 2011

superblock-quarter morphology promote the walkable urbanism and healthy transport systems which encourages energy preservation. In contrast, neither the viable range of use and facilities nor healthy transports can be promoted in most parts of the *soi*-based morphology where FARs at 1.00-1.99 are defined.

However, Figure 6.6 shows that a ring-like pattern of modern building fabric in the superblock layer has overlaid the traditional townscape of shophouses with a large footprint and long runs of blank wall, from office buildings and condominiums. Despite showing interesting building groups along the roads' strips, these new buildings with their large frontage discourage visual interaction and natural surveillance – “eyes upon the street” (Jacobs, 1961).



Figure 6.6 The Built Environment of the Superblock Morphology in Sukhumvit, 2010  
Source: Author, 2010

In the superblock-quarter morphology, although a multi-ring-like pattern of new buildings and uses replaces several bungalows, more active frontages are found because new shops and restaurants face the public realm. Figure 6.7 shows a mix of building types in the superblock-quarter morphology. A mix of building ages and tenures are also encouraged, promoting features of resilience and richness.



Figure 6.7 The Built Environment of the Superblock-Quarter Morphology in Sukhumvit, 2010  
Source: Author, 2010

The *soi*-based morphology is defined by low-density and fine grain of built forms in which locally distinctive buildings and spaces still remain. Crucially, in the riverine and low-income communities located around *taysois*, well-defined access to houses is noticed along the street at ground floor level and lively features such as balconies, roof terraces and shopfronts can be found, showing signs of life (Bentley *et al.*, 1985; Butina Watson and Bentley, 2007). Although this visual interaction is noticed from those types of settlement, it cannot be observed from the ground floor level of bungalows (see Figure 6.8). Moreover, because bungalows define a large land area of the *soi*-based morphology, a similarity of landscape and housing types between *sois* is crucial, discouraging aspects of visually interesting buildings (see Table 6.4, p.191).



Figure 6.8 The Built Environment of the *Soi*-Based Morphology in Sukhumvit, 2011  
Source: Author, 2011

### 6.2.5 Use Pattern

As shown in *Appendix J*, the literature-based indicator numbers 14 to 22 are fundamental in terms of use pattern, influencing the evaluation of the case study's urban forms. Table 6.5 shows the sustainability scores rated by applying these indicators to evaluate Sukhumvit's use patterns.

Table 6.5 Sustainability Scores of Sukhumvit's Use Pattern from a Global Perspective

| Literature-Based Indicators |   |  | Scores*    |                    |            |
|-----------------------------|---|--|------------|--------------------|------------|
|                             |   |  | Superblock | Superblock-Quarter | <i>Soi</i> |
| Use                         | 14  | Density of Population  | [1]        | [1]                | [1]        |
|                             | 15  | Mixed Communities  | [2]        | [3]                | [3]        |
|                             | 16  | Viable Range of Uses and Facilities                            | [3]        | [2]                | [1]        |
|                             | 17  | Employment and Economic Activities                             | [2]        | [2]                | [1]        |
|                             | 18  | Public Transport Infrastructure                                | [3]        | [1]                | [1]        |
|                             | 19  | Layout of Transport Stations as an Integral Part of the Street | [3]        | [1]                | [1]        |
|                             | 20  | Multi-Modes of Movement  | [3]        | [1]                | [1]        |
|                             | 21  | Walking and Cycling Priority                                   | [1]        | [1]                | [1]        |
| 22                          | Restricted Vehicle Circulation and Speeds | [1]  | [1]        | [1]                |            |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating the database of urban forms developed in CH5, following the parameters of the literature-based indicators established in Appendix J.

Recorded for Vadhana district including the whole area of Sukhumvit, net density is 216 persons/ha (VDA, 2009) which is higher than Bangkok Metropolitan's net density, 77 persons/ha (SED, 2011). However, Table 6.6 shows that the case study area's density is still lower than several density guides for delivering sustainable urban forms, shown in blue. Sukhumvit's net density cannot even attain the minimum density for a tram service proposed at 240 persons/ha as shown in the table.

Table 6.6 Comparison between Density Guides and Sukhumvit's Density in 2009 (Net Density)

| Density Guide   | Persons/Ha |
|---|------------|
| Maximum density for Sustainable Urban Neighbourhood (URBED) | 494        |
| Central accessible urban density (Friends of the Earth)     | 370        |
| Sustainable urban density (Friends of the Earth)            | 275        |
| RIBA (Homes for the future group)                           | 247        |
| Minimum density for a tram service                          | 240        |
| <b>Net density Sukhumvit (2009)</b>                         | <b>216</b> |
| Garden City 1898 (Ebenezer Howard)                          | 180        |
| Minimum density for a bus service                           | 100        |

Source: Carmona *et al.*, 2003, p.185; Rudlin and Falk, 1999, p.161; VDA, 2009; NHA, 2011

There is a wide range of land and building utilization in Sukhumvit; however, the patterns of uses are different between Sukhumvit's morphological layers as shown in Figure 6.9.

In Sukhumvit, the ribbon development of modern commercial and residential uses is located along arterial roads. As shown in Figure 6.9, this fabric encompasses a large rectangular area of traditional residences and stimulates the superblock morphology. Mixed use and broad spread of employment and rents can be found in several areas of this morphological layer, encouraging economic viability and social vitality in respect of global views (Jenks, 2000; Jenks and Burgess, 2000; Jenks and Dempsey, 2005).

It should be noted, however, that street vendors locate around *paksois* and support a variety of services. They accumulate in the locations where high levels of pedestrian flow are noticed; fine grain streets found in the superblock morphology are crucial (see 6.2.2 *Street and Block*). Figure 6.10 shows that most necessary services and facilities can be found within appropriate distances for access in an example area nearby Sukhumvit Road. The best example in terms of viable range of use and facilities is identified for this layer as shown in Table 6.5 (p.195).

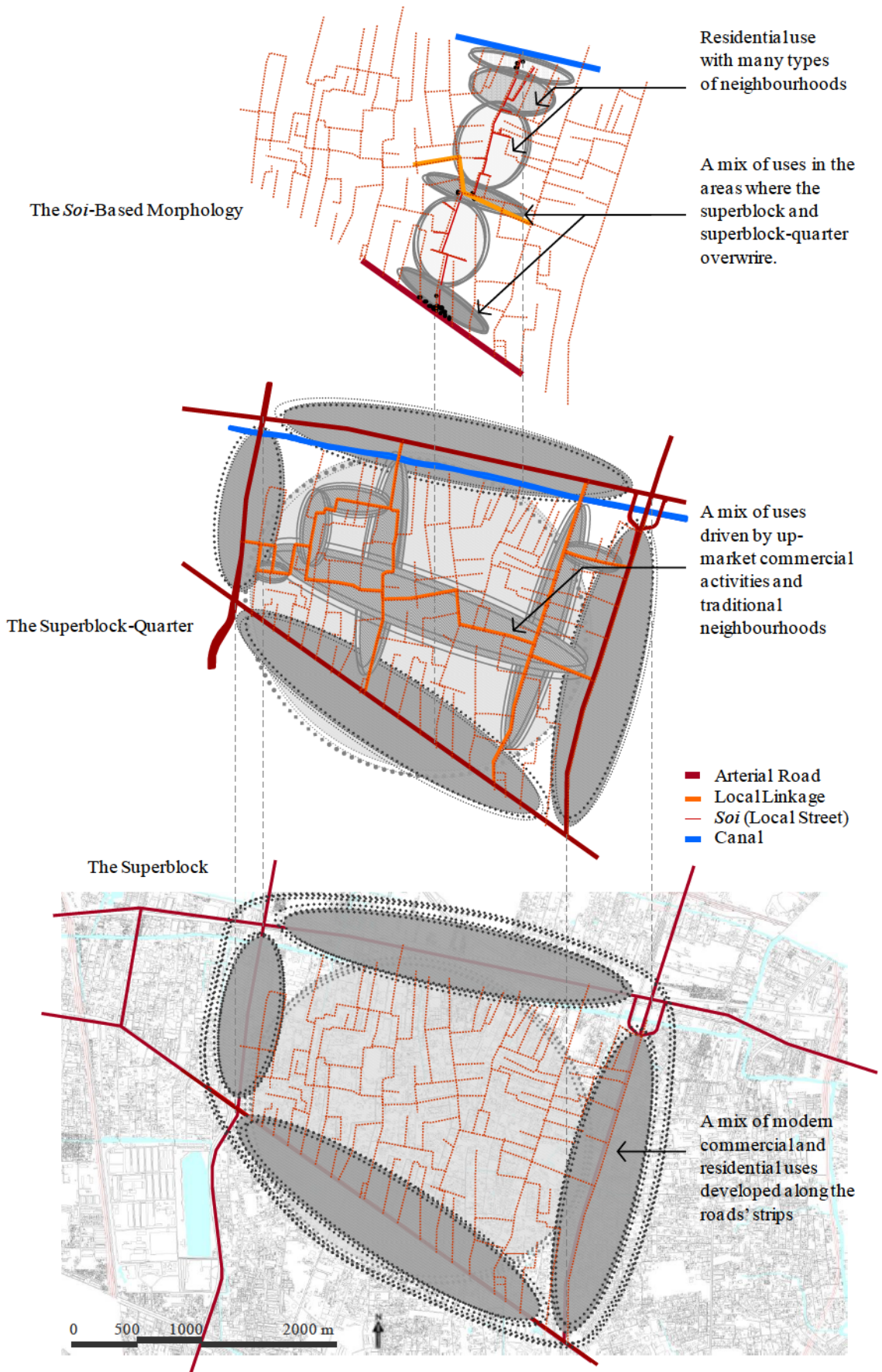


Figure 6.9 Use Patterns in Sukhumvit, 2011  
 Source: Field Survey, 2011

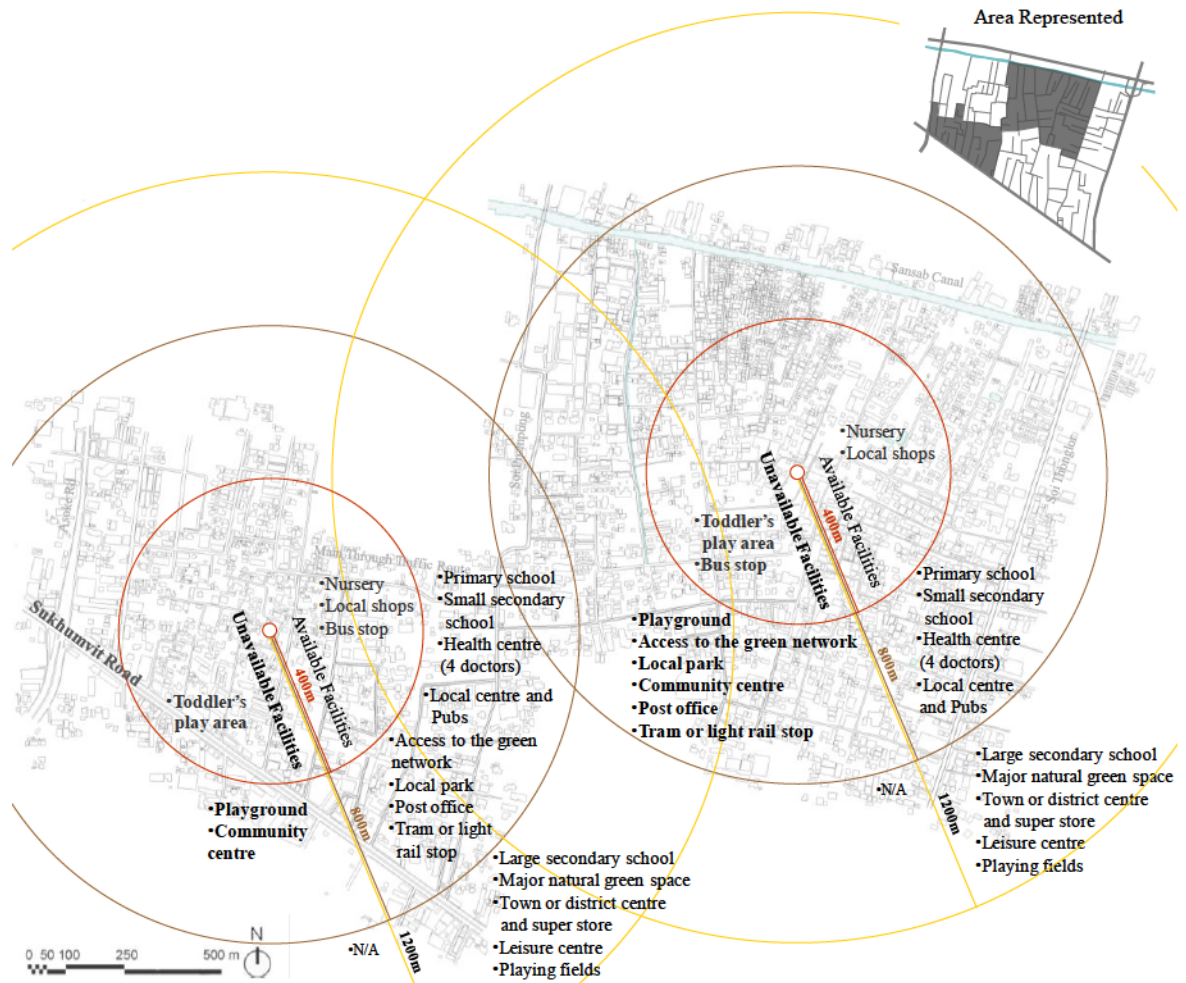


Figure 6.10 Local Services and Facilities in Sukhumvit, 2011

Source: Field Survey, 2011; Access to Local Facilities Cited from Barton *et al.*, 2003

Although a mix of uses is recently developed along the local linkage's strips influencing the superblock-quarter morphology, it is driven by up-market commercial activity as shown in Figure 6.9. Further, Figure 6.10 shows an example of the superblock's inner area where few services and facilities can be found. What is challenging in this evaluation is that most services and facilities are accumulated only in the superblock morphology but they are not available within the superblock-quarter and the *soi*-based morphology.

A real potential of mixed use can be provided when route networks are connected and high levels of pedestrian flow are encouraged by good connections (Bentley, 1999). However, based on coarse grain of streets and blocks of the *soi*-based morphology (see 6.2.2 *Street*

and Block), not only are low levels of pedestrian flow defined, but also few economic exchanges and limited services and facilities are identified for the *soi*-based morphology.

Different features between morphological layers are also found in terms of movement modes. Figure 6.11 shows that multi-modes of public transport are developed only along the roads' strips which define the superblock morphology, influencing the best example in the case of public transport and movement modes among all layers as evaluated in Table 6.5 (p.195). In contrast, little public transport is integrated into local areas. Based on the will of people to walk within a 400 metre standard for bus stops and an 800 metre standard for metros (Barton *et al.*, 2003), Figure 6.11 shows that the service radiuses of existing public transport, developed along the main roads cannot cope with the inner areas of the superblock.



Figure 6.11 Examples of Access to Public Transport Stops and Stations in Sukhumvit, 2011  
Source: TTD, 2011; Field Survey, 2011; Access Standards Cited from Barton *et al.*, 2003

Regarding walkability, it should be emphasized that all routes including arterial roads, the local linkage and local streets are not designed for traffic calming. Vehicle restrictions, aiming to encourage walking and cycling have never been implemented in Sukhumvit.

## 6.2.6 Relationships of All Elements

As discussed in CH1, sustainability qualities can be delivered through spatial elements as well as their connections. To evaluate Sukhumvit's urban forms, the literature-based indicator numbers 23 to 30 developed in regard to the relationships between morphological elements are employed and the scores are rated following their parameters in *Appendix J*. Table 6.7 shows the results of this evaluation.

Table 6.7 Sustainability Scores of Sukhumvit's Morphological Relations from a Global Perspective

| Literature-Based Indicators |    |   | Scores*    |                    |     |
|-----------------------------|----|---|------------|--------------------|-----|
|                             |    |   | Superblock | Superblock-Quarter | Soi |
| All Elements                | 23 | Well-Ventilated Spaces                            | [1]        | [2]                | [3] |
|                             | 24 | Greenery Display and Soft Landscape               | [1]        | [1]                | [2] |
|                             | 25 | Gradual Change of Spatial Configuration           | [1]        | [2]                | [3] |
|                             | 26 | Legible Settlement through Active Use             | [3]        | [3]                | [2] |
|                             | 27 | Legibility through Landmark and Space Disposition | [3]        | [2]                | [1] |
|                             | 28 | Positive Identity and Landscape Character         | [1]        | [2]                | [3] |
|                             | 29 | Preserving Significant Public Realm               | [3]        | [1]                | [2] |
|                             | 30 | Personalisation of Communities                    | [3]        | [3]                | [2] |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating the database of urban forms developed in CH5, following the parameters of the literature-based indicators established in Appendix J.

Well-ventilated space is defined by configurations of streets and blocks, building heights and enclosure spaces (Givoni, 2003). As evaluated in *6.2.4 Building Fabric*, the ribbon development of high density buildings blocks the wind and appreciably reduces urban ventilation. This situation is also affected by the large span of elevated railways developed along Sukhumvit Road; Boonyou and Jitkhajornwanich (2000) go further, stating that this construction causes high levels of pollution near ground level which are difficult to decrease. Figure 6.12 shows the construction of the elevated railway above Sukhumvit Road.

It should be noted that, in the superblock-quarter morphology, high density built forms also affect natural ventilation along the local linkage. However, well-ventilated spaces can be defined for the *soi*-based morphology where there is low density settlement.



Figure 6.12 The Construction of the Elevated Railway above Sukhumvit Road, 2010  
Source: Author, 2010

Greenery and soft landscaping building settings and spaces are required from spatial settings in order to manifest sustainable urban forms (Barton *et al.*, 2003; Rudlin and Falk, 1999). Nevertheless, they are rarely found in Sukhumvit. As discussed in 6.2.1 *Street and Open Space*, green corridors are not developed in the Sukhumvit's streets and spaces. Greenery is found in a few areas of *sois* while soft landscapes are rarely incorporated into new buildings located in the superblock and the superblock-quarter morphology.

In terms of the process of change, as discussed in many areas in this section, the rapid change of built forms is undertaken in the superblock and the superblock-quarter while it proceeds only in a few areas of the *soi*-based morphology. Different results of evaluation in terms of gradual change are shown in Table 6.7 (p.200).

Although a contrast between new development and the historic pattern of forms is observed along the roads and the local linkage, the concentration of new built forms becomes a key to promote legible settlement along prime permeable channels. From a global perspective, landmarks, gateways and focal points influenced by modern building groups and spaces support a readable place to the superblock morphology. Table 6.7 shows good results for this feature. In the same way, Figure 6.13 shows modern buildings located

along the local linkage, highlighting a focal point to the complex pattern of *sois* which is not easy to be read in the local areas.



Figure 6.13 Modern Buildings Located along the Local Linkage's Strip in Sukhumvit, 2011  
Source: Author, 2011

The continuity of local identity can be achieved by retaining the attachment of history, climate, ecology and building practice, which is fundamental in defining how people created, recreated and sustained their places (Butina Watson and Bentley, 2007; Cooper, 2000; Zetter and Butina Watson, 2006). However, the change of spatial configurations occurs in many areas of Sukhumvit.

Even though modern types of buildings developed along arterial roads contribute to the dominance of modern districts and the global identity of the place, they have replaced many traditional building groups in order to define the superblock morphology. As well, despite promoting legibility of the superblock-quarter, the modern symbolism of forms located along the local linkage discourages local and visually imagined continuation of traditional neighbourhoods that enable people to understand the place (Bentley *et al.*, 1985; Bentley, 1999).

In the *soi*-based morphology, not only does the new connectivity of through traffic systems overwrite traditional permeable channels and spaces of *sois*, the continuity of scale, massing and height of local neighbourhoods is affected by new development in *paksois*, *klangsois* and *taysois* as discussed in CH5. Figure 6.14 shows new buildings recently developed adjacent to bungalows. Although this change of socio-spatial patterns is noticed, local identity and landscape character still persist in many locations of *sois*.



Figure 6.14 New Buildings Developed Adjacent to Bungalows in Sukhumvit, 2010  
Source: Author, 2010

It should be noted that, while a modern socio-spatial pattern of the superblock morphology is located along modern roads, the superblock-quarter is formulated along the local connectivity by overwriting the traditional public realm of *sois*. The latter pattern discourages the aim to preserve significant public realm as evaluated in Table 6.7 (p.200).

### 6.2.7 Summary of Physical Evaluation

To summarise the results of the physical evaluation, Table 6.8 is developed by including 30 sustainability scores as they are assessed from Tables 6.1 to 6.5 and 6.7. These scores are rearranged into the particular sets for defining sustainability qualities in the next section.

Table 6.8 Sustainability Scores Rated for Sukhumvit's Urban Forms

| Literature-Based Indicators |    |  | Scores*    |                    |     |
|-----------------------------|----|--|------------|--------------------|-----|
|                             |    |  | Superblock | Superblock-Quarter | Soi |
| Street and Open Space       | 1  | Linkage between Centres of High Activities                     | [3]        | [3]                | [2] |
|                             | 2  | Linkage of Public and Private Open Space as Green Corridors    | [1]        | [1]                | [1] |
|                             | 3  | Linked Green Corridors as Natural Networks                     | [1]        | [1]                | [1] |
|                             | 4  | Planting and Renewing Street Trees                             | [2]        | [1]                | [1] |
|                             | 5  | Reduced Hard Surfaces and Run-Off                              | [1]        | [1]                | [2] |
|                             | 6  | Visually Imaginable Networks of Space                          | [3]        | [1]                | [1] |
| Street and Block            | 7  | Fine Grained Street and Block                                  | [2]        | [2]                | [1] |
| Plot and Building           | 8  | Fine Grain of Land Subdivisions and Buildings                  | [1]        | [2]                | [3] |
| Building                    | 9  | Density of Built Components                                    | [3]        | [2]                | [1] |
|                             | 10 | Active Frontages   | [2]        | [2]                | [2] |
|                             | 11 | Mixed Building Types, Ages and Tenures                         | [2]        | [3]                | [3] |
|                             | 12 | Visually Interesting Buildings                                 | [2]        | [2]                | [1] |
|                             | 13 | Locally Distinctive Building Groups and Spaces                 | [2]        | [2]                | [3] |
| Use                         | 14 | Density of Population  | [1]        | [1]                | [1] |
|                             | 15 | Mixed Communities  | [2]        | [3]                | [3] |
|                             | 16 | Viable Range of Uses and Facilities                            | [3]        | [2]                | [1] |
|                             | 17 | Employment and Economic Activities                             | [2]        | [2]                | [1] |
|                             | 18 | Public Transport Infrastructure                                | [3]        | [1]                | [1] |
|                             | 19 | Layout of Transport Stations as an Integral Part of the Street | [3]        | [1]                | [1] |
|                             | 20 | Multi-Modes of Movement  | [3]        | [1]                | [1] |
|                             | 21 | Walking and Cycling Priority                                   | [1]        | [1]                | [1] |
|                             | 22 | Restricted Vehicle Circulation and Speeds                      | [1]        | [1]                | [1] |
| All Elements                | 23 | Well-Ventilated Spaces   | [1]        | [2]                | [3] |
|                             | 24 | Greenery Display and Soft Landscape                            | [1]        | [1]                | [2] |
|                             | 25 | Gradual Change of Spatial Configuration                        | [1]        | [2]                | [3] |
|                             | 26 | Legible Settlement through Active Use                          | [3]        | [3]                | [2] |
|                             | 27 | Legibility through Landmark and Space Disposition              | [3]        | [2]                | [1] |
|                             | 28 | Positive Identity and Landscape Character                      | [1]        | [2]                | [3] |
|                             | 29 | Preserving Significant Public Realm                            | [3]        | [1]                | [2] |
|                             | 30 | Personalisation of Communities                                 | [3]        | [3]                | [2] |

[3] good [2] moderate [1] poor

\* Scores are rated in Table 6.1 to 6.5 and 6.7.

### 6.3 Sustainability Scores for Defining Sustainability Qualities

This section presents the assessment of Sukhumvit's sustainability scores for identifying levels of sustainability from a global perspective.

Because sustainability qualities are delivered through socio-spatial components and connections in a complex way, they are indicated by different combinations of indicators. To define levels of sustainability, the scores assessed from the 30 indicators in the previous section have to be categorized into particular sets for identifying levels of sustainability as they are designated in CH1.

*Appendix K* (p.406) shows the sustainability evaluations; eight tables are presented in relation to eight qualities of sustainable urban forms. The specific indicators for evaluating each quality are included into each table and the scores rated for those indicators (Table 6.8) are also delivered. At each table, the average scores are calculated for Sukhumvit's morphological layers, representing the numeric results of evaluations. Table 6.9 shows the summary of the average scores.

Table 6.9 Average Scores Calculated from Appendix K

| Sustainability Qualities | Average Scores |                    |            |
|--------------------------|----------------|--------------------|------------|
|                          | Superblock     | Superblock-Quarter | <i>Soi</i> |
| Resource Efficiency      | 2.00           | 1.70               | 1.30       |
| Biotic Support           | 1.42           | 1.14               | 1.42       |
| Cleanliness              | 1.57           | 1.28               | 1.42       |
| Resilience               | 2.00           | 2.00               | 1.85       |
| Variety                  | 2.12           | 2.12               | 1.87       |
| Accessibility            | 2.50           | 1.83               | 1.50       |
| Legibility               | 2.75           | 2.00               | 1.25       |
| Identity                 | 2.25           | 2.00               | 2.50       |

Note: 3 is the maximum score in relation to the indicators' parameter.

## 6.4 Sukhumvit's Levels of Sustainability

In accordance with the average scores summarized in the previous section, the levels of sustainability are highlighted in Table 6.10. What the table shows is that sustainability is delivered in different levels and scales for a given location. In Sukhumvit, ways in which each morphological layer presents sustainability is dissimilar from the other layers. Within each layer, how each quality of sustainable urban forms is delivered is also different from the other qualities.

For the superblock, a clear structure of settlement influenced by global investment and modern life is unique and various public transport systems located along the roads strengthen its urban characteristics. These features enable the superblock morphology to become the best spatial pattern versus the others in terms of resource efficiency, accessibility and legibility in point of global views, as shown in Table 6.10.

However, the long fabric of high density buildings affects the quality of cleanliness and the elevated train line makes matters worse. The low level of biotic support is also identified because few green areas and networks are included in the superblock morphology. Further, in spite of promoting global investment and development, the high level of land

amalgamation and the construction of free-standing pavilions turn down a potential of small-scale tradings as well as a capacity of future form and use alteration. High density buildings also affect townscape merit when they have replaced traditional shophouses and built adjacent to traditional houses.

Table 6.10 Global Levels of Sustainability Assessed from the Literature-Based Indicators

| Sustainability Qualities | Global Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|---------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low      |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2       | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
| Biotic Support           | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
| Cleanliness              | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
| Resilience               | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
| Variety                  | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
| Accessibility            | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
| Legibility               | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
| Identity                 | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |
|                          | ■             |         | ■       |         | ■        |         | ■       |         | ■         |         |

- Superblock Morphology
- Superblock-Quarter Morphology
- *Soi*-Based Morphology

In contrast, the expression of collective socio-cultural patterns is noticed in the *soi*-based morphology and its degree of identity is the strongest among all layers in Sukhumvit as shown in Table 6.10. However, weak levels are identified for several sustainability qualities. The very low level of legibility is defined because *sois* cannot be simply and visually imaginable when they tend to connect with others as a complex circulation; the similarity of spatial patterns between *sois* is complementary. Although the feature of identity is encouraged as low density buildings, the very low level of resource efficiency is identified because the choice of public transport is limited. Discouraging walkability, coarse grain of streets and blocks and a lack of green corridors and display from private gardens are crucial in defining the very low levels of biotic support and cleanliness of the *soi*-based morphology.

From a global perspective, the superblock-quarter morphology delivers better levels of sustainability than the *soi*-based morphology does. The quality of identity shown for this layer is opaque (see Table 6.10); nonetheless, a mix of built forms and more active use accumulating along the local linkage's strips promotes the features of variety, resilience and legibility of the place. A mix of building types, ages and tenures is more promoted. However, because this morphology is developed along the through traffic routes taking place upon configurations of narrow *sois* where few modes of transport and soft landscape are found, biotic support and cleanliness are evaluated as the lowest levels among the other morphological layers. Inconsistency between scales of new buildings and narrow shapes of *sois* is fundamental to affecting those levels of sustainability.

## 6.5 Conclusion

This chapter presented the physical evaluation of Sukhumvit's urban forms in order to define global levels of sustainability.

Key results are:

1. The superblock morphology is the best spatial pattern compared with the others in terms of resource efficiency, accessibility and legibility because of the concentration of high density buildings, multi-modes of movement and interesting building groups located along the roads' strips.
2. The *soi*-based morphology drives the best expression of identity versus the other layers, although it delivers poor levels of variety, accessibility and legibility because of its similarity of settlements, coarse grain of streets and blocks and low density built forms.
3. The superblock-quarter morphology manifests higher levels of resource efficiency, resilience, variety, accessibility and legibility than the *soi*-based morphology, although the decline in identity is determined from a global perspective.

With respect to the results of evaluation, key conclusions are:

1. Sustainability is delivered in various scales depending on distinctive socio-spatial patterns of the case study.

2. Within each morphological layer, various levels of sustainability are observed.
3. Based on those key findings (stated above), even a single superblock of Bangkok can deliver different levels of sustainability, showing different capacities in terms of sustainable urban forms.

Influencing dissimilar capacities for delivering sustainability, ways in which morphological patterns are developed and the extent to which morphological outlines are indicated are crucial. Key spatial elements driving global levels of sustainability are:

1. Street
2. Block
3. Plot
4. Building
5. Use
6. Relationships between Elements

Key findings of this chapter emphasize the relationships between socio-spatial patterns and sustainability levels in which different capacities in terms of sustainable urban forms are defined from a global perspective. However, questions of the levels of sustainability responsive to local capacity still remain, resulting in the local evaluation of sustainability in the next chapter.

# Chapter Seven

## Perceptual Evaluation for Locally Acceptable Sustainable Urban Forms

### 7.1 Introduction

As discussed in the preliminary conceptual framework developed in CH3, sustainable urban form cannot be examined without considering the local process of form-productions because a capacity to deliver it is influenced by social ideas and actions which have to be undertaken at the local level. In this sense, although levels of sustainability have been assessed from a global interpretation in CH6, local sustainability has to be evaluated in order to identify acceptable degrees of development which can accommodate future form-aspirations and sustainability dimensions into distinctive socio-spatial patterns.

Informing the fifth research objective, this chapter aims to evaluate local levels of sustainability in Sukhumvit. Based on the methods of perceptual evaluation developed in CH4, the following actions are taken.

1. To assess local perceptions with relevance to sustainability and local form, collected from Sukhumvit.

2. To utilize the perception-based data assessed from stage one to formulate a framework of form-adaptations representing capacity for change.
3. To implement the local framework derived from stage two to evaluate the applicability of literature-based indicators (see CH1) and to modify them.
4. To implement the indicators, established from stage three, to evaluate local levels of sustainability of Sukhumvit's morphological patterns (see CH5).
5. To identify gaps in defining sustainability with relevance to urban localities by comparing Sukhumvit's global (see CH6) and local levels of sustainability assessed in stage four.

To fulfill these objectives, the following chapter structure is formulated.

- 7.1 Introduction
- 7.2 Local Interpretation of Sustainability
- 7.3 Local Perception-Based Data for the Urban Forms
- 7.4 Local Framework of Form-Adaptations
- 7.5 Local Indicators for Evaluating Local Levels of Sustainability
- 7.6 Locally Responsive Scores of Sustainability
- 7.7 Sukhumvit's Local Levels of Sustainability
- 7.8 Gaps in Defining Sustainability with Relevance to Urban Localities
- 7.9 Conclusion

## **7.2 Local Interpretation of Sustainability**

This section presents the analysis of stakeholders' attitude in defining and interpreting local sustainability. What people understand by the term 'sustainability' is a key question of the semi-structured interviews conducted with 16 representatives from various stakeholders (investors and developers, public authorities, design professionals, leaders of communities and residents) who get involved with form-productions of Sukhumvit.

The outcome of this analysis is crucial to define the actor who perceives sustainability with responsive to urban localities in which their perceptions of form-adaptations will be further investigated in the next section. Moreover, this analysis provides a foundation to understand individual ambition underpinning involvement patterns and implementation

strategies for locally acceptable sustainable urban forms in CH8. Methods of field study are presented in CH4 and the instrument used for collecting data is shown in *Appendix C* (p.351).

Based on communication with stakeholders in the field, Figure 7.1 shows the interpretations that different actors had for sustainability.

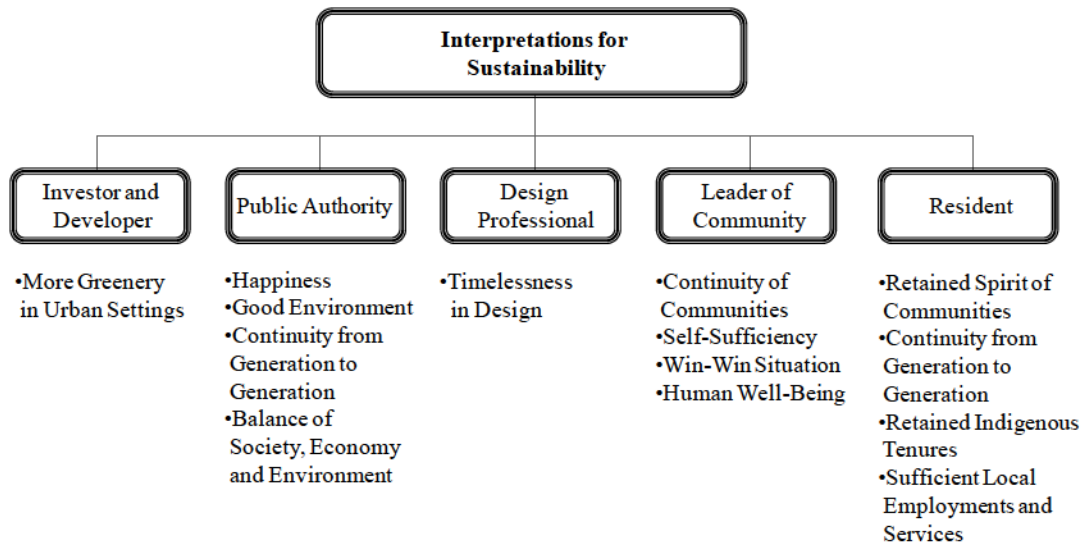


Figure 7.1 Different Terminology for Local Sustainability  
Source: Semi-Structured Interviews in Sukhumvit, 2009

While public authorities had a broad vision of sustainability such as a “good environment”, the continuity of generations and the balance of development, a representative of investors and developers articulated a vision for more greenery to manifest sustainability in development projects. Figure 7.1 also shows that “timelessness” was identified as an aim of sustainability by a design professional, describing successful architecture as having capacity to cope with future changes in fashion. In contrast, leaders of communities and residents both perceived sustainability related to local forms, such as the continuity of communities, self-sufficiency, local autonomy and human well-being.

Perceived sustainability was driven by different factors that stakeholders used in their interpretation. Leaders of communities and residents took their experience into account when interpreting sustainability. They pointed out the problems of limited use and controls in regard to a lack of green open spaces, a rapid growth of high density development, a

large amount of gentrification and congestion in Sukhumvit, which all affected their places and communities. These interpretations influenced the aim to retain traditional neighbourhoods and to promote good environment for Sukhumvit's various user groups in order to achieve sustainability.

With the concern for urban growth and the demand for new residential areas, other stakeholders applied a global standardization of sustainability built forms such as green development into the interpretation of sustainability. Although the opinion of public authorities seemed to be consistent with the needs of communities, the popular solution for urban compactness was the environmental choice, which conflicts with users' perceived sustainability.

Different means of sustainability cause contradictions between stakeholders' opinions. To achieve more greenery and high living standards, high density development was chosen by investors and developers, public authorities and a design professional. In contrast, sustainability perceived by communities responded to local culture and forms. Based on this finding, users' perceptions are a key to understanding sustainable urban form located in time and space because they represent the strongest link between sustainability and locally socio-spatial patterns.

### **7.3 Local Perception-Based Data for the Urban Forms**

As discussed in the previous section, users' attitudes are instrumental because they show interpretation of sustainability responsive to local contexts. This section is intended to further analyse users' perceptions in terms of form-adaptations which are the cornerstone in identifying locally appropriate sustainable urban forms.

To collect attitudinal data, semi-structured interviews were conducted and the question sheets, represented images and maps were implemented for enabling interviewees to recognize their experience and express their opinion. Methods for data collection are designed in CH4 and the instrument used in the interviews is presented in *Appendix D* (p.353). Collected from 88 participants, users' perceptions are analysed to identify future form-aspirations in terms of street, block, plot, building, use and relations of all elements; it should be noted that these structures are a key component to deliver sustainable urban form through spatial patterns (see CH1).

Seven subsections are divided as follows. Perceptions of:

- 7.3.1 Sukhumvit;
- 7.3.2 Street and Open Space;
- 7.3.3 Street and Block;
- 7.3.4 Plot and Building;
- 7.3.5 Building Fabric;
- 7.3.6 Use Pattern.

### **7.3.1 Perceptions of Sukhumvit**

Sukhumvit is defined by multilayered socio-spatial patterns which still retain a morphological distinctiveness. As analysed in CH5, they are the superblock, the superblock-quarter and the *soi*-based morphology. Crucially, the unity of each morphological layer and their relationships were perceived by users.

Incorporated in the 20 questions used in the interviews (see *Appendix D*), question 19, *Do you feel that your neighbourhood/this area is unique?*, was a starting point to investigate users' perceptions of socio-spatial patterns. Analysed in *Appendix H* (p.386), 81.8% of people felt the uniqueness of the case study area and the explanations given for supporting their attitude defined multilayered morphological layers of Sukhumvit.

Expressed by participants, the features of high density built forms, modern types of buildings and mobility of people along the roads' strips defined the Sukhumvit superblock. People also recognized that bungalows, neighbourhoods and religious institutions located in *sois*, were part of "place identity", presenting the *soi*-based morphology. Further, in the interviews, 'lifestyle' was often used by participants to explain the characteristics of inner areas inside the superblock, representing the superblock-quarter morphology.

In regard to question numbers 4 (for residents and workers) and 5 (for visitors), *Where are the boundaries to your neighbourhood/this area?*, Figure 7.2 shows the mental map including interviewees' outlines of these three morphological layers in their recognitions.

Based on the mental map, the superblock morphology was clearly perceived as the whole Yan Sukhumvit (see CH5) identified by modern districts encompassing traditional neighbourhoods inside the superblock. The figure also shows that people perceived subdivisions of the superblock, defining the superblock-quarter morphology. A mix of modern and traditional landscapes was recognized as part of its uniqueness.

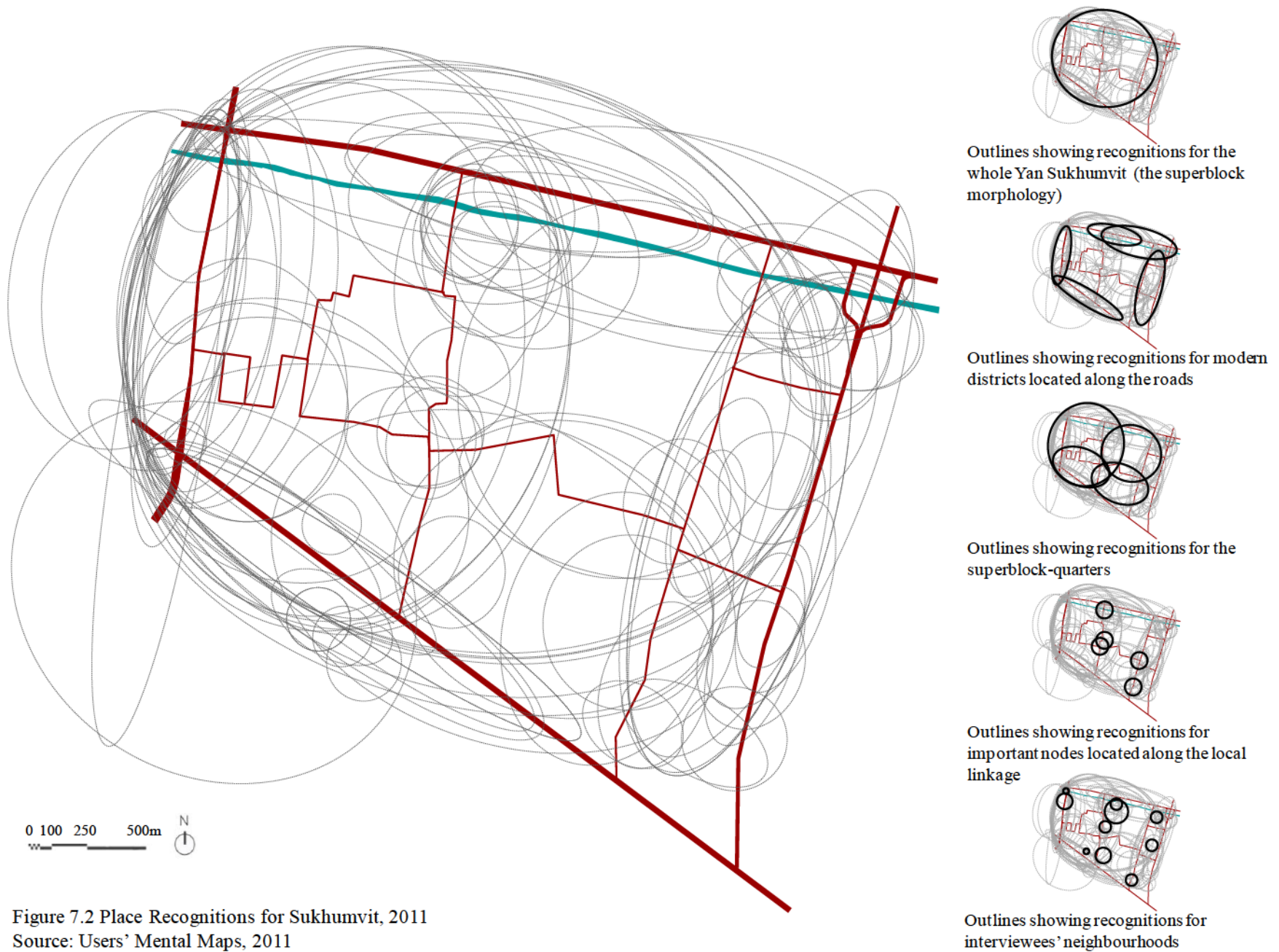


Figure 7.2 Place Recognitions for Sukhumvit, 2011  
Source: Users' Mental Maps, 2011

However, although people have a clear image of the concentration of building types and use forming the superblock-quarters, a few landmarks and distinctive spaces were pointed out when this layer is outlined by the local linkage developed upon the complex network of *sois*.

Users' perceptions of traditional communities were found from the field study and were defined as one of Sukhumvit's good aspects, in which people expected this local townscape to be retained. Crucially, even though people recognized social systems in which various communities, user groups and classes get involved at their *sois*, they did not have a logical image of *soi* configuration. This argument is exemplified by Figure 7.2 that people could not draw the whole structure of *sois* on the map, despite talking about *sois*.

The distinctiveness of Sukhumvit is further clarified by represented images chosen by participants. Figure 7.3 shows nine images of Bangkok selected by interviewees. They present different spatial patterns including street patterns, urban grains, building densities, building heights, building types, open spaces and natural features. In relation to question 19, *Do you feel that your neighbourhood/this area is unique?*, Figure 7.4 shows responses to those images; image numbers 1, 2 and 4 were selected by most people.

Based on these chosen images, a mix of built forms including high-rise buildings located together with lower density areas and a few green open spaces was a key element for image selection. The accumulation of high-rise buildings and the connection of roads and sky train networks seen in the images are also fundamental. This set of images was also chosen for Bangkok's identity, demonstrating the generalization of Sukhumvit to other areas of the city.

Perceptions of Sukhumvit's urban forms and for future form-aspirations were driven by the recognition of both global and local identity. As discussed above, mixed modern and local townscapes were a clear image of Sukhumvit, influencing aspirations for a global trend of urban development and for protection for traditional communities. This perception resulted in ways in which people interpreted and evaluated various environmental choices for Sukhumvit as they are described further in the following subsections.



1



2



3



4



5



6



7



8



9

Figure 7.3 Represented Images Used in the Semi-Structured Interviews, Sukhumvit, 2011

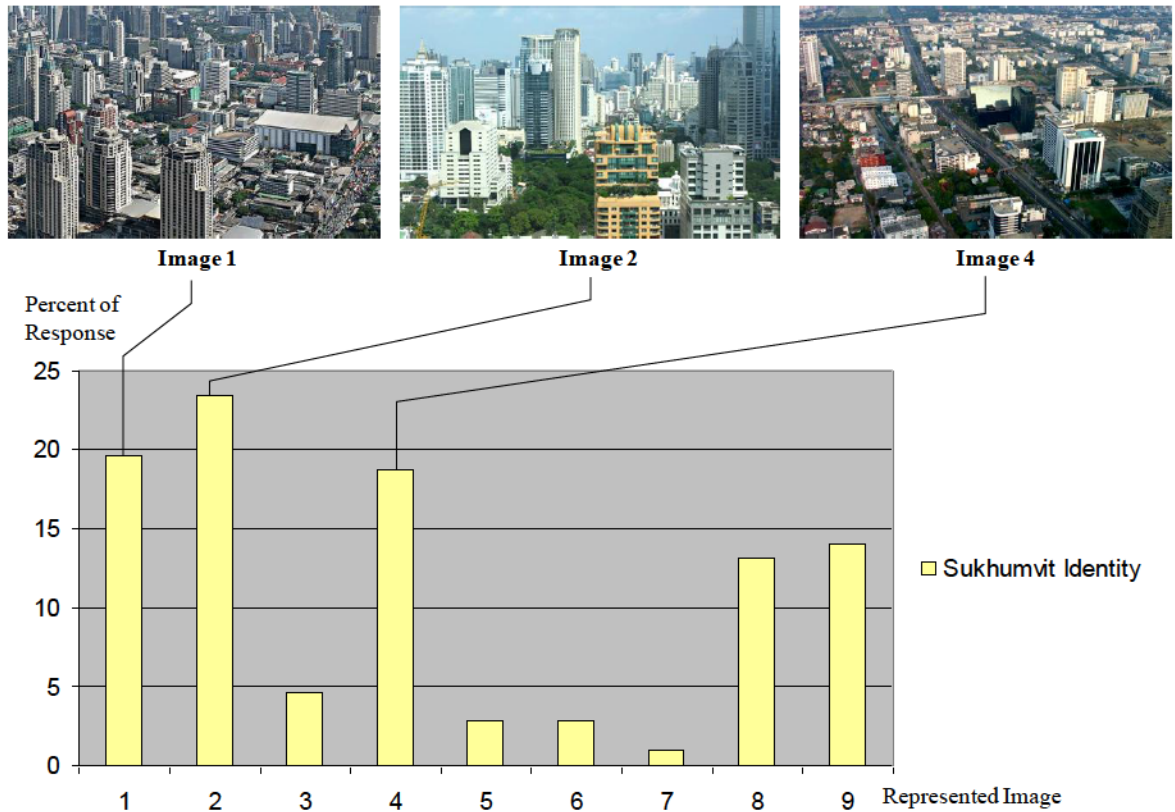


Figure 7.4 Users' Perception for Sukhumvit Identity, 2011  
 Source: Semi-Structured Interview, 2011

Table 7.1 shows the summary to recognitions for Sukhumvit which is a starting point of perception-based data for Sukhumvit's urban forms.

Table 7.1 Perceptions of Sukhumvit

| Superblock  | Superblock-Quarter  | Soi  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• People recognized the superblock's perimeters as a distinctive settlement of global development.</li> <li>• People had got a clear image of modern districts, defined by mental maps.</li> </ul> | <ul style="list-style-type: none"> <li>• People could read subdivisions of the superblock, defining the superblock-quarter morphology.</li> <li>• People perceived a mix of modern and traditional landscape as the distinctiveness of this layer.</li> </ul> | <ul style="list-style-type: none"> <li>• People perceived the traditional communities and expected this local townscape to be retained.</li> <li>• Although people recognized socio-spatial patterns of the <i>soi</i>-based morphology, yet they did not have a clear image of <i>sois</i>' configuration.</li> </ul> |

### 7.3.2 Perceptions of Street and Open Space in Relation to Form-Adaptations

Regarding quality of street and open space, perceptions of accessibility and walkability are instrumental. With reference to question 6, *How easy is it to get to these places/spaces?*, 45.5% of participants rated an easy level of accessibility to Sukhumvit. They gave this

score because of the connections of road networks and multi-modes of transport developed along the roads, defining a satisfaction for levels of connectivity of the superblock morphology.

For the other morphological layers, attitude to street and open space was collected from question 20, *What are good and bad aspects of your neighbourhood/this area?* Well-connected *soi* used for through traffic was one of the good aspects that people recognized, representing satisfaction of connectivity along the local linkage. It should be noted, however, that congestion and pollution along this route were also perceived as negative aspects (which will be discussed further in the other subsections). For the *soi*-based morphology, narrow shape of *sois* and distance to access points were pointed out as bad aspects of Sukhumvit, defining low levels of connectivity in recognition for *sois*.

Figure 7.5 shows that, although an easy level of accessibility was rated for Sukhumvit, a moderate satisfaction for walkability was rated by 40.9% of participants. According to question 10, *How easy is it to walk around your neighbourhood/this area?*, users explained their experience in the use of streets in various locations and noted their satisfaction at the same level.

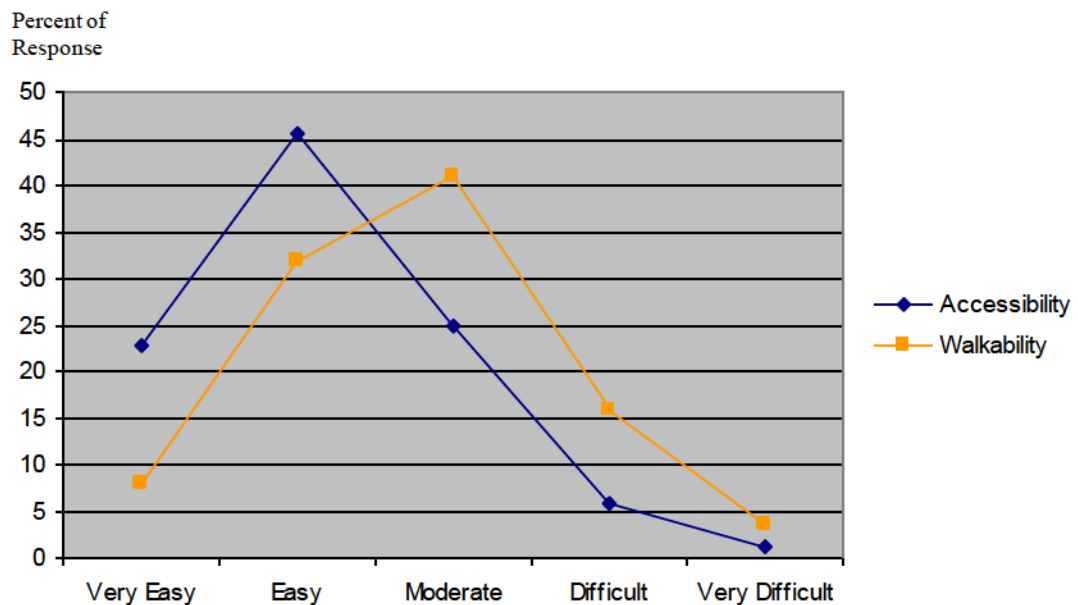


Figure 7.5 Users' Satisfaction in Accessibility and Walkability for Sukhumvit, 2011  
Source: Semi-Structured Interview, 2011

Influencing the moderate satisfaction for walkability, factors such as poor pavement condition, obstructions from street vendors, and a lack of street trees, shadow, and a comfortable climate were pointed out for the areas along arterial roads. Figure 7.6 shows the accumulation of street vendors impeding pedestrian flow along the roads' strips in Sukhumvit. Issues of traffic density, a lack of pavements, shade and street trees, and too great a distance to walk in many *sois* were given for describing walkability in *soi* networks. Figure 7.7 shows an example of a *soi* showing those negative features.

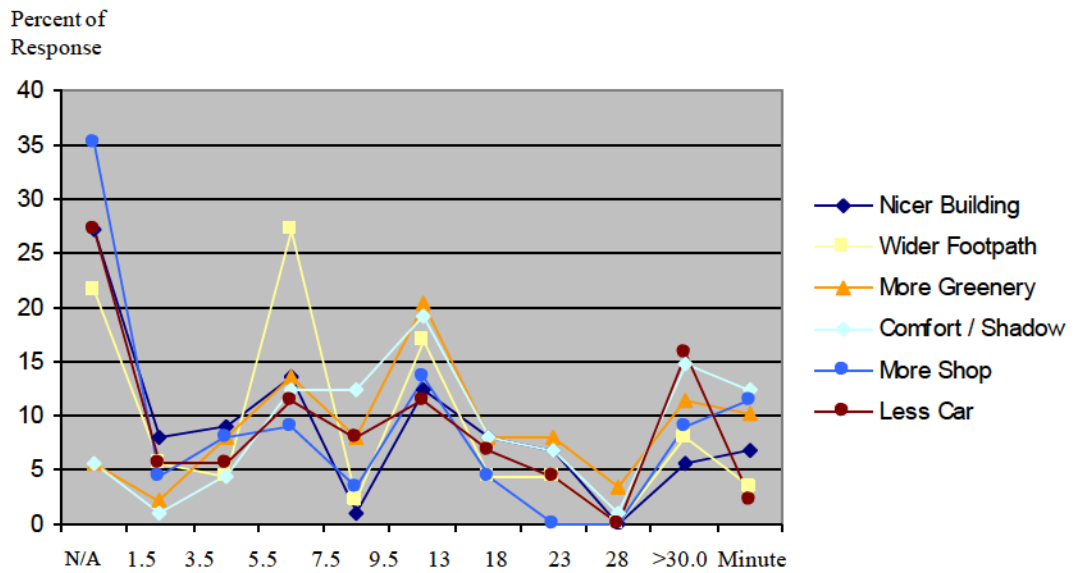
Based on communication with interviewees, aspects of pavement condition, shade and trees are crucial in encouraging walkability. Regarding question 13, *How much further (than usual) do these environmental features encourage you to walk?*, Figure 7.8 shows the results. While many did not take nicer buildings, more shops and less cars into account as key features encouraging walkability, most participants agreed that wider pavements could convince them to walk 5.5 minutes further. Greenery and comfort/shade could encourage them to walk 9.5 minutes more than usual. This data is substantial to understand missing features in the environmental settings and desired features which should be provided for people.



Figure 7.6 Accumulation of Street Vendors on Footpath Spaces in Sukhumvit, 2011  
Source: Author, 2011



Figure 7.7 A Lack of Sidewalks, Shade and Street Trees in a Soi, Sukhumvit, 2011  
 Source: Author, 2011



Note: N/A implies inapplicable features in encouraging people to walk further

Figure 7.8 Users' Perceptions for Environmental Features in Encouraging Walkability (Further Than Usual), Sukhumvit, 2011  
 Source: Semi-Structured Interview, 2011

Based on the data as they are analysed in this subsection, Table 7.2 shows perceptions of street and open space in terms of form-adaptations accepted and aspired for Sukhumvit. It should be emphasized that, incorporated by perceptions of other morphological components assessed in the following sections, this base is utilized for establishing a framework of form-adaptations in *7.4 Local Framework of Form-Adaptations*.

Table 7.2 Perception-Based Data for Sukhumvit's Street and Open Space

| Superblock  | Superblock-Quarter  | Soi   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• People perceived and expected to retain high levels of connectivity along the roads.</li> <li>• People thought that wider pavements should be developed along the roads' strips.</li> <li>• People thought that wider pavements could convince them to walk 5.5 minute further than usual.</li> <li>• People needed more soft landscape and confirmed that street trees are a key component of healthy urban ecology and walkability.</li> </ul> | <ul style="list-style-type: none"> <li>• People would like to have high levels of connectivity along the local linkage.</li> <li>• People needed visually imaginable networks along the local linkage.</li> <li>• People would like to have pavements along the local linkage's strips.</li> <li>• People required more street trees for all routes.</li> </ul> | <ul style="list-style-type: none"> <li>• People perceived too great a distance to access <i>sois</i>.</li> <li>• People needed more soft landscaping from both public and private spaces.</li> <li>• People preferred to walk 9.5 minute further than usual if either greenery or shade is more developed.</li> </ul> |

### 7.3.3 Perceptions of Street and Block in Relation to Form-Adaptations

As discussed in the previous subsection, street features result in accessibility and walkability, as well as its configurations. In this subsection, grain of street and block is examined through the perceptions of comfortable spaces to walk in Sukhumvit.

In relation to question 11, *Which part of your neighbourhood/this area do you feel is the most comfortable place/space to walk around?*, the mental maps were contributed by interviewees to show these spaces. Figure 7.9 shows the certain lines 88 participants recognized for comfortable spaces to walk in Sukhumvit.

Figure 7.9 shows that many people pointed out comfortable spaces in a few strips along the roads of the superblock and the local linkage of the superblock-quarter where fine-grained streets and blocks define (CH5). Further, those spaces were liked because of safety, shops, no congestion from street vendors, wide and good pavement condition and available street trees and shade, for instance. Figure 7.10 shows a comfortable space chosen by most people.

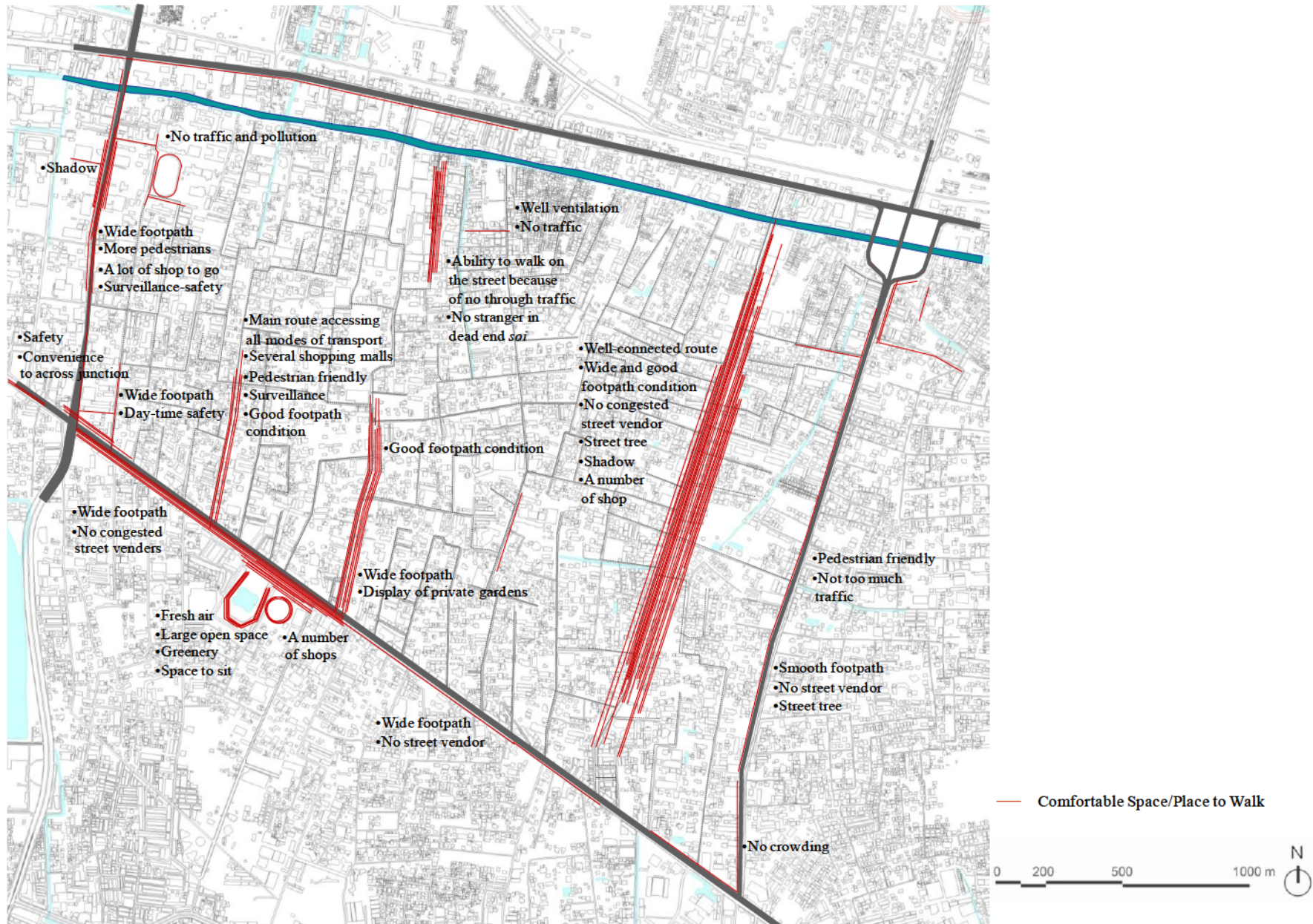


Figure 7.9 Comfortable Spaces and Places to Walk in Sukhumvit, 2011  
Source: Users' Mental Maps, 2011



Figure 7.10 Two Examples of Streets People Perceived as Comfortable and Uncomfortable Spaces to Walk in Sukhumvit, 2011

Source: Defined by User's Mental Maps

In contrast, because a few areas were recognized as having comfortable spaces, it implies that many streets were perceived as uncomfortable. Figure 7.9 shows that many *sois* inside the superblock were recognized as neither livable streets nor comfortable areas. Among several reasons, distance to access *sois* and a lack of soft landscaping features are the key factors discouraging the willingness to walk, verifying the impact of coarse grain of streets and blocks to walkability in *sois*. Moreover, Figure 7.10 shows an uncomfortable space identified by the users' mental maps, where pavements and natural features are not incorporated. Although front yards from houses still remain along *sois*, the decline of greenery (see CH5) affects the urban comfort perceived by people.

Table 7.3 shows perceptions of comfort spaces to walk with relevance to grain of street and block.

Table 7.3 Perception-Based Data for Sukhumvit's Street and Block

| Superblock  | Superblock-Quarter   | Soi   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• People perceived a livable street in relation to fine-grained streets and blocks located along the roads' strips.</li> </ul> | <ul style="list-style-type: none"> <li>• People perceived comfortable spaces in the fine grained streets and blocks of this layer. However, many areas were not defined because of the effect from traffic and a lack of pavements, greenery and shade.</li> </ul> | <ul style="list-style-type: none"> <li>• Too long an average distance to walk is one of the key factors defining uncomfortable spaces to walk found in the coarse-grained streets and blocks of <i>sois</i>.</li> </ul> |

### 7.3.4 Perceptions of Plot and Building in Relation to Form-Adaptations

Perceptions of plot and building were examined through users' preferred urban forms. Question 16, *Would you please rank three images you would like to live in?*, was implemented together with the represented images of Bangkok (see 7.3.1 *Perceptions of Sukhumvit*) for data collection. In the interviews, participants were asked to rank the first, second and third preferred urban forms from nine images and the highest percentages defined three urban forms people would most like to live in. Figure 7.11 shows percent of responses and the images selected by interviewees.

A variety of built forms were chosen to exhibit preferred urban forms. Represented by image number 9, the pattern of bungalows with green open spaces was selected for the first rank as shown in Figure 7.11. Condominiums with green open spaces was chosen for the second; and an accumulation of modern and high-rise buildings with green open spaces was selected for the third, represented by image numbers 7 and 2 respectively.

As explained by interviewees, the feel of comfort influenced by open spaces and distance between buildings and the natural features seen from the images are fundamental. Crucially, in terms of Sukhumvit, this perception-based data defines that the change of urban forms was not identified as a negative aspect; and the feel of comfort incorporated by natural features is a key instrument to attain an acceptable response for change.

This argument is supported by the fact that, as shown in Figure 7.12, image number 2 was selected both for Sukhumvit's identity (see 7.3.1 *Perceptions of Sukhumvit*) and for a desirable pattern, which implies that modern and large footprint buildings were accepted as part of place identity which people liked. In other words, because of the acceptance of global identity and changing purposes and activities in modern districts, people did not

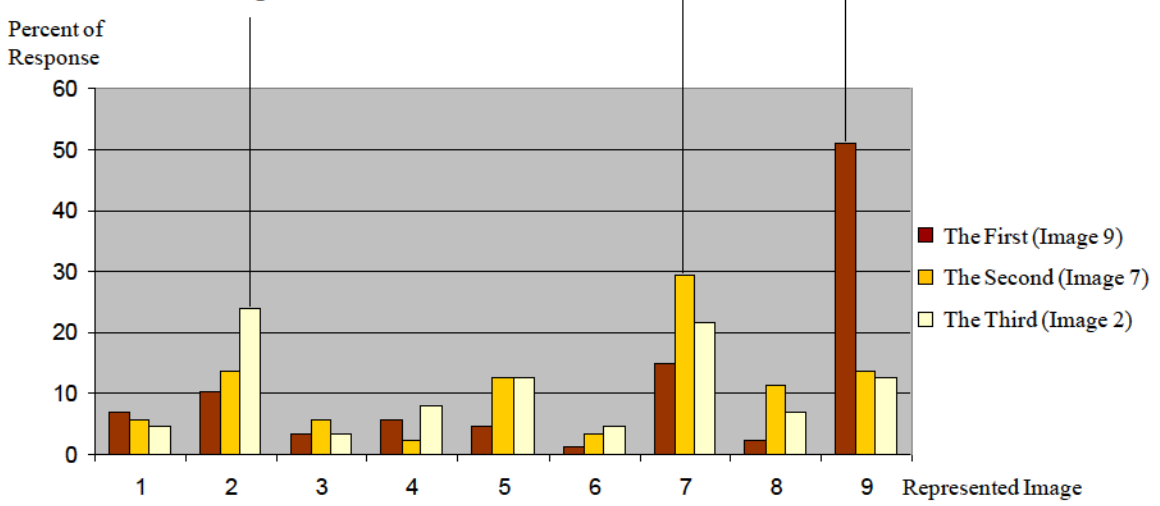


Figure 7.11 Users' Preferred Urban Forms, Sukhumvit, 2011  
 Source: Semi-Structured Interview, 2011



Figure 7.12 Image No. 2 Chosen for Representing Sukhumvit Identity and a Desirable Urban Form, 2011  
 Source: Semi-Structured Interview, 2011

oppose the change from shophouses to modern buildings located along the roads. Further, the change is preferred if natural feature is attached more in the urban settings.

However, represented by image number 9 (see Figure 7.13), the fine-grained built form was ranked as the most preferred urban form. This perception shows the aspiration in having low density and fine-grained patterns for a home place, which can be interpreted as retaining Sukhumvit's existing pattern of plots and buildings in traditional neighbourhoods of the *soi*-based morphology.



Figure 7.13 Image No. 9 Chosen for the Most Desirable Urban Form in Sukhumvit, 2011  
Source: Semi-Structured Interview, 2011

Based on these discussions, users' perceptions with relevance to plot and building are summarized in Table 7.4.

Table 7.4 Perception-Based Data for Sukhumvit's Plot and Building

| Superblock   | Superblock-Quarter   | <i>Soi</i>   |
|--|--|--|
| <ul style="list-style-type: none"> <li>• People accepted the change of plots and buildings located along the roads because of the acceptance of global identity and changing purposes and activities in modern districts.</li> </ul> | <ul style="list-style-type: none"> <li>• People were concerned that fine grain of bungalows is a key feature defining Sukhumvit's morphological distinctiveness although modern and large footprint buildings are increasingly developed.</li> </ul> | <ul style="list-style-type: none"> <li>• People aspired for fine-grained built forms attached by greenery as the most preferable urban form. This data verifies a satisfaction for the fine grain of plots and buildings of this layer.</li> </ul> |

### 7.3.5 Perceptions of Building Fabric in Relation to Form-Adaptations

As discussed in the previous subsections, people recognized both the global tissue of modern built forms and uses and the local tissue of traditional socio-spatial patterns. In this context, although the acceptance for the change towards modern townscape was found for districts promoting the Sukhumvit superblock, yet the protections for traditional neighbourhoods are still required for local areas. This finding is also derived from perceptions of “good” and “bad” aspects of Sukhumvit as shown in Table 7.5.

Table 7.5 Perceptions of Good and Bad Aspects of Sukhumvit, 2011

| Good Aspects   | Bad Aspects  |
|--|--|
| <ul style="list-style-type: none"> <li>• Multi-Modes of Transport</li> <li>• Business Centres and Interesting Buildings</li> <li>• Modern and Lifestyle Centres</li> <li>• Retained Traditional Communities</li> <li>• Benjasiri Park</li> <li>• Connection of <i>Sois</i> Used for Through Traffic</li> <li>• Shopping Malls</li> </ul> | <ul style="list-style-type: none"> <li>• Traffic and Pollution</li> <li>• Crowding and Population Density</li> <li>• High Cost of Food</li> <li>• Pub and Bar</li> <li>• Poor Pavement Conditions</li> <li>• Too Much Office Buildings</li> <li>• Insufficient Parks</li> <li>• Lack of Greenery</li> <li>• Narrow Shape of <i>Sois</i></li> <li>• Lack of Safety along <i>Soi</i> Networks</li> </ul> |

Source: Semi-Structured Interviews, 2011

Table 7.5 shows that, located in the superblock morphology, business centres and their interesting buildings were evaluated as a good aspect of Sukhumvit. Defining the superblock-quarter morphology, lifestyle centres (shopping centres with leisure amenities developed for upscale consumers) located along the local linkage were also recognized as a positive feature. This data shows that the change of building fabric was locally accepted in order to accommodate new development and modern activities while an acceptable degree of change was identified by protecting morphological distinctiveness in *sois*.

Nevertheless, although people did not oppose the modern built forms filling in the locations of shophouses, they still expected to have pedestrian friendly streets and vitality of places for encouraging comfortable space (see 7.3.3 *Perceptions of Street and Block in Relation to Form-Adaptations*). Well-defined access and lively features facing public realms therefore were expected to be developed in the strips along main roads. In contrast, because the bungalow with large front yards was identified as the most preferred urban form, active frontages were not expected for their houses.

For the superblock-quarter morphology, the perceptions were mixed. Users interchangeably used the modern built forms and mixed activities and the traditional townscape and residences to point out the areas along the local linkage. In this sense, users perceived that a variety of forms including both modern and traditional buildings is essential to define this layer where various user groups and activities get involved. However, regarding question 8 used in the interviews, *Which uses do you need less of in your neighbourhood/this area?*, people evaluated high-rise condominiums as a symbolic form of high density living which people dislike for the local areas.

Together with building type and landscape character, the density of the built component is also crucial in investigating perceptions of building fabric. How people perceived building density was examined through question 17, *Would you please group high, medium, and low densities from these images?* Again, nine represented images were incorporated for data collection. Figure 7.14 shows responses to those images in terms of perceived density.

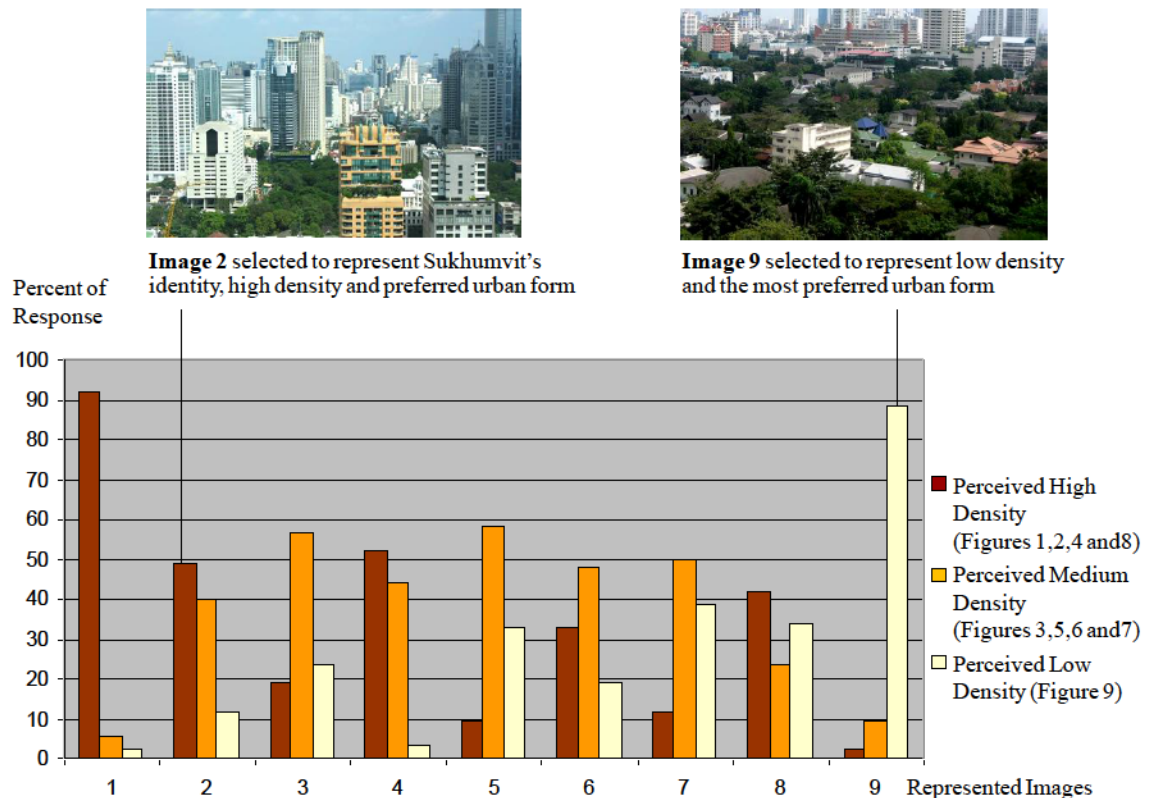


Figure 7.14 Users' Perceptions for Building Densities, Sukhumvit, 2011  
 Source: Semi-Structured Interview, 2011

Figure 7.14 shows that image numbers 1, 2, 4 and 8 were chosen for high density; image numbers 3, 5, 6 and 7 were selected for medium density; and image number 9 was selected for low density. Key findings from these data are examined below, as well as why people grouped those images.

High density built form was accepted as a good urban form for Sukhumvit. This finding is identified by the cross-perceptual data that image 2 was chosen by people both for specifying Sukhumvit's high density and for representing preferred urban form (see Figure 7.14). It should be emphasized that, as discussed in the previous subsection, natural features incorporated in urban settings and spaces as seen in that image is crucial to reach users' satisfaction for high density development.

The second finding is that low density built form was the most desirable for a home place. Representing built form with 1.0 FAR, image 9 was perceived for low density and selected for the most preferred urban form (see the previous subsection) (Figure 7.14). The aspiration to retain the traditional built forms' levels of density in the local areas was consolidated.

Finally, "density" was not perceived from density per square, but by the feel of comfort defined by soft landscape and enclosure space. Figure 7.15 shows the inconsistency between perceived density taken from Figure 7.14 and real floor area ratio (FAR) represented by each image. People perceived and ranked different levels of density for images 3 and 4 and images 7 and 9, although each group represents the same FAR. Further, interviewees perceived the low density built form represented by image 8 as high density where green open spaces are rarely found.

Perceptions in relation to building fabric are summarized in Table 7.6.

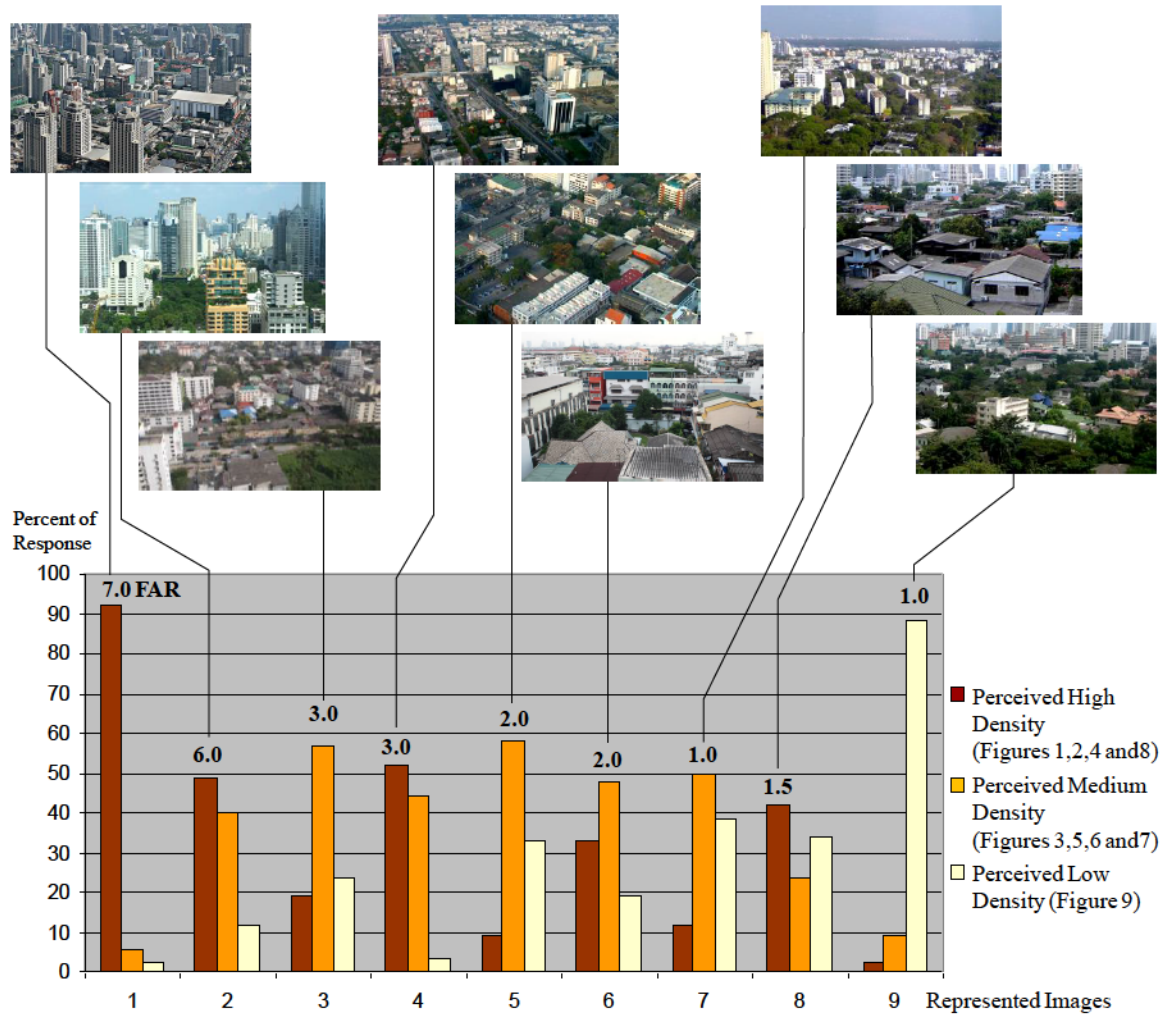
Table 7.6 Perception-Based Data for Sukhumvit's Building Fabric

| Superblock  | Superblock-Quarter   | Soi  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• People perceived density from the effective density, influenced by soft landscape and open spaces, not by the building density. This perception was applied for all morphological layers.</li> <li>• People expected to have pedestrian-friendly streets,</li> </ul> | <ul style="list-style-type: none"> <li>• People perceived that a variety of forms including both modern and traditional buildings is essential to define this layer.</li> <li>• People perceived a mix of global and local identity at this layer because both modern and traditional built forms were used interchangeably to interpret the areas along the local linkage.</li> </ul> | <ul style="list-style-type: none"> <li>• 51.1% of people preferred to live in a low density area (1.0 FAR).</li> <li>• People did not expect active frontages of buildings for their home places, defined by people choosing the form of bungalows developed with large front yards for identifying the preferred home place.</li> </ul> |

Continued

Table 7.6 Continued

| Superblock  | Superblock-Quarter   | Soi  |
|---|--|--|
| <p>showing the need for mobility of people and a vitality of places.</p> <ul style="list-style-type: none"> <li>• People did not perceive the importance of mixed building types, ages and tenures at this layer because they evaluated this layer as one of the most modern areas of Bangkok.</li> <li>• People used the accumulation of modern high-rise buildings as a key element to interpret place identity.</li> </ul> | <ul style="list-style-type: none"> <li>• However, people thought high-rise condominiums as a symbolic form of high density which people disliked for the local areas.</li> </ul> | <ul style="list-style-type: none"> <li>• People identified the remaining traditional communities as a good aspect of Sukhumvit.</li> </ul> |



Note: Floor area ratios (FARs) are presented above bar charts.

Figure 7.15 Inconsistency Between Perceived Density and Building Density, Sukhumvit, 2011  
Source: Semi-Structured Interview, 2011

### 7.3.6 Perceptions of Use Pattern in Relation to Form-Adaptations

Perceptions of use patterns were collected through questions 7 and 8, *Which uses do you need more of in your neighbourhood/this area?* and *Which uses do you need less of in your neighbourhood/this area?* Table 7.7 shows the results.

Table 7.7 Users' Expectation for Use in Sukhumvit, 2011

| <i>Which uses do you need more of in your neighbourhood/this area</i>  | <i>Which uses do you need less of in your neighbourhood/this area</i>   |
|--|---|
| <ul style="list-style-type: none"> <li>• Medium and Low Cost Residence</li> <li>• Low Cost Service and Facility               <ul style="list-style-type: none"> <li>○ Restaurant / Food Plaza</li> <li>○ Hospital</li> <li>○ Market</li> <li>○ Shopping Mall</li> <li>○ School</li> </ul> </li> <li>• Open Space               <ul style="list-style-type: none"> <li>○ Public Green Space</li> <li>○ Square</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• High-Rise Condominiums</li> <li>• High-Rise Office Buildings</li> <li>• Street Vendors</li> <li>• Pubs and Bars</li> <li>• Population</li> <li>• Traffic and Congestion</li> </ul> |
| <i>Why do you need more?</i>   | <i>Why do you need less?</i>  |
| <ul style="list-style-type: none"> <li>• Responding to Local Need</li> <li>• Gaining Fresh Air / Natural Ventilation</li> <li>• Reducing Pollution</li> </ul>  | <ul style="list-style-type: none"> <li>• Decreasing Population Density</li> <li>• Decreasing Congestion</li> <li>• Enabling Walkability</li> </ul>  |

Source: Semi-Structured Interviews, 2011

As shown in Table 7.7, medium and low cost residences, low cost services and facilities and open space were perceived as inadequate. In accordance with this perception, Figure 7.16 shows the mental map that 88 interviewees drew for *Where is the most common place/space for meeting neighbours and/or friends?* (question 9 in Appendix D). The figure shows that few areas were used by users and they were far apart, where many locate only on the superblock's perimeters.

In addition, 93% and 67% of people expected to have more soft landscaping open spaces and public squares in Sukhumvit; this data was assessed through questions 14 and 15, *Do you consider it important to have parks nearby?* and *Do you consider it important to have squares nearby?* Fresh air, ventilation and access to greenery were key reasons.

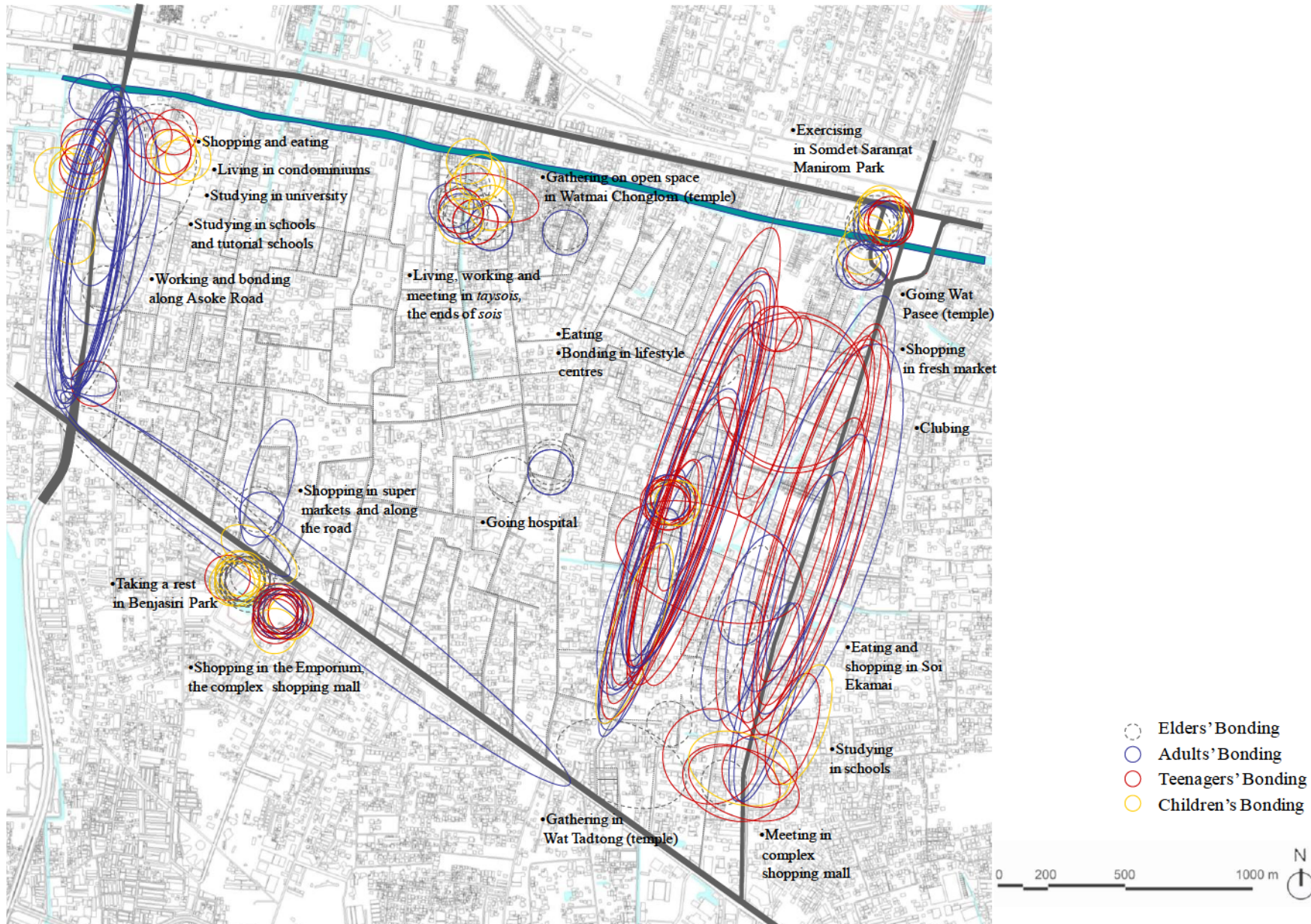


Figure 7.16 Common Places and Spaces People Use in Sukhumvit, 2011  
 Source: Users' Mental Maps, 2011

In contrast, users identified a requirement for less high-rise residences and commercial buildings, street vendors, population and traffic congestion (Table 7.7). Reason for that opinion is to decrease population density and congestion and to enable walkability. “I want to see fewer condominiums in order to see less people and traffic” said an adult office worker in Sukhumvit.

The relationship between expectations for pattern of use and perceptions of street and open space was found from the interviews. In Sukhumvit, with few pavements, people cannot flow out onto the street without intimidation from traffic and pollution and without obstruction from street vendors who accumulate along streets. Based on communication content with participants, people have gained the perception of crowding when they cannot achieve a comfort feeling in controlling and using public open spaces. In this sense, dual-perceptual data were found: expectations for high levels of connectivity and requirements to tame traffic and pollution; as well as, greater need for more local services, shops and vitality along the streets and aspirations to get rid of street vendors from streets (Table 7.7).

In terms of transport modes, Table 7.8 shows user’s satisfactions and expectations for modes of transport, assessed from questions 1 and 2, *Which modes of transport do you normally use?* and *Would you please rank transportations you use?*

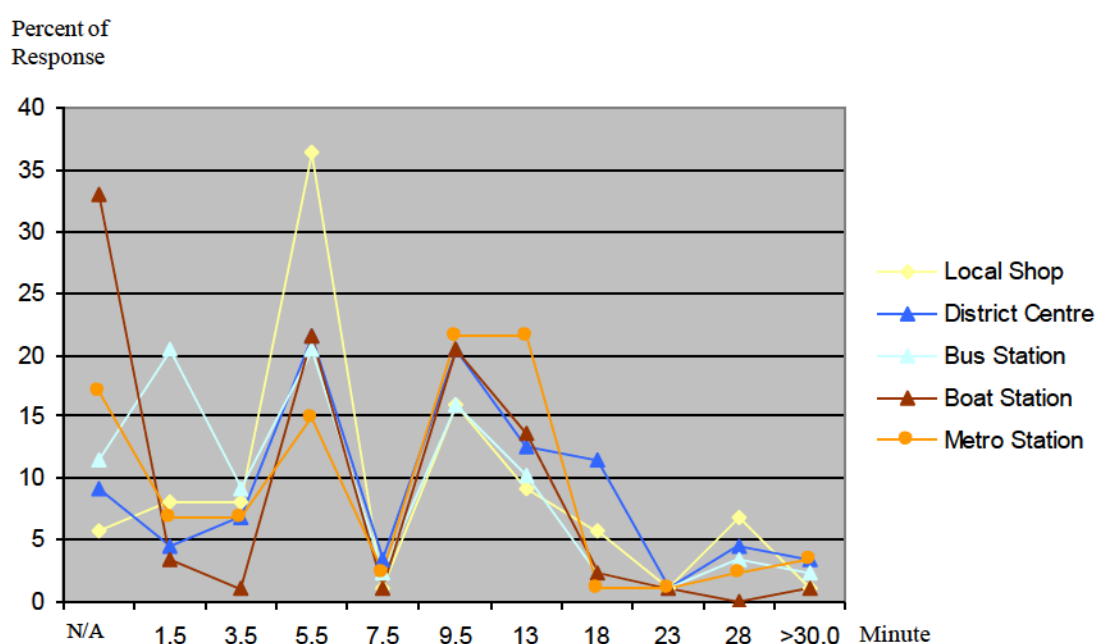
Table 7.8 Users’ Satisfaction and Expectation for Modes of Transport in Sukhumvit, 2011

| Modes of Transport | Percent of Uses | Most Satisfaction | Why have you given this score?  | How could this form of transport be improved?                                    |
|--------------------|-----------------|-------------------|---|--|
| Train              | 27.5            | Good              | Positive: convenient, fast<br>Negative: expensive                                 | More train lines   |
| Bus                | 19.6            | Moderate          | Positive: inexpensive<br>Negative: congestion, not air-conditioned                | Better traffic management for decreasing congestion                              |
| Boat               | 7.2             | Moderate          | Positive: fast<br>Negative: inadequate safety, deficient boats                    | Better service and safety  |
| Car                | 17.6            | Moderate          | Positive: convenient<br>Negative: slow journey because of congestion              | Better traffic management for decreasing congestion                              |
| Motorbike          | 7.2             | Good              | Positive: fast, getting direct to destination                                     | Specific motorbike lane provision  |
| Bicycle            | 2.6             | Good              | Positive: convenient, fast<br>Negative: lack of bike lane                         | Precise regulation and design for bicycle users                                  |
| Foot               | 18.3            | Moderate          | Positive: convenient<br>Negative: poor pavements, obstruction from street vendors | Wider pavements with shadow, street trees, and no congestion from street vendors |
| Total              | 100.0           |                   |   |  |

Source: Interviews with Users, 2011

As shown in Table 7.8, most people ranked “good” for train, motorbike, and bicycle, but they valued “moderate” for boat, bus, car and foot. The latter group was not given for a good score with the reason of poor service for boat, slow journeys affected by congestion for bus and car, and barriers to walkability.

While a few users used boats to access Sukhumvit, a great number used train and bus for their journey. However, people were prepared to walk only for short distances to access bus stations. Regarding question 12, *How far are you willing to walk from home/work/visit places to access these following places?*, Figure 7.17 shows that, although most people were prepared to walk for 5.5 minutes to access local shops, district centre and boat station and 10.5 minutes for metro, many were prepared to walk to access bus stops only for 3.5 minutes. The main reason why people tend not to walk that far is not the hot climate of Bangkok but the congestion which makes using buses a negative experience.



Note: N/A implies inapplicable places to access or use

Figure 7.17 Users' Preparation to Access Places by Walk, Sukhumvit, 2011  
Source: Semi-Structured Interview, 2011

Data showed that users required more local services and facilities and expected to access public transport modes to be as easy as possible in the areas along the roads and the local linkage. However, with respect to perceptions of “home” in the *soi*-based morphology,

people did not recognize the importance of having mass transport such as metros and buses in *sois* for accessing land and buildings. Similarly, although local services and facilities were required, a wide range of economic activity was not expected for the home zone.

Table 7.9 shows the summary to perceptions of use pattern in Sukhumvit.

Table 7.9 Perception-Based Data for Sukhumvit's Use Pattern

| Superblock  | Superblock-Quarter  | Soi   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• People perceived crowding as a negative factor affecting the willingness to use public spaces.</li> <li>• Although people accepted that a wide range of uses is important, the accumulation of street vendors affecting walkability should be reduced.</li> <li>• People required more local services and facilities such as local restaurants, markets, hospitals and schools.</li> <li>• People would like to have more parks, squares, greenery and shade.</li> <li>• 86% and 51% of people were not satisfied using bus and car due to excessive congestion along the roads.</li> <li>• People were prepared to walk 10.5 minutes (approx. 800m.) for metros and 3.5 minutes (approx. 300m.) for bus stops, influenced by congestion.</li> <li>• People expected to access all public transport stations as easily as possible.</li> </ul> | <ul style="list-style-type: none"> <li>• People thought that freedom and control over public realm are important to encourage the willingness to use public spaces.</li> <li>• People accepted that a wide range of uses is important for this layer.</li> <li>• People required more local services and facilities; the high cost food was recognized as one of Sukhumvit's bad aspects.</li> <li>• People expected to have more public transport along the local linkage.</li> <li>• Despite being used as the local linkage, less traffic was required.</li> </ul> | <ul style="list-style-type: none"> <li>• People evaluated intermixed communities as one of the key features that should be preserved.</li> <li>• People perceived this layer as a truly home place where a wide range of economic activity was not required.</li> <li>• Despite requiring more transport services, people did not want to have mass transport such as buses in the home area.</li> <li>• People are willing to walk more while retaining the use of private motorized transport and the service of small-scale public transports (motorcycle taxi and minibus).</li> <li>• People ranked high traffic level in Sukhumvit as bad aspects.</li> </ul> |

## 7.4 Local Framework of Form-Adaptations

This section presents a framework of form-adaptations. The aim of this framework is to interpret acceptance for change of Sukhumvit's patterns of form, influencing the modifications of indicators for evaluating acceptable sustainable urban forms (in the next section). Further, it provides the ways in which the design principles for local sustainable urban forms can be established in CH8.

As shown in Table 7.10, the local framework is interpreted in relation to perception-based data as they are summarized in Tables 7.1 to 7.4, 7.6 and 7.9 in the previous section.

Table 7.10 The Local Framework of Form-Adaptations with Relevance to Local Perception-Based Data

| Key Issues            |    | Superblock  | Superblock-Quarter   | <i>Soi</i>   |  |
|-----------------------|----|---|--|--|--|
| Street and Open Space | 1  | Linkage between Centres of High Activities                  | With respect to perceptions of high levels of connectivity, road networks should be maintained.  | A short linked-up pattern of the local linkage should be protected.  | Well-connected routes should be promoted to encourage accessibility of <i>sois</i> .   |
|                       | 2  | Linkage of Public and Private Open Space as Green Corridors | Defining desirable form patterns, soft landscape should be more developed along the roads' strips.   | Soft landscape should be more developed along the local linkage's strips.  | Display from private gardens should be encouraged.   |
|                       | 3  | Linked Green Corridors as Natural Networks                  | Major natural spaces should be more developed, such as pocket parks along the roads.   | The main natural network should be developed along the local linkage.  | Green corridors should be developed and linked as a network.   |
|                       | 4  | Planting and Renewing Street Trees                          | Street trees have to be planted along all routes.  | Street trees have to be planted.   | Street trees have to be planted.   |
|                       | 5  | Reduced Hard Surfaces and Run-Off                           | Soft landscape has to be developed, providing natural drainage and absorption.   | Soft landscape has to be developed and linked with canal, providing excess run-off.  | Sansab canal has to be preserved; coarse gain of any structures impeding run-off to the canal should be removed.   |
|                       | 6  | Visually Imaginable Networks of Space                       | Influencing a readable place, a visible choice of roads has to be protected.   | Distinctiveness of the local linkage has to be encouraged.   | Visual permeability along <i>sois</i> should be developed.   |
| Street and Block      | 7  | Fine Grained Street and Block                               | Encouraging a mobility of people, the distances between <i>paksois</i> should be kept unchanged. <i>Paksois</i> should be more developed on coarse-gained streets. | Fine-grained streets found along the local linkage should be preserved.  | Lengths of blocks should be divided; well-connected <i>sois</i> are fundamental.   |
| Plot and Building     | 8  | Fine Grain of Land Subdivisions and Buildings               | With respect to perceived global identity, fine grain of plots and buildings is not required to be protected by people.  | A mix of plot sizes and building footprints should be retained. Gradual change is complementary  | Fine grain of plots and buildings has to be protected.   |
| Building              | 9  | Density of Built Components                                 | High density is accepted for global identity but a feel of comfort defined by green open spaces has to be prioritized and measured.                                | Representing a mix of modern and traditional townscape, medium density is accepted for superblock-quarter but a feel of comfort has to be evaluated. | 1 FAR is expected from people for their traditional townscape and a feel of comfort has to be prioritized.   |
|                       | 10 | Active Frontages  | Well-defined access and lively features facing public realms should be promoted.   | Well-defined access and lively features facing public realms should be promoted.   | Despite being required from a few users, active frontages buildings are not requested in general; this is defined from the front private space of bungalows that people needed most. |
|                       | 11 | Mixed Building Types, Ages and Tenures                      | Regarding acceptance for change, a mix of building types, ages and tenures in modern districts is not required by users.   | A variety of forms should be protected, defining a mix of global and local identity perceived by people.   | Defining Sukhumvit's good aspects, a wide range of traditional communities should be retained.   |

Continued

Table 7.10 Continued

| Key Issues |    | Superblock   | Superblock-Quarter  | <i>Soi</i>  |   |
|------------|----|--|---|---|---|
|            | 12 | Visually Interesting Buildings                                 | Defined by modern buildings, interesting built forms along the roads have to be retained and encouraged.                                      | A mix of landscape features driven by modern and traditional built forms should be retained.                                  | Civic and community buildings located in <i>sois</i> should be preserved.   |
|            | 13 | Locally Distinctive Building Groups and Spaces                 | Traditional buildings are not required to be protected regarding the acceptance for modern development.                                       | To retain a degree of a mix of global and local identity, current boundary treatments and building lines have to be retained. | Expressing local distinctiveness, traditional townscape has to be protected.  |
| Use        | 14 | Density of Population  | High population density is accepted but an emotion of freedom influenced by physical permeability has to be prioritized.                      | Elements influencing freedom and control have to be prioritized while medium density is accepted.                             | Density should not be higher than current level (216 Persons/ha) and elements influencing freedom and control have to be prioritized. |
|            | 15 | Mixed Communities  | A wide range of land utilization and residences should be promoted.   | A variety of uses replying to various user groups has to be retained.   | Intermixed communities found along <i>soi</i> networks have to be protected.  |
|            | 16 | Viable Range of Uses and Facilities                            | People required more local services and facilities which have to be encouraged, such as parks and restaurants.                                | Services and facilities have to be encouraged, such as parks, markets and schools.  | Services and facilities have to be encouraged, such as local shops.   |
|            | 17 | Employment and Economic Activities                             | Locally economic activities influenced by street vendors should be retained; mobility of people is complementary.                             | Street vendors should be encouraged to support local economy of the local areas.  | Economic activity is required in the superblock and superblock-quarter but not in <i>sois</i> of home places.                         |
|            | 18 | Public Transport Infrastructure                                | Public transport options should be provided with respect to specific walking distances.   | Public transport options should be provided with respect to specific walking distances.                                       | Public transport options should be provided with respect to specific walking distances.   |
|            | 19 | Layout of Transport Stations as an Integral Part of the Street | Developed transport stations along the roads' strips should be retained.  | Transport stations should be developed and easy to access along the local linkage.  | Stations for small-scale public transport should be built.  |
|            | 20 | Multi-Modes of Movement  | Found at this layer, a variety of transport options should be retained.   | More transport options should be promoted such as buses, walking and cycling.   | Excluding mass transport, choices of transport should be provided.  |
|            | 21 | Walking and Cycling Priority                                   | As a key to encourage walkability, greenery and shade have to be prioritized and pavements should be widened.                                 | Greenery and shade have to be provided together with pavement development and traffic taming.                                 | Greenery and shade have to be prioritized as a key factor encouraging walkability.  |
|            | 22 | Restricted Vehicle Circulation and Speeds                      | Vehicle restriction and speed in terms of traffic taming are not required for the roads where high levels of physical movement are requested. | A high traffic level has to be prevented from the local linkage.  | Traffic cutting through neighbourhoods has to be prevented.   |

Continued

Table 7.10 Continued

| Key Issues   |    | Superblock  | Superblock-Quarter  | <i>Soi</i>  |   |
|--------------|----|---|---|---|---|
| All Elements | 23 | Well-Ventilated Spaces                            | Pollution needs decreasing. High long structures impeding airflow should be removed, such as elevated rail ways above Sukhumvit Road. | Well-ventilated spaces should be developed by preventing concentrations of high long structures of the same height. | Well-ventilated spaces should be retained by preserving low density settlements.  |
|              | 24 | Greenery Display and Soft Landscape               | Soft landscape should be provided for people, especially from high density building groups located along the roads' strips.           | Greenery display should be incorporated more from both new and traditional buildings.                               | Display from bungalows' gardens should be encouraged.   |
|              | 25 | Gradual Change of Spatial Configuration           | Gradual change is not required, regarding the acceptance for global development.  | Contributing to a mix of global and local identity, gradual change of built forms should be undertaken.             | Identifying Sukhumvit's good aspects, local townscape of traditional neighbourhoods has to be retained.   |
|              | 26 | Legible Settlement through Active Use             | A clear image of modern districts influenced by concentrations of business activities should be maintained.                           | Mix use accumulating along the local linkage should be retained.  | Active use should be more developed for encouraging focal points to <i>soi</i> networks.  |
|              | 27 | Legibility through Landmark and Space Disposition | Landmarks influenced by new building groups should be preserved.  | Landmarks, gateways and focal points should be more incorporated in the local linkage.                              | Focal points should be more developed to help the orientation of <i>soi</i> networks.   |
|              | 28 | Positive Identity and Landscape Character         | Locally responsive climate and ecology have to be more included in modern buildings and spaces, resulting in the positive identity.   | Responding to local perceptions, natural features have to be prioritized in urban settings.                         | Defining the most desirable urban form, the protection for soft landscapes has to be prioritized together with the protection for local identity. |
|              | 29 | Preserving Significant Public Realm               | Regarding the development of modern districts, alterations of urban settings and public realm are accepted by people.                 | With respect to the process of change, preservation for the local linkage is not required by people.                | Defining the <i>soi</i> -based morphology, <i>sois</i> should be protected.   |
|              | 30 | Personalisation of Communities                    | Dominance of modern townscape defining global identity should be protected.   | Uniqueness of a mix of socio-spatial patterns should be retained, defining a mix of global and local identity.      | Distinctiveness of traditional neighbourhoods should be retained.   |

Note: The table represents capacity for change in order to: 1) provide the ways in which the design principles for local sustainable urban forms are established in CH8 and 2) identify the indicators which have to be modified in the next section as shown in *blue*.

Social aspirations for form-adaptations are shown in Table 7.10, representing capacity for the change of Sukhumvit. Further, the data are presented in accordance with morphological components (street, block, plot, building, use and relations from all elements) through which qualities of sustainable urban form can be delivered (CH1). In this sense, local acceptances for subsequent change (as shown in the table) become a foundation to

ascertain acceptable degrees of sustainable development through the modifications of indicators used in the evaluations of sustainable urban forms.

Because these perception-based data are presented following 30 subcategories to evaluate sustainability by literature-based indicators (*Appendix J*), the responsiveness between the urban form locally accepted and the sustainable urban form globally evaluated can be interrogated. As shown in the table, inconsistency between them is highlighted in **blue**, influencing the modification of local indicators undertaken in the next section.

## **7.5 Local Indicators for Evaluating Local Levels of Sustainability**

A key to establish the local indicators is to produce a set of indicators with respect to acceptable degrees of development. With reference to the framework showing local perceptions and future form-aspirations, the indicators for evaluating local levels of sustainability are formulated. Based on Table 7.10, Table 7.11 shows ways in which the local indicators are established (methods of modifying the local indicators are designed in CH4). The literature-based indicators appropriate with what people expect for their environmental choices are retained. Highlighted in blue (Table 7.11), the indicators which do not correspond with social aspiration are omitted and the new ones are modified.

It should be emphasized that ways in which the literature-based indicators are rejected or modified rely on perception-based data of form-aspirations collected in the field (Table 7.10). How participants did or did not recognize the importance of urban features and components are instrumental in evaluating locally acceptable sustainable urban forms at each layer of Sukhumvit's socio-spatial structures. In this sense, the interpretation of accepted and rejected indicators is based on data collected from specific samples in which the modification of local indicators needs to be further refined in other locations.

For the superblock morphology, the indicators are modified with reference to local acceptance for global development in the modern districts. Table 7.11 shows that, while many literature-based indicators are appropriate for use in the evaluation of locally acceptable sustainable urban forms, the indicators emphasizing fine grain of plots and buildings, mixed building types, locally distinctive building groups and spaces and gradual change are omitted.

Table 7.11 Modifications of Local Indicators for Evaluating Sustainability

| Literature-Based Indicators (LBI)* |    |  | Local Indicators**   |  |  |
|------------------------------------|----|--|--|--|--|
|                                    |    |  | Superblock   | Superblock-Quarter   | Soi  |
| Street and Open Space              | 1  | Linkage between Centres of High Activities                     | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 2  | Linkage of Public and Private Open Space as Green Corridors    | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 3  | Linked Green Corridors as Natural Networks                     | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 4  | Planting and Renewing Street Trees                             | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 5  | Reduced Hard Surfaces and Run-Off                              | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 6  | Visually Imaginable Networks of Space                          | LBI is retained.   | LBI is retained.   | LBI is retained.   |
| Street and Block                   | 7  | Fine Grained Street and Block                                  | LBI is retained.   | LBI is retained.   | LBI is retained.   |
| Plot and Building                  | 8  | Fine Grain of Land Subdivisions and Buildings                  | LBI is omitted.  | LBI is retained.   | LBI is retained.   |
| Building                           | 9  | Density of Built Components                                    | Indicator is modified: <i>Levels of Building Density and Feel of Comfort</i>             | Indicator is modified: <i>Levels of Building Density and Feel of Comfort</i>             | Indicator is modified: <i>Levels of Building Density and Feel of Comfort</i>             |
|                                    | 10 | Active Frontages   | LBI is retained.   | LBI is retained.   | LBI is omitted.  |
|                                    | 11 | Mixed Building Types, Ages and Tenures                         | LBI is omitted.  | LBI is retained.   | LBI is retained.   |
|                                    | 12 | Visually Interesting Buildings                                 | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 13 | Locally Distinctive Building Groups and Spaces                 | LBI is omitted.  | LBI is retained.   | LBI is retained.   |
| Use                                | 14 | Density of Population  | Indicator is modified: <i>Levels of Population Density and Control over Public Realm</i> | Indicator is modified: <i>Levels of Population Density and Control over Public Realm</i> | Indicator is modified: <i>Levels of Population Density and Control over Public Realm</i> |
|                                    | 15 | Mixed Communities  | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 16 | Viable Range of Uses and Facilities                            | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 17 | Employment and Economic Activities                             | LBI is retained.   | LBI is retained.   | LBI is omitted.  |
|                                    | 18 | Public Transport Infrastructure                                | Indicator is modified: <i>Public Transport and Specific Distances to Access</i>          | Indicator is modified: <i>Public Transport and Specific Distances to Access</i>          | Indicator is modified: <i>Public Transport and Specific Distances to Access</i>          |
|                                    | 19 | Layout of Transport Stations as an Integral Part of the Street | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 20 | Multi-Modes of Movement  | LBI is retained.   | LBI is retained.   | Indicator is modified: <i>Modes of Movement and Small-Scale Public Transport</i>         |
|                                    | 21 | Walking and Cycling Priority                                   | Indicator is modified: <i>Walking and Cycling Encouraged by Greenery</i>                 | Indicator is modified: <i>Walking and Cycling Encouraged by Greenery</i>                 | Indicator is modified: <i>Walking and Cycling Encouraged by Greenery</i>                 |
|                                    | 22 | Restricted Vehicle Circulation and Speeds                      | LBI is omitted.  | LBI is retained.   | LBI is retained.   |

Continued

Table 7.11 Continued

| Literature-Based Indicators (LBI)* |    |   | Local Indicators**   |  |  |
|------------------------------------|----|---|--|--|--|
|                                    |    |   | Superblock   | Superblock-Quarter   | <i>Soi</i>   |
| All Elements                       | 23 | Well-Ventilated Spaces                            | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 24 | Greenery Display and Soft Landscape               | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 25 | Gradual Change of Spatial Configuration           | LBI is omitted.  | LBI is retained.   | LBI is retained.   |
|                                    | 26 | Legible Settlement through Active Use             | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 27 | Legibility through Landmark and Space Disposition | LBI is retained.   | LBI is retained.   | LBI is retained.   |
|                                    | 28 | Positive Identity and Landscape Character         | Indicator is modified:<br><i>Positive Identity Defined by Locally Responsive Climate and Ecology</i> | Indicator is modified:<br><i>Positive Identity Defined by Locally Responsive Climate and Ecology</i> | Indicator is modified:<br><i>Positive Identity Defined by Locally Responsive Climate and Ecology</i> |
|                                    | 29 | Preserving Significant Public Realm               | LBI is omitted.  | LBI is omitted.  | Retaining  |
|                                    | 30 | Personalisation of Communities                    | LBI is retained.   | LBI is retained.   | LBI is retained.   |

\* The literature-based indicators are developed in CH1.

\*\* Highlighted in blue, the local indicators are modified with relevance to the perception-based data collected from the field (see Table 7.10).

\*\* The local indicators are presented as the work sheet in Appendix J.

For the superblock-quarter morphology, the indicators are formulated with respect to the recognitions of a mix of global and local tissue. The indicators are modified by retaining the evaluation content for traditional built forms, fine grain, mixed building types and gradual change, while emphasizing issues of mixed use, economic activities and multi-modes of movement that should be developed for this morphological layer.

For the *soi*-based morphology, the indicators are established in order to respond to the particular patterns of, and local aspirations for, Sukhumvit's traditional neighbourhoods. Table 7.11 shows that, while several literature-based indicators are retained, the indicators focusing on active frontage for housings and on employment and economic activities in home place are omitted from the evaluation.

Furthermore, specific perceptions and aspirations derived from the semi-structured interviews with participants are implemented to modify the indicators responsive to local contexts and conditions. As shown in Table 7.11 and *Appendix J* (p.395), they are:

1. *Levels of Building Density and Feel of Comfort (Indicator 9)*, The indicator incorporates high, medium and low density expected from users for three morphological layers and prioritizes the feel of comfort (a key to attain acceptance for change) measured by soft landscaping open spaces in urban settings.

2. *Levels of Population Density and Control Over Public Realm (Indicator 14)*, Because people evaluated crowding through physical permeability (see 7.3.6 *Perceptions of Use Pattern in Relation to Form-Adaptations*), choice and quality of access in public spaces have to be measured. Further, the acceptance for higher density of the superblock and superblock-quarter and the expectations to secure current density (216 persons/ha) in *sois* are incorporated in the evaluation.
3. *Public Transport and Specific Distances to Access (Indicator 18)*, Specific walking distance to access bus stops (3.5 minute or approximate 300 metre) found from perception-based data replaces the global standard to access bus stops in which 5 minute or 400 metre is suggested by Barton *et al.* (2003).
4. *Modes of Movement and Small-Scale Public Transport (Indicator 20)*, With reference to the *soi*-based morphology, small-scale public transport in response to the home zone are emphasized in the sustainability evaluation; such as motorcycle taxis and minibuses.
5. *Walking and Cycling Encouraged by Greenery (Indicator 21)*, An attachment of greenery and shade is prioritized as a key feature to be evaluated because it could encourage people to walk 9.5 minutes further than usual in Sukhumvit (see 7.3.2 *Perceptions of Street and Open Space in Relation to Form-Adaptations*).
6. *Positive Identity Defined by Locally Responsive Climate and Ecology (Indicator 28)*, As the instrument to attain local acceptance for the change, the natural features attached as an integral part of townscape have to be included in the evaluation for identity perceived differently between global and local tissues of Sukhumvit.

Presented in *Appendix J*, the local indicators are set to each morphological layer and the descriptions and parameters used for their evaluation are also incorporated to each indicator. By applying these indicators, the case study area's local levels of sustainability are assessed in the following sections.

## 7.6 Locally Responsive Scores of Sustainability

As discussed in CH4, to define local levels of sustainability, perceptual evaluation has to be implemented by using the local indicators established in the previous section to evaluate Sukhumvit's urban forms.

Shown as the key database in CH5 (p.178-180), Sukhumvit's streets, blocks, plots, buildings, use and relationships between all elements are reviewed following the local indicators' parameters (good [3], moderate [2] and poor [1] manifestations) as they are noted in *Appendix J*. As a result of evaluation, the scores are rated with respect to the parameters as shown in Table 7.12.

Table 7.12 Locally Sustainability Scores Rated for Sukhumvit's Urban Forms

| Local Indicators      |    |   | Scores*    |                    |     |
|-----------------------|----|---|------------|--------------------|-----|
|                       |    |   | Superblock | Superblock-Quarter | Soi |
| Street and Open Space | 1  | Linkage between Centres of High Activities                          | [3]        | [3]                | [2] |
|                       | 2  | Linkage of Public and Private Open Space as Green Corridors         | [1]        | [1]                | [1] |
|                       | 3  | Linked Green Corridors as Natural Networks                          | [1]        | [1]                | [1] |
|                       | 4  | Planting and Renewing Street Trees                                  | [2]        | [1]                | [1] |
|                       | 5  | Reduced Hard Surfaces and Run-Off                                   | [1]        | [1]                | [2] |
|                       | 6  | Visually Imaginable Networks of Space                               | [3]        | [1]                | [1] |
| Street and Block      | 7  | Fine Grained Street and Block                                       | [2]        | [2]                | [1] |
| Plot and Building     | 8  | Fine Grain of Land Subdivisions and Buildings                       | N/A        | [2]                | [3] |
| Building              | 9  | Levels of Building Density and Feel of Comfort                      | [1]        | [1]                | [2] |
|                       | 10 | Active Frontages  | [2]        | [2]                | N/A |
|                       | 11 | Mixed Building Types, Ages and Tenures                              | N/A        | [3]                | [3] |
|                       | 12 | Visually Interesting Buildings                                      | [2]        | [2]                | [1] |
|                       | 13 | Locally Distinctive Building Groups and Spaces                      | N/A        | [2]                | [3] |
| Use                   | 14 | Levels of Population Density and Control over Public Realm          | [1]        | [1]                | [2] |
|                       | 15 | Mixed Communities   | [2]        | [3]                | [3] |
|                       | 16 | Viable Range of Uses and Facilities                                 | [3]        | [2]                | [1] |
|                       | 17 | Employment and Economic Activities                                  | [2]        | [2]                | N/A |
|                       | 18 | Public Transport and Specific Distances to Access                   | [3]        | [1]                | [1] |
|                       | 19 | Layout of Transport Stations as an Integral Part of the Street      | [3]        | [1]                | [1] |
|                       | 20 | Multi-Modes of Movement   | [3]        | [1]                | [1] |
|                       | 21 | Walking and Cycling Encouraged by Greenery                          | [1]        | [1]                | [1] |
|                       | 22 | Restricted Vehicle Circulation and Speeds                           | N/A        | [1]                | [1] |
|                       | 23 | Well-Ventilated Spaces  | [1]        | [2]                | [3] |
| All Elements          | 24 | Greenery Display and Soft Landscape                                 | [1]        | [1]                | [2] |
|                       | 25 | Gradual Change of Spatial Configuration                             | N/A        | [2]                | [3] |
|                       | 26 | Legible Settlement through Active Use                               | [3]        | [3]                | [2] |
|                       | 27 | Legibility through Landmark and Space Disposition                   | [3]        | [2]                | [1] |
|                       | 28 | Positive Identity Defined by Locally Responsive Climate and Ecology | [1]        | [1]                | [2] |
|                       | 29 | Preserving Significant Public Realm                                 | N/A        | N/A                | [2] |
|                       | 30 | Personalisation of Communities                                      | [3]        | [3]                | [2] |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating the database of urban forms developed in CH5, following the parameters of the local indicators established in Appendix J.

N/A When participants did not recognize the importance of an urban feature, the local indicators were not applied.

To define levels of sustainability, the scores as shown in Table 7.12 are categorized into the particular sets for identifying levels of sustainability qualities. (It should be noted that different combinations of indicators for evaluating levels of: resource efficiency; biotic support; cleanliness; resilience; variety; accessibility; legibility; and identity, have been discussed in CHs 1 and 4).

*Appendix L* (p.409) shows the perceptual evaluations of the case study area in eight tables. Each table is developed by including the specific set of indicators for evaluating each quality and presenting the scores as they are assessed for those indicators (Table 7.12). At each table in *Appendix L*, the average scores are calculated for three morphological layers of Sukhumvit, representing the numeric results of evaluations. Table 7.13 shows the summary of the average scores.

Table 7.13 Average Scores Calculated from Appendix L

| Sustainability Qualities | Average Scores |                    |            |
|--------------------------|----------------|--------------------|------------|
|                          | Superblock     | Superblock-Quarter | <i>Soi</i> |
| Resource Efficiency      | 1.88           | 1.60               | 1.55       |
| Biotic Support           | 1.42           | 1.14               | 1.57       |
| Cleanliness              | 1.66           | 1.28               | 1.42       |
| Resilience               | 2.50           | 2.00               | 2.00       |
| Variety                  | 2.33           | 2.12               | 2.00       |
| Accessibility            | 2.80           | 1.83               | 1.50       |
| Legibility               | 2.75           | 2.00               | 1.25       |
| Identity                 | 2.00           | 2.00               | 2.25       |

Note: 3 is the maximum score in relation to the indicators' parameter.

## 7.7 Sukhumvit's Local Levels of Sustainability

In accordance with the average scores summarized in the previous section, the local levels of sustainability are shown in Table 7.14. As seen from the table, levels of sustainability are different between morphological layers and between qualities delivered by each morphology.

Table 7.14 shows that, comprising high-rise and large footprint buildings, multi-modes of movement and a wide range of uses and activities, the superblock morphology delivers very high levels of accessibility and legibility. Further, regarding the acceptance for the change, the indicators in relation to fine grain and gradual change are not applied in the perceptual evaluation for modern districts. High levels of resilience and variety therefore are assessed. Crucially, the other morphologies deliver these qualities at poorer levels.

Spatial patterns of the superblock should be protected for securing those sustainability qualities for Sukhumvit.

The qualities of identity, biotic support and cleanliness of the traditional neighbourhoods are found as the highest among the others (Table 7.14). To maintain these sustainability qualities, the feature of green open space and display, low density settlement, fine-grained built forms and locally morphological distinctiveness defining the *soi*-based morphology should be retained.

Furthermore, as shown in Table 7.14, the qualities of variety, accessibility and legibility, which cannot be delivered through morphological patterns of the *soi*-based morphology, are strengthened by the superblock-quarter morphology where the accumulation of mixed building types, uses and activities are recently developed along the local linkage’s strips. These features of the urban form should be secured for delivering these sustainability qualities for local areas inside the superblock.

Table 7.14 Local Levels of Sustainability Assessed from the Local Indicators

| Sustainability Qualities | Local Levels                  |         |         |         |                               |         |                      |         |           |         |
|--------------------------|-------------------------------|---------|---------|---------|-------------------------------|---------|----------------------|---------|-----------|---------|
|                          | Very Low                      |         | Low     |         | Moderate                      |         | High                 |         | Very High |         |
|                          | 1.0-1.2                       | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0                       | 2.1-2.2 | 2.3-2.4              | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      | Superblock Morphology         |         |         |         |                               |         |                      |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         |                               |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |
| Biotic Support           | Superblock Morphology         |         |         |         |                               |         |                      |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         |                               |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |
| Cleanliness              | Superblock Morphology         |         |         |         |                               |         |                      |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         |                               |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |
| Resilience               | Superblock Morphology         |         |         |         | Superblock-Quarter Morphology |         |                      |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         | Soi-Based Morphology          |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |
| Variety                  | Superblock Morphology         |         |         |         | Superblock-Quarter Morphology |         |                      |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         | Soi-Based Morphology          |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |
| Accessibility            | Superblock Morphology         |         |         |         | Superblock-Quarter Morphology |         |                      |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         | Soi-Based Morphology          |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |
| Legibility               | Superblock Morphology         |         |         |         | Superblock-Quarter Morphology |         |                      |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         | Soi-Based Morphology          |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |
| Identity                 | Superblock Morphology         |         |         |         | Superblock-Quarter Morphology |         | Soi-Based Morphology |         |           |         |
|                          | Superblock-Quarter Morphology |         |         |         | Soi-Based Morphology          |         |                      |         |           |         |
|                          | Soi-Based Morphology          |         |         |         |                               |         |                      |         |           |         |

- Superblock Morphology
- Superblock-Quarter Morphology
- Soi-Based Morphology

Although good levels of sustainability identify preservation-worthy features of each morphological layer, several qualities of sustainability have to receive more encouragement. Evaluated in this section, the local levels of sustainability present the local capacity to deliver sustainability in Sukhumvit as well as ways in which it can be strengthened as discussed further in the next chapter.

## 7.8 Gaps in Defining Sustainability with Relevance to Urban Localities

Based on two sets of indicators used in the evaluations, two sets of sustainability levels are identified by this study. As shown from Tables 7.15 to 7.17, Sukhumvit's global levels of sustainability of the superblock, the superblock-quarter and the *soi*-based morphology are taken from CH6; local levels of that are brought from the previous section.

According to these tables, although consistency is found from several levels of sustainability assessed from global and local perceptions, yet the difference between them is substantial, identifying gaps in defining sustainability in relation to urban localities.

Table 7.15 **Superblock Morphology**: Global and Local Levels of Sustainability

| Sustainability Qualities | Sustainability Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|-----------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low              |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2               | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      | ■                     | ■       | ■       | ■       | ■        |         |         |         |           |         |
| Biotic Support           | ■                     | ■       |         |         |          |         |         |         |           |         |
| Cleanliness              | ■                     | ■       | ■       |         |          |         |         |         |           |         |
| Resilience               | ■                     | ■       | ■       | ■       | ■        |         |         |         |           |         |
| Variety                  | ■                     | ■       | ■       | ■       | ■        | ■       |         |         |           |         |
| Accessibility            | ■                     | ■       | ■       | ■       | ■        | ■       | ■       | ■       | ■         |         |
| Legibility               | ■                     | ■       | ■       | ■       | ■        | ■       | ■       | ■       | ■         |         |
| Identity                 | ■                     | ■       | ■       | ■       | ■        | ■       |         |         |           |         |

■ Global levels are assessed in CH6.

■ Local levels are assessed in the previous section.

Table 7.16 **Superblock-Quarter Morphology**: Global and Local Levels of Sustainability

| Sustainability Qualities | Sustainability Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|-----------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low              |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2               | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      |                       |         |         |         |          |         |         |         |           |         |
| Biotic Support           |                       |         |         |         |          |         |         |         |           |         |
| Cleanliness              |                       |         |         |         |          |         |         |         |           |         |
| Resilience               |                       |         |         |         |          |         |         |         |           |         |
| Variety                  |                       |         |         |         |          |         |         |         |           |         |
| Accessibility            |                       |         |         |         |          |         |         |         |           |         |
| Legibility               |                       |         |         |         |          |         |         |         |           |         |
| Identity                 |                       |         |         |         |          |         |         |         |           |         |

Global levels are assessed in CH6.  
 Local levels are assessed in the previous section.

Table 7.17 **Soi-Based Morphology**: Global and Local Levels of Sustainability

| Sustainability Qualities | Sustainability Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|-----------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low              |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2               | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      |                       |         |         |         |          |         |         |         |           |         |
| Biotic Support           |                       |         |         |         |          |         |         |         |           |         |
| Cleanliness              |                       |         |         |         |          |         |         |         |           |         |
| Resilience               |                       |         |         |         |          |         |         |         |           |         |
| Variety                  |                       |         |         |         |          |         |         |         |           |         |
| Accessibility            |                       |         |         |         |          |         |         |         |           |         |
| Legibility               |                       |         |         |         |          |         |         |         |           |         |
| Identity                 |                       |         |         |         |          |         |         |         |           |         |

Global levels are assessed in CH6.  
 Local levels are assessed in the previous section.

A global perspective used for justifying sustainable urban forms cannot cope with appropriate degrees of development as people perceive for their place. For the superblock morphology, on the one hand, the acceptance for morphological change towards modern townscape results in higher levels of resilience and variety than they are indicated by literature-based indicators (Table 7.15). On the other hand, defined from users' perceptions, local requirements for more greenery and permeability influence lower levels

of resource efficiency and identity of this morphological layer than they are evaluated by a global view. It should be noted that a lower level of resource efficiency is also assessed for the superblock-quarter (Table 7.16) due to the same reason.

With respect to perceptions of the *soi*-based morphology as a traditional home place, local levels of many sustainability qualities are higher than global levels (Table 7.17) because a number of urban features are not required by users to be evaluated (compared with the global view), such as a wide range of economic activity and active frontage for buildings. Further, low density of buildings and population is consistent with social aspirations. However, because of a very high expectation for locally responsive climate and ecology in urban settings, quality of identity of traditional neighbourhoods where natural networks decline is not yet the best example, evaluated from a local perspective.

Based on this discussion, the gap in defining sustainability is not only the result of evaluations but also ways in which global and local indicators are established and used in different ways, as shown in Box 7.1.

#### Box 7.1 Gap in Defining Sustainability with Relevance to Urban Localities

1. Global criteria of sustainable urban forms are not capable in evaluating sustainability responsiveness to urban localities because they are not developed with respect to the local form.
2. Global criteria cannot be used for evaluating local sustainability because social ideas and needs with reference to the local forms are not taken into account in the evaluation.
3. Global criteria cannot cope with sustainability in relation to form and use alterations because local acceptance for change representing acceptable degrees of development in not integrated into the evaluation.
4. Results of global evaluations cannot result in sustainability implementations because the local capacity to deliver it is not integrated into the establishment and use of the indicators.

## 7.9 Conclusion

This chapter was intended to apply methods of perceptual evaluation to define local levels of sustainability for Sukhumvit. Following the fieldwork methodologies as developed in CH4, various actions were taken in the field study.

Collected from various stakeholders in Sukhumvit, although different definitions of sustainability were found among actors, users' perception was the cornerstone in defining locally appropriate sustainable urban forms because it reflected the interpretation of sustainability responsive to locality.

Users' perceptions were further collected and analysed in terms of Sukhumvit's form-adaptations. A key finding is that people perceived the local form in accordance with three morphological layers as they are defined in CH5. Driving aspirations for the change of the urban forms, recognitions for global and local identity were fundamental. In point of local views, transformations of the superblock and the superblock-quarter were locally accepted in order to accommodate global development and modern activities while an acceptable degree of the change was identified by protecting the distinctiveness of the *soi*-based morphology. In summary, key perceptions are:

1. Acceptance for global identity of the superblock morphology;
2. Acceptance for mixed global and local identity of the superblock-quarter morphology;
3. Protection for local identity of the *soi*-based morphology.

Representing capacity for change and reflecting appropriate degrees of sustainable development, local acceptance for form-adaptations was found as a key driver of locally appropriate sustainable urban forms. The acceptance was conditioned by specific requirements to be attached in the urban settings:

1. Feel of comfort defined by green open spaces;
2. Control over public realm defined by physical permeability;
3. Walking distances to access specific modes of transport;
4. Importance of greenery and shade in encouraging walkability;
5. Positive identity defined by locally responsive climate and ecology.

Based on the perceptions of Sukhumvit which were identified as the local framework of form-adaptations, local indicators were produced in order to cope with acceptable degrees

of sustainable development and to be used for evaluating locally acceptable sustainable urban forms.

Assessed in this chapter, local levels of sustainability show:

1. Different capacities to deliver sustainability between morphological layers;
2. Preservation-worthy tissues defined from their sustainability levels;
3. Required actions for maintaining and increasing sustainability qualities.

Finally, the difference between global levels of sustainability assessed in CH6 and local levels of that evaluated in this chapter shows gaps in defining sustainability. Dissimilar levels of sustainability highlight the gaps, as well as different ways to establish and use the global and local indicators. Key aspects on which local indicators rely, while global ones do not are:

1. Social idea of the local form.
2. Need for local climate, ecology and identity.
3. Acceptance for subsequent change.

Based on the local framework of form-adaptations and local levels of sustainability identified with reference to perception-based data, the design principles and implementation strategies for delivering locally acceptable sustainable urban form will be established in the next chapter. Crucially, they lead to another stage of the analysis of sustainable urban forms in which various ambitions and development dimensions come to play a role in the local process of form-productions.

# Chapter Eight

## Design Principles and Implementation Strategies

### **8.1 Introduction**

This chapter presents the design principles and implementation strategies for delivering locally acceptable sustainable urban form for Sukhumvit, with reference to the sixth research objective.

Analysed in CH7, the local levels of sustainability and the local framework of form-adaptations interpreted from user's perceptions required actions for shaping Sukhumvit's socio-spatial patterns. Those findings are utilized in this chapter in order to formulate the design principles which are solutions for achieving local sustainable urban forms with relevance to the superblock, the superblock-quarter and the *soi*-based morphology (see CH5).

However, as demonstrated by the preliminary conceptual framework (CH3), sustainable urban form cannot be achieved beyond human perceptions, aspirations and actions defining form-productions of the built environment. The extent to which key actors' ambitions and development dimensions interact and how they can be accommodated into the delivery of

sustainable urban forms has to be interpreted. In the field study, the acceptance for, and the validity of, the design principles were examined through public opinion, as well as the establishment of key implementation strategies.

To fulfill the aim of this chapter, chapter objectives are formulated.

1. To propose design principles of Sukhumvit's locally acceptable sustainable urban forms.
2. To test and refine the design principles with key stakeholders in the field study.
3. To identify the capacity to deliver locally acceptable sustainable urban forms by evaluating levels of sustainability of Sukhumvit's future form-adaptations.
4. To formulate implementation strategies for the delivery of Sukhumvit's locally acceptable sustainable urban forms.

With respect to the chapter objectives, chapter structure is:

- 8.1 Introduction;
- 8.2 Design Principles of Locally Acceptable Sustainable Urban Forms;
- 8.3 Acceptance and Refinement of the Design Principles;
- 8.4 Capacity to Deliver Locally Acceptable Sustainable Urban Forms;
- 8.5 Implementation Strategies of Locally Acceptable Sustainable Urban Forms;
- 8.6 Conclusion.

## **8.2 Design Principles of Locally Acceptable Sustainable Urban Forms**

This section presents the development of the design principles for achieving locally acceptable sustainable urban forms proposed for Sukhumvit. Influenced and shaped by the users' perceptions and aspirations and local levels of sustainability as they are explained in CH7, the key concepts for delivering sustainable urban forms accepted and aspired by people are interpreted and design principles are proposed for the superblock, the superblock-quarter and the *soi*-based morphology.

### 8.2.1 Key Concepts

As discussed in CH7, low levels of many sustainability qualities have been identified for Sukhumvit. This finding represents specific degrees of sustainability of the existing urban forms and ways in which they should be strengthened through socio-spatial patterns.

Box 8.1 shows the key concepts defining the extent to which locally acceptable sustainable urban form can be constructed for Sukhumvit.

**Box 8.1 Key Concepts for Achieving Locally Acceptable Sustainable Urban Forms for Sukhumvit**

1. **Positive Identity**, Morphological distinctiveness of Sukhumvit's socio-spatial patterns (the superblock, the superblock-quarter and the *soi*-based morphology) has to be secured in order to continue global and local identity that users perceive from their place.
2. **Graded Density**, In Sukhumvit, density of built components is crucial in defining building fabric and townscape that people perceive different morphological layers. Graded density of built forms has to be implemented for retaining multi-layered distinctiveness.
3. **Permeability**, Based on users' perceptions and aspirations, physical, visual and natural permeability have to be developed in order to attain acceptable levels for change and respond to the preferred environmental choices of Sukhumvit.
4. **Choice**, Local needs have to be supplied through a wide range of uses and activities. Greater access to local services and facilities are fundamental.
5. **Accessibility**, Within a large land area of the Sukhumvit superblock, people should be able to access a wide range of choices regarding linkage networks, modes of movement and open spaces.

The key to accomplishing locally acceptable sustainable urban forms is to promote the environmental features which can increase levels of sustainability and relate to degrees of development which are locally accepted.

To secure sustainability levels for each morphological layer, multicultural patterns that are based on place identity need to be maintained in order that people can recognize of their places and communities. Crucially, socio-spatial patterns of Sukhumvit are driven by

several features including density of built components which should be controlled for protecting uniqueness of the place.

Responding to acceptable levels for change and to preferred environmental choices, permeability of place is suggested. Physical and natural permeability are substantial in influencing the feel of comfort and the control over public spaces that people are willing to have (see CH7); visual permeability can make local areas inside the superblock be more attainable. These aspects were perceived by people not only for evaluating density and the feel of crowding but also for identifying suitable modifications of forms appearing at different layers in Sukhumvit.

In regard to a diversity of needs, Box 8.1 also shows that choice and accessibility need to be promoted. This includes local services and facilities, a wide range of uses and activities to be developed, as well as design applications for linkage networks, modes of movement and open spaces.

## **8.2.2 Design Principles**

Based on the key concepts established in the previous subsection, the design principles for delivering locally acceptable sustainable urban forms are formulated with respect to three morphological layers of Sukhumvit as shown in Table 8.1. The design principles are explained at each layer.

### **8.2.2.1 Design Principles for the Superblock**

For the superblock morphology, the modern townscape located along arterial roads' strips should be retained in order to protect global identity. Figure 8.1 shows the location of modern districts defining this morphology. On this basis, high density of built component, centres of high activities and wide range of uses are encouraged.

In accordance with users' perceptions of modern townscape, a floor area ratio allowance (FAR) of 10 for commercial uses in Sukhumvit initiated by Department of City Planning, Bangkok (DCP, 2006a) is incorporated into the design principles, proposed for supporting economic viability, urban containment and walkable urbanism as shown in Figure 8.2 (p.257). It should be noted, however, that fine-grained plots and buildings are suggested, with the aim of encouraging small-scale traders along the roads' strips.

Table 8.1 Design Principles for Sukhumvit's Locally Acceptable Sustainable Urban Forms

| Spatial Elements      | Sukhumvit's Urban Forms   |  |  |
|-----------------------|---|--|--|
|                       | Superblock Morphology   | Superblock-Quarter Morphology  | Soi-Based Morphology   |
| Street and Open Space | <ul style="list-style-type: none"> <li>• Widening pavements.</li> <li>• Planting street trees along all routes.</li> <li>• Increasing soft landscape open spaces by developing public parks and pocket parks.</li> <li>• Encouraging natural ventilation by developing underground train line instead of sky train line.</li> </ul> | <ul style="list-style-type: none"> <li>• Developing pavements.</li> <li>• Planting street trees along all routes.</li> <li>• Increasing soft landscaped open spaces by developing pocket parks.</li> <li>• Developing the local linkages as a key legible path for local areas.</li> </ul> | <ul style="list-style-type: none"> <li>• Developing pavements.</li> <li>• Planting street trees along all routes.</li> <li>• Encouraging greenery display from private gardens.</li> <li>• Retaining significant public realm of <i>sois</i>.</li> <li>• Connecting <i>sois</i> to Sansab canal for natural drainage and absorption.</li> <li>• Encouraging personalisation of communities.</li> </ul> |
| Plot                  | <ul style="list-style-type: none"> <li>• Encouraging fine-grained plots and buildings located along the roads' strips.</li> </ul>   | <ul style="list-style-type: none"> <li>• Maintaining fine-grained plots and buildings located along the local linkage's strips.</li> </ul>   | <ul style="list-style-type: none"> <li>• Retaining a local morphological distinctiveness by preserving fine-grained patterns of plots and built forms.</li> </ul>  |
| Block                 | <ul style="list-style-type: none"> <li>• Retaining fine-grained streets and blocks.</li> </ul>  | <ul style="list-style-type: none"> <li>• Retaining fine-grained streets and blocks.</li> </ul>   | <ul style="list-style-type: none"> <li>• Developing fine-grained streets and blocks by connecting routes through large blocks.</li> <li>• Avoiding the connection of traffic routes to protect traditional communities.</li> </ul>   |
| Building              | <ul style="list-style-type: none"> <li>• Allowing high density development (10.0 FAR) along the superblock's strips.</li> <li>• Creating a positive townscape with an attachment of natural features and greenery displays in building groups and spaces.</li> </ul>  | <ul style="list-style-type: none"> <li>• Controlling medium density development (5.0 FAR) along the local linkage's strips.</li> <li>• Encouraging a positive mix of modern and local townscape with various built forms attached by greenery.</li> </ul>                                  | <ul style="list-style-type: none"> <li>• Retaining low density development (2.0 FAR) in traditional neighbourhoods.</li> </ul>   |
| Use                   | <ul style="list-style-type: none"> <li>• Providing appropriate spaces for street vendors at <i>paksois</i>.</li> <li>• Lengthening rapid transport lines to cover the superblock layer.</li> </ul>  | <ul style="list-style-type: none"> <li>• Providing appropriate spaces for street vendors at <i>klangsois</i>.</li> <li>• Taming private motorized transport.</li> <li>• Adding cycle lanes.</li> </ul>   | <ul style="list-style-type: none"> <li>• Providing appropriate spaces for street vendors at <i>paksois</i>, <i>klangsois</i> and <i>taysois</i>.</li> <li>• Taming private motorized transport.</li> </ul>   |

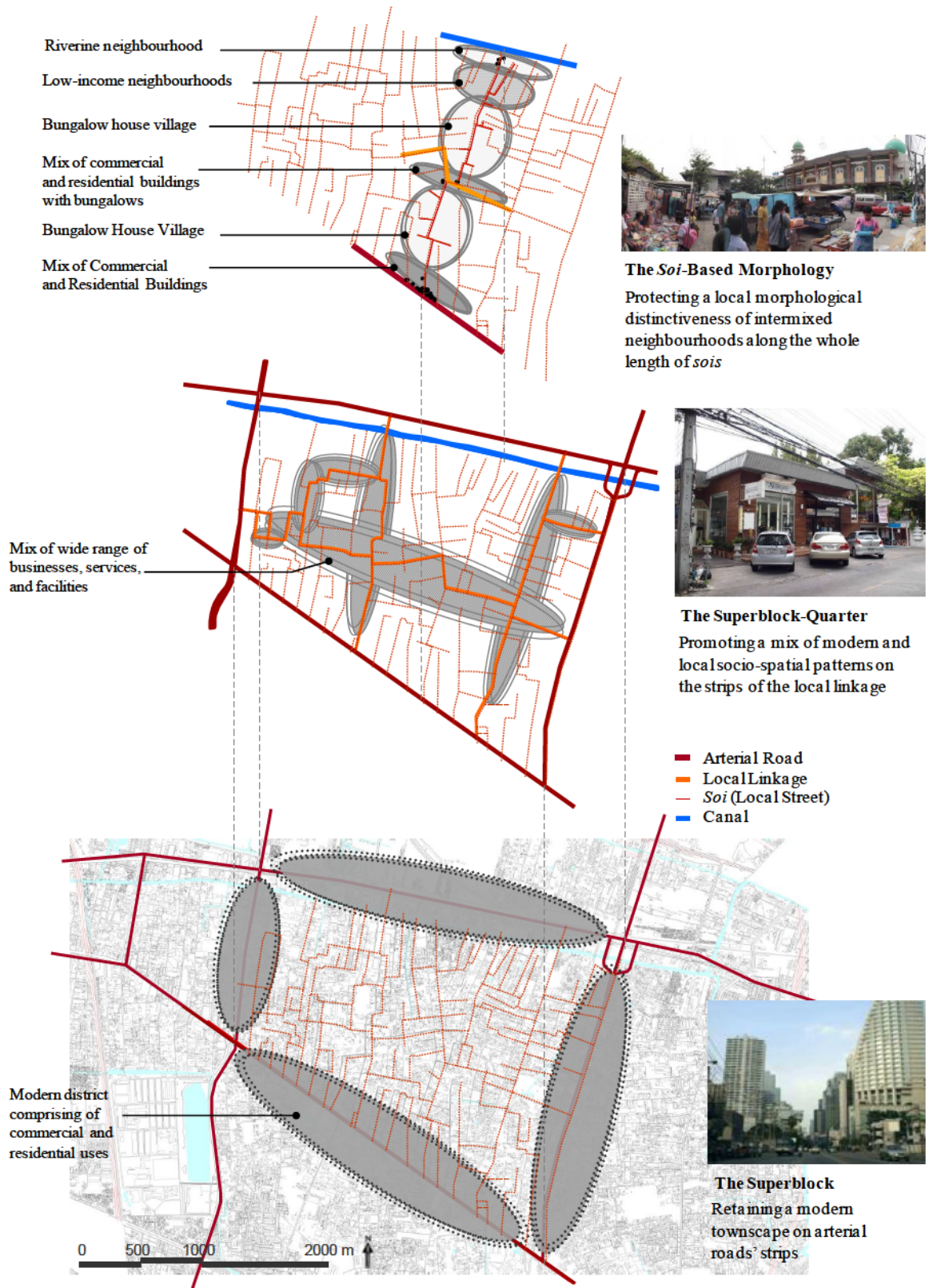


Figure 8.1 Protection for Modern and Local Townscape for Sukhumvit, 2012

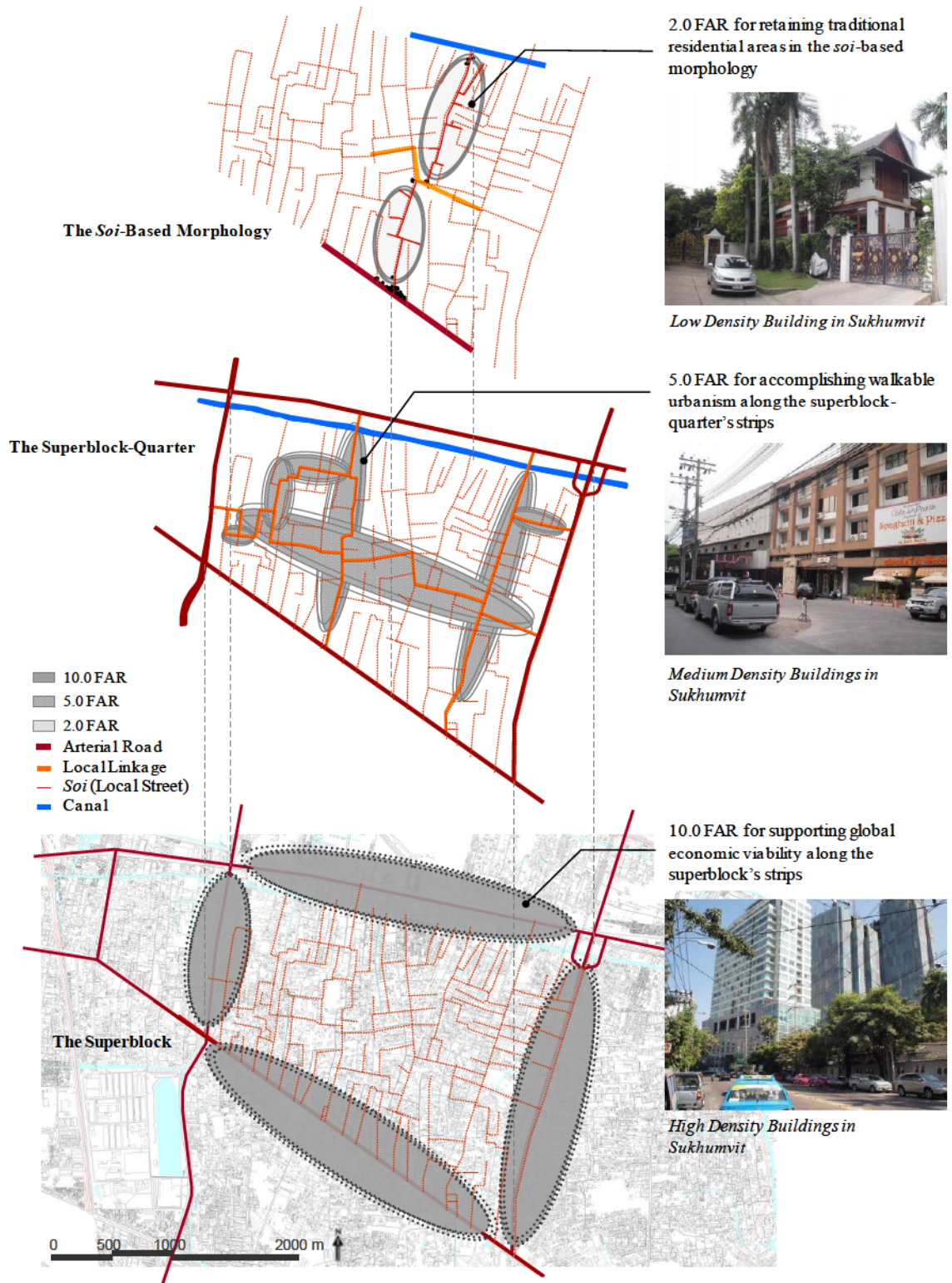


Figure 8.2 Graded Density of Built Forms for Sukhumvit, 2012

To deliver a positive characteristic that people expect from the modern townscape, the feel of green space has to be integrated. Figure 8.3 shows that, at the superblock morphology, the locally responsive ecology and climate in high density building groups and spaces are achieved by the development of parks, street trees and greenery display. The attachment of natural features is also crucial for the other morphological layers, which will be discussed in the following subsections.

To increase natural ventilation, key barriers impeding air flow need to be removed. Figure 8.4 shows that the sky train line in which the large span construction causes pollution should be replaced by an underground rapid transport system. Environmental friendly public transport connecting centres of high activities should be also implemented, such as zero-carbon buses.

Currently pavements are 3-4 metre in width, wider pavements are suggested for promoting physical permeability and accommodating street vendors who supply low cost services and facilities. Because of the high rents in Sukhumvit, street vendors located on pavements become key suppliers for local economy (see CH5). As shown in Figure 8.5, they should be retained, making a design requirement for wider pavements at this morphological layer. It should be noted moreover that pavements complemented by greenery and shade can encourage people to walk 9.5 minutes further than usual (see CH7), which is a key to decrease private motorized transport and pollution.

As discussed above, design inquiries to achieve locally acceptable sustainable urban form for the superblock morphology are included in Table 8.1 (p.255).

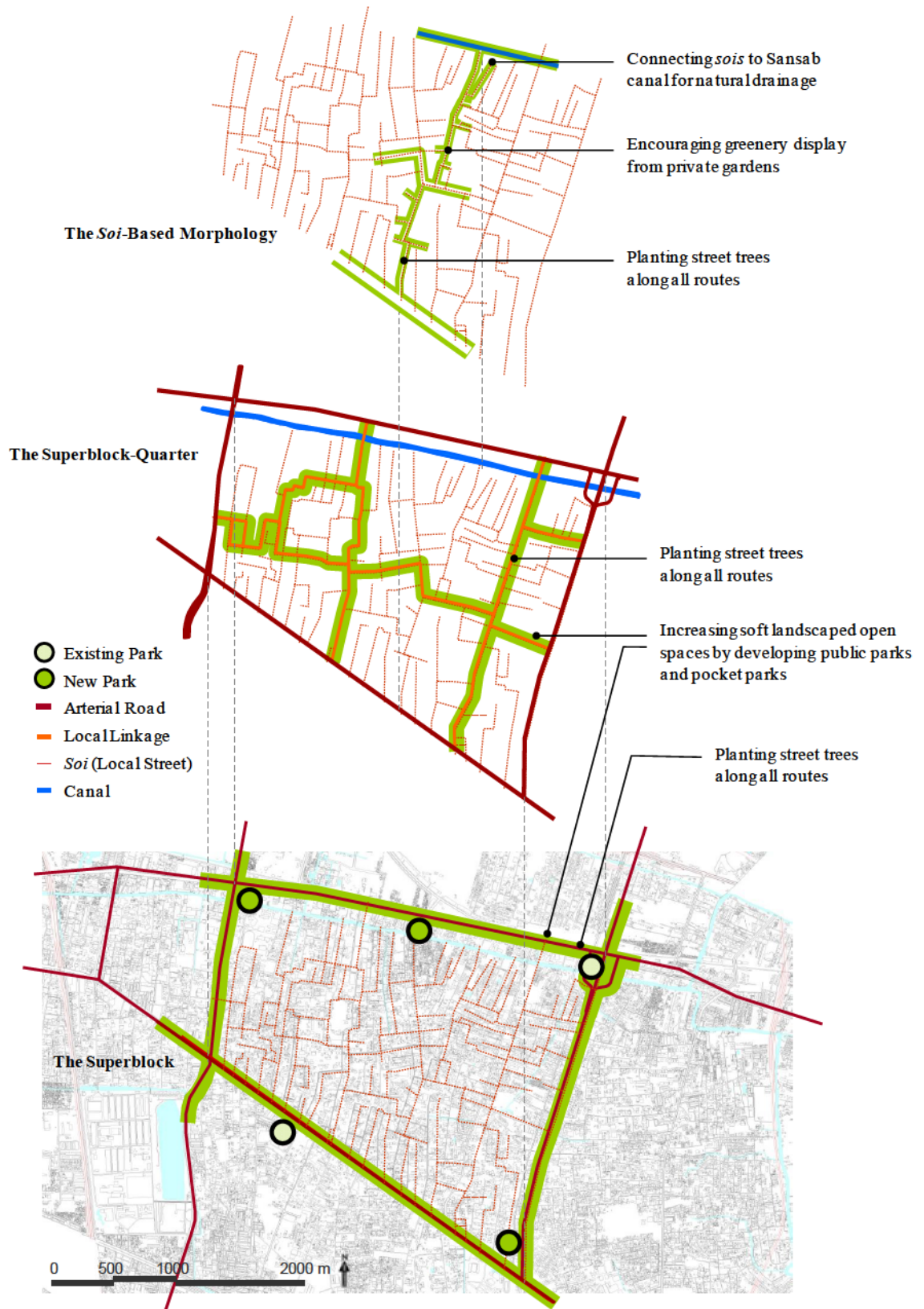


Figure 8.3 Development for Natural Permeability for Sukhumvit, 2012



Figure 8.4 The Construction of the Elevated Railway Above Sukhumvit Road, 2012  
Source: Author, 2012



Figure 8.5 Street Vendors - Key Supplier of Local Services and Facilities in Sukhumvit, 2012  
Source: Author, 2012

### 8.2.2.2 Design Principles for the Superblock-Quarter

As analysed in CH7, although people had an image of Sukhumvit as one of the most modern districts of Bangkok, they also perceived traditional neighbourhoods as the local identity inside the superblock. Crucially, a mix of modern and traditional identity was recognized for the superblock-quarter morphology, which should be protected.

To retain morphological distinctiveness of Sukhumvit, Figure 8.2 (p.257) shows that the concept of ‘graded density’ (Barton *et.al.*, 2003) is implemented by grading various building densities in relation to different degrees of economic activity, accessibility and townscape preservation. While high density is initiated for the superblock, the medium level of built intensity at 5 FAR along the strips of the local linkage is suggested. This level of density responds to the development of a mix of built forms accepted for the superblock-quarter by users (CH7). Moreover, at this density level, a high level of pedestrian flow, a variety of services and facilities, and a reduction of trip lengths using healthy transport can be encouraged.

In terms of natural features, green open spaces should be developed in the front setbacks of new buildings. As well, street trees and greenery displays should be promoted along the strips of the local linkage. Accompanied by street furniture, specific shapes and sizes of street trees can support the legibility of the local linkages as a key path for the local areas (Figure 8.6; The Superblock-Quarter).

Figure 8.6 also shows that pavements which are found in a few areas should be developed for encouraging walkability. In addition, private motorized transport has to be calmed in order to reduce intimidation and pollution. Cycle lanes are suggested to be provided for promoting movement without dependency on the car.

Finally, fine grain of plots and buildings are protected in order that a wide range of activities and small-scale business in the form of bungalows can be retained. Again, this influences a wide range of services and facilities, and spaces for street vendors are provided.

All design principles proposed for the superblock-quarter morphology are summarized in Table 8.1 (p.255).

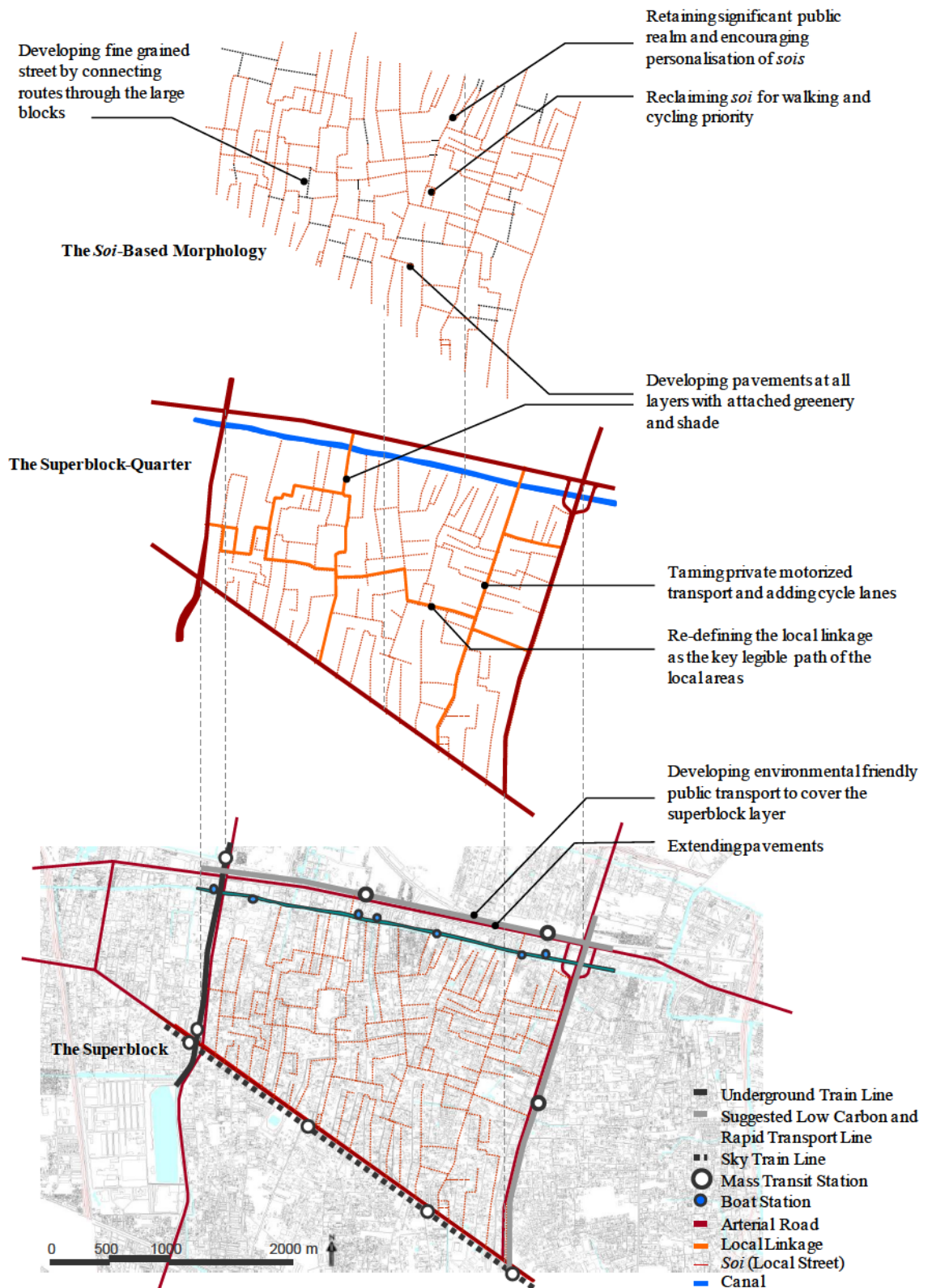


Figure 8.6 Development for Physical Permeability for Sukhumvit, 2012

### 8.2.2.3 Design Principles for the *Soi*-Based Morphology

*Soi*-based morphology is the lateral morphological pattern where intermixed neighbourhoods are located by sharing on the same *sois* (CH5). This morphological layer is the tissue that people perceive as a local identity of Sukhumvit and is the most preferred socio-spatial pattern (CH7). This morphological distinctiveness has to be protected by preserving fine-grained patterns of plots and built forms.

The protection from low density is fundamental both to retain local identity and to encourage energy reduction, because low density built forms rarely reflect heat waves and they absorb solar heat. Although people aspire for 1 FAR for their place (CH7), the traditional built form in most areas are developed with FAR of 1.0 for the type of bungalows and of 2.0 for housings in the riverine and low-income communities (CH5). In order to protect all historic patterns of the *soi*-based morphology, Figure 8.2 (p.257) shows that low density is suggested at 2 FAR. It should be emphasized that, in the *soi*-based morphology, shophouses developed with FARs from 3.0 to 4.0 have been included in the high density areas of the superblock layer (see 8.2.2.1 *Design Principles for the Superblock Morphology*).

The feel of “green” is promoted through the development of street trees and the encouragement of greenery display from private gardens. As discussed in CH5, front yards of bungalows are a key natural feature which should be protected and displayed as part of the street scene. Figure 8.7 shows an example of the bungalow’s front yard. Crucially, front yards and their display are a platform of natural permeability, defining acceptable levels of change and preferred urban form.

Natural drainage is another issue that is important for this morphological pattern. Although the Sansab canal is the main water body in Sukhumvit, the riverine and low-income communities accumulating along the strips of Sansab canal impede run-off (Figure 8.8). In this sense, natural drainage should be provided by connecting the open spaces of *sois* to this main water body.

Table 8.1 (p.255) shows that walkability has to be encouraged by developing pavements which are rarely found and by taming traffic in all *sois*. Well-connected routes need to be developed. As shown in Figure 8.6 (p.262), with the spatial relation of all morphological layers, well-connected routes implemented at this layer will make a change for the others in terms of accessibility.



Figure 8.7 An Example of a Bungalow's Front Yard in Sukhumvit, 2010  
Source: Author, 2010



Figure 8.8 Long Structure of Low-Income Communities Located Along Sansab Canal's Strips  
Impeding Run-Off in Sukhumvit, 2010  
Source: Author, 2010

Although a finer grain of street and block depth is required for *sois*, new connections of *sois* have to be undertaken, only in large street blocks such as 450x700 metre and 150x1,000 metre in order that the change of traditional neighbourhoods can be prevented and new connections, as traffic cuts, through neighbourhoods can be avoided.

Finally, low cost services and facilities need to be encouraged by providing more space for street vendors. Three locations of street vendors should be secured, which are *paksois*, *klangsois* and *taysois*. Figure 8.9 shows that, based on users' preparation to access local shops for 5.5 minute (or 400 metre approximately) as explained in CH7, to retain street vendors is to encourage local suppliers in Sukhumvit.

### **8.3 Acceptance and Refinement of the Design Principles**

As presented by the preliminary conceptual framework and the fieldwork methodologies (CHs 3 and 4), the design principles for achieving locally acceptable sustainable urban forms have to be tested and refined in the field so that various aspirations and development dimensions can be accommodated.

To evaluate the design principles, focus group discussions were carried out with 40 residents from two communities, as shown in Figures 8.10 and 8.11. Furthermore, face-to-face semi-structured interviews were undertaken with 21 representatives from other stakeholders: landowners, investors and developers, small-scale traders, a design professional, public authorities and leaders of communities. The theoretical sampling method was utilized by identifying participants from official registers, government organization registers and directories of consultants who get involved with form-production processes of Sukhumvit (CH4). The instrument used for testing the design principles is shown in *Appendix E* (p.361).

In the following subsections, a comparison between the acceptance of the proposed principles from residents and that from the other stakeholders is analysed and used for refining the design principles. While the agreement of residents was defined from communication content in the focus groups, the opinion of the others collected from the interviews were assessed through percentages of responses (*Appendix I*, p.392).

There was no uniformity of agreement. Although inconsistent agreement is identified by a few percentages of disagreement (maximum 20 percent), a refinement of the design principles was undertaken to gain maximum support from the stakeholders.

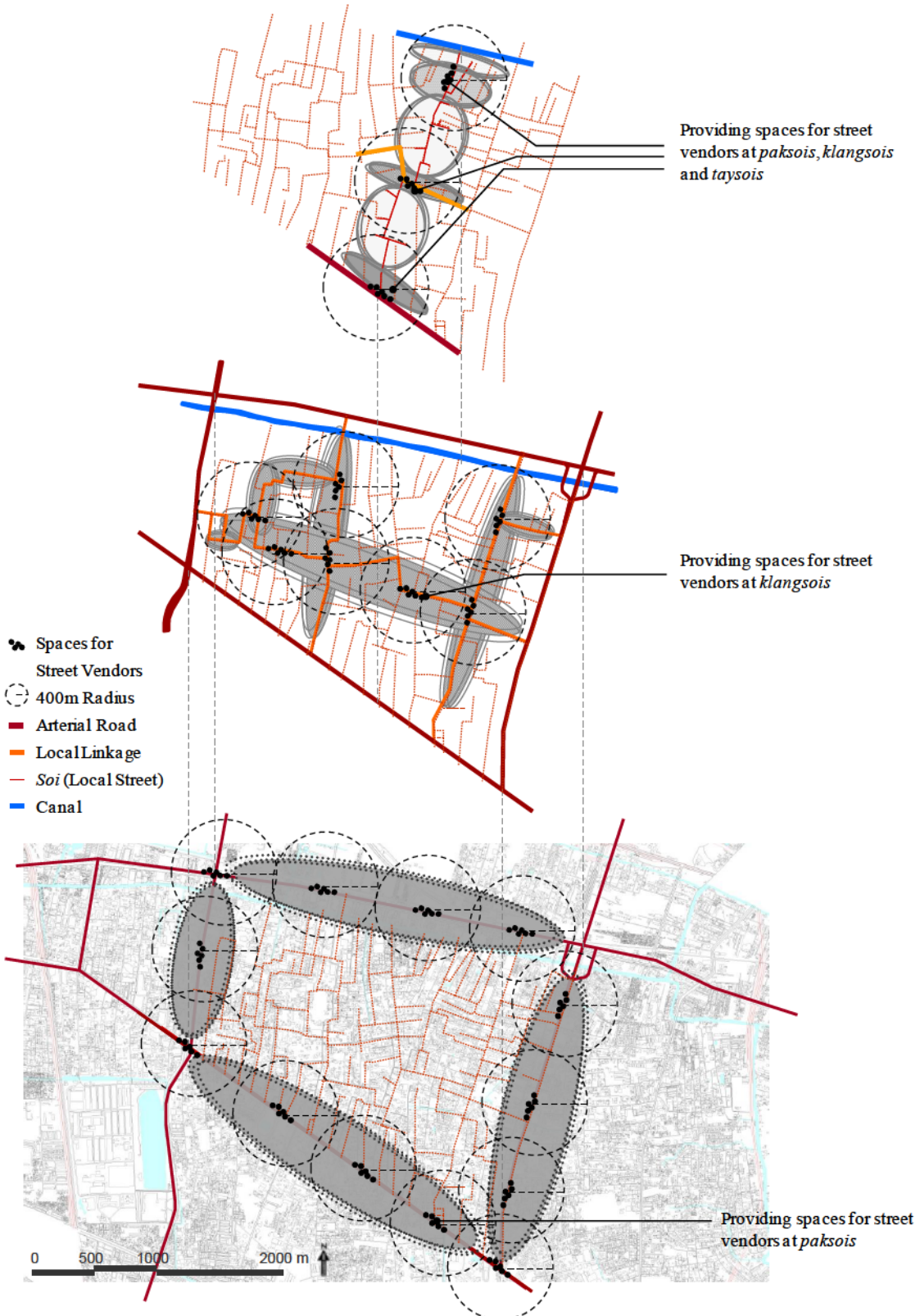


Figure 8.9 Encouragement for Small Scale Traders in Sukhumvit, 2011



Figure 8.10 Focus Group Discussion with 12 Residents, Bandon Community, Sukhumvit, 2012  
Source: Author, 2012



Figure 8.11 Focus Group Discussion with 28 Residents, Jamjun Community, Sukhumvit, 2012  
Source: Author, 2012

All stakeholders' opinions were taken into account to arrive at appropriate solutions for the multilayered socio-spatial patterns identified in Sukhumvit.

### 8.3.1 The Superblock Morphology

Table 8.2 shows the acceptance for the design principles proposed for Sukhumvit's superblock morphology. The table shows the relationship of the design principles, questions used in the evaluation processes, acceptance from residents and other stakeholders, requirements for improving the principles and the refined design principles (shown in blue).

As stated in this section's introduction, while the agreements of residents were defined from the focus group discussions, the opinion of the other stakeholders were identified by percentages of responses (Figure 8.12). Agreement and disagreement of both groups are represented with the form of powergrams (Table 8.2).

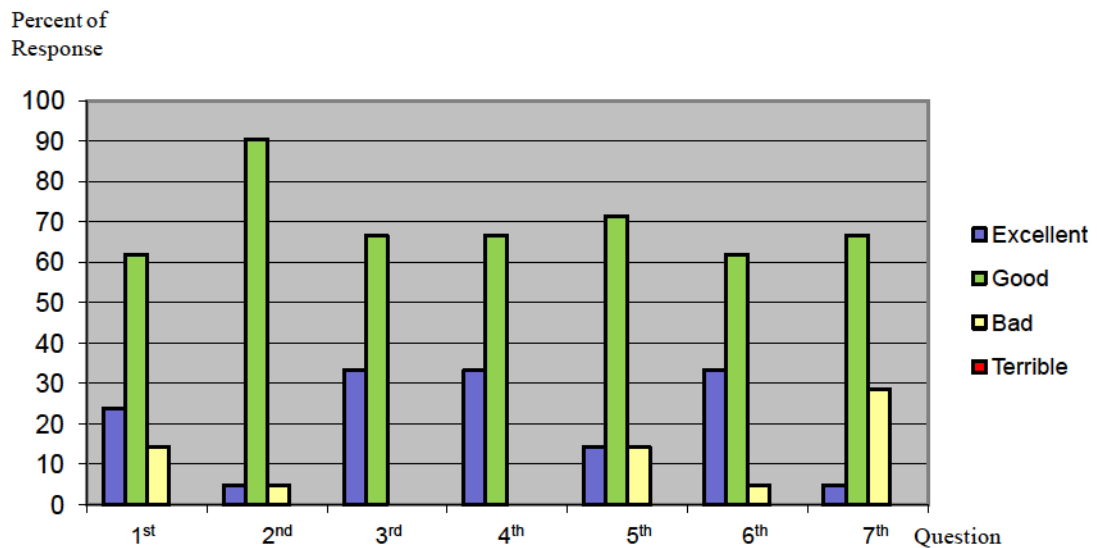


Figure 8.12 Key Stakeholders' Satisfaction with the Design Principles  
Proposed for **the Superblock Morphology**, 2012

Source: Semi-structured interviews with key stakeholders (landowners, investors and developers, small-scale traders, a design professional, public authorities and leaders of communities)

Table 8.2 **Superblock Morphology**: Local Acceptance for the Design Principles

| Design Principles<br>(taken from Table 8.1)  | Questions Used for Testing<br>(see Appendix E)   | Acceptance |        | Required<br>Refinement | Refined Design Principles   |
|--|--|------------|--------|------------------------|---|
|  |  | Residents  | Others |                        |   |
| <ul style="list-style-type: none"> <li>•Widening pavements.</li> <li>•Planting street trees along all routes.</li> </ul>   | 1. How do you rate the idea of providing more pedestrian spaces and plants and trees?                            | ●          | ●      | No                     | •Design principles are retained.  |
| <ul style="list-style-type: none"> <li>•Lengthening rapid transport lines to cover the superblock layer.</li> </ul>  | 2. How do you rate the idea of having underground train lines following all arterial roads?                      | ●          | ●      | No                     | •Design principle is retained.  |
| <ul style="list-style-type: none"> <li>•Developing public parks and pocket parks.</li> </ul>   | 3. How do you rate the idea of providing more parks and squares we can use?                                      | ●          | ●      | No                     | •Design principle is retained.  |
| <ul style="list-style-type: none"> <li>•Attaching more natural features and greenery displays in building groups and spaces.</li> </ul>  | 4. How do you rate the idea of displaying greenery on buildings?   | ●          | ●      | No                     | •Design principle is retained.  |
| <ul style="list-style-type: none"> <li>•Encouraging natural ventilation by developing underground train line instead of sky train line.</li> </ul>                                     | 5. How do you rate the idea of replacing the sky train line with an underground train line for more ventilation? | ●          | ●      | No                     | •Design principle is retained.  |
| <ul style="list-style-type: none"> <li>•Providing spaces for street vendors at <i>paksois</i>.</li> </ul>  | 6. How do you rate the idea of including decent areas for street selling stalls/kiosks along arterial roads?     | ●          | ●      | No                     | •Design principle is retained.  |
| <ul style="list-style-type: none"> <li>•Allowing high density development (10.0 FAR) along the superblock's strips.</li> <li>•Encouraging fine-grained plots and buildings.</li> </ul> | 7. How do you rate the idea of combining modern high-rise buildings and variety in shops along arterial roads?   | ●          | ○      | Yes                    | <ul style="list-style-type: none"> <li>•Action to allow high density is retained.</li> <li>•Action to encourage fine-grained plots and buildings is omitted.</li> </ul> |

● Agreement      ○ Inconsistent Agreement (20 percent of disagreement)

Note: Other stakeholders include landowners, investors and developers, small-scale traders, a design professional, public authorities and leaders of communities

Source: Focus groups with residents and semi-structured interviews with other stakeholders in Sukhumvit, 2012

Established for the superblock morphology, most design principles were accepted by both groups. Agreed design actions are: more pedestrian spaces, plants and trees; rapid transport lines developed on all arterial roads; more parks and greenery display; an underground train line replacing the sky train line; and appropriate areas for street selling. It should be noted that, although the idea to replace the sky train line by an underground train line was accepted in order to achieve good ventilation, feasibility in terms of funding requirements was a concern expressed by participants during the process of design evaluation.

An inconsistency was found from the action to encourage small-scale traders. Although residents agreed with the design action to initiate fine-grained plots and buildings in order to maintain a potential for local shops, it was argued by others. Namely a designer, investors and developers argued that Sukhumvit's modern districts have become famous for business activities and associated residential accommodation. Besides, land value and market signal in those locations make the protection for fine-grained plots and buildings impractical.

Based on the morphological change required throughout the superblock layer, inconsistency is defined by 28.6% rating the design action to encourage small-scale traders as a bad concept compared with 66.7% rating it as a good concept (Figure 8.12; Question 7). As explained in *8.3 Acceptance and Refinement of the Design Principles*, although slight disagreements were found, the design principles were refined in order to gain local acceptance from all stakeholders. As shown in Table 8.2, to accommodate all aspirations and development dimensions into future form-adaptations, the action to encourage fine-grained plots and buildings was omitted from the initial principles proposed for the superblock. This modification to ensure a solution encompasses a 'trade off' between the morphological layers in terms of sustainability (this issue is discussed further in *8.3.4 Future Form-Modifications*).

### **8.3.2 The Superblock-Quarter Morphology**

Table 8.3 shows acceptance for the design principles proposed for the superblock-quarter morphology. Both agreement and disagreement from participants are presented and the refined design principles are shown in blue.

Table 8.3 **Superblock-Quarter Morphology**: Local Acceptance for the Design Principles

| Design Principles<br>(taken from Table 8.1)   | Questions Used for Testing<br>(see Appendix E)   | Acceptance |        | Required<br>Refinement | Refined Design Principles  |
|---|--|------------|--------|------------------------|--|
|   |  | Residents  | Others |                        |  |
| <ul style="list-style-type: none"> <li>•Developing pavements.</li> <li>•Planting street trees along all routes.</li> </ul>  | 1. How do you rate the idea of providing more pedestrian spaces, plants and trees?                                 | ●          | ○      | Yes                    | <ul style="list-style-type: none"> <li>•Providing pavements in relation to street widths.</li> <li>•Planting street trees in the areas where pavements can accommodate them.</li> </ul>  |
| <ul style="list-style-type: none"> <li>•Taming private motorized transport.</li> </ul>  | 2. How do you rate the idea of slowing cars down on main through traffic routes?                                   | ●          | ○      | Yes                    | <ul style="list-style-type: none"> <li>•Restricting vehicle speed.</li> <li>•Integrating transport options (private motorized transport, small-scale public transport, walking and cycling).</li> </ul>  |
| <ul style="list-style-type: none"> <li>•Developing pocket parks.</li> </ul>   | 3. How do you rate the idea of providing more parks and squares we can use?  | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>   |
| <ul style="list-style-type: none"> <li>•Developing local linkages as the key legible path of the local areas.</li> </ul>  | 4. How do you rate the idea of outstanding main through traffic routes?  | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>   |
| <ul style="list-style-type: none"> <li>•Adding cycle lanes.</li> </ul>  | 5. How do you rate the idea of adding lanes?   | ●          | ⊙      | Yes                    | <ul style="list-style-type: none"> <li>•Providing lanes in relation to street widths.</li> </ul>   |
| <ul style="list-style-type: none"> <li>•Providing spaces for street vendors at <i>klangsois</i>.</li> </ul>   | 6. How do you rate the idea of including proper areas for street stalls/kiosks along main through traffic routes?  | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>   |
| <ul style="list-style-type: none"> <li>•Controlling medium density development (5.0 FAR) along the local linkage's strips.</li> <li>•Encouraging a positive mix of modern and local townscape with various built forms attached by greenery.</li> <li>•Maintaining fine-grained plots and buildings along the local linkage.</li> </ul> | 7. How do you rate the idea of having various building characteristics and uses along main through traffic routes? | ●          | ○      | Yes                    | <ul style="list-style-type: none"> <li>•Density control is refined for various levels (8.0, 6.0 and 4.0 FARs).</li> <li>•Action to encourage greenery is retained.</li> <li>•Built forms and grain of plots and buildings have to be guided in relation to street widths.</li> </ul> |

● Agreement    ○ Inconsistent Agreement (20 percent of disagreement)    ⊙ Disagreement

Note: Other stakeholders include landowners, investors and developers, small-scale traders, a design professional, public authorities and leaders of communities

Source: Focus groups with residents and semi-structured interviews with other stakeholders in Sukhumvit, 2012

For the superblock-quarter, several actions for shaping the urban form were argued by key stakeholders in Sukhumvit, in spite being accepted by residents. As shown in Table 8.3, the disagreement was found for the action aiming to develop pedestrian spaces and to plant street trees along the local linkage's strips. 33.3% of interviewees rated "poor" for this action (Figure 8.13; Question 1). Many participants argued that, at this morphological layer, the development of pavements upon the configurations of *sois* would reduce road capacity required for through traffic routes.

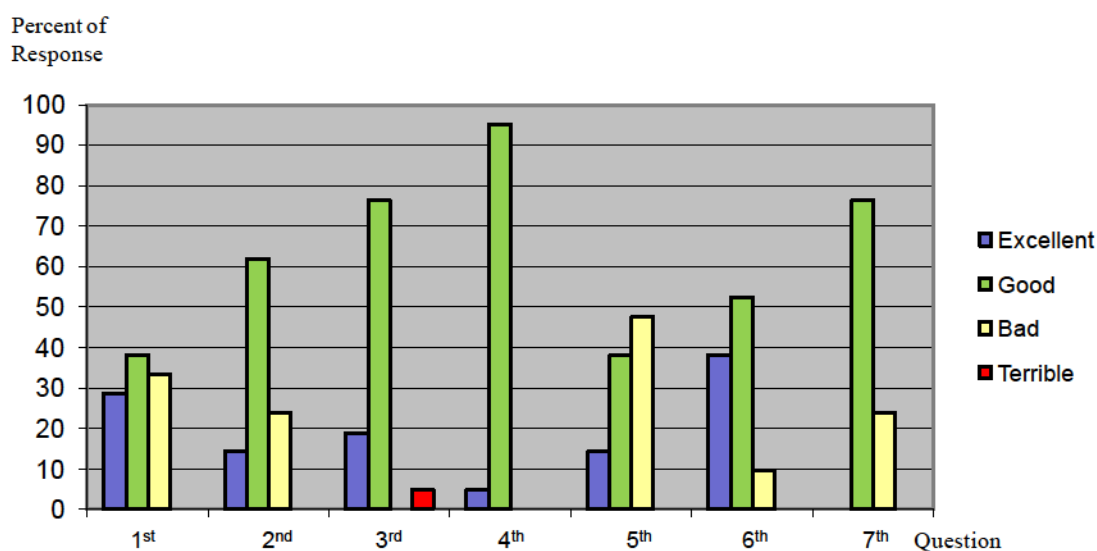


Figure 8.13 Key Stakeholders' Satisfaction with the Design Principles  
Proposed for **the Superblock-Quarter Morphology**, 2012

Source: Semi-structured interviews with key stakeholders (landowners, investors and developers, small-scale traders, a design professional, public authorities and leaders of communities)

Further, although the idea of slowing cars down on the local linkage was accepted by residents, it was not supported by other stakeholders. Figure 8.13 shows that, at Question 2, "poor" was rated as 23.8% and "good" was recorded by 61.9% of stakeholders. The powergrams in Table 8.3 represent the different opinions between residents and other stakeholders.

Actions to provide more parks and squares and to remark the local linkage for making a readable place were favoured by all actors. The idea to develop cycle lanes was not supported by several participants (Figure 8.13; Question 5) because of the limited capacity of *sois*, despite being agreed by residents. They considered that cycle lane provision was an

irrelevant design for Thai and expatriate upper-classes who always use private motorised transport in Sukhumvit.

Even though the concept of providing proper areas for street vendors along the local linkage's strips was accepted by both residents and the other stakeholders, the guidance to control building density and to retain fine-grained plots and buildings in order to have various building characteristics and uses was not agreed by all. While residents accepted this idea, 23.8% of the others rated it as a poor principle regarding investment and the need for more residential spaces in Sukhumvit (Figure 8.13; Question 7).

As discussed above, Table 8.3 shows disagreement for several design principles introduced for the superblock-quarter morphology. Crucially, they were required to be refined in relation to different capacities of streets and land located along the local linkage.

Configurations of *sois* are a key factor that many actors used for evaluating the future form-adaptations. Because the width of *sois* varies along their length when they were developed, following land rights and irrigation basins (see CH5), not all lengths of the local linkage are of a consistent width. As shown in Figure 8.14, width can vary from 4 to 10 metre at each part of a *soi*. This nature of *soi* configuration results in different values and capabilities for land development.

With respect to market signals, investment and development in Sukhumvit, the land beside wide streets should be allowed for more development than land beside narrow streets. To protect the multilayered identity of Sukhumvit and to sustain various local expectations, the design principles are refined to control built forms in relation to street widths (Table 8.3). In other words, the traditional spatial patterns can yet be preserved along narrow streets and that change can be advanced along wide streets. On this basis, all aspirations for form-adaptations can be compromised and the acceptance for the design principles can be achieved among stakeholders.

The refined design principles are improved with reference to various capacities of *sois*. Requested by many stakeholders, level of building density should be allowed more on the high value lands defined by the widths of streets as shown in Table 8.4. However, as shown in Table 8.4 and Figure 8.15, in order to protect morphological distinctiveness located along *soi* networks, greater density is approved only at specific distances from the arterial roads and the local linkage.



Figure 8.14 Various Widths of *Sois* in Sukhumvit, 2012  
Source: Author, 2012

Table 8.4 Refined Design Principles for Graded Densities in Sukhumvit

| Density Levels      | Floor Area Ratios (FARs) | Locations  |
|---------------------|--------------------------|--|
| High Density        | 10.0                     | The areas along the strips of <b>arterial roads</b> with at least 18 metre width.  |
| Medium-High Density | 8.0                      | The areas along the strips of <b>local linkage</b> with at least 12 metre width.   |
| Medium Density      | 6.0                      | The areas along the strips of <i>sois</i> with at least 10 metre width and the areas have to be located within 80 metre distance from the arterial roads or the local linkage. |
| Medium-Low Density  | 4.0                      | The areas along the strips of <i>sois</i> with at least 8 metre width and the areas have to be located within 120 metre distance from the arterial roads or the local linkage. |
| Low Density         | 2.0                      | Other areas.   |

Note: Figure 8.15 shows this refined design principle.

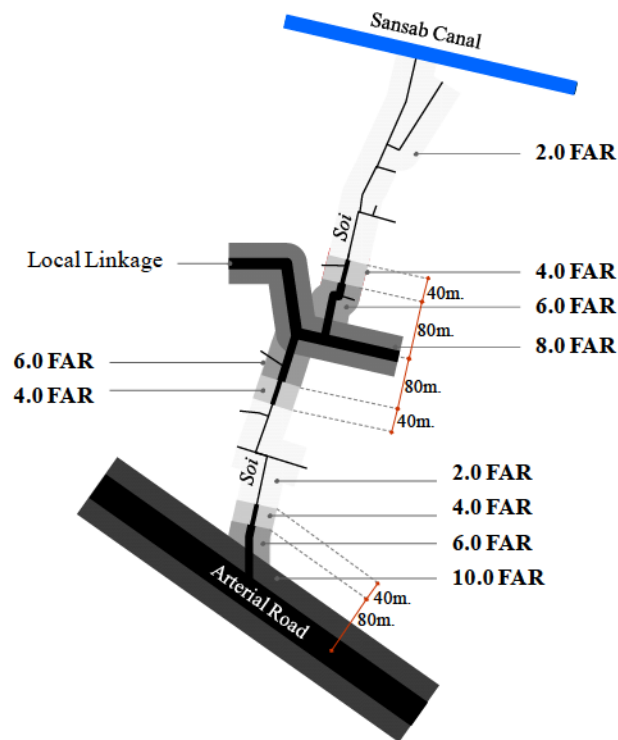


Figure 8.15 Refined Design Principle for Graded Density in Relation to Street Widths, Sukhumvit, 2012

Further, different capacities of *sois* are implemented as a platform to refine the actions to develop pavements, street trees, traffic taming and cycle lanes along the local linkage.

In the process of the design evaluation, needs of various user groups were instrumental, as well as how they could be accommodated into the limited capacity of the local linkage and *sois*. It should be noted that key user groups of Sukhumvit and their travel behavior became controversial among participants. Despite recognizing the willingness to walk of low-income residents, central authorities, a designer, investors and developers determined that the travel behaviour of Thai and expatriate upper-classes who always use private motorised transport even for short distances has to be incorporated into the design principles.

Rather than omitting private motorised transport, the integrated transport options are implemented along the local linkage defining the superblock-quarter morphology. They include walking and cycling, private motorized transport and small-scale public transport. Figure 8.16 shows the motorcycle taxi, a key small-scale public transport in local areas which could be retained and encouraged because it uses a few spaces of streets to function.



Figure 8.16 Motorcycle Taxis – Key Public Transport in the Local Areas inside the Sukhumvit Superblock, 2012

Source: Author, 2012

Figure 8.17 shows the refined design principles in relation to the use of street: 1) providing pavements and cycle lanes on the streets with 10 metre width or more; 2) providing pavements on the streets with 8 metre width; and, 3) accommodating pavements on one side of the street with 6 metre width. To encourage environmental friendly streets, vehicle speed is restricted for all areas inside the superblock and street trees are planted in the areas where pavements can accommodate them; climbers are also encouraged. These refined design principles are included in Table 8.3 (p.271).

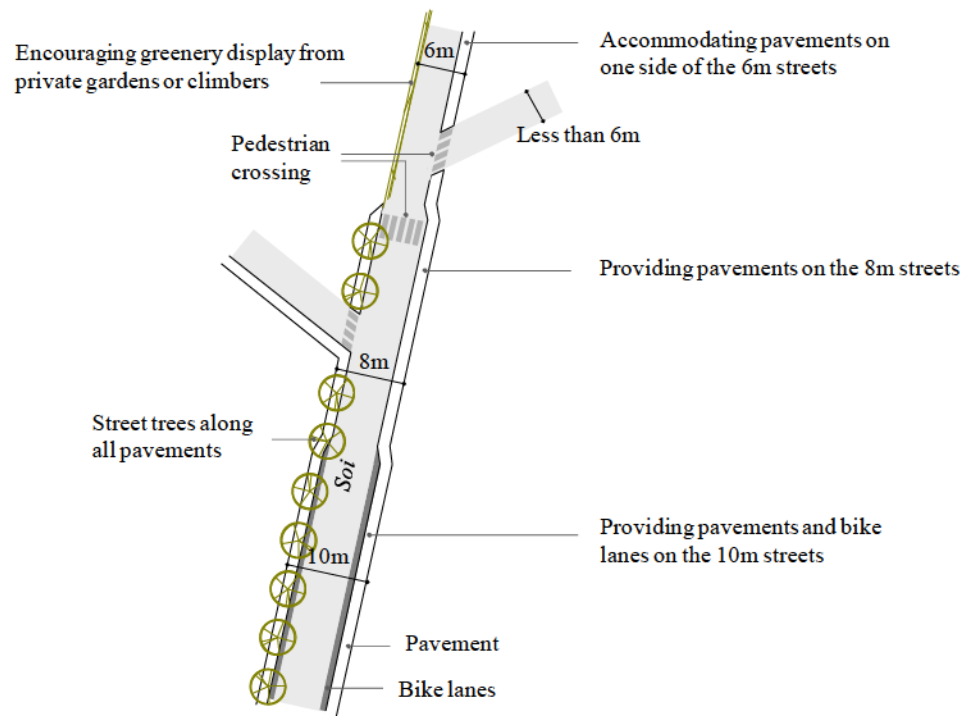


Figure 8.17 Refined Design Principles for Developing Integrated Transport Modes and Natural Networks with Respect to Street Widths, Sukhumvit, 2012

### 8.3.3 The *Soi*-Based Morphology

Table 8.5 shows the local acceptance for the design principles and the refined design principles proposed for the *soi*-based morphology are presented in blue.

As seen from the table, many design principles were accepted by all participants. The agreed design actions are: pedestrian spaces, plants and trees; greenery display; well-connected routes; traffic taming; personalisation of communities; proper spaces for street vendors; protection for fine-grained built forms and low density settlement.

Nevertheless, some design principles needed to be improved. Although the development of pavements and natural networks for neighbourhoods located in *sois* was accepted by actors, yet it has to be initiated with respect to the limited capacity of *sois* (see the previous subsection). Table 8.5 shows the refined design principles in relation to street widths.

Table 8.5 **Soi-Based Morphology**: Local Acceptance for the Design Principles

| Design Principles<br>(taken from Table 8.1)   | Questions Used for Testing<br>(see Appendix E)  | Acceptance |        | Required<br>Refinement | Refined Design Principles   |
|---|---|------------|--------|------------------------|---|
|   |   | Residents  | Others |                        |   |
| <ul style="list-style-type: none"> <li>•Developing pavements.</li> <li>•Planting street trees along all routes.</li> </ul>  | 1. How do you rate the idea of providing pavements and plants and trees on all <i>sois</i> ?                    | ●          | ●      | Yes                    | <ul style="list-style-type: none"> <li>•Providing pavements in relation to street widths.</li> <li>•Planting street trees in the areas where pavements can accommodate them.</li> </ul> |
| <ul style="list-style-type: none"> <li>•Encouraging greenery display from private gardens.</li> </ul>   | 2. How do you rate the idea of displaying private gardens from housings?  | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>  |
| <ul style="list-style-type: none"> <li>•Connecting routes through large blocks.</li> </ul>  | 3. How do you rate the idea of connecting <i>sois</i> for easier walking and cycling in neighbourhoods?         | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>  |
| <ul style="list-style-type: none"> <li>•Taming private motorized transport.</li> </ul>  | 4. How do you rate the idea of slowing cars down on all <i>sois</i> ?   | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>  |
| <ul style="list-style-type: none"> <li>•Encouraging personalisation of communities.</li> </ul>  | 5. How do you rate the idea of personalising each <i>soi</i> ?  | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>  |
| <ul style="list-style-type: none"> <li>•Providing spaces for street vendors at <i>taysois</i>.</li> </ul>   | 6. How do you rate the idea of including appropriate areas for street selling stalls/kiosks at <i>taysois</i> ? | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principle is retained.</li> </ul>  |
| <ul style="list-style-type: none"> <li>•Connecting <i>sois</i> to Sansab canal for natural drainage.</li> </ul>   | 7. How do you rate the idea of providing run-off from <i>sois</i> to Sansab canal?                              | ⊙          | ⊙      | Yes                    | <ul style="list-style-type: none"> <li>•Design principle is omitted.</li> </ul>   |
| <ul style="list-style-type: none"> <li>•Preserving fine-grained patterns of plots and built forms.</li> <li>•Remaining low density development (2.0 FAR).</li> <li>•Retaining significant public realm of <i>sois</i> and avoiding the connection of traffic routes.</li> </ul> | 8. How do you rate the idea of preserving traditional neighbourhoods?   | ●          | ●      | No                     | <ul style="list-style-type: none"> <li>•Design principles are retained.</li> </ul>  |

● Agreement      ⊙ Inconsistent Agreement (20 percent of disagreement)      ⊖ Disagreement

Note: Other stakeholders include landowners, investors and developers, small-scale traders, a design professional, public authorities and leaders of communities

Source: Focus groups with residents and semi-structured interviews with other stakeholders in Sukhumvit, 2012

Regarding the design to provide run-off, Figure 8.18 shows an example of traditional neighbourhood located at *taysoi*, as the long run of structure for which run-off from *sois* to Sansab canal is suggested.



Figure 8.18 Traditional Settlements Located along the Strips of Sansab Canal in Sukhumvit, 2011  
Source: Author, 2011

However, it was rejected by most participants because Sukhumvit was not affected by the 2011 flood despite waters reaching 1.0 to 1.5 metre and lasting as long as a month in other areas of Bangkok. All stakeholders said that the flooding had been prevented by Bangkok's flood mitigation scheme for many areas of the inner city including Sukhumvit. Nevertheless, several urban areas were affected; resulted from conflicting management and the lack of an effective information system between central and local authorities. Disagreement for this design action was also expressed by participants in regard to the aim to protect traditional neighbourhoods located along the Sansab canal. The action to provide

run-off was denied by residents and rated as a poor idea by 76.2% of the other stakeholders (see Question 7 in Figure 8.19).

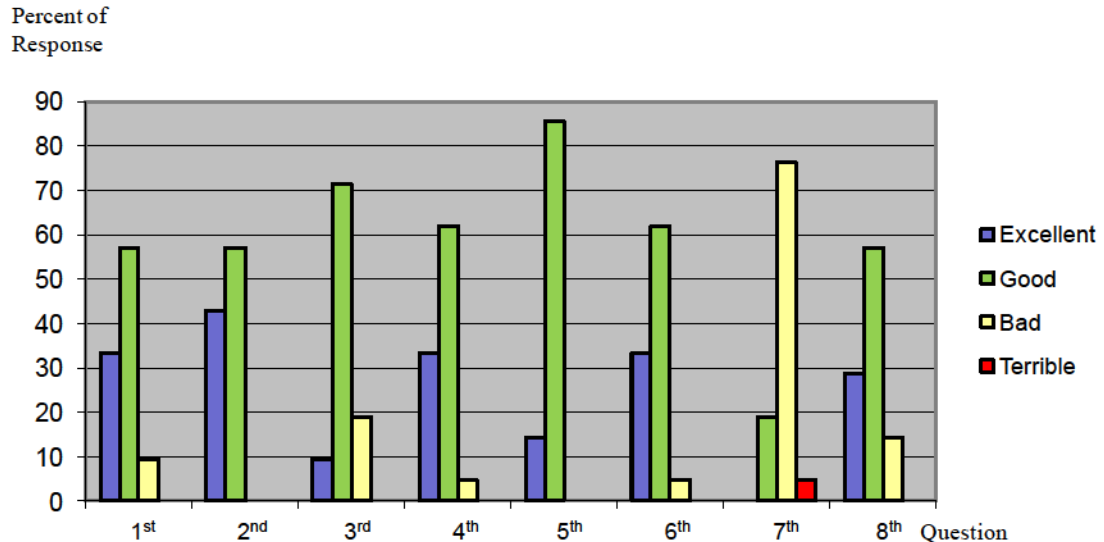


Figure 8.19 Key Stakeholders' Satisfaction with the Design Principles Proposed for the *Soi-Based Morphology*, 2012

Source: Semi-structured interviews with key stakeholders (landowners, investors and developers, small-scale traders, a design professional, public authorities and leaders of communities)

### 8.3.4 Future Form-Modifications

Based on the ways in which the design principles are refined as presented in Tables 8.2, 8.3 and 8.5, the modifications of Sukhumvit's urban forms are summarized in Table 8.6. The actions which can be undertaken for delivering locally acceptable sustainable urban forms are presented, as well as limitations.

As shown in Table 8.6, proposed future form-adaptations are the result of accommodating individual interpretation, social expectation and political acceptance into acceptable modifications of forms. The design principles have been tested and refined in order to provide the best solutions that all participants can accept and in which the principles can be locally implemented. Overall Sukhumvit's multilayered socio-spatial patterns are well consolidated, although designs for one socio-spatial layer may reduce its local sustainability.

Table 8.6 Sukhumvit's Future Form-Modifications for Locally Acceptable Sustainable Urban Forms

| Key Issues            |    |   | Summary  |  |  |
|-----------------------|----|---|--|--|--|
|                       |    |   | Superblock   | Superblock-Quarter   | <i>Soi</i>   |
| Street and Open Space | 1  | Linkage between Centres of High Activities                  | The connection of arterial roads is retained.  | The short linked-up pattern of the local linkage is retained.  | Better connectivity can be implemented in a few areas because of the protections for morphological distinctiveness.  |
|                       | 2  | Linkage of Public and Private Open Space as Green Corridors | Green corridors will be promoted by street trees and green open spaces.  | Street trees will be planted in the areas where pavements can be accommodated.   | Street trees will be planted in the areas where pavements can be accommodated.   |
|                       | 3  | Linked Green Corridors as Natural Networks                  | Green corridors will be linked as a network from the development of street trees and green open spaces.                      | Natural networks will be achieved in some areas where pavements can accommodate them.  | Street trees cannot be promoted for all areas regarding narrow streets.  |
|                       | 4  | Planting and Renewing Street Trees                          | Street trees will be planted along all arterial roads' strips.   | Street trees can be planted in a few areas.  | Street trees can be planted in a few areas.  |
|                       | 5  | Reduced Hard Surfaces and Run-Off                           | Natural drainage (and absorption) will be encouraged more by new green open spaces in high density building groups.          | Natural drainage and absorption will be encouraged.  | The protection for riverine and slum communities is proposed by many stakeholders, despite impeding runoff.  |
|                       | 6  | Visually Imaginable Networks of Space                       | A clear pattern of arterial road connections is maintained.  | A few areas along the local linkages can be remarked by street trees and street furniture regarding narrow <i>sois</i> .           | Despite being more connected in some parts, <i>sois</i> cannot yet be easily defined.  |
| Street and Block      | 7  | Fine Grained Street and Block                               | Fine grained streets and blocks can be retained because connections between <i>paksois</i> and arterial roads still persist. | Finer grained streets and blocks will be developed for few areas regarding the protection of traditional neighbourhoods.           | Space disposition of <i>sois</i> can be implemented for a few areas because of the protection of traditional neighbourhoods.                                 |
| Plot and Building     | 8  | Fine Grain of Land Subdivisions and Buildings               | Land amalgamation and the development of modern buildings are initiated.   | The development of large building footprints is required by upscale market.  | Fine grain of footprint buildings is going to be secured.  |
| Building              | 9  | Levels of Building Density and Feel of Comfort              | High density buildings and soft landscape will be more developed in new building groups and spaces.                          | Regarding market signal, high density buildings will be more allowed; soft landscapes can be integrated into this new development. | Low density buildings can be retained and greenery will be more supported by display of private gardens although street trees can be planted in a few areas. |
|                       | 10 | Active Frontages  | Visual interaction to the public realm is going to be decreased from the development of large footprint buildings.           | The active frontage found from shops and restaurants is going to be reduced regarding the new development.                         | Located in most parts of <i>sois</i> , retained bungalows do not promote features of active frontages.   |
|                       | 11 | Mixed Building Types, Ages and Tenures                      | Following the new development, a variety of building types, ages and tenures will be reduced.                                | A variety of building types, ages and tenures will be reduced.   | The intermixed neighbourhoods found in many <i>sois</i> can be preserved.  |

Continued

Table 8.6 Continued

| Key Issues |    |  | Summary  |   |   |
|------------|----|--|--|---|---|
|            |    |  | Superblock   | Superblock-Quarter  | <i>Soi</i>  |
|            | 12 | Visually Interesting Buildings                                 | Groups of interesting buildings will be more settled by allowance for 10 FAR along the key public realm.                             | Influenced by the development of modern buildings, memorable buildings and landscape will be encouraged.  | Interesting landscape features cannot be encouraged because of the protection of neighbourhoods.  |
|            | 13 | Locally Distinctive Building Groups and Spaces                 | The allowance for 10 FAR will replace traditional buildings and landscape.   | The allowance for 8, 6 and 4 FARs discourages traditional buildings, boundary treatments and building lines.  | Locally distinctive residential buildings and spaces will be preserved by the control of 2.0 FAR.   |
| Use        | 14 | Levels of Population Density and Control over Public Realm     | Population will increase and physical permeability will be more encouraged by widening pavements and by zoning street vendors.       | Regarding narrow streets, physical permeability can be encouraged in few areas. This does not correspond to population residing in the local areas. | Although current density of residents in <i>sois</i> can be retained, few areas can accommodate pavements supporting physical permeability. |
|            | 15 | Mixed Communities  | A variety of land utilization and residences found at this layer are retained and encouraged.  | A variety of land utilization and residences will be encouraged.  | Intermixed communities along the length of <i>sois</i> will be preserved.   |
|            | 16 | Viable Range of Uses and Facilities                            | Found within appropriate distances to access, most everyday uses and facilities are retained.  | Mixed uses will be promoted by new buildings and uses and street vendors.   | Provided spaces for street vendors will encourage more local services and facilities.   |
|            | 17 | Employment and Economic Activities                             | The high density development and the provision for street vendors' spaces will promote a wide range of economic exchange.            | The high density development and the provision for street vendors' spaces will promote more economic exchange.                                      | Regarding perceptions for home zone, economic activity is not required at this layer.   |
|            | 18 | Public Transport Infrastructure                                | All public transport infrastructures are retained. Bus stops and metros are found within 300 and 800 m respectively from most areas. | Bus stops and metros cannot be developed at this layer regarding conditions of street widths.   | A great distance to access transport stations from the local areas cannot be reduced in <i>sois</i> .                                       |
|            | 19 | Layout of Transport Stations as an Integral Part of the Street | All public transport infrastructures that can be easily seen and used are retained.  | Not all modes of public transport can be located.   | Not all modes of public transport can be located.   |
|            | 20 | Multi-Modes of Movement  | Found along the networks of arterial roads, a variety of transport options are retained.   | Because of narrow streets, pavements and cycle lanes can be provided in few areas.  | Pavements and cycle lanes cannot be delivered along the whole length of <i>sois</i> .   |
|            | 21 | Walking and Cycling Encouraged by Greenery                     | Although greenery and shade will be more developed, the flow of traffic is still required on all arterial roads.                     | Pavements and cycle lanes can be developed in some areas, as well as street trees.  | Although traffic in <i>sois</i> can be tamed, pavements and street trees can be provided in few parts of <i>sois</i> .                      |
|            | 22 | Restricted Vehicle Circulation and Speeds                      | Traffic circulation and speeds are not restricted with reference to the required high level of movement.                             | Although the motorized transport is not excluded, traffic speed can be restricted.  | Even though vehicle circulation cannot be restricted, vehicle speed will be limited.  |

Continued

Table 8.6 Continued

| Key Issues   |                                |   | Summary  |  |   |
|--------------|--------------------------------|---|--|--|---|
|              |                                |   | Superblock   | Superblock-Quarter   | <i>Soi</i>  |
| All Elements | 23                             | Well-Ventilated Spaces  | Removing the sky train line will encourage better ventilation.   | High long structures encompassing low density areas cannot be denied.  | Good ventilated spaces are preserved by retaining low density buildings.  |
|              | 24                             | Greenery Display and Soft Landscape   | Greenery displays and soft landscapes can be attached in new building groups.  | Greenery displays and soft landscapes can be attached in new building groups.                                  | Greenery displays and soft landscapes can be encouraged along the length of <i>sois</i> .                                       |
|              | 25                             | Gradual Change of Spatial Configuration   | Traditional building groups and spaces will be replaced by new development required by the market.                                       | Several traditional building groups and spaces will be replaced by new development.                            | A number of traditional housings and spaces found in many <i>sois</i> will be protected.  |
|              | 26                             | Legible Settlement through Active Use   | The accumulation of use is retained and is more intensive along the arterial roads.  | Active use will be strengthened along the local linkage.   | To preserve traditional building settings, intensity of activities is not supported.  |
|              | 27                             | Legibility through Landmark and Space Disposition                                       | The concentration of skyscrapers is maintained at the important nodes.   | Influenced by the new development, the distinctive space of the local linkage will be manifested.              | Landmark and space disposition can be implemented in a few areas.   |
|              | 28                             | Positive Identity Defined by Locally Responsive Climate and Ecology                     | Greenery displays and soft landscapes can be more integrated into the modern townscape.  | Better integration between natural feature and townscape can be promoted through a few areas.                  | A number of existing natural features and distinctive patterns of traditional neighbourhoods can be preserved.                  |
|              | 29                             | Preserving Significant Public Realm   | Regarding the modern development, alterations of urban settings and public realm are ongoing.  | Local connectivity and public realm is changing in regard to hybrid systems of through traffic.                | The public realms of <i>sois</i> are retained although the middle parts of <i>sois</i> have been overlaid by the local linkage. |
| 30           | Personalisation of Communities | The distinctiveness of modern districts found along arterial roads' strips is retained. | A mix of modern and traditional built forms and activities will change regarding the high density development required by market signal. | Uniqueness and dominance can be encouraged in a few areas where riverine and low-income neighbourhoods define. |   |

Note: Implementation strategies to deliver proposed future form-adaptations are discussed in 8.5 *Implementation Strategies of Locally Acceptable Sustainable Urban Forms*.

A ‘trade off’ between socio-spatial patterns of form-adaptations and aspects of sustainability is instrumental to the refinement of the design principles. Table 8.6 shows that the change towards modernity for the superblock (such as the decrease in fine grain of plots and buildings) is compensated by the political agreement to retain traditional morphological distinctiveness of *sois* inside the superblock. Therefore a “hybrid” model proposed for the superblock-quarter combines both global development and urban conservation, and is also acceptable to the majority of participants. On this basis, delivery

of both global and local aspects of sustainability (CH1) is reconciled and integrated into future form-adaptations proposed for Sukhumvit.

Table 8.6 shows the locally acceptable sustainable urban forms and is the foundation for evaluation of capacity to deliver local sustainability. To achieve the latter, Sukhumvit's form-adaptations are identified by 30 subcategories, and they are used to evaluate local sustainability in the next section.

## 8.4 Capacity to Deliver Locally Acceptable Sustainable Urban Form

Based on the ways in which Sukhumvit's urban forms can be shaped or sustained, this section discusses an outcome of locally acceptable sustainable urban forms. The local levels of sustainability are evaluated and Sukhumvit's capacity to deliver locally acceptable sustainable urban forms is analysed in this section.

### 8.4.1 Local Levels of Sustainability of the Refined Design Principles

To analyse the capacity of Sukhumvit's future form-adaptations in terms of sustainability, methods of perceptual evaluation developed in CH4 are utilized by applying the local indicators developed in CH7 and presented in *Appendix J* to evaluate Sukhumvit's form-modifications (Table 8.6). Following the local indicators' parameters (good [3], moderate [2] and poor [1]), the scores are rated as shown in Table 8.7.

Table 8.7 Sustainability Scores Rated for Sukhumvit's Form-Modifications

| Local Indicators      |   |   | Scores*    |                    |     |
|-----------------------|---|---|------------|--------------------|-----|
|                       |   |   | Superblock | Superblock-Quarter | Soi |
| Street and Open Space | 1 | Linkage between Centres of High Activities                  | [3]        | [3]                | [2] |
|                       | 2 | Linkage of Public and Private Open Space as Green Corridors | [3]        | [2]                | [2] |
|                       | 3 | Linked Green Corridors as Natural Networks                  | [2]        | [2]                | [2] |
|                       | 4 | Planting and Renewing Street Trees                          | [3]        | [2]                | [2] |
|                       | 5 | Reduced Hard Surfaces and Run-Off                           | [2]        | [2]                | [2] |
|                       | 6 | Visually Imaginable Networks of Space                       | [3]        | [2]                | [1] |
| Street and Block      | 7 | Fine Grained Street and Block                               | [2]        | [2]                | [1] |
| Plot and Building     | 8 | Fine Grain of Land Subdivisions and Buildings               | N/A        | [1]                | [3] |

Continued

Table 8.7 Continued

| Local Indicators |              |   | Scores*                |                    |     |
|------------------|--------------|---|------------------------|--------------------|-----|
|                  |              |   | Superblock             | Superblock-Quarter | Soi |
| Building         | 9            | Levels of Building Density and Feel of Comfort                      | [2]                    | [2]                | [2] |
|                  | 10           | Active Frontages  | [1]                    | [1]                | N/A |
|                  | 11           | Mixed Building Types, Ages and Tenures                              | N/A                    | [2]                | [3] |
|                  | 12           | Visually Interesting Buildings                                      | [3]                    | [3]                | [1] |
|                  | 13           | Locally Distinctive Building Groups and Spaces                      | N/A                    | [1]                | [3] |
| Use              | 14           | Levels of Population Density and Control over Public Realm          | [3]                    | [2]                | [2] |
|                  | 15           | Mixed Communities   | [3]                    | [3]                | [3] |
|                  | 16           | Viable Range of Uses and Facilities                                 | [3]                    | [3]                | [3] |
|                  | 17           | Employment and Economic Activities                                  | [3]                    | [3]                | N/A |
|                  | 18           | Public Transport and Specific Distances to Access                   | [3]                    | [1]                | [1] |
|                  | 19           | Layout of Transport Stations as an Integral Part of the Street      | [3]                    | [1]                | [1] |
|                  | 20           | Multi-Modes of Movement   | [3]                    | [1]                | [1] |
|                  | 21           | Walking and Cycling Encouraged by Greenery                          | [2]                    | [2]                | [2] |
|                  | 22           | Restricted Vehicle Circulation and Speeds                           | N/A                    | [2]                | [2] |
|                  | All Elements | 23  | Well-Ventilated Spaces | [2]                | [1] |
| 24               |              | Greenery Display and Soft Landscape                                 | [2]                    | [2]                | [3] |
| 25               |              | Gradual Change of Spatial Configuration                             | N/A                    | [1]                | [3] |
| 26               |              | Legible Settlement through Active Use                               | [3]                    | [3]                | [2] |
| 27               |              | Legibility through Landmark and Space Disposition                   | [3]                    | [3]                | [1] |
| 28               |              | Positive Identity Defined by Locally Responsive Climate and Ecology | [3]                    | [2]                | [2] |
| 29               |              | Preserving Significant Public Realm                                 | N/A                    | N/A                | [2] |
| 30               |              | Personalisation of Communities                                      | [3]                    | [2]                | [2] |

[3] good [2] moderate [1] poor

\* Scores are rated by evaluating Sukhumvit's form-modifications (see Table 8.6), following the parameters of the local indicators established in Appendix J.

N/A When participants did not recognize the importance of an urban feature, the local indicators were not applied.

Consequently, the scores are categorized into particular sets for identifying levels of sustainability qualities in *Appendix M* (p.412); the combinations of indicators are specified in CH1. At each table in *Appendix M*, the average scores are calculated for representing the numeric results of evaluations, shown in Table 8.8.

Table 8.8 Average Scores Calculated from Appendix M

| Sustainability Qualities | Average Scores |                    |      |
|--------------------------|----------------|--------------------|------|
|                          | Superblock     | Superblock-Quarter | Soi  |
| Resource Efficiency      | 2.55           | 2.10               | 2.00 |
| Biotic Support           | 2.57           | 1.71               | 2.14 |
| Cleanliness              | 2.33           | 1.71               | 1.85 |
| Resilience               | 2.75           | 1.85               | 2.33 |
| Variety                  | 2.50           | 2.00               | 2.33 |
| Accessibility            | 2.80           | 1.83               | 2.00 |
| Legibility               | 3.00           | 2.75               | 1.25 |
| Identity                 | 3.00           | 1.66               | 2.25 |

Note: 3 is the maximum score in relation to the indicators' parameter.

Based the average scores (see Table 8.8), the local levels of sustainability are highlighted in Table 8.9.

Table 8.9 Local Levels of Sustainability of the Refined Design Principles

| Sustainability Qualities | Sustainability Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|-----------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low              |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2               | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
| Biotic Support           |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
| Cleanliness              |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
| Resilience               |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
| Variety                  |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
| Accessibility            |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
| Legibility               |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
| Identity                 |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |
|                          |                       |         |         |         |          |         |         |         |           |         |

Superblock Morphology  
 Superblock-Quarter Morphology  
 *Soi*-Based Morphology

As shown in Table 8.9, local levels of sustainability are utilized for evaluating the capacity of Sukhumvit in delivering locally acceptable sustainable urban forms in the next subsection.

### 8.4.2 The Capacity to Deliver Locally Acceptable Sustainable Urban Forms

In order to examine the capacity to deliver Sukhumvit’s locally acceptable sustainable urban forms, two sets of local levels of sustainability are brought into comparison. Tables 8.11 to 8.13 show local levels of sustainability evaluated in CH7 for current form patterns and that assessed in the previous subsection for future form-adaptations proposed by the design principles.

As shown in Tables 8.10 to 8.12, the change of sustainability degrees influenced by the design proposals is obvious, defining capacity in delivering sustainability responsive to place.

**Table 8.10 Superblock Morphology:** Comparison of Local Levels of Sustainability between Existing Urban Forms and Future Form-Adaptations of Sukhumvit

| Sustainability Qualities | Sustainability Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|-----------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low              |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2               | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      |                       |         |         |         |          |         |         |         |           |         |
| Biotic Support           |                       |         |         |         |          |         |         |         |           |         |
| Cleanliness              |                       |         |         |         |          |         |         |         |           |         |
| Resilience               |                       |         |         |         |          |         |         |         |           |         |
| Variety                  |                       |         |         |         |          |         |         |         |           |         |
| Accessibility            |                       |         |         |         |          |         |         |         |           |         |
| Legibility               |                       |         |         |         |          |         |         |         |           |         |
| Identity                 |                       |         |         |         |          |         |         |         |           |         |

- Local levels of sustainability of the existing urban forms are assessed in CH7.
- Local levels of sustainability of the future form-adaptations are assessed in Table 8.9.


**Table 8.11 Superblock-Quarter Morphology:** Comparison of Local Levels of Sustainability between Existing Urban Forms and Future Form-Adaptations of Sukhumvit


| Sustainability Qualities | Sustainability Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|-----------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low              |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2               | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      |                       |         |         |         |          |         |         |         |           |         |
| Biotic Support           |                       |         |         |         |          |         |         |         |           |         |
| Cleanliness              |                       |         |         |         |          |         |         |         |           |         |
| Resilience               |                       |         |         |         |          |         |         |         |           |         |
| Variety                  |                       |         |         |         |          |         |         |         |           |         |
| Accessibility            |                       |         |         |         |          |         |         |         |           |         |
| Legibility               |                       |         |         |         |          |         |         |         |           |         |
| Identity                 |                       |         |         |         |          |         |         |         |           |         |

- Local levels of sustainability of the existing urban forms are assessed in CH7.
- Local levels of sustainability of the future form-adaptations are assessed in Table 8.9.

Table 8.12 **Soi-Based Morphology**: Comparison of Local Levels of Sustainability between Existing Urban Forms and Future Form-Adaptations of Sukhumvit

| Sustainability Qualities | Sustainability Levels |         |         |         |          |         |         |         |           |         |
|--------------------------|-----------------------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|
|                          | Very Low              |         | Low     |         | Moderate |         | High    |         | Very High |         |
|                          | 1.0-1.2               | 1.3-1.4 | 1.5-1.6 | 1.7-1.8 | 1.9-2.0  | 2.1-2.2 | 2.3-2.4 | 2.5-2.6 | 2.7-2.8   | 2.9-3.0 |
| Resource Efficiency      |                       |         |         |         |          |         |         |         |           |         |
| Biotic Support           |                       |         |         |         |          |         |         |         |           |         |
| Cleanliness              |                       |         |         |         |          |         |         |         |           |         |
| Resilience               |                       |         |         |         |          |         |         |         |           |         |
| Variety                  |                       |         |         |         |          |         |         |         |           |         |
| Accessibility            |                       |         |         |         |          |         |         |         |           |         |
| Legibility               |                       |         |         |         |          |         |         |         |           |         |
| Identity                 |                       |         |         |         |          |         |         |         |           |         |

 Local levels of sustainability of the existing urban forms are assessed in CH7.

 Local levels of sustainability of the future form-adaptations are assessed in Table 8.9.

In this sense, how sustainability can be responsive to local culture and form is influenced by distinctive socio-spatial patterns, the interpretations of those patterns for the environmental choices and the political consensus in accepting the change. Inevitably, despite not delivering the best levels of all aspects of sustainability, local sustainability is the result of reconciling all local factors into the modifications of locally acceptable sustainable urban forms.

While the flow of global identity perceived by users, choices evaluated by other stakeholders and market signals is noted for the modern townscape of the superblock, a few issues of the design principles are required to be revised in order to achieve acceptance among actors. High and very high levels of sustainability can be delivered as shown in Table 8.10.

In contrast, when users' preferred choices are different from, and are required to be accommodated with, other stakeholders' aspirations driven by economic dimensions and rapid growth of the city, the design principles for the superblock-quarter have to be adjusted to consolidate local acceptance for sustainable urban forms. Although the refinement of the design principles reduces levels of resilience and variety (Table 8.11),

allowance for the change of this layer is to accommodate protections for the other morphology. As discussed in 8.3.4 *Future Form-Modifications*, there is an interplay between modern development and urban conservation in any given morphology.

Derived from the field studies, the change of the superblock-quarter and the extent to which sustainability levels are delivered becomes crucial to ascertain a low rate of investment and political consensus to protect the *soi*-based morphology. If more change is accepted at the superblock-quarter, several sustainability qualities of *sois* can be secured. The protections of the *soi*-based morphology is substantial to continue townscape merit in which users perceived for their imagined community, attached by local history, climate, ecology and personality. As shown in Table 8.12, for instance, levels of resource efficiency, biotic support and cleanliness can be promoted for *sois* and for Sukhumvit.

## **8.5 Implementation Strategies of Locally Acceptable Sustainable Urban Forms**

The achievement of locally acceptable sustainable urban forms is defined both by the ways in which sustainability and urban localities can be accommodated into design inquiries and by the extent to which those inquiries can be locally implemented. As collective procedures of form-adaptations, key implementation strategies for delivering the design principles have to be established.

This section presents key implementation strategies for delivering Sukhumvit's locally acceptable sustainable urban forms. Derived from the field study, the pattern of involvement was examined on the one hand; key implementation strategies for delivering the refined design were established on the other.

### **8.5.1 Local Process of Form-Productions in Sukhumvit**

To assess key actors' roles, semi-structured interviews were conducted with 16 representatives from various stakeholders. Techniques for data collections and analysis methods are formulated in CH4 and the instrument used in the interviews is presented in *Appendix F* (p.375).

Derived from communications with interviewees, the built form of Sukhumvit is the product of a process by which actions and aspirations of few stakeholders are

accommodated and accomplished. The market imperfection (Adam, 1994) is noticed in Sukhumvit because a few developers and investors exist regarding high transaction cost particularly in land cost. Further, market functions are only driven by the demand of gentrification by those who are willing to buy land and property while the needs of indigenous residents are not taken into account by market signals.

In terms of the state, the key barrier to deliver an urban quality is a lack of comprehensive plans. Requiring support by the law, immediate budgets and goodwill from all stakeholders, the effort to establish a long-term plan always declines with short-term electoral reasons. In this context, the implementation tools that the state uses for controlling the built environment and for moderating the unexpected outcomes from markets in Sukhumvit are the Building Control Act and the Bangkok Land Use Plan as shown in Figure 8.20.

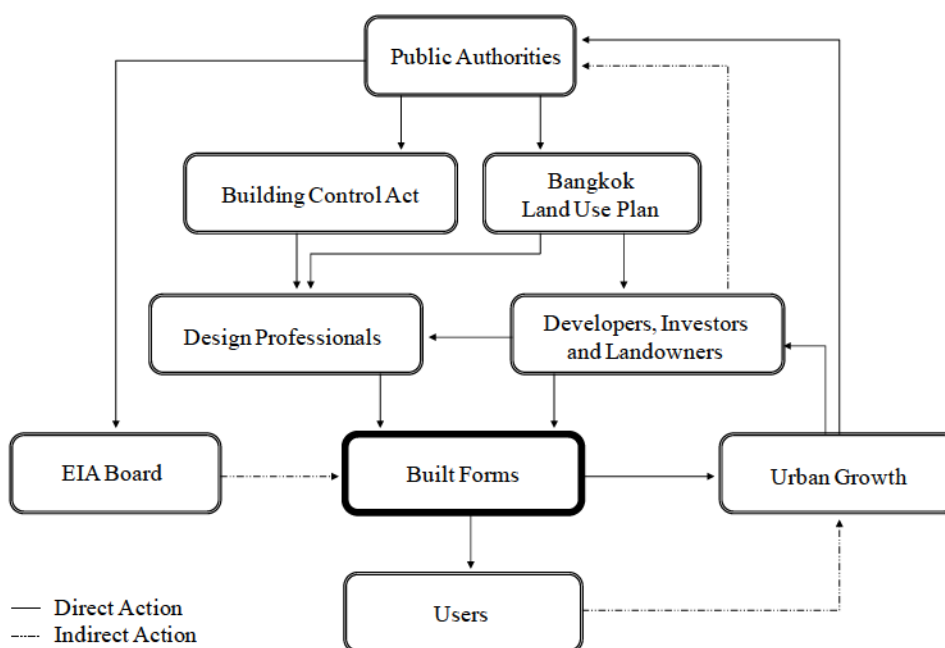


Figure 8.20 Local Process of Form-Productions in Sukhumvit, 2010  
Source: Interviews with Key Stakeholders, 2010

However, these two instruments cannot deliver contextual responsiveness for a given location because the Building Control Act is formulated to be applied to all locations in the country with the same mandate, and the Bangkok Land Use Plan is an infrastructure

planning tool which cannot deliver particular qualities necessary for specific places. The built forms of Sukhumvit therefore are merely developed by following those quantitative regulations by practitioners, developers and investors.

The Environmental Impact Assessment (EIA) becomes the key instrument that the state recently utilizes to control project developments with respect to local contexts, as shown in Figure 8.20. Nonetheless, because the approval of EIA is based on the judgment of the board not on specific mandates, this mechanism occasionally collapses when the developers and investors complain and force the state to approve projects under the patronage system.

To initiate the urban form, therefore, Bangkok Metropolitan Administration (BMA), the local government of Bangkok, has been taking control of urban development. The supplementary design policies and guidance in terms of building density and open spaces have been addressed more in the 2006 Bangkok Land Use Plan (DCP, 2006a).

However, the contradictory statements for controlling the urban forms between central and local authorities were defined by several interviewees. As shown in Figure 8.21, central government always requires all infrastructure, particularly road constructions and public transportation, to be developed for supporting gated communities in the suburbs, although local government makes an effort to intensify the density in the urban areas. Electoral reasons influence inconsistent visions between these authorities. It should be noted that the development of roads and transport is out of the BMA's control despite having the right of manipulating buildings and open spaces in Bangkok.

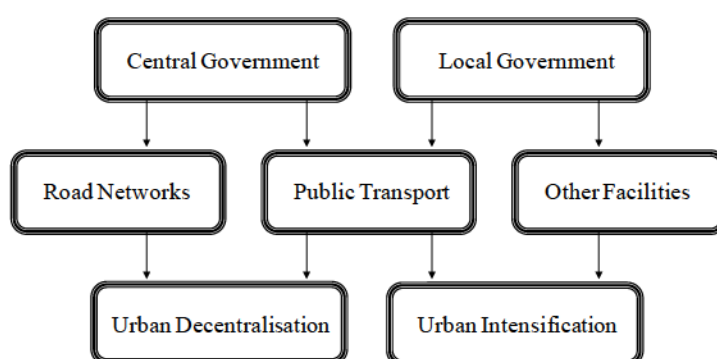


Figure 8.21 Contradictory Sanctions for Urban Development in Bangkok, 2010  
Source: Interviews with Key Stakeholders, 2010

As the consequences of this form-production process, in Sukhumvit, users are in the low rungs in a ladder of citizen participation (Arnstein, 1969) in which they never participate in planning or conducting programs of urban development. As shown in Figure 8.20, requirements in relation to the local form have never been activated by users. Besides, as discussed in CH7, when the transformations of Sukhumvit are driven by other actors who perceive sustainability in a different way from users, locally acceptable sustainable urban form is not being delivered for Sukhumvit.

### 8.5.2 Key Implementation Strategies

To establish key implementation strategies for Sukhumvit's locally acceptable sustainable urban forms, the focus group discussion was undertaken in the field study with 15 representatives from various stakeholders as shown in Figures 8.22 and 8.23. The instrument utilized in the discussion is presented in *Appendix G* (p.378).

As agreed by participants, a lack of spatial plans, a misalignment of development strategies between authorities and a low level of citizen participation (as explained in the previous subsection) are barriers to implementation of the design principles presented in this thesis. Nevertheless, alternative mechanisms were formulated in the group in order to fill gaps in the design. Interpreted from focus group discussions, Figure 8.24 shows a mechanism for delivering the design principles.

Figure 8.24 shows that both the "hands-on" roles of authorities and community empowerment have to be implemented, as well as top-down projects and bottom-up development. On the one hand, the supplementary design policies and guidance in the Bangkok Land Use Plan, the compulsory purchase and land readjustment can be initiated by the state for delivering the design principles. On the other hand, several issues of the principles can be utilized for producing district and community plans by local authorities and communities; and the state can implement these plans into the process of controlling, reviewing and monitoring the urban transformation, as shown in the figure. Based on Figure 8.24, Table 8.13 shows implementation strategies for the delivery of the refined designs.



Figure 8.22 Focus Group Discussion for Establishing Key Implementation Strategies, Sukhumvit, 2012

Source: Author, 2012



Figure 8.23 Focus Group Discussion for Establishing Key Implementation Strategies, Sukhumvit, 2012

Source: Author, 2012

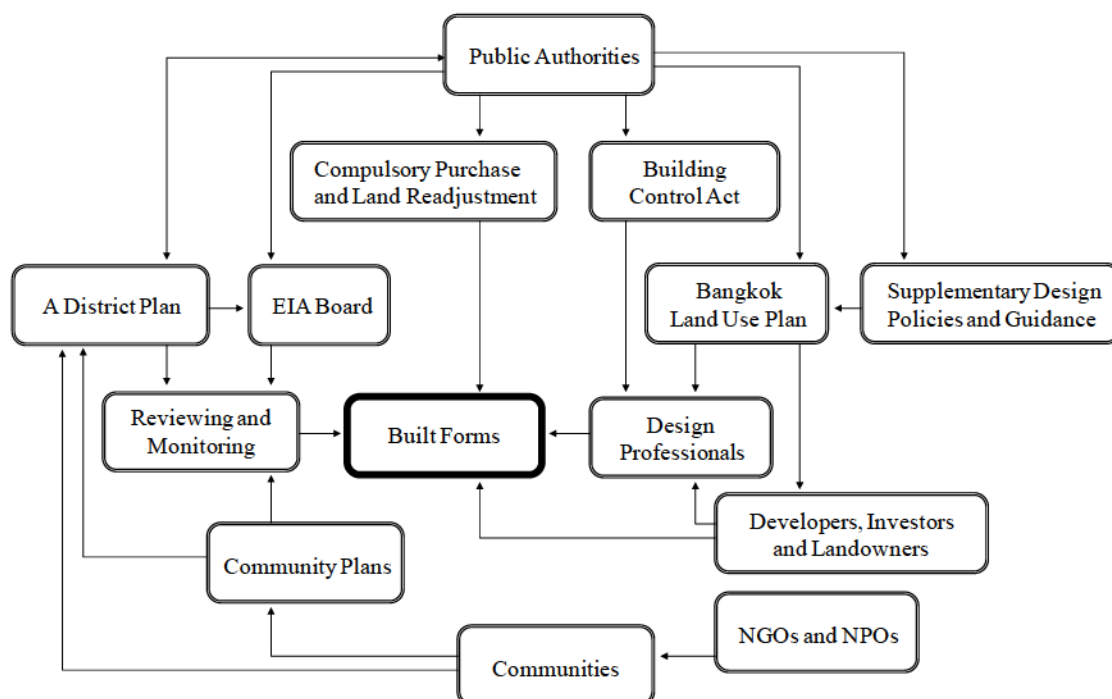


Figure 8.24 Mechanism for Delivery of the Refined Design Principles, Sukhumvit, 2012  
Source: Focus Group Discussion with Key Stakeholders, 2012

### The Supplementary Design Policies and Guidance

In the focus group discussion, many stakeholders agreed that the supplementary design policies and guidance in the Bangkok Land Use Plan constituted by Bangkok Metropolitan Administration (BMA) are key to delivering the design principles. As shown in Table 8.13, different FARs can be initiated in relation to certain roads and streets and to specific areas and distances. Further, soft landscaping open spaces and pavements developed on the front setbacks of high and medium-high density building groups and used as the public domain can be encouraged by the incentive of the land use plan. A programme of public transport development can also be promoted.

### The Compulsory Purchase

Several stakeholders accepted that compulsory purchase is difficult to implement when it requires high budgets. This mechanism, however, was considered as one of the alternative solutions for initiating specific design qualities. Areas implemented by compulsory purchase will be a good example, encouraging other stakeholders to implement the design principles for other locations.

Table 8.13 Proposed Implementation Strategies for Delivery of the Refined Design Principles

| Refined Design Principles<br>(Based on Tables 8.2, 8.3 and 8.5)  | Key Mechanisms   | Delivery Partners   | Funding Requirements  | Timing (Years) |    |    |
|--|--|---|---|----------------|----|----|
|  |  |   |   | 5              | 10 | 15 |
| <ul style="list-style-type: none"> <li>• Creating a positive identity with an attachment of greenery.</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>Supplementary Design Policies and Guidance</b>, Incentive should be used for developing green open spaces in the front setbacks of high and medium-high density building groups in the Bangkok Land Use Plan.</li> </ul> | <ul style="list-style-type: none"> <li>• BMA</li> <li>• Developers and Investors</li> <li>• Design Professionals</li> <li>• Landowners</li> </ul> | <ul style="list-style-type: none"> <li>• Private</li> </ul>                   |                |    |    |
|  | <ul style="list-style-type: none"> <li>• <b>Reviewing and Monitoring</b>, The project developments should be reviewed with reference to district and community plans.</li> </ul>   | <ul style="list-style-type: none"> <li>• EIA Board</li> </ul>   | <ul style="list-style-type: none"> <li>• Public</li> </ul>                    |                |    |    |
| <ul style="list-style-type: none"> <li>• Planting street trees and integrating greenery displays in building settings and spaces.</li> </ul>                   | <ul style="list-style-type: none"> <li>• <b>District Plan and Community Plans</b>, The development of street trees and greenery displays can be initiated by the local framework of development.</li> </ul>  | <ul style="list-style-type: none"> <li>• VDA</li> <li>• Communities</li> <li>• NGOs and/or NPOs</li> </ul>  | <ul style="list-style-type: none"> <li>• Public</li> <li>• Private</li> </ul> |                |    |    |
| <ul style="list-style-type: none"> <li>• Controlling building density in relation to street widths.</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>Supplementary Design Policies and Guidance</b>, Different FARs can be regulated as supplementary guidance in the Bangkok Land Use Plan.</li> </ul>   | <ul style="list-style-type: none"> <li>• BMA</li> <li>• Developers and Investors</li> <li>• Design Professionals</li> <li>• Landowners</li> </ul> | <ul style="list-style-type: none"> <li>• Private</li> </ul>                   |                |    |    |
| <ul style="list-style-type: none"> <li>• Retaining significant public realm</li> <li>• Encouraging public realm personalization in each <i>soi</i>.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Community Plans</b>, Specific plans of communities should be established by participatory design.</li> </ul>   | <ul style="list-style-type: none"> <li>• VDA</li> <li>• Communities</li> <li>• NGOs and/or NPOs</li> </ul>  | <ul style="list-style-type: none"> <li>• Public</li> <li>• Private</li> </ul> |                |    |    |
| <ul style="list-style-type: none"> <li>• Developing fine grained street blocks and taming private motorized transport.</li> </ul>                              | <ul style="list-style-type: none"> <li>• <b>Compulsory Purchase</b>, Well-connected routes can be implemented by compulsory purchase.</li> </ul>   | <ul style="list-style-type: none"> <li>• Central Government</li> <li>• BMA</li> </ul>   | <ul style="list-style-type: none"> <li>• Public</li> </ul>                    |                |    |    |
|  | <ul style="list-style-type: none"> <li>• <b>District Plan</b>, Vehicle restriction can be initiated by the local framework of development.</li> </ul>  | <ul style="list-style-type: none"> <li>• Central Government</li> <li>• VDA</li> <li>• Communities</li> </ul>                                      | <ul style="list-style-type: none"> <li>• Public</li> </ul>                    |                |    |    |
| <ul style="list-style-type: none"> <li>• Providing pavements and cycle lanes in relation to street widths.</li> </ul>  | <ul style="list-style-type: none"> <li>• <b>Supplementary Design Policies and Guidance</b>, Pavement and cycle lane provision can be stated as supplementary guidance in the Bangkok Land Use Plan.</li> </ul>   | <ul style="list-style-type: none"> <li>• Central Government</li> <li>• BMA</li> </ul>   | <ul style="list-style-type: none"> <li>• Public</li> </ul>                    |                |    |    |

Continued

Table 8.13 Continued

| Refined Design Principles<br>(Based on Tables 8.2, 8.3 and 8.5)  | Key Mechanisms   | Delivery Partners  | Funding Requirements  | Timing (Years) |    |    |
|--|--|--|---|----------------|----|----|
|  |  |  |   | 5              | 10 | 15 |
| (Continued)  | <ul style="list-style-type: none"> <li>• <b>Compulsory Purchase</b>, The extension of street spaces including the development of pavements and cycle lanes can be implemented by compulsory purchase.</li> </ul> | <ul style="list-style-type: none"> <li>• Central Government</li> <li>• BMA</li> </ul>  | • Public  |                |    |    |
|  | <ul style="list-style-type: none"> <li>• <b>Land Readjustment</b>, the development of pavements and cycle lanes can be promoted if lands are readjusted and street spaces are extended.</li> </ul>               | <ul style="list-style-type: none"> <li>• BMA</li> <li>• VDA</li> <li>• Developers and Investors</li> <li>• Design Professionals</li> <li>• Landowners</li> </ul> | • Private   |                |    |    |
| <ul style="list-style-type: none"> <li>• Remarking the local linkage as the key legible path of the local areas.</li> <li>• Integrating multi-modes of transport.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>District Plan</b>, The local linkage improvement should be stated in the local framework of development.</li> </ul>  | <ul style="list-style-type: none"> <li>• Central Government</li> <li>• VDA</li> <li>• Communities</li> </ul>   | • Public  |                |    |    |
| <ul style="list-style-type: none"> <li>• Lengthening rapid transport lines.</li> <li>• Replacing the sky train line with an underground train line.</li> </ul>               | <ul style="list-style-type: none"> <li>• <b>Supplementary Design Policies and Guidance</b>, The programme of rapid transport development can be initiated by the Bangkok Land Use Plan.</li> </ul>               | <ul style="list-style-type: none"> <li>• Central Government</li> <li>• BMA</li> <li>• Developers and Investors</li> </ul>  | <ul style="list-style-type: none"> <li>• Public</li> <li>• Private</li> </ul> |                |    |    |
| <ul style="list-style-type: none"> <li>• Retaining small-scale traders along the local linkage.</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>Supplementary Design Policies and Guidance</b>, Traditional fine grain can be retained in relation to FAR controls in the Bangkok Land Use Plan.</li> </ul>          | <ul style="list-style-type: none"> <li>• BMA</li> <li>• Developers and Investors</li> <li>• Design Professionals</li> <li>• Landowners</li> </ul>                | • Private   |                |    |    |
| <ul style="list-style-type: none"> <li>• Providing spaces for street vendors at all morphological layers.</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>District Plan and Community Plans</b>, Appropriate spaces for street vendors should be identified by the local framework of development.</li> </ul>                  | <ul style="list-style-type: none"> <li>• VDA</li> <li>• Communities</li> <li>• NGOs and/or NPOs</li> </ul>   | • Public  |                |    |    |

BMA Bangkok Metropolitan Administration, the Local Authority of Bangkok

EIA Board Environmental Impact Assessment Board, Environmental Impact Evaluation Bureau, Thailand

NGOs Non-Governmental Organizations

NPOs Nonprofit Organizations

VDA Vadhana District Administration, the Local Authority of Sukhumvit

Source: Key mechanisms and delivery partners are defined from the focus group discussion with key stakeholders in Sukhumvit, 2012.

Funding requirement and timing are interpreted from the established key mechanisms.

### **Land Readjustment**

With reference to the refined design principles, a correlation between density of built component and street width is noted. Particularly in the superblock-quarter morphology, while several streets are too narrow for developing high density buildings, pavements and cycle lanes, land readjustment can promote the extension of the narrow streets in order that higher density buildings can be developed, as well as spaces for pedestrians and cyclists.

### **The District Plan**

A lack of consistent vision between authorities, one of key barriers of design implementation, can be replaced by the district plan. Existing as the local administration of Sukhumvit, Vadhana District Administration is the local authority which should take this action. Despite not having enough budget and human resources at present, this authority can produce a plan in general terms of public space improvement and management for delivering the design principles (as shown in Table 8.13). The plan can be consequently used for initiating supplementary design policies in the land use plan and for reviewing and monitoring project development.

### **The Community Plans**

For the *soi*-based morphology where intermixed neighbourhoods locate, community plans are instrumental by means of communities' deciding how local spaces should be developed, such as street trees, spaces for street vendors, traffic taming, preferred building heights and boundary treatments (as shown in Table 8.13). Discussed in the focus group, although the community plans are not supported by law and cannot be implemented within the statutory system, yet the plans can present the local requirement to be used for the development of the district plan and for the process of reviewing and monitoring the proposed projects by the state (Figure 8.24, p.293).

### **Reviewing and Monitoring**

As discussed in 8.4.1 *Local Process of Form-Productions in Sukhumvit*, the environmental impact assessment board is one of the current mechanisms to control Sukhumvit's built forms, by reviewing large scale projects including a building with 18 metre height or more, a building or a building group with 10,000 square metre or more, and large scale housing projects, e.g. hotel or hospital (EIEB, 2013). Derived from the discussion between

stakeholders, this process of reviewing and monitoring can be encouraged if any local plans and frameworks of given locations are available at the time. Crucially, both the district plan and the community plan can empower reviewing and monitoring processes in which the design principles can be secured through the local process of form-productions.

### **Funding Requirements and Timing**

To deliver the principles of locally acceptable sustainable urban forms, funding streams and a time table need to be identified together with appropriate delivery partners. Table 8.13 shows that a number of design actions can be implemented by authorities which can control budgets and thus influence e.g. building density and use of open space. As well, several actions proposed at the *soi* level have been implemented by communities.

Several design principles can be used in local urban management and development and indeed can be incorporated into current implementations for development. Nevertheless, further discussions are required between local administration and key stakeholders such as promoting well-connected *sois*, constructing pavement and extending underground train lines. Although the design applications have been interpreted in relation to delivery by key participants, the former need to be tested further in order to ascertain feasibility in an economic, social and political context.

## **8.6 Conclusion**

In this chapter, the design principles and strategies for implementing locally acceptable sustainable urban form were formulated for Sukhumvit.

With respect to local levels of sustainability and the local framework of form-adaptations of Sukhumvit as they are analysed in CH7, the design principles were established in order to strengthen sustainability qualities of three morphological layers: the superblock, the superblock-quarter and the *soi*-based morphology. Key concepts are:

1. *Positive Identity*, The morphological distinctiveness of Sukhumvit is to be retained in order that place identity and levels of sustainability manifested through the existing urban forms can be secured;
2. *Graded Density*, In order to protect the uniqueness of place, graded density is implemented to keep both a global and local identity of Sukhumvit;

3. *Permeability*, Defining acceptable levels for change and the preferred environmental choices of Sukhumvit, the quality of physical, visual and natural permeability is promoted for all morphological layers;
4. *Choice*, Regarding various user groups, a diversity of needs has to be supplied through a wide range of uses and activities;
5. *Accessibility*, To access choices, appropriate networks and modes of movement and open spaces are designed for spatial patterns of Sukhumvit.

However, not all design principles can be sustained through the process of form-adaptations. In the field study, local factors came to play a role in shaping the urban forms of Sukhumvit through various participants' ambitions.

1. Influence of the Urban Growth
2. Market Signals in Prime Locations
3. Different Capacities of Lands with Relation to *Soi* Configurations
4. Various Patterns of Travel Behaviour
5. Requirement to Accommodate All Inquiry into Limited Space of *Sois*

The design principles have to accommodate development and gain a majority acceptance in support of locally acceptable sustainable urban forms. Change in one morphological layer can sustain a low rate of change in another. As such this sustains and increases local sustainability of the superblock typology. Design changes and changed levels of sustainability between morphological layers need to be negotiated by appropriate stakeholders.

Capacity of locally acceptable sustainable urban forms, therefore, appears at different levels, depending on how consistent environmental choices between actors are and can be reconciled. In other words, in spite of not delivering the best levels of sustainability, the locally acceptable sustainable urban form is the result of accommodating local desires into the suitable modifications of forms.

Further, the implementation strategies for delivering the refined design principles were also developed in the field study. Again, particular patterns of involvement and mechanisms drive ways in which the principles can be implemented. Defined as key barriers in implementing locally acceptable sustainable urban forms, a lack of local spatial plans, a misalignment of development strategies and a low level of citizen participation were found

from the interviews with key personal in Sukhumvit. In this context, the hands-on roles of authorities and community empowerment need undertaking. Following this basis, a set of implementation tools was established.

1. The Supplementary Design Policies and Guidance
2. The Compulsory Purchase
3. The Land Readjustment
4. The District Plan
5. The Community Plans
6. The Process of Reviewing and Monitoring

The study suggests however that the proposed mechanisms need further discussions and involvement in order to attain feasibility for implementing Sukhumvit's locally acceptable sustainable urban forms.

Findings of this chapter presented an outcome of locally acceptable sustainable urban form in terms of spatial solutions, modifications of forms, required political consensus and tools for delivery. Based on these data, the validity of the preliminary conceptual framework will be discussed and the final conceptual framework for identifying locally acceptable sustainable urban forms will be established in the next chapter.

# Chapter Nine

## Conceptual Framework Part Four: Refining the Conceptual Framework

### 9.1 Introduction

Addressing the seventh research objective, the aim of this chapter is to consolidate the final conceptual framework for identifying locally acceptable sustainable urban forms. It should be emphasized that the conceptual framework refined in this chapter informs the key research questions, *what is the locally appropriate sustainable urban form and how can it be achieved within the context of inner Bangkok?*

Based on findings derived by applying the preliminary conceptual framework and the fieldwork methodologies (CHs 3 and 4) to analyse the case study, the final conceptual framework is developed with respect to theoretical and practical data. Key findings are summarized from CHs 5 to 8 in which locally acceptable sustainable urban form was analysed in Sukhumvit. The coherence between the conceptual framework (based on a literature review) and empirical evidence derived from Sukhumvit is interrogated, defining ways in which the framework can be consolidated.

To fulfill the aim of this chapter, key objectives are formulated.

1. To summarise key findings from the field study
2. To use the key findings to interrogate the validity of the preliminary conceptual framework
3. To establish the final conceptual framework
4. To define lines of inquiry for identifying locally acceptable sustainable urban form

In accordance with the chapter objectives, the chapter structure is formulated.

9.1 Introduction

9.2 Validity of the Preliminary Conceptual Framework

9.3 The Final Conceptual Framework

9.4 Inquiry to Identify Locally Acceptable Sustainable Urban Form

9.5 Conclusion

## **9.2 Validity of the Preliminary Conceptual Framework**

Two subsections are presented in order to evaluate the validity of the preliminary conceptual framework. They are 1) the outcome from the identification of locally acceptable sustainable urban form in Sukhumvit and 2) the strength and weakness of the theoretical framework implemented in the analysis. This section provides a basis of how the final conceptual framework is consolidated.

### **9.2.1 Outcomes from the Identification of Local Sustainable Urban Form**

As presented by the preliminary conceptual framework, local sustainable urban form has to be seen as a cultural product derived from a local process of form-productions where human perceptions and actions react reciprocally. To identify it, key issues to be analysed are: 1) urban localities; 2) local perceptions; 3) levels of sustainability; 4) local adaptations (CH3). Following the fieldwork methodologies, those issues were investigated in Sukhumvit and empirical data were analysed and presented in CHs 5 to 8. Figure 9.1 shows the relationships between the theoretical framework and the outcomes found from Sukhumvit.

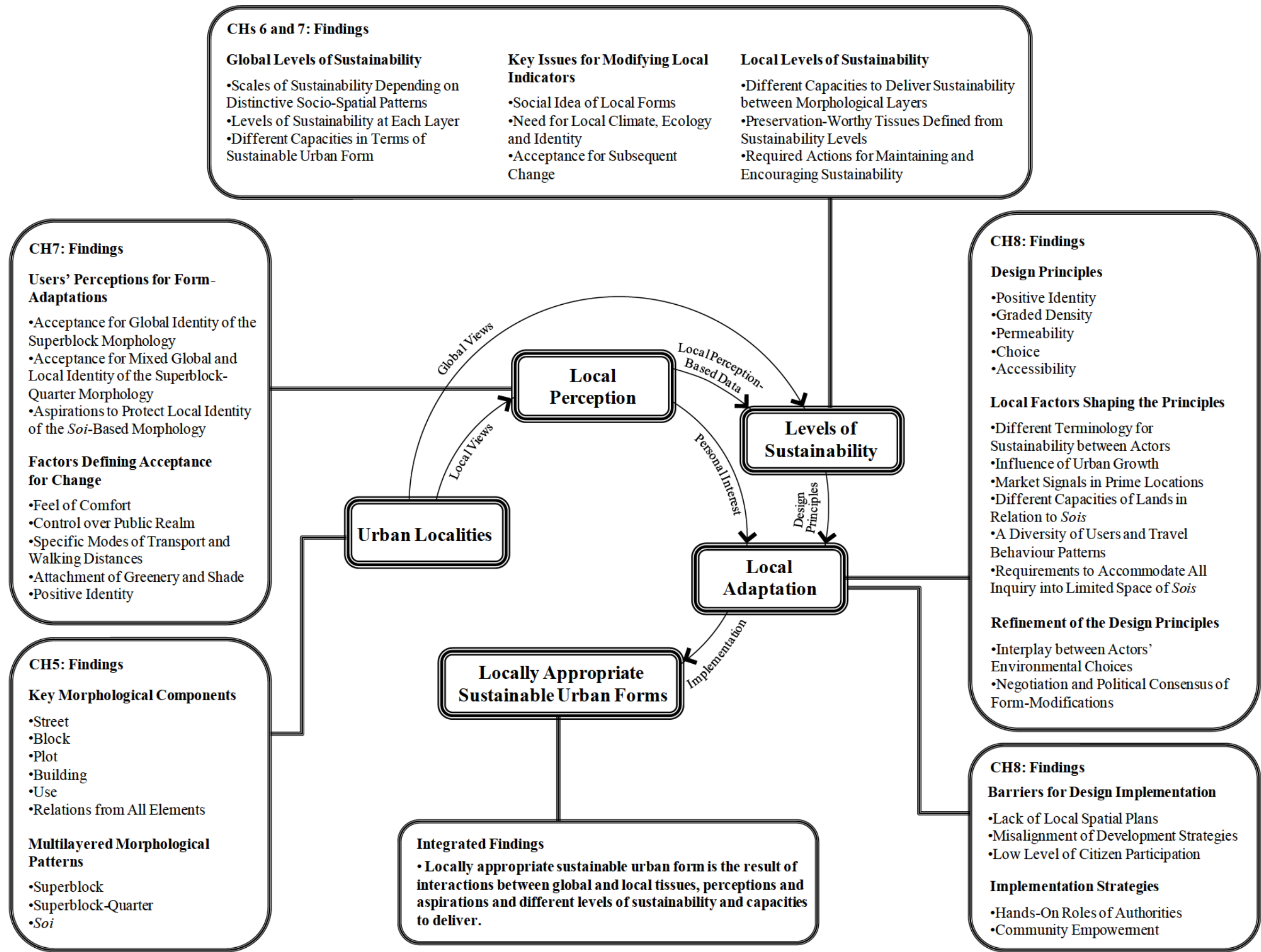


Figure 9.1 Key Findings Found from the Field Study by Applying the Preliminary Conceptual Framework to Analyse Sukhumvit

**Urban Localities,** Defined as the first action to identify sustainable urban forms, socio-spatial patterns have to be examined in order to provide a foundation to define sustainability located in time and space. On this basis, morphological components of Sukhumvit were analysed with respect to an evolutionary approach in CH5. Key finding is that relationships between socio-economic cycles and physical development can be understood through a series of morphological layers.

As a cultural product, socio-spatial patterns developed through urban phases of development are: 1) the superblock morphology which is the fabric of modern commercial and residential districts superimposed upon traditional neighbourhoods in a ring-like pattern; 2) the superblock-quarter morphology which is a multi-ring-like pattern of mixed built forms and activities consolidated along the strips of the local linkage inside the superblock; and 3) the *soi*-based morphology which is a local tissue where traditional intermixed neighbourhoods are located by sharing the same *sois*. As shown in Figure 9.1, these multilayered morphologies identify different interpretations of sustainability in Sukhumvit.

**Local Perceptions,** To examine a capacity to deliver sustainability of a given location, social recognitions, interpretations and evaluations of the environment are crucial as defined by the preliminary conceptual framework.

Assessed in CH7, although perceptions from various stakeholders are important, user is only one group who expresses a desire for sustainability in relation to local culture and form. A key finding is that people perceived their place in accordance with the three morphological layers (as they are analysed in CH5) where both modern and local townscape can be identified. In this context, global-local relationships come to play a role in place-recognitions and sustainability is locally interpreted with reference to the interactions between global and local identity. As shown in Figure 9.1, key issues interpreted from users' perceptions are: the acceptance for global identity of the superblock layer and for mixed global and local identity of the superblock-quarter; and aspirations to protect the local identity of the *soi*-based morphology.

People's perceptions and aspirations for change are influenced by positive features of the local forms. They are the feel of comfort, physical permeability, greenery, shade and local climate and ecology. Crucially, these factors become fundamental in evaluating levels of

sustainability because they define acceptance for change and acceptable sustainable urban forms.

**Levels of Sustainability,** As presented by the framework, the distinctiveness of locally responsive sustainability can be defined from sustainability levels evaluated from global and local perspectives (verified by the findings from CHs 6 and 7).

By applying global criteria for evaluating sustainable urban forms Sukhumvit's capacity to deliver sustainability was found at different scales (CH6) depending on how socio-spatial patterns are taken into account. This was also found in CH7 when local indicators were implemented. Nonetheless, different levels of sustainability were indicated between literature- and perception-based evaluations, showing gaps in identifying local sustainability. The gaps are influenced by ways in which global and local indicators are used. Key aspects driving the modification of local indicators, which are not included by global indicators, are acceptable degrees of development and aspirations for future forms as they are assessed from users' perceptions.

Because different levels of sustainability were identified in Sukhumvit's morphological layers, capacities to deliver sustainability and required actions for maintaining and increasing sustainability qualities vary between those layers. Moreover, good levels of sustainability define preservation-worthy tissues in terms of sustainability, which influence form-adaptations for locally acceptable sustainable urban forms.

**Local Adaptations,** To illustrate locally acceptable sustainable urban form and how it can be manifested, design principles and implementation strategies are crucial, as demonstrated by the theoretical framework.

The design principles (CH8) aiming to strengthen sustainability qualities were established with respect to capacities and required actions to deliver sustainable urban forms. However, different terminology of sustainability between stakeholders results in the constraints of how local contexts and conditions can be accommodated into design solutions, such as rapid urban growth, market signals and land and street capacities in terms of investment and development (see Figure 9.1).

In Sukhumvit, the interaction between actors' environmental choices is obvious and negotiations are undertaken in a different way between global and local tissues. Locally acceptable sustainable urban forms, in this sense, are found at different levels and scales

depending on the interplay between stakeholders' acceptability and how they can be reconciled. In order to identify sustainable urban forms at the local level, the modern fabric of high density built forms, movement networks and activities has to be continued in the superblock and superblock-quarter in order to secure Sukhumvit's levels of resource efficiency, resilience, variety, accessibility, legibility and global identity. Crucially, this action is intended to achieve a political consensus to maintain a low rate of change of the local tissue inside the superblock where a number of positive urban features is perceived by users. The protection of the local tissue can promote Sukhumvit's levels of biotic support, cleanliness and local identity.

However, a lack of local spatial plans, a misalignment of development strategies and a low level of citizen participation were identified as key barriers to deliver those proposals. The study found that hands-on roles of authorities and community empowerment become fundamental to define and achieve Sukhumvit's local sustainable urban forms where the development of modern tissue has to be controlled and the positive features of local forms have to be encouraged.

**Local Appropriateness**, With reference to the empirical findings, the study found that locally appropriate sustainable urban form is the result of interactions between global and local tissues, perceptions and aspirations, and different levels of sustainability and capacity to deliver. In this context, appropriateness is not merely reciprocity between perceptions and form-adaptations as they are defined by the preliminary conceptual framework, but the study found that **local appropriateness is the interplay between desirable and acceptable levels for change.**

Modification of forms needs to be appropriate to increase sustainability of a location through the local form-production process. However, sustainable urban forms need to be locally acceptable in order to drive change. Local sustainability thus relies on ways in which participants evaluate and determine choice with respect to locally acceptable sustainable urban forms.

Based on the key findings (as summarized above), important data have been identified, which lead to the evaluation of the preliminary conceptual framework in the next section.

## 9.2.2 Strength and Weakness of the Theoretical Framework

Based on findings, as discussed in the previous subsection, Table 9.1 shows the validity of the preliminary conceptual framework; the strengths and weaknesses in implementing it to identify locally acceptable sustainable urban forms are presented.

Table 9.1 Validity of the Preliminary Conceptual Framework

| Strength  | Weakness   |
|---|--|
| 1. A relationship between urban forms, perceptions, sustainability levels and form-adaptations suggested by the framework is found as a workable structure to identify sustainability at the local level. | 1. Particular relationships between global and local tissues, acceptable and desirable degrees of development, and different capacities to deliver sustainability between morphological layers are found. Crucially, they are not identified by the framework. |
| 2. Distinctive socio-spatial pattern is a good starting point to interrogate sustainability, verified by the field study.   | 2. In Sukhumvit, interactions between globalization and localization of the urban forms are a cornerstone to interrogate sustainability which is not demonstrated by the framework.  |
| 3. Perceptions are a key to defining sustainability, confirmed by the relationships between social interpretations for environmental choice and sustainable urban forms.                                  | 3. The framework does not prioritize users' perceptions in defining sustainability, which is crucial to ascertain local sustainability.  |
| 4. Based on the conceptual framework, different levels of sustainability evaluated from global and local indicators are found.  | 4. Although different levels of sustainability have been found, key aspects driving that differentiation are not explained by the framework, such as social ideas of local forms, local needs of global and local identity and acceptance for change.          |
| 5. Importance to incorporate various aspirations for form-productions in order to define local sustainable urban forms.   | 5. In the field study, locally acceptable sustainable urban forms are identified by the interplay between the change of global tissue and protection of local tissue. This specific aspect should be introduced by the framework.                              |
| 6. Defining local appropriateness of sustainable urban forms, the reciprocity between perceptions and form-adaptations is verified.   | 6. Underpinning local appropriateness, the interaction between desirable and acceptable levels for change is substantial. Again, it should be identified by the framework.   |

As shown in Table 9.1, the validity of the preliminary conceptual framework is verified by the data collected and analysed for identifying sustainable urban forms at the local level. However, the weakness of the framework is defined by the fact that insight issues and their

relationships influencing locally acceptable sustainable urban forms are not yet included (Table 9.1).

On this basis, both strengths of the preliminary conceptual framework and empirical findings of locally acceptable sustainable urban forms are required to be integrated in the development of the final conceptual framework in the next section.

### 9.3 The Final Conceptual Framework

With respect to the key findings and the strengths and weaknesses of the preliminary conceptual framework, the final conceptual framework for identifying locally acceptable sustainable urban forms is developed in this section. Based on the extent to which empirical data are derived and how they relate to one another, a definition of locally acceptable sustainable urban form is developed.

**A locally acceptable sustainable urban form is set in a political and social context within which global-local sustainability are individually perceived. Choices within this framework are negotiated with respect to defining appropriate levels of change and to derive suitable modifications of forms.**

Influencing this definition, Figure 9.2 shows the final conceptual framework for identifying locally acceptable sustainable urban forms. As discussed in CH3, sustainability is the interplay between global ecological concern and local environmental health; how all sustainability dimensions can be accommodated has to be determined by the capacity of local form-productions. This theoretical basis is retained as a skeleton of the final conceptual framework; the relationships of local forms, perceptions, levels of sustainability, consensus for change (modifications of forms) are included in the framework as shown in the figure.

The conceptual framework shows that socio-spatial patterns of a given location have to be investigated initially in order to provide a foundation to interrogate locally acceptable sustainability as shown in Figure 9.2. Nonetheless, globalization and localization of social spaces and systems, territoriality and identity drive the expressions of morphological distinctiveness in a complex way. Distinguished through socio-economic cycles, global-local relationships and developmental experience of a place, uniqueness of morphological layers has to be analysed, as well as symbolic forms of global and local identity. These urban structures are crucial in terms of sustainable urban forms because they reflect ways

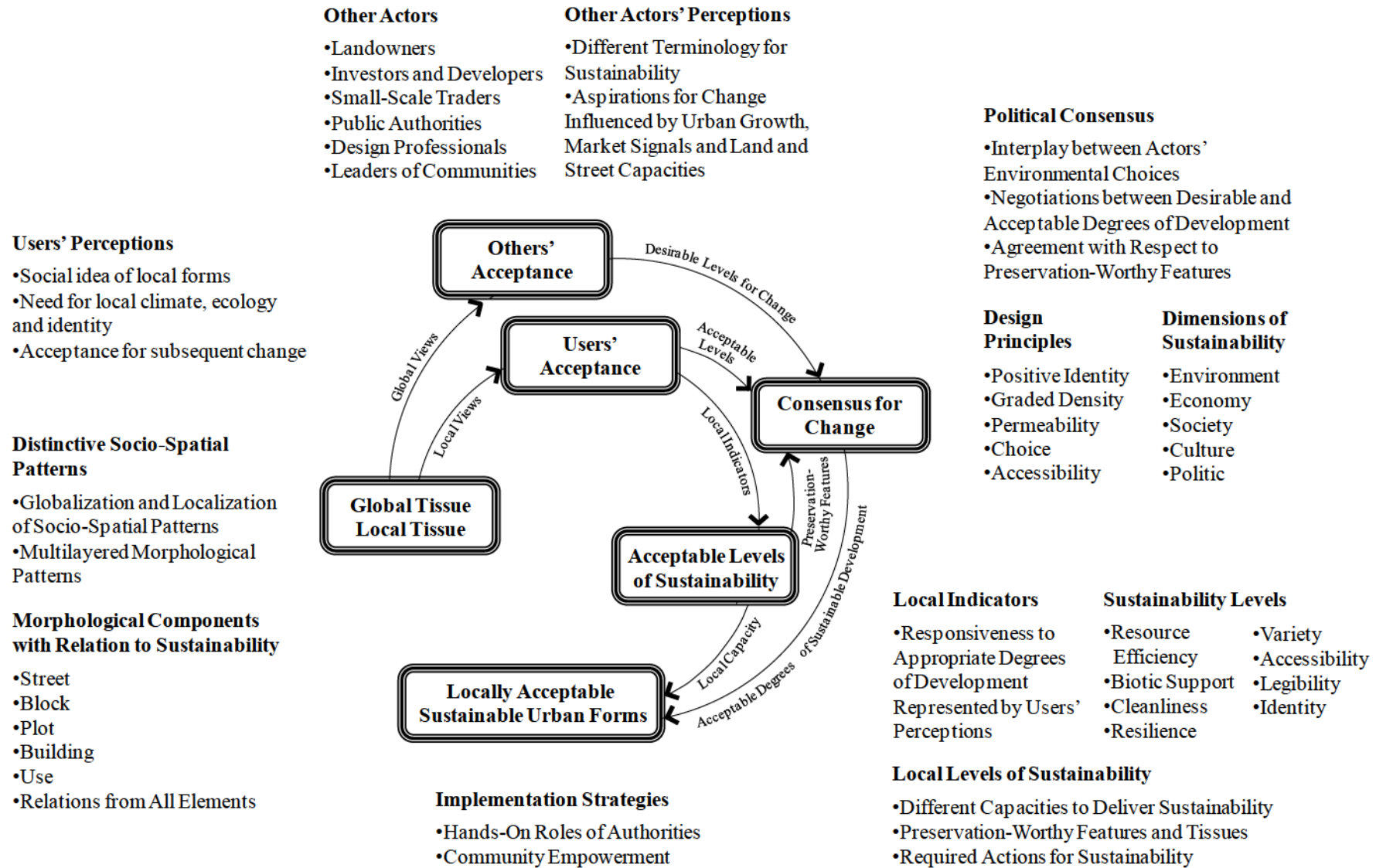


Figure 9.2 Final Conceptual Framework for Identifying Locally Acceptable Sustainable Urban Forms

in which people shape and reshape the environment and what they expect from their different socio-spatial patterns.

Capacity of the urban form to deliver sustainability is determined by acceptable degrees of development (acceptable from the local perspective); in this sense, social interpretations and evaluations of forms are fundamental.

However, because people use different filters to perceive their environment (CH2), acceptance for change therefore differs among actors' perceptions. In this context, representing perceptions of various actors, two circles showing the relationships from perceptions to form-adaptations are included in the final conceptual framework (Figure 9.2). They present the dual functions of local acceptance which should be emphasized in the identification of sustainability; one is users' perceptions and another is other stakeholders' perceptions.

For the inner circle of the framework (Figure 9.2), perceptions of users are prioritized because users perceive sustainability with respect to local culture and form (previous section). As the local views, users' perceptions are important to define local capacity to deliver sustainability because they reflect expressions of morphological distinctiveness, desirable components of a place and acceptable levels of change. It should be emphasized however that these data have to be used for identifying a framework of form-adaptations and for establishing local indicators for evaluating sustainability in which social ideas, local identity, and acceptable degrees of sustainable development can be integrated into the evaluation of sustainable urban forms.

The outer circle of the framework is influenced by other stakeholders' perceptions (Figure 9.2). This set of perceptions may reflect sustainability in relation to urban localities but, based on the case study's findings, globalizations of, and solutions for, form patterns were mainly initiated as a global terminology of sustainability. However, both medium and long term outcomes of their perspectives are assessed by the conceptual framework. Demonstrating desirable levels for change, constraints of urban growth, economic inquiry and land and street capacities defining requirements for investment and development can be finalized, which have to be accommodated into form-adaptations of locally acceptable sustainable urban form.

Even though the interaction between stakeholders and their environmental choices is proceeded with the form of negotiations, in most cases, a local terminology of

sustainability is rejected when users do not have power to control a given form (CH8). As shown in Figure 9.2, the identification of locally acceptable sustainable urban forms is enabled when, derived from users and other stakeholders, two sets of social ideas and needs for shaping the environment interact through the political process of form-productions. The final conceptual framework shows that, including acceptable and desirable levels for change, two perceptual data come to play a role in negotiating suitable modifications of local sustainable urban forms.

Nonetheless, local capacity to deliver sustainability is not only driven by what people perceive, accept and aspire for change but also which features of the urban form should be changed or kept unchanged. The conceptual framework shows that, defined by levels of sustainability, preservation-worthy features of the urban form are important to energize the dialogue for delivering sustainable urban forms. As shown in the framework, three local factors come to play a role in negotiating locally acceptable sustainable urban forms between actors: 1) desirable levels for change; 2) acceptable levels for change; and 3) sustainability preservation-worthy features of the existing urban forms.

In Sukhumvit where various spatial patterns and social ideas and needs prevail, locally acceptable sustainable urban form can be identified through the political consensus allowing the modernity of form while sustaining the positive features of the local form. In other words, the local appropriateness for sustainable urban form is achieved when users' acceptable levels for the change, others' desirable levels for change, and sustainability preservation-worthy features are consistent at each tissue of the built environment. This relationship in turn emphasizes different capacities to deliver acceptable sustainability even in the single case study as found from the superblock of Sukhumvit.

Finally, to reconcile the identification of locally acceptable sustainable urban forms, key barriers in implementing sustainable urban forms have to be identified and analysed in order that the importance of authorities' roles and community empowerment can be taken into account.

#### **9.4 Inquiry to Identify Locally Acceptable Sustainable Urban Form**

With reference to the final conceptual framework, inquiry for identifying locally acceptable sustainable urban forms is shown in Table 9.2. It should be noted that all

inquiries are formulated with respect both to a platform provided by the theoretical framework and to practical conclusions as they are derived from Sukhumvit.

Table 9.2 Inquiry to Identify Locally Acceptable Sustainable Urban Forms

| Key Issues                        | Inquiry for Analysis   |
|-----------------------------------|--|
| 1. Global and Local Tissue        | <p>Key morphological components used under the investigation of sustainable urban forms are:</p> <ol style="list-style-type: none"> <li>1. Street;</li> <li>2. Block;</li> <li>3. Plot;</li> <li>4. Building;</li> <li>5. Use;</li> <li>6. Relationships from All Elements.</li> </ol> <p>Within the process of change, key issues are:</p> <ol style="list-style-type: none"> <li>1. Globalization and Localization of Socio-Spatial Patterns;</li> <li>2. Multilayered Morphological Patterns.</li> </ol>  |
| 2. Users' Acceptance              | <p>Key issues to be assessed from users' attitude are:</p> <ol style="list-style-type: none"> <li>1. Social idea of local forms;</li> <li>2. Need for local climate, ecology and identity;</li> <li>3. Acceptance for change.</li> </ol>   |
| 3. Local Levels of Sustainability | <p>Local indicators for evaluating sustainability have to be constructed with respect to capacity for change represented by users' perceptions.</p> <p>By using local indicators, local levels of sustainability are:</p> <ol style="list-style-type: none"> <li>1. Resource Efficiency;</li> <li>2. Biotic Support;</li> <li>3. Cleanliness;</li> <li>4. Resilience;</li> <li>5. Variety;</li> <li>6. Accessibility;</li> <li>7. Legibility;</li> <li>8. Identity.</li> </ol> <p>Based on the levels of sustainability, key topics that need analysing are:</p> <ol style="list-style-type: none"> <li>1. Different Capacities to Deliver Sustainability;</li> <li>2. Preservation-Worthy Features and Tissues;</li> <li>3. Required Actions for Sustainability.</li> </ol> |
| 4. Other Actors' Acceptance       | <p>Other stakeholders' perceptions have to be investigated in order to ascertain:</p> <ol style="list-style-type: none"> <li>1. Different Terminology for Sustainability;</li> <li>2. Aspirations for Change and Developmental Dimensions Influencing Those Aspirations.</li> </ol> <p>Other stakeholders:</p> <ol style="list-style-type: none"> <li>1. Landowners;</li> <li>2. Investors and Developers;</li> <li>3. Small-Scale Traders;</li> <li>4. Public Authorities;</li> <li>5. Design Professionals;</li> <li>6. Leaders of Communities.</li> </ol>   |

Continued

Table 9.2 Continued

| Key Issues                                    | Inquiry for Analysis   |
|---|--|
| 5. Consensus for Change                       | <p>An agreement for form-modifications has to be undertaken among actors. Key patterns of involvement which should be analysed are:</p> <ol style="list-style-type: none"> <li>1. Interplay between Actors' Environmental Choices;</li> <li>2. Negotiations between Desirable and Acceptable Levels of Development;</li> <li>3. Agreement with Respect to Sustainability Preservation-Worthy Features.</li> </ol> <p>The design strategies have to be formulated in order to encourage sustainability dimensions. Possible concepts to manifest locally acceptable sustainable urban forms are:</p> <ol style="list-style-type: none"> <li>1. Positive Identity;</li> <li>2. Graded Density;</li> <li>3. Permeability;</li> <li>4. Choice;</li> <li>5. Accessibility.</li> </ol> |
| 6. Locally Acceptable Sustainable Urban Forms | <p>Identification of locally acceptable sustainable urban forms is not only driven by negotiations for environmental choice but also by how choices can be delivered. Key issues to establish implementation strategies are:</p> <ol style="list-style-type: none"> <li>1. Hands-On Roles of Authorities;</li> <li>2. Community Empowerment.</li> </ol>  |

## 9.5 Conclusion

This chapter consolidates the conceptual framework for identifying locally acceptable sustainable urban forms with respect to theoretical and practical positions. To achieve this aim, the coherence between the preliminary conceptual framework established in CH3 and empirical data assessed from CHs 5 to 8 was examined.

Sustainable urban form appropriate with urban locality is the result of reciprocity between perceptions and form-adaptations as suggested by the preliminary conceptual framework. Nonetheless, empirical data shows that local sustainable urban form is the consequence of interactions between global and local tissues, acceptable levels of urban development, and different capacities to deliver sustainability. The key finding is that:

*The interplay between users' acceptable levels for change and other actors' desirable levels for that change becomes a key to understanding local appropriateness.*

On this basis, although generalizations in applying the theoretical framework to analyse locally appropriate sustainable urban forms are found, a number of issues related to locally

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acceptable sustainable urban forms identified from the field study have to be emphasized, which influence the refinement of a final conceptual framework.

The final conceptual framework presents the dual functions of perceptions between users and other stakeholders driving locally acceptable sustainable urban forms. Further, they have to be accommodated with respect to sustainability features of a location in order to define suitable modifications of forms. The framework specifies that the extent to which locally acceptable sustainable urban form can be identified is constrained by:

1. Users' acceptable degrees of development, encouraged by local climate, ecology and identity;
2. Other actors' desirable levels for change, influenced by urban growth, market signals and land and street capacities in terms of investment and development;
3. Preservation-worthy features of urban forms identified by levels of sustainability based on perceptual evaluations of acceptable sustainable urban forms.

In this context, a key conclusion is that a sustainable urban form at the local level is a politically-specific acceptable form patterns in which global and local sustainability are individually interpreted and choices are socially negotiated with respect to defining appropriate levels of change and to achieving suitable modifications of forms.

The final conceptual framework and its analysis presented in this chapter will be taken into account in light of new knowledge on the identification of locally acceptable sustainable urban forms in the next chapter.

# Conclusion

## 10.1 Introduction

The study establishes a specific framework for identifying locally acceptable sustainable urban forms and to identify ways in which they can be analysed and delivered.

According to the research questions formulated: *What is the locally appropriate sustainable urban form? How can it be achieved within the context of inner Bangkok?*, the research identified that ‘acceptability’ is central to clarifying the capacity for change, in terms of local sustainability and appropriate levels of sustainable urban form. On this basis, the development of conceptual frameworks has been shaped by ways in which local acceptance is assessed and implemented to define local sustainable urban forms.

In this chapter, both theoretical and empirical findings are summarized and taken into account to derive a conclusion for achieving locally acceptable sustainable urban forms. The research methodology is evaluated, the limitations of the study defined and contributions to new knowledge on the identification of locally acceptable sustainable urban forms discussed. Implementations and recommendations are also specified in a broader context.

Chapter structure:

- 10.1 Introduction
- 10.2 Summary of Findings
- 10.3 Limitations and Contributions
- 10.4 Implementations of Findings
- 10.5 Recommendations for Further Study

## **10.2 Summary of Findings**

The findings are framed by the development of conceptual frameworks for identifying locally acceptable sustainable urban forms. Summary of key findings in relation to four conceptual frameworks is presented, as well as the methodology for analysis and generalizations of the research.

### **Conceptual Framework Part One**

Regarding the first sub-question of the research, *What are the approaches to identifying sustainable urban forms from a global perspective?*, the Conceptual Framework Part One was formulated in CH1 by dealing with dimensions of sustainable development and approaches for defining sustainable urban forms from a global perspective.

A key finding is that both sustainability dimensions and approaches to assessing sustainable urban forms vary when complementary concepts of futurity and justice have to be taken into account. One emphasizes global ecological concerns and other prioritizes local environmental quality and basic needs at given locations. In this sense, various types of development can be identified as sustainable, depending on which objectives of sustainability are prioritized, ranked from, for instance, ‘strong’ to ‘weak’ levels of sustainability.

Hence, the complex relationship between urban form and sustainable development is due to the responsibility to deliver global and local agendas of sustainability and which aspects of global-local sustainability are implemented by design.

The approach of co-dwelling with nature (Butina Watson and Bentley, 2007) is found as a key concept to manifest both global and local relevance of sustainable urban forms. It is the proposition of urbanization processes, co-existing with environment and local socio-cultural contexts. Based on this perspective, key qualities of sustainable urban forms were identified and key spatial patterns in relation to the delivery of those qualities were formulated.

A global perspective of sustainable urban form, however, is challenged by the fact that implementations of sustainable urban forms have to be examined at the local level where interactions between global aspects and local needs in terms of sustainability can be accommodated, resulting in the development of the conceptual framework “part two”.

### **Conceptual Framework Part Two**

Regarding the second sub-question of the research, *What are the approaches to identifying sustainable urban forms from a local proposition?*, the Conceptual Framework Part Two was formulated in CH2.

In order to understand the linkage between sustainable urban form and locality, aspects of local built environment and the process by which they are locally constructed are crucial. The local form was defined as a socio-spatial structure that people perceive of their own social identities, territoriality and history. This not only reflects spatial characteristics of forms but also emphasizes the psychological relations between human and their environment in defining a local place. The extent to which built form is shaped as a cultural product is driven by the form-production process where human perceptions and suitable modifications of forms are connected.

Capacity to produce the local form is driven by social evaluation of form and actions. On this basis, sustainable development is required by the conceptual framework “part two” to be integrated as a function of form-production processes where human perceptions and actions interact reciprocally. Sustainable urban form has to be constructed as the cultural products which let people associate with their own social identities and to continue shared history through spatial patterns.

### Conceptual Framework Part Three and Four

Regarding the last sub-question of the research, *What are the locally appropriate sustainable urban forms suitable for inner Bangkok?*, two conceptual frameworks were established: The Conceptual Framework Part Three and The Conceptual Framework Part Four.

The conceptual framework “part three” was developed in CH3 as a theoretically integrated framework from both global and local perspectives. Defined by the framework, sustainability cannot be delivered outside human perceptions and actions. A key to identify local sustainable urban forms is to put humans at the centre of interpretations for sustainability and actions for sustainable urban forms. Important issues to be undertaken for identifying local sustainable urban forms were specified.

1. *Urban Locality*: Distinctive socio-spatial patterns have to be examined in order to provide a foundation to interpret sustainability located in time and space.
2. *Local Perception*: How sustainable urban form can be constructed as a cultural product is constrained by ways in which people evaluate environmental choice and how they embed their aspirations into the modification of forms.
3. *Levels of Sustainability*: Appropriate degrees of sustainable development have to be identified upon local capacity. Social perceptions and aspirations of forms representing capacity for change are a platform to establish local criteria for evaluating appropriate degrees of sustainable development.
4. *Local Adaptation*: The extent to which degrees of sustainability can be implemented through the local form is influenced by the involvement between stakeholders to undertake form-modifications.

Based on these concepts, fieldwork methodologies were established in CH4 in order to analyse local sustainable urban forms in Sukhumvit, Bangkok and to assess empirical data to formulate the final conceptual framework.

In the field study, globalization and localization of forms became fundamental to how sustainability is interpreted at the local level. Formulated through several phases of development, Sukhumvit’s socio-spatial patterns were defined (CH5). Figure 10.1 shows: 1) *Superblock Morphology*, the global tissue of commercial and residential districts

superimposed upon traditional neighbourhoods in a ring-like pattern; 2) *Superblock-Quarter Morphology*, a multi-ring-like pattern of mixed built forms and activities consolidated along the strips of the local linkage inside the superblock; 3) *Soi-Based Morphology*, a local tissue where traditional neighbourhoods are located by sharing the same *sois*, the local streets.

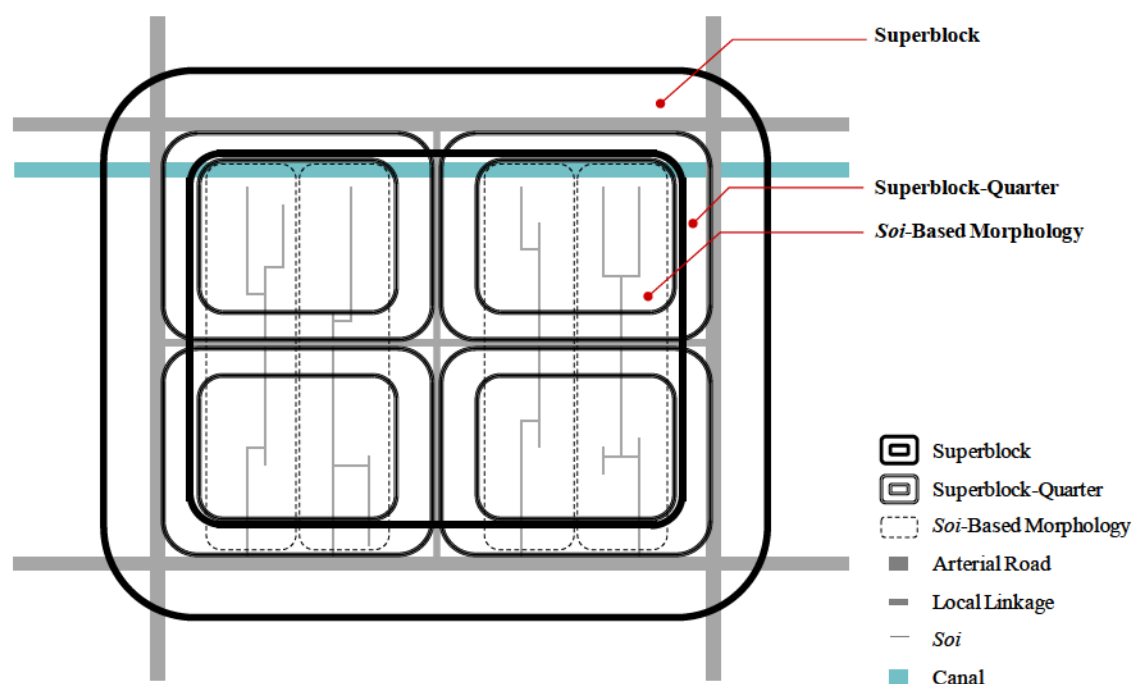


Figure 10.1 The Superblock Typology Based on Sukhumvit's Patterns of Form

To interrogate local sustainability, users' attitudes were found to be important because they interpret sustainability as responsive to local needs and forms (CH7). Users' perceptions were further investigated and the research found that expressions of Sukhumvit's morphological distinctiveness were recognized by people at the interaction between global and local identity. Social ideas and requirements, therefore, were identified as specific sets for different tissues of Sukhumvit.

With reference to empirical data, acceptance is fundamental in defining local sustainable urban forms. Figure 10.2 shows that acceptability is central, because the acceptance for change defines a local capacity for form-adaptations, from which appropriate degrees of sustainable development can be determined. What people accept in terms of form-modifications may be influenced by familiarity but ways in which choices are evaluated

and accepted are constrained by social identity, sense of belonging, and local socio-spatial structures. In this sense, acceptance becomes a platform to identify sustainable urban forms at the local level, namely a locally acceptable sustainable urban form.

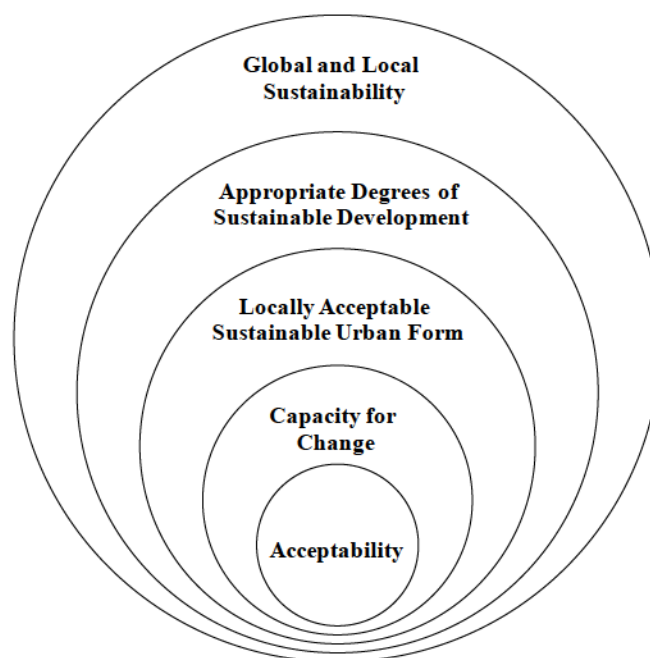


Figure 10.2 Key Issues in Identifying Locally Acceptable Sustainable Urban Forms

To identify a locally acceptable sustainable urban form, users' acceptance for Sukhumvit's form-adaptations were assessed and implemented to establish indicators for evaluating levels of sustainability (CH7). Designed by the fieldwork methodologies (CH4), the process to develop a local indicator is to interrogate the applicability of literature-based indicators to users' acceptance for change. On this basis, acceptable degrees of development are embedded into, and appropriate degrees of sustainability can be interpreted from, the evaluation. It should be emphasized that the interpretation of indicators is based on users' acceptance for change; the local indicators need to be refined further in future case studies.

In the field study, local capacity for change was found at different scales dependent on what people perceive and evaluate the current form patterns and what they accept for change at each morphological layer. In this context, because of different perceptions and aspirations for the superblock, superblock-quarter and *soi*-based morphology, capacity to deliver sustainability varied between those layers. Following users' recognitions of, and

aspirations for three morphological layers of Sukhumvit, three sets of indicators were ascertained, as well as three sets of sustainability.

Because the superblock morphology was perceived as the global identity of Sukhumvit, its modernity and rapid change of built forms and movement networks were accepted. This layer becomes the best example in terms of resource efficiency, variety, accessibility and legibility in terms of local sustainability. On the other hand, *sois* are a place where people described local identity. Traditional morphological distinctiveness of *sois* was found as the most preferred form pattern, manifesting a good example for biotic support, cleanliness and identity. In contrast, the transformation of the superblock-quarter morphology was perceived as a mixed global and local identity. Despite requirements for townscape conservation, people admired its variety, accessibility and legibility, influenced by global change.

Evaluated from Sukhumvit's multilayered morphological patterns, the difference between global (CH6) and local levels of sustainability (CH7) is substantial. Ways in which global and local indicators are established are a key driver. Local aspects, which the local indicators take into account of, while global ones do not, are the notions of form, climate, ecology, identity and acceptance for change. A key conclusion is that global evaluations cannot result in sustainability implementations at the local level because the capacity to deliver sustainability is not integrated into the evaluation.

Based on the acceptance for change and with local sustainability assessed, design principles for achieving locally acceptable sustainable urban forms were developed (CH8). The principles were formulated in order to sustain global and local tissues because each socio-spatial layer reflects preservation-worthy features in terms of local sustainability. Global and local layers deliver different qualities of sustainability to Sukhumvit and all need sustaining. Both globalisation and localization of built forms are sustainable and they are complementary. Figure 10.3 shows a summary of design applications proposed for the Sukhumvit superblock.

As shown in Figure 10.3, the design principles demonstrate the ways in which global and local sustainability are accommodated. Three existing socio-spatial patterns are secured with the concept of graded density, initiating various degrees of built form, activity, accessibility and townscape preservation. While global development with the form of high density and high connectivity of public transport promotes resource efficiency, variety, accessibility and legibility along the superblock's perimeters, traditional neighbourhoods

located in *sois* with the form of low-density and fine grain encourage urban ventilation, natural features and gradual change inside the superblock typology. A wide range of local activities and better levels of pedestrian access are integrated into the superblock-quarter where *sois* are accessed and connected to a larger web of the city.

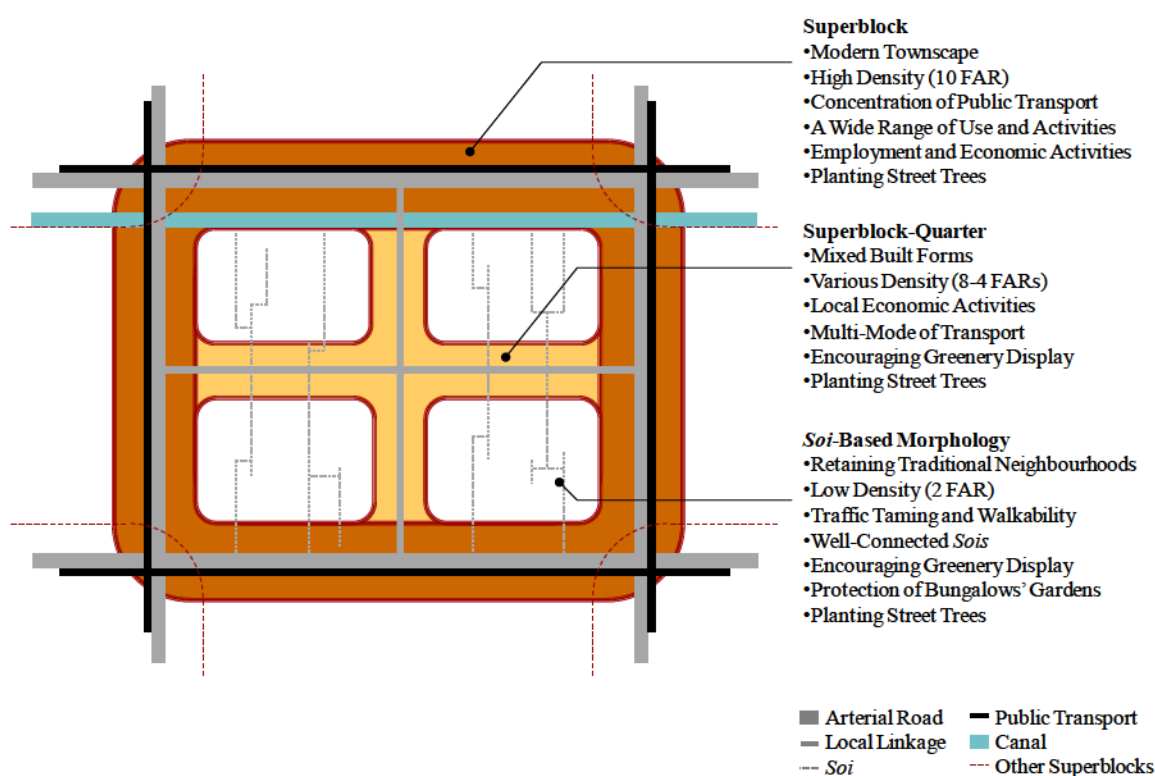


Figure 10.3 A Summary of Design Applications Proposed for the Sukhumvit Superblock

To get support from all stakeholders, proposals for delivering locally acceptable sustainable urban forms were tested (CH8). The research found that negotiations between stakeholders' environmental choices are crucial, and these occur in a different way between morphological layers. Regarding the factors of housing demand, market signals and capacities of lands and streets, land development at the levels of the superblock and superblock-quarter was required by choice. Participants' levels for change become instrumental in refining the design principles.

'Trade off' between form-adaptations and aspects of sustainability is a platform to negotiate and achieve locally acceptable sustainable urban forms. Participants are compromised in delivering global and local sustainability in the different socio-spatial layers. Greater modernity is required for the superblock and superblock-quarter in order

that the political consensus to sustain locality and a low rate of change in *sois* can be achieved. Both global and local sustainability can be retained and the design principles were politically refined to make them more acceptable, with a greater chance of being. Local acceptance to sustainable urban form can be maximized from all stakeholders.

Further, to achieve locally acceptable sustainable urban forms in Sukhumvit, key implementation strategies and delivery partners were discussed with key stakeholders in the field (CH8). The research found that the ‘hands-on’ roles of authorities and communities have to be undertaken and many design actions can be included into existing plans conceived by authorities and communities with regular budgets. It should be emphasized, however, that some strategies such as an underground train line extension require more discussions and a feasibility study is needed to test the broader economic, social and political consequences.

With respect to both theoretical and empirical findings, the conceptual framework “part four” was formulated in CH9 in order to provide comprehensive answers to the key research questions. A conclusion was derived for locally acceptable sustainable urban forms. Namely:

*A locally acceptable sustainable urban form is set in a political and social context within which global-local sustainability are individually perceived. Choices within this framework are negotiated with respect to defining appropriate levels of change and to derive suitable modifications of forms.*

This final conceptual framework defined that, although appropriateness is the modifications of forms to balance global and local sustainability and to increase sustainability of a location, acceptability is a key driver to achieve and implement a local sustainable urban form. To identify locally acceptable sustainable urban forms, ways in which different participants evaluate and accept choice and negotiate choices of sustainability were integrated into the basis of sustainable urban forms which should be conceived as a cultural product of a place.

### **Methodology for Identifying Locally Acceptable Sustainable Urban Forms**

Based on the final conceptual framework (CH9), a summary of sustainable urban forms is presented (Figure 10.4).

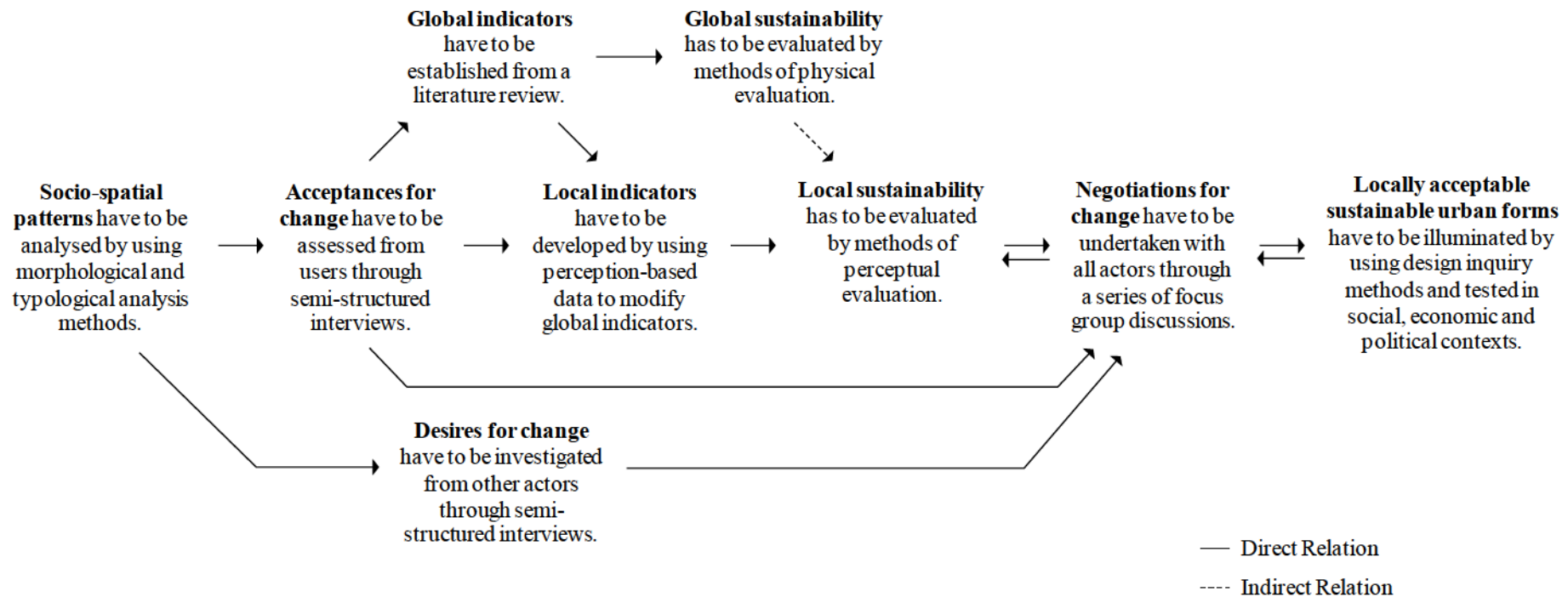


Figure 10.4 A Summary of Methodology in Identifying Locally Acceptable Sustainable Urban Forms

1. *Socio-Spatial Patterns*: Globalization and localization of socio-spatial patterns have to be examined by using morphological and typological analysis methods. Key morphological components to be analysed are streets, blocks, plots, buildings and use patterns. Figure 10.4 shows that this analysis provides a basis to evaluate the capacity to deliver sustainability.
2. *Participants' Acceptance*: Representing capacity for change, users' acceptance for form-adaptations were assessed through semi-structured interviews. Both qualitative and quantitative methods are integrated for data collection and analysis.
3. *Local Indicators*: To evaluate local sustainability, local indicators have to be established in relation to users' acceptance for form-adaptations. Figure 10.4 shows that a method is to use perception-based data (reflecting capacity for change) to modify global indicators (literature-based indicators). It should be emphasized, again, that this methodology enables the locally modified indicators to be used for evaluating acceptable degrees of sustainability at each socio-spatial pattern.
4. *Local Levels of Sustainability*: While global sustainability is evaluated by using global indicators through methods of physical evaluation, local sustainability has to be evaluated by using local indicators through methods of perceptual evaluation (Figure 10.4). Comparison between global and local sustainability demonstrates the distinctiveness of local sustainable urban forms.
5. *Consensus for Change*: An agreement to locally acceptable sustainable urban forms has to be achieved among stakeholders. Based on local levels of sustainability and users' acceptance for form-adaptations, design principles have to be formulated by using design inquiry methods and further to negotiate stakeholders' expectations in focus group discussions (Figure 10.4). Crucially, a 'trade off' between form-adaptations and aspects of sustainability (as discussed previously) is a key concept to compromise users' acceptance for change and other stakeholders' desirable levels for change upon global and local sustainability features of a location.

### **Generalizations of Research's Findings**

Generalizations of the conceptual frameworks of, and the methodologies to identify, locally acceptable sustainable urban forms established in the current research are noted. Analytical frameworks and line of inquiry can be applied for analysing socio-spatial

patterns, capacity for change, global and local sustainability and sustainable urban forms in other locations.

Although the key issues to be investigated and the approaches to analyse them are transferable, the specific outcomes of the current study have to be applied cautiously, such as the local acceptance for change, the local indicators and the local levels of sustainability. Despite providing the best example in terms of perception-based data, what people do or do not perceive, aspire and accept, choices assessed for Sukhumvit are constrained by the particular sample as well as by culture, society, economy and environment. Hence, based on acceptability, which varies from place to place, the local indicators established for evaluating sustainability cannot apply in other locations, even though the global indicators can be generalized.

While the conceptual frameworks and methodologies formulated can be theoretically and practically adopted by other researchers, the design principles and implementation strategies are particular to Sukhumvit. They therefore provide an example of locally acceptable sustainable urban forms for the sites of the superblock typology, influenced by both global and local tissues and by rapid city growth. However, driven by different socio-economic cycles and development experiences, patterns of the superblock in other locations may be different, which makes for a change of design applications and the mechanism to deliver locally acceptable sustainable urban forms.

### **10.3 Limitations and Contributions**

With reference to the key findings, although the research has achieved its aim, objectives and questions, the limitations and shortcomings have to be defined and taken into account when evaluating the results of study.

The current study has some limitations:

1. The study focused on an extensive topic; this was narrowed for understanding particular phenomena and events in relation to locally acceptable sustainable urban forms. This study presents a comprehensive explanation for sustainable urban forms at the local level which cannot be delivered from a specific issue in the first place.

2. The theories adopted in this study can be criticized in terms of quantity and quality. However, the theoretical frameworks were noticed as a workable concept when they were applied to analyse locally acceptable sustainable urban forms.
3. Generalizing from Sukhumvit to inner Bangkok's urban forms may not be wholly appropriate. Nevertheless, Sukhumvit is a typical case of superblock patterns and its problems are common across the inner city.
4. Certain limitations can also be debated about the large scale of Sukhumvit, but the whole area is required to be analysed in order that multilayered morphological layers and their connections within a superblock can be defined.
5. In accordance with the scale of Sukhumvit, the design proposed for achieving locally acceptable sustainable urban forms might be seen as too generic. However, the design principles were formulated with reference to the well-defined prototypes of the superblock, the superblock-quarter and the *soi*-based morphology, representing a comprehensive idea for shaping urban forms in Sukhumvit.
6. Limitations of physical data used for analyzing Sukhumvit's urban forms are obvious. Because few collections of spatial components (streets, blocks, plots, buildings and use patterns) are chronologically recorded in Thailand, the urban form from each period of development cannot be exactly identified. Nevertheless, the validity of analysis is verified by a great amount of socio-economic and historical data related to physical development. The uniqueness of each morphological layer itself is an aid in relation to urban transformations of Sukhumvit.
7. Criticism can be undertaken on the sampling sizes and the methods for recruiting participants in several research stages. Nonetheless, the consistency of the data backs up its reliability.
8. Sources of participants' bias can be noted as limitations. This may be found from the interviews and focus group discussions because respondents' experiences, recalling events and contributing opinion are influenced by a number of external forces and personal factors. The efficiency of data, however, is verified by the capability in dealing with research questions.
9. Bias can also be criticized in terms of the researcher's subjectivity by which the complex functions of how people perceive, evaluate and aspire for change were

analysed and interpreted. The validity of the results, however, has been reinforced by empirical applications in the process of testing, verifying and improving the research answers.

10. The final limitation is the issue of instruments used for collecting perceptual data because access to this information may be discouraged by the collection techniques. Although unexpected outcomes have been prevented by the use of various instruments such as close- and open-ended questions and mental maps, a different or more robust methodology might assess social evaluations and aspirations related to sustainability more effectively in future studies.

Notwithstanding that several limitations have been identified, yet the research methodologies and their outcomes are valid. This legitimizes the key contributions to new knowledge highlighted by the current research.

1. The development of a conceptual framework for identifying locally acceptable sustainable urban forms.
2. The establishment of a methodology for analyzing locally acceptable sustainable urban forms.
3. The evaluation of global and local levels of sustainability in relation to distinctive socio-spatial patterns.
4. The identification of morphological patterns of Sukhumvit's superbloc representing key features of inner Bangkok's urban forms.
5. The establishment of design principles and implementation strategies for the delivery of Sukhumvit's locally acceptable sustainable urban forms.

## **10.4 Implementations of Findings**

Based on the key contributions to new knowledge as assessed in the previous section, several potentials for implementing the research's findings were found for a broader context.

The conceptual framework for identifying locally acceptable sustainable urban forms opens up ways in which local sustainable urban form is explained and interpreted. Rather

than viewing sustainability in terms of global environmental preservation alone, the framework has clarified dimensions of sustainable development in both global and local terms (long-term importance of environmental preservation and short-term urgencies of the quality of life) and specified that they are accommodated by a local capacity to deliver.

Design practices are challenged to acknowledge the connection between sustainable urban form and locality. Although the relationships between sustainability and urban form is complex when both global and local relevance of sustainable development have to be integrated, the conceptual framework has simplified these issues by viewing sustainable urban form as a cultural product derived from a local process of form-productions.

The conceptual framework provides a platform for design professionals and theorists to understand acceptable degrees of sustainable development for a given location. Design and development strategies in terms of sustainable urban forms can be encouraged and a better quality of place responsive to people can be delivered.

Global and local levels of sustainability evaluated in the current study become key identifiers for a locally specific framework for defining sustainable urban forms. This is identified by the results of global evaluations are not capable in dealing with sustainability implementations at the local area because they are not consistent with acceptable degrees of sustainable development as represented by local sustainability. Local levels of sustainability themselves provide evidence for designers and theorists to justify areas of a given location which should be protected in terms of urban conservation and sustainable urban forms.

Showing the effective outcomes of the research, the methodology for analysing locally acceptable sustainable urban forms is crucial in steering the mechanism of urban design and development in positive ways. If the method is applied, the delivery of sustainability for global terms and the protections for local identity and history can be incorporated. This methodology, therefore, is a workable tool to be used by authorities and design professionals in planning and designing the city for achieving sustainability. In addition, educators are challenged to apply this methodology to study local sustainable urban forms and refine it further.

Analysis methods established in the current research also encourages several stakeholders to take part in the delivery of locally acceptable sustainable urban forms. Crucially, users, who always are deprived from the process of form-productions, are prioritized as central to

the identification of sustainable urban forms in which local terminology of sustainability can be ascertained. The methodology becomes the instrument in encouraging user and community empowerment in the process of decision-making.

The descriptions of Sukhumvit's superblock are the cornerstone fostering change in the ways in which inner Bangkok's urban forms are viewed and valued. Although superblocks have been criticized by a few researchers and design professionals, the examples of the superblock, the superblock-quarter and the *soi*-based morphology embedded in the single superblock of Sukhumvit will entail a new direction of design and planning unit of Bangkok. The findings of these morphological layers and their connections will enable change of decision-making, development strategies and design practices across disciplines. In addition, Sukhumvit's urban forms will be the commencement to investigate other superblock typologies.

Finally, the design principles and implementation strategies formulated for Sukhumvit can be used by various stakeholders. To deliver locally acceptable sustainable urban forms, public authorities can adopt these proposals by setting up an initiative design policy and guidance for Sukhumvit. The principles can be used as an example of design appraisal and an implementation tool for other superblocks in Bangkok. The design principles and implementation strategies can also encourage landowners, developers and investors to take part by developing lands and projects in accordance with actions suggested. Local authorities and communities can reinforce the delivery of locally acceptable sustainable urban forms by applying the proposals to develop a spatial plan for Sukhumvit as well as implementing the proposals as a tool for negotiation.

## **10.5 Recommendations for Further Study**

Notwithstanding that the transparency of the research's key findings has been verified and the implementations of the findings for a broader context have been discussed; nevertheless, a research is not "a one-time act that is static, self-contained, an end in itself" (Leedy and Ormrod, 2001, p.8).

Defined as a research limitation (see *10.3 Limitations and Contributions*), the topic of the current study is a very extensive one. However, once the comprehensive explanation of locally acceptable sustainable urban forms has been set, particular topics and activities can be specified. Based on the developed conceptual frameworks, key issues (socio-spatial

patterns, users' acceptance, levels of sustainability, other stakeholders' acceptance, and consensus for form-modifications) to be analysed in terms of sustainable urban forms are crucial in defining further activities.

Regarding the urban form which is a foundation to interpret local sustainability, the appraisal toolkits for morphological analysis should be further developed by integrating various methods into the study of sustainable urban forms, such as the analysis of spatial configurations by using methods of space syntax (Hillier and Hanson, 1984). In the case of the superblock, the development of finer criteria and frameworks for analysing each morphological layer might be interesting. Possibly, subordinate layers could be found from the superblock typology, resulting in alternative solutions for identifying locally acceptable sustainable urban forms.

Although Sukhumvit was selected, more research is required for other examples and typologies of superblocks, which could generalize the study of superblock patterns. While the superblock pattern with through accesses representing key features of an inner city was analysed in the current research, the type of superblock with culs-de-sac defining contemporary suburbs where gated communities are located has been left for another study. The superblock modes of urban development might be found in other countries and can be taken into cross-cultural analysis in which differences and similarities between superblock patterns can be found. Crucially, the identification of locally acceptable sustainable urban forms in relation to superblock patterns will be promoted.

Defined as a local tissue of Sukhumvit, the *soi*-based morphology is a foundation to understand lateral morphological patterns in which traditional neighbourhoods are developed and located in Bangkok. This urban tissue should be studied further in regard to the change of *sois* and identity of the local built environment. Topics related to the impact of *soi* in a broader developmental context are also interesting.

As found in the current research, to identify locally acceptable sustainable urban forms, users' perceptions related to morphological distinctiveness are crucial. A study for more robust methods and techniques for assessing users' perceptions and aspirations for form-adaptations should be carried out. Because human perception is influenced by a number of factors which can be assessed in different ways, it might be useful if the ways in which people perceive and evaluate sustainable urban forms can be carried out in a broader context.

Further study can be defined in terms of the interconnections between ‘global’ and ‘local’ in defining sustainable urban forms which were found across disciplines in the current study. Global and local aspects have influence on the principles of sustainability and objectives of sustainable development and also are reflected by the ways in which local forms have been built. How people perceive and aspire for their place is also constrained by global-local relevance. In this sense, the importance in studying global and local aspects in influencing urban development is illustrated. Future research about human perceptions of place and sustainability in relation to global and local impact might be useful.

Regarding the indicators for evaluating levels of sustainability, it will be interesting if the established indicators are refined further and new indicators are also incorporated. Although validity of the indicators has been verified by outcomes of the current research, other indicators may be found if specific areas at each morphological layer are analysed in the finer scales as new subordinate layers would be explored. In addition, indicators would be more refined if particular perceptions and acceptances will have been assessed in relation to those specific areas in future research.

Aspects of local contexts and conditions may be further embedded into the identification of sustainable urban forms if other stakeholders’ perceptions were more integrated into the establishment of indicators and the process of sustainability evaluations. Wider social systems, economic functions and environmental conditions in impacting sustainability would be consolidated.

Involvement from various stakeholders and implementations for sustainable urban forms also results in further activities. It is necessary to set up participatory frameworks such as negotiation tools for sustaining positive features of local sustainability and forms. Tools for implementing the design principles proposed by the current research should be further studied and incorporated, such as action plans, management and conservation plans. It would be very interesting to study the feasibility of the suggested principles. A series of further discussions with all stakeholders about cost to implement proposed design applications are also required. A study for schemes of urban management and a change of design policy and guidance is important in order to strengthen the ways in which locally acceptable sustainable urban forms can be delivered.

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# Appendix A

## Inner Bangkok's Urban Forms and Sustainability Issues

This appendix is intended to identify key features of inner Bangkok's urban forms and related issues of sustainability in order to establish criteria for site selection; they are part of the establishment of fieldwork methodologies (see CH4).

The structure of this appendix is: Background of Bangkok Settlement; Typologies of Bangkok's Urban Forms and Sustainability Problems; and Criteria for Site Selection.

### Background of Bangkok Settlement

As discussed in the research background (see *Introduction*), although the original Bangkok was a small-scale city in which all transport was by boat and waterways, Bangkok became one of the fastest growing urban economies in the world since integrating into the world economy, resulting in the expansion of urban agglomeration. Figures A1 and A2 show the original Bangkok in 1782 and the development of shophouses and road networks in 1910.

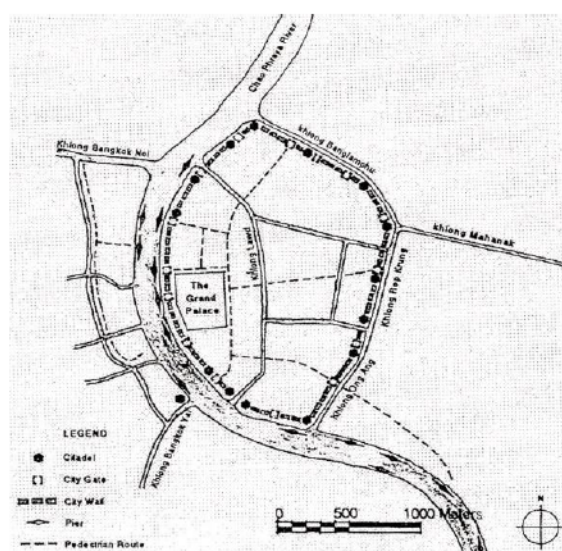


Figure A1 The Original City of Bangkok in 1782  
Source: Boonlua, 2007, p.108

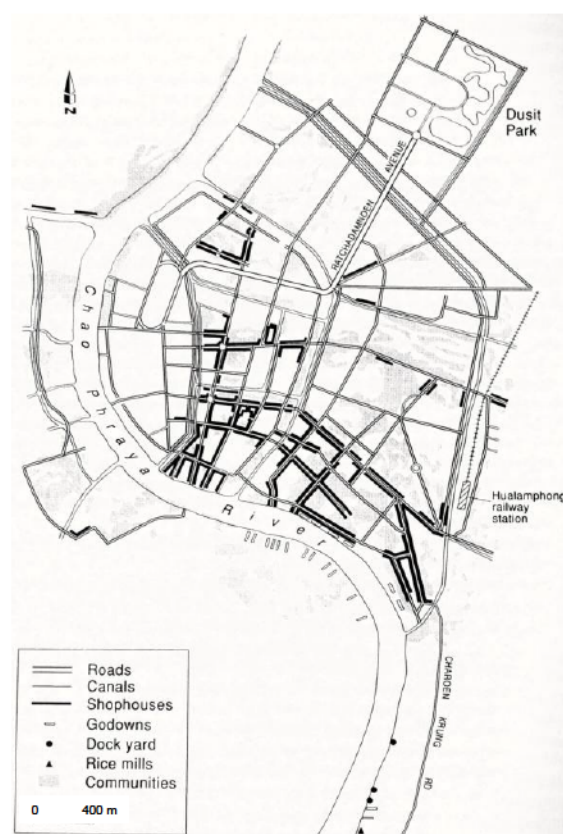


Figure A2 Bangkok c.1910, showing Roads and Shop Houses Development  
Source: Askew, 2002, p.32

Bangkok expanded its area from 13 sq.km in 1900 to 124 sq.km in 1960 (Dutt *et al.*, 1994). Figure A3 shows that the built up area was not limited only within the Bangkok province, but many communities and centres were settled throughout many parts of five surrounding provinces, known as Bangkok Metropolitan Area and also Greater Bangkok. In the 1930s, the population of Bangkok increased at a rate of 6 percent annual growth. Not only had the population of Bangkok reached over 2 million in 1960, but also a large number of both minor and major canals had already been filled in and roads were constructed in their place.

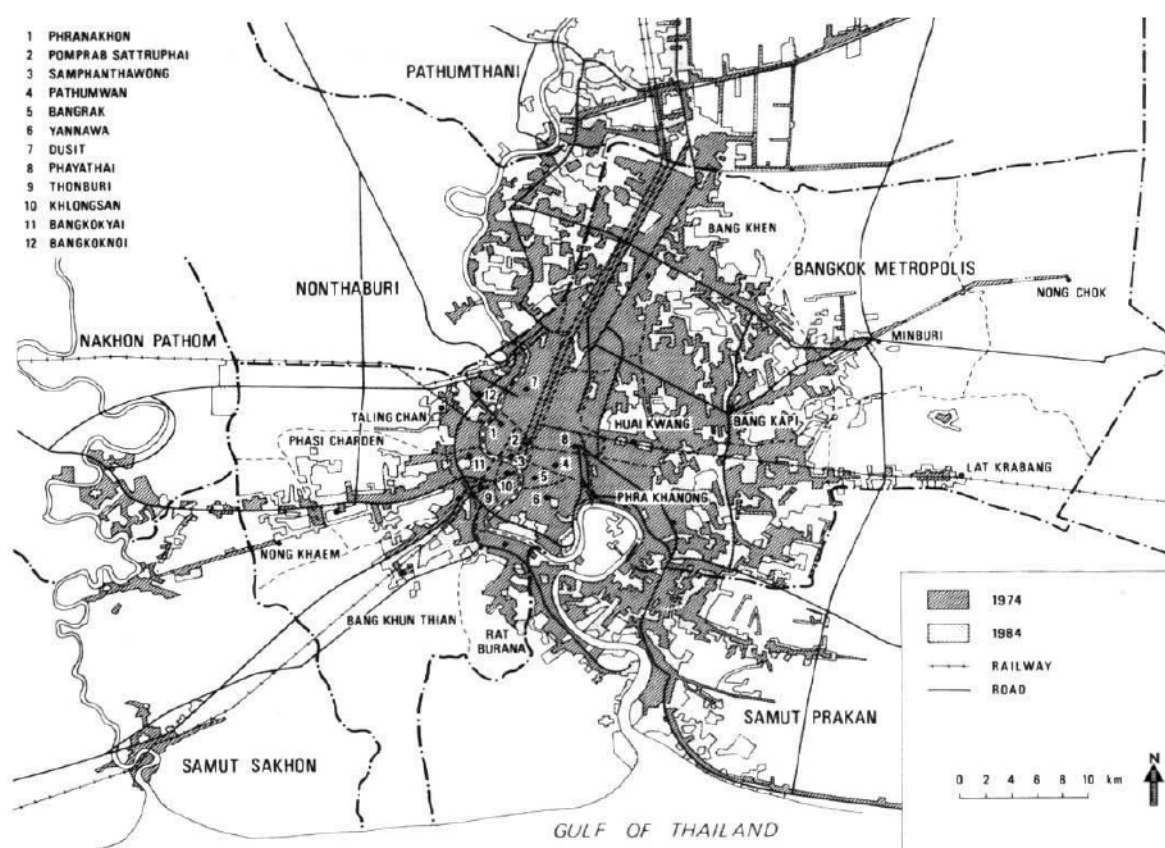


Figure A3 Bangkok Metropolitan Urbanized Area, 1974 and 1984  
Source: Krongkaew, 1997, p.317

In relation to rapid urban growth, the Greater Bangkok Plan was developed as the first land use plan for Bangkok by the American consultant team Litchfield and Associates in 1960. Bangkok Metropolis had been criticized as an automobile city and for its lack of clear zonal organization, with minimal separation of industrial, commercial and residential uses. Establishing land-use zoning for the urban growth in the next three decades, the Litchfield plan presented a Western urban model onto Bangkok by modern land use zoning, as shown

in Figure A4. However, Askew (2002) argues that the plan was never implemented because there was neither the legal framework nor the political will to impose the planning ideals of the Americans.

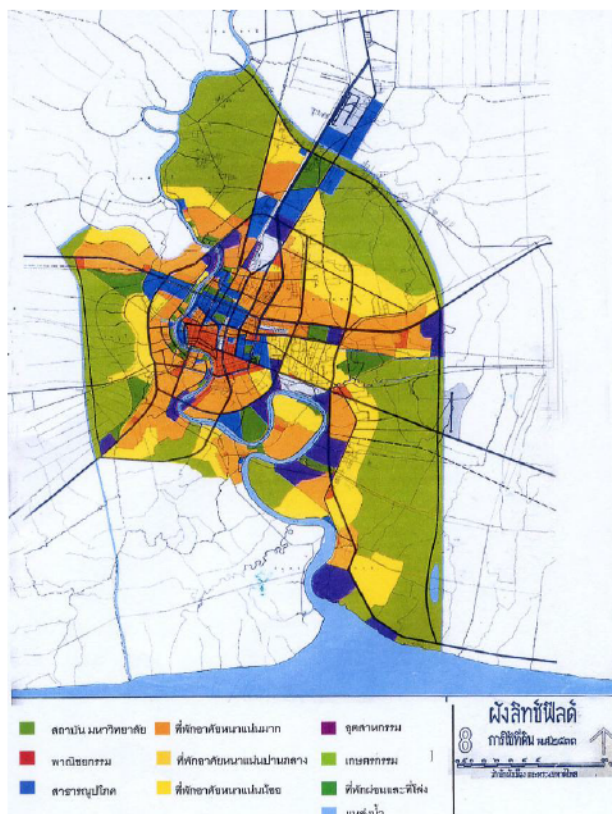


Figure A4 Greater Bangkok Plan 2533  
proposed by Litchfield and Associates in 1960  
Source: CU, 2010, p.2-21

In terms of political, economic, and cultural life, all aspects of the country were dominated by the city of Bangkok which was a powerful attraction for migrants (Drakakis-Smith, 1981). While the population exceeded 3 million in 1971, it was not until Thailand's Fourth National Economic and Social Development Plan that the question of unbalanced regional growth and Bangkok's disproportionate growth were addressed. However, in the 1980s, the population still increased and reached 5 million people; the population of the capital was 51 times the size of the second-largest city of Thailand and the built-up area reached 239 sq.km (Askew, 2002).

In the early 1990s, the areas within a 40 km. radius of Bangkok were rapidly filled up with numerous housing estates, commercial areas, and recreational places such as amusement parks and golf courses (Krongkaew, 1997). Figure A5 shows the built-up area of Bangkok in 1993, compared with the original Bangkok in 1782. During 1987-1992, 2,100 buildings of six or more stories were approved for construction in Bangkok and a total of 2.61 million sq.m of retail spaces were developed in 1995 alone (Intrachooto *et al.*, 2008).

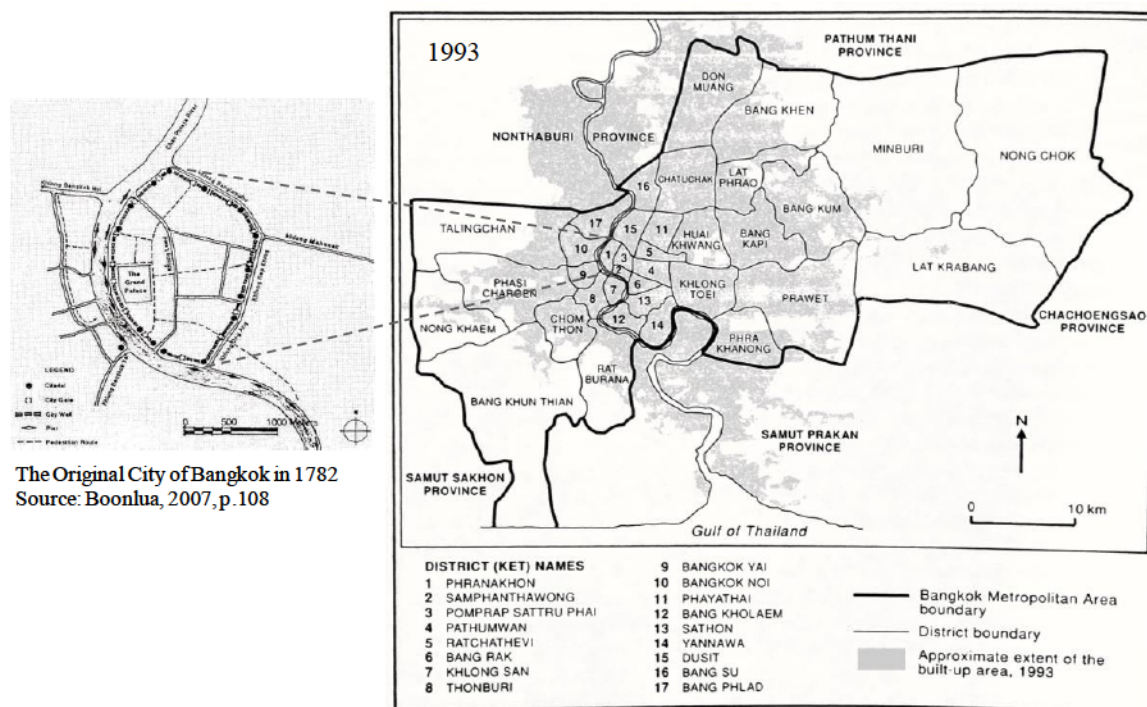


Figure A5 The Bangkok Metropolitan Area, showing Built-Up Area in 1993  
Source: Adapted from Askew, 2002, p.62

Due to rapid urban growth, several problems are identified for Bangkok. On the one hand, Bangkok is identified as a land-consuming city because of excessive urban sprawl on the suburbs (Hall and Pfeiffer, 2000); on the other hand, it has problems with land pressures in inner Bangkok (Cleary, 2005). It should be noted that Bangkok's land pressures lead to high costs of land, inadequate housing, lack of public open space, squatter settlement and congestion.

### Typologies of Bangkok's Urban Forms and Sustainability Problems

Bangkok's social structure changed since the city transformed with rapid urban growth. With the pattern of urban sprawl, middle and upper classes move to the extended areas surrounding the historical core. Kaothien and Webster (2000) point out that the rural, green, and swamp areas of Bangkok were transformed to suburban and modern urban settlements. This transformation was the outcome of widening the urban economic hierarchy with an outward direction from an urban core to the peripheries, catching the radius pattern of road networks.

Bangkok has been called the ‘Los Angeles of Asia’; not only does its local name mean the city of angels, but many development patterns are primarily driven by the road network as in Los Angeles (*ibid.*). Since Bangkok’s main mode of transportation changed from water-based to land-based development driving urban transformation, road networks have been crucial in defining urban transformation.

By considering the connection of road networks, Bangkok’s spatial patterns can be determined and the three types are best clarified by different stages of settlements. Figure A6 shows different typologies appearing outwards from the urban centre to its peripheries:

1. The historic core is found with the form of small organic blocks, with a fine-scale connection of road networks;
2. The earlier phase of extended areas is differentiated by the pattern of relatively small gridiron blocks;
3. The later phase of extended areas can be categorized as a pattern of superblocks with a coarse-scale connection of road networks.

A superblock is determined as the mode of road and land development, which is a product of the fact that a large rectangular area is bounded by few main roads. Nonetheless, based on Figure A6, the typology of superblocks can be further divided into two sub-categories:

- 3.1 A superblock pattern with through accesses;
- 3.2 A superblock pattern with culs-de-sacs.

The former is the urban form that occurs when traditional neighbourhoods are located on unregulated local streets as complex through accesses but they are consequently encompassed by the recent network of modern roads. Askew (1993) defines this form pattern as a diverse settlement when a variety of social classes and groups locate together through time. Importantly, this typology makes Bangkok highly intermixed in terms of economic functions, land utilization and spatial patterns when it covers a large land area of inner Bangkok, representing modern extended urban areas of the city.



Figure A6 Typology of Bangkok's Urban Forms, 2011  
Source: Adapted from the 2001 Bangkok GIS (DCP, 2001)

In contrast, the type of superblock with culs-de-sac represents contemporary suburbs where gated communities have recently developed after the establishment of arterial roads, on planned local streets with the pattern of culs-de-sacs.

Covering a large land area of inner city, superblocks with through access dominate all characteristics of modern Bangkok. They are the urban fabric encouraging the richness of urban life through high density, mixed used and activities along the road strips and expressing a variety of social classes which can be seen from the local tissue of intermixed neighbourhoods located in the areas inside the superblocks. Very wealthy individuals, several middle class houses and slums can all be found within each superblock.

However, morphological patterns of this superblock type are crucial in defining (all) sustainability problems. Because of coarse scales of road connections defining superblocks, Bangkok has very limited land areas devoted to roads and parking. All road space accounts for only 8 percent of the city area (Boonlua, 2007). In this context, Barter and Kenworthy (1997) point out that vehicle use and urban forms in Bangkok is in an imbalance, which makes the city prone to gridlock and causes the permanent congestion (Intrachooto, 2008; Moor and Rees, 2000). In extreme cases, a journey on the road networks in Bangkok can take over five hours a day or even more with long and slow journeys to and from work (Hall and Pfeiffer, 2000).

Because of the influence of superblocks, Bangkok is defined as both linear urban forms (Boonlua, 2007) and poly-nuclear patterns (Webster, 2004). Accumulating as linear patterns, most urban developments take place on the periphery of superblocks, while they cannot be accommodated in the areas inside the superblocks in which several local streets are dead ends in the middle and are too narrow to support those developments. This condition also controls the development of Bangkok's mass transit system which can be settled only along the main roads.

Although centres of high activities are developed linked to the mass transit systems, poly-nuclear patterns are found only on the edges of superblocks within a small radius from transit stations. In this sense, even though inner Bangkok is determined as a high density city (Barter and Kenworthy, 1997; Jenks, 2000), there is a high density development only along the road strips encompassing the superblocks. Land pressure of inner Bangkok, therefore, is influenced not only by built densities, but also by superblocks' configurations which limit land capacity of the city. It should be noted that the issues of inadequate housing and lack of public open spaces are the results of superblocks located in inner city as well.

Despite promoting mixed use and a broad spread of rents and tenures, high density accumulating along the periphery of superblocks affects local climate and pollution in the city. The long structures of high-rise buildings along the roads reflect heat waves and increase solar heat absorption which causes urban heat islands; as well, they block the wind and reduce appreciably urban ventilation both in the streets and in affected low-rise areas (Givoni, 2003). Boonjawat *et al.* (2000) identify that the minimum temperature of inner Bangkok has increased by 1.23 °C in 50 years (from 23.39 °C in 1951) and the maximum heat island intensity of the surface temperature up to 5.5 °C compared to the suburbs.

### **Criteria for Site Selection**

In order to select a case study for an analysis of sustainable urban forms, key features of inner Bangkok's urban forms have to be implemented, as well as issues of sustainability problems.

In terms of a case study representing inner Bangkok's urban forms:

1. The site has to be located in inner Bangkok, representing a large land area of the city.
2. The pattern of the site has to be a superblock pattern representing a modern area of Bangkok's urban forms.
3. The site's superblock should include tissue of traditional neighbourhoods located on local streets, defining a variety of social classes and a pattern of mixed use representing unique characteristics of Bangkok.

In terms of sustainability problems:

1. The site should represent urban problems in terms of sustainability. They are, for example, land pressures, congestion, inadequate housing, lack of public open space, squatter settlement, urban heat islands and pollution.

These topics are included in the criteria for site selection established in CH4.

## Appendix B

### Instrument for Collecting Behaviour-Environment Relations

This appendix presents the instrument utilized in face-to-face semi-structured interviews with users in order to gather behaviour-environment data of the case study. They are crucial in the analysis of the case study's socio-spatial patterns in CH5.

The question format is designed to ascertain how people use the environment, where do social activities take place, how people change the environment and why, and what takes place in particular settings. It should be noted that the insight of the relationships between social activities and built forms is investigated through the starting points guided by this set of questions. Table B1 shows the questions implemented in the interview.

Table B1 Questions for Collecting Behaviour-Environment Data

| Key Issues   |                                      | Questions  |
|--|--------------------------------------|--|
| What are urban form patterns of the case study area?     | How do users use the urban forms?    | Which parts of the neighbourhood do you use?                               |
|  |                                      | For what purpose do you use them?<br>Please explain why?                   |
|  |                                      | Do those parts of your neighbourhood suit with your uses in everyday life? |
|  | How does the urban form change?      | Has the form of your neighbourhood been changed?<br>How?                   |
|  |                                      | What has kept unchanged?   |
|  |                                      | What are key factors affecting these changes or lack of change?            |
| How do users appreciate the urban forms of their places? | What are local need and aspirations? | Are you satisfied with these changes or lack of changes?                   |
|  |                                      | Which parts of the neighbourhood do you like?<br>Why?                      |
|  |                                      | Which parts of the neighbourhood do you dislike?<br>Why?                   |
|  |                                      | What do you want to change in your neighbourhood?                          |

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## Appendix C

### Instrument for Collecting Local Terminology of Sustainability

This appendix presents the instrument employed to collect attitudinal data of sustainability through face-to-face semi-structured interviews with various stakeholders: investors and developers, public authorities, design professionals, leaders of communities and residents. Different terminologies of sustainability responsive to the locality are fundamental in defining sustainability located in time and space; crucially, this information is taken into account in local perception-based data analyzed for establishing local criteria of sustainable urban forms in CH7.

Questions implemented in the interview are instrumental. They are designed to assess what each stakeholder understands by the term 'sustainability' and how it relates to urban localities. Based on these data, each actor group's terminology of sustainability can be illustrated. Table C1 shows the questions used in the field study.

Table C1 Questions for Collecting Local Terminology of Sustainability

| Questions used in the Semi-Structured Interviews  |  |   |   |  |
|---|--|---|---|--|
| Investors and Developers  | Public Authorities   | Design Professionals  | Leaders of Communities  | Residents  |
| <ul style="list-style-type: none"> <li>• What do you understand the term 'sustainability' to mean?</li> </ul>   | <ul style="list-style-type: none"> <li>• What do you understand the term 'sustainability' to mean?</li> </ul>  | <ul style="list-style-type: none"> <li>• What do you understand the term 'sustainability' to mean?</li> </ul>   | <ul style="list-style-type: none"> <li>• What do you understand the term 'sustainability' to mean?</li> </ul>   | <ul style="list-style-type: none"> <li>• What do you understand the term 'sustainability' to mean?</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Do your visions include work on approaches for sustainability? Could you describe how?</li> </ul>  | <ul style="list-style-type: none"> <li>• Do your political visions work on approaches for sustainability? Could you describe how?</li> </ul>                                       | <ul style="list-style-type: none"> <li>• Does your work on the urban forms include sustainability? Please explain how?</li> </ul>   | <ul style="list-style-type: none"> <li>• Does your community development incorporate these sustainability aspects? Please explain how?</li> </ul>   | <ul style="list-style-type: none"> <li>• To achieve these sustainability aspects, in which way do you prefer to shape the neighbourhood?</li> </ul>          |
| <ul style="list-style-type: none"> <li>• What do you consider to be the unique characteristic of Bangkok?</li> </ul>  | <ul style="list-style-type: none"> <li>• What do you consider to be the unique feature of Bangkok?</li> </ul>  | <ul style="list-style-type: none"> <li>• What do you consider to be the unique feature of Bangkok?</li> </ul>   | <ul style="list-style-type: none"> <li>• What do you consider to be the unique feature of Bangkok?</li> </ul>   | <ul style="list-style-type: none"> <li>• What do you consider to be the unique feature of Bangkok?</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Do your visions incorporate these specific aspects? Could you describe how?</li> </ul>   | <ul style="list-style-type: none"> <li>• Do your political visions incorporate these specific aspects? Could you describe how?</li> </ul>  | <ul style="list-style-type: none"> <li>• Do your visions incorporate these specific aspects? Could you describe how?</li> </ul>   | <ul style="list-style-type: none"> <li>• What do you consider to be the unique feature of your neighbourhood?</li> <li>• Does your community development incorporate these specific aspects? Could you describe how?</li> </ul> | <ul style="list-style-type: none"> <li>• What do you consider to be the unique feature of your neighbourhood?</li> </ul>                                     |
| <ul style="list-style-type: none"> <li>• What weight do you give to the sustainability and the unique characteristics of Bangkok when produce your visions of development?</li> </ul> | <ul style="list-style-type: none"> <li>• What weight do you give to the sustainability and the unique characteristics of Bangkok when formulate your political visions?</li> </ul> | <ul style="list-style-type: none"> <li>• What weight do you give to the sustainability and the unique characteristics of Bangkok when formulate your visions of the urban form production?</li> </ul> | <ul style="list-style-type: none"> <li>• What weight do you give to the sustainability and the unique characteristics of the neighbourhood when produce your community development?</li> </ul>                                  | <ul style="list-style-type: none"> <li>• To protect and/or enhance these specific aspects, in which way do you prefer to shape the neighbourhood?</li> </ul> |

## Appendix D

### Instrument for Collecting Perceptions for Form-Adaptations

This appendix presents questions implemented in face-to-face semi-structured interviews for gathering users' perceptions for form-adaptations. Crucially, this data is central in the analysis of the relationships between the case study's capacity for change and modifications for sustainable urban forms and to establish criteria for evaluating local levels of sustainability in CH7.

Questions are designed with reference to how sustainability can be delivered through morphological components as they are analyzed in CH1. However, rather than proceeding with specific questions in terms of spatial structures (street, block, plot, building and use), the instrument is developed with simple questions about urban forms. This aims to collect a wide range of information and to ascertain distinctive relationships between the local forms and form-adaptations by encouraging participants to recognize, describe and indicate perceptions for existing spatial structures, ambitions for the change and expectations for what should be built in regard to appropriate degrees of development.

Four sections are formulated to guide communication with participants.

- Section 1: Forms of Transport
- Section 2: Boundaries, Urban Comfort, Choices and Accessibility
- Section 3: Public Open Spaces
- Section 4: Urban Grains, Densities, and Identities

Further, techniques of a mental map are also incorporated in the interview for allowing interviewees to describe the role of the environment in spatial processes and to reveal the particular settings from their perceptions.

The question format utilized in the field study is presented as follows.

# Interviews with Users

Place of the interview ..... Interview No. ....  
 Name of the interviewer .....  
 Date ..... / ..... / ..... Time .....

*Good morning / afternoon. I am sorry to bother you, but I would like to ask you some questions about this area. This is a research project in the title of Locally Appropriate Sustainable Urban Form: the Case of Sukhumvit Superblock.*

## Section 1: Forms of Transports

1. Which modes of transport do you normally use? (*Questions with Show Card A*)

Sky/Underground trains       Buses       Boats  
 Private cars       Bicycles       Foot

2. Would you please rank transportations you use? (*Questions with Show Card A*)

- **Sky/Underground trains**       5 Very good  4 Good  3 Moderate  2 Bad  1 Very bad  
 Why have you given this score? .....  
 .....  
 How could this form of transport be improved? .....  
 .....
- **Buses**       5 Very good  4 Good  3 Moderate  2 Bad  1 Very bad  
 Why have you given this score? .....  
 .....  
 How could this form of transport be improved? .....  
 .....
- **Boats**       5 Very good  4 Good  3 Moderate  2 Bad  1 Very bad  
 Why have you given this score? .....  
 .....  
 How could this form of transport be improved? .....  
 .....
- **Private cars**       5 Very good  4 Good  3 Moderate  2 Bad  1 Very bad  
 Why have you given this score? .....  
 .....  
 How could this form of transport be improved? .....  
 .....
- **Bicycles**       5 Very good  4 Good  3 Moderate  2 Bad  1 Very bad  
 Why have you given this score? .....  
 .....  
 How could this form of transport be improved? .....  
 .....
- **Foot**       5 Very good  4 Good  3 Moderate  2 Bad  1 Very bad  
 Why have you given this score? .....  
 .....  
 How could this form of transport be improved? .....  
 .....

---

**Section 2: Boundaries, Urban Comfort, Choices and Accessibility**


---

3. Are you a resident, a worker, and/or a visitor for this area?  
 A resident       A worker       A visitor
4. For a resident and a worker, where are the boundaries to your neighbourhood/this area?  
 Please show me on the map.

.....

Why have you selected these boundaries?  
 .....

Where are the places/spaces you frequently use? Please show me on the map.  
 .....

5. For a visitor, in which purposes do you visit here?  
 Shopping       Eating       Meeting       Others .....

Where are the boundaries to this area? Please show me on the map.  
 .....

Why have you selected these boundaries?  
 .....

Where are the places/spaces you frequently use? Please show me on the map.  
 .....

6. How easy is it to get to these places/spaces?  
 Very easy       Easy       Moderate       Difficult       Very difficult

Why do you feel that? .....

7. Which uses do you need more of in your neighbourhood/this area?  
 .....

Why do you need more? .....

8. Which uses do you need less of in your neighbourhood/this area?  
 .....

Why do you need less? .....

9. Where is the most common place/space for meeting neighbours and/or friends?

|   | Elders   | Adults   | Teenagers  | Children   |
|---|--|--|--|--|
| Places/Spaces                           | .....<br>.....<br>.....<br>.....<br>Please show me on the map. | .....<br>.....<br>.....<br>.....<br>Please show me on the map. | .....<br>.....<br>.....<br>.....<br>Please show me on the map. | .....<br>.....<br>.....<br>.....<br>Please show me on the map. |
| Why do they choose these places/spaces? | .....<br>.....<br>.....<br>.....                               | .....<br>.....<br>.....<br>.....                               | .....<br>.....<br>.....<br>.....                               | .....<br>.....<br>.....<br>.....                               |

10. How easy is it to walk around your neighbourhood/this area?

Very easy       Easy       Moderate       Difficult       Very difficult

Why do you feel that? .....

.....

11. Which part of your neighbourhood/this area do you feel is the most comfortable place/space to walk around? Please show me on the map.

.....

Why do you feel that? .....

12. How far are you willing to walk from home/work/visit places\* to access these following places? (*Questions with Show Card B*)

|                                    | N/A                      | 1-2                      | 3-4                      | 5-6                      | 7-8                      | 9-10                     | > 10 min.                                |
|------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| • Local shops                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • District centres                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • Bus stations                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • Boat stations                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • Sky / Underground train stations | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |

13. How much further (than usual) do these environmental features encourage you to walk? (*Questions with Show Card C*)

|                                     | N/A                      | 1-2                      | 3-4                      | 5-6                      | 7-8                      | 9-10                     | > 10 min.                                |
|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| • Nicer buildings                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • Wider footpaths                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • More greenery                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • Comfortable climate/ more shadows | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • More sidewalk shops               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • Less cars                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |
| • Other .....                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Note ..... min. |

---

**Section 3: Public Open Spaces**

---

14. Do you consider it important to have parks nearby?       Yes       No

Why is/is not it important? .....

.....

If it is important, what features should good parks have?

.....

15. Do you consider it important to have squares nearby?       Yes       No

Why is/is not it important? .....

.....

If it is important, what features should good squares have?

.....

---

\*Note: following the interviewee's status to the case study in question no.3

---

**Section 4: Urban Grains, Densities, and Identities**


---

16. Would you please rank three images you would like to live in? (*Questions with Example Images*)

**First** [ ]      **Second** [ ]      **Third** [ ]

Why do you choose them? .....

17. Would you please group high, medium, and low densities from these images? (*Questions with Example Images*)

|                         | High Density                                       | Medium Density                                     | Low Density  |
|-------------------------|--|--|--|
| Images                  | [ ]1 [ ]2 [ ]3<br>[ ]4 [ ]5 [ ]6<br>[ ]7 [ ]8 [ ]9 | [ ]1 [ ]2 [ ]3<br>[ ]4 [ ]5 [ ]6<br>[ ]7 [ ]8 [ ]9 | [ ]1 [ ]2 [ ]3<br>[ ]4 [ ]5 [ ]6<br>[ ]7 [ ]8 [ ]9 |
| Why do you choose them? | .....<br>.....<br>.....<br>.....                   | .....<br>.....<br>.....<br>.....                   | .....<br>.....<br>.....<br>.....                   |

18. Which images best represent Bangkok? (*Questions with Example Images*)

[ ]1 [ ]2 [ ]3 [ ]4 [ ]5 [ ]6 [ ]7 [ ]8 [ ]9

Why do you choose them? .....

19. Do you feel that your neighbourhood/this area is unique? [ ] Yes [ ] No

Why do you feel that? .....

What are important elements defining that unique? .....

.....

Which images best represent your neighbourhood/this area?

(*Questions with Example Images*)

[ ]1 [ ]2 [ ]3 [ ]4 [ ]5 [ ]6 [ ]7 [ ]8 [ ]9

20. What are good and bad aspects of your neighbourhood/this area?

Good aspects: .....

.....

Bad aspects: .....

.....

---

**Section 5: Interviewee's Information**


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Sex [ ] Male [ ] Female

Group age [ ] 18-25 [ ] 26-35 [ ] 36-45 [ ] 46-55 [ ] 56-65 [ ] > 65

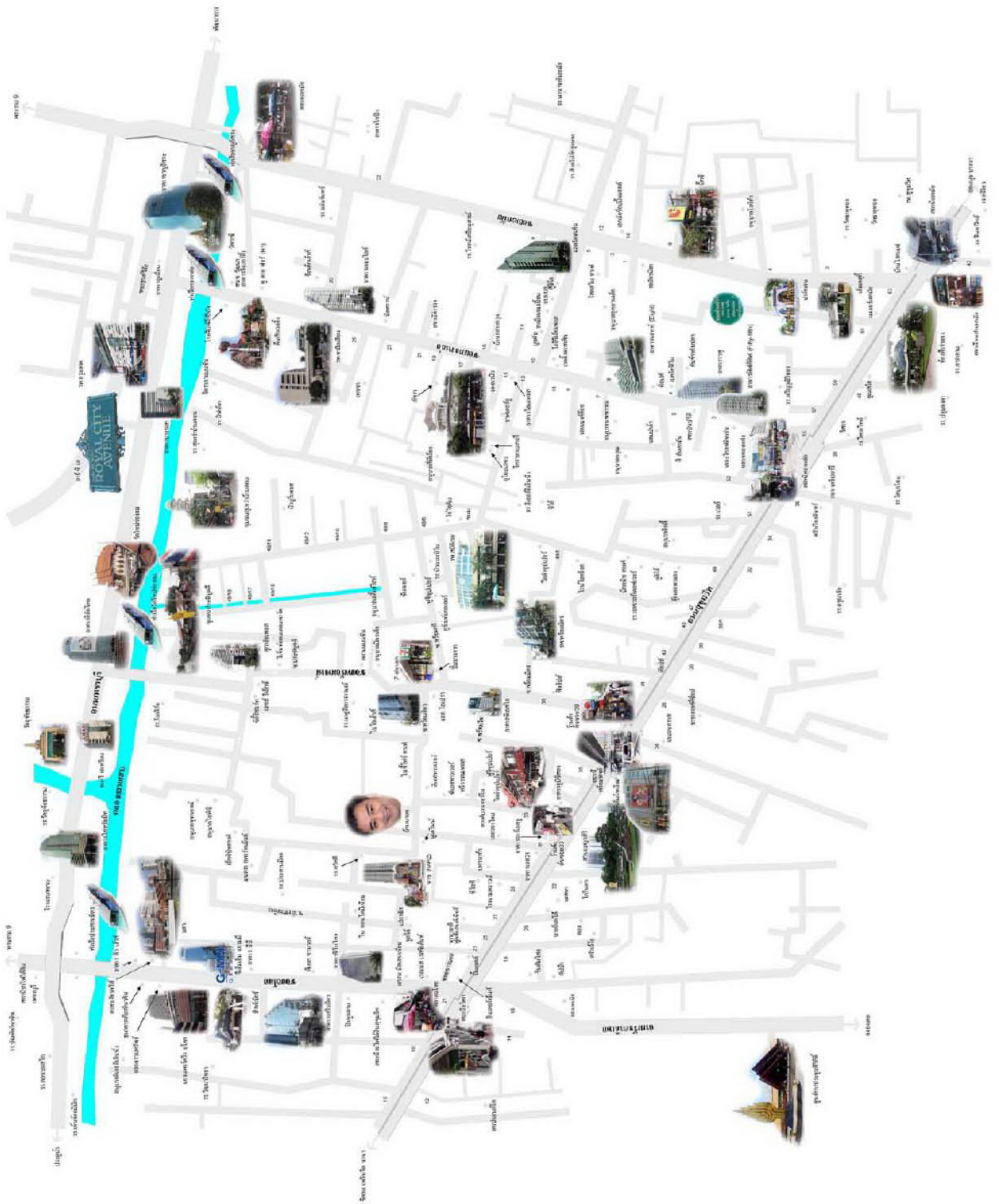
Occupation .....

*Thank you very much for all your co-operation.*

**Show Card A** (for Question No.1 and 2)**Sky / Underground trains****Buses****Boats****Private cars****Bicycles****Foot**

[5] Very good   [4] Good   [3] Moderate   [2] Bad   [1] Very bad   [N/A] Not Applicable

**Show Card B** (for Question No.12)**Local shops****District centres****Bus stations****Boat stations****Sky / Underground train stations****Show Card C** (for Question No.13)**Nicer buildings****Wider footpaths****More greenery****Comfortable climate/more shadows****More sidewalk shops****Less cars****Other .....**





3



2



1



6



5



4



9



8



7

## Appendix E

### Instrument for Collecting Agreement to the Design Principles

As discussed in the fieldwork methodologies in CH4, in order to accommodate various ambitions and development dimensions into form-production processes, solutions for local sustainable urban forms have to be tested and refined with various stakeholders in the field study. This appendix presents instruments for collecting agreement to the design principles, providing ways in which the principles can be evaluated and consolidated in CH8.

Two instruments are incorporated to achieve this aim, which are the panels presenting the design principles and the questions used in the focus groups with residents, and in the interviews with public authorities, design professionals, investors and developers, land owners, small scale traders and leaders of communities.

The panels are developed to shed light on the background of the research and the design principles (CH8) established for each morphological layer of Sukhumvit: the superblock; the superblock-quarter; and the *soi*-based morphology (CH5). Nonetheless, to communicate with various key actors, design actions are exhibited with simpler definitions and represented by images and examples. Five panels are developed as follows.

- a. **Panel 1**, The first panel is to give participants the background of the research and the aim of the design evaluation.
- b. **Panel 2**, Titled as ‘Starting Points’, this panel shows how the design principles have been established and what are the required actions of the principles.
- c. **Panels 3, 4 and 5**, To enable all stakeholders to evaluate the design actions, the design principles are presented following three morphological layers of Sukhumvit as well as three panels being formulated to represent them. Crucially, representative schemes and examples are used.

Panel 3 is associated with ‘Sukhumvit as a Healthy Place to Do Business’ regarding the actions to manifest the feel of green, cleanliness and biotic support in central business districts of the superblock morphology.



## Visions for Sukhumvit

Sukhumvit is an important place in Bangkok. It includes the most modern business districts and a number of traditional residential areas. However, there are many problems so that we have to think how Sukhumvit should be made more desirable.

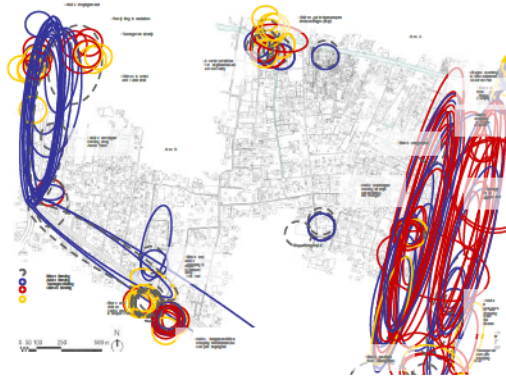
This is the space for telling us how you think Sukhumvit might be improved. This is the latest stage in the research which started three years ago in Oxford Brookes University, England.

The research has already held a number of interviews with local people, developers, practitioners and governors. As well, focus group discussions were carried out with design professions. These were to see what are Sukhumvit's problems and what are the opportunities to improve it.

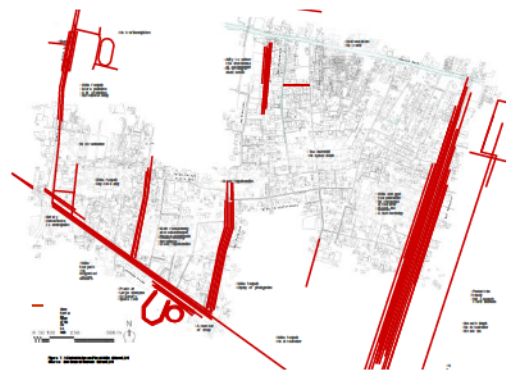
At this time, we have made the visions for Sukhumvit. They are concepts which we would like to have your opinion about. If they prompt you to think of other ideas of your own, please do not hesitate to put them into our discussion.

On this panel, we have mapped out the key problems which people have given through interviews, and our own observations.

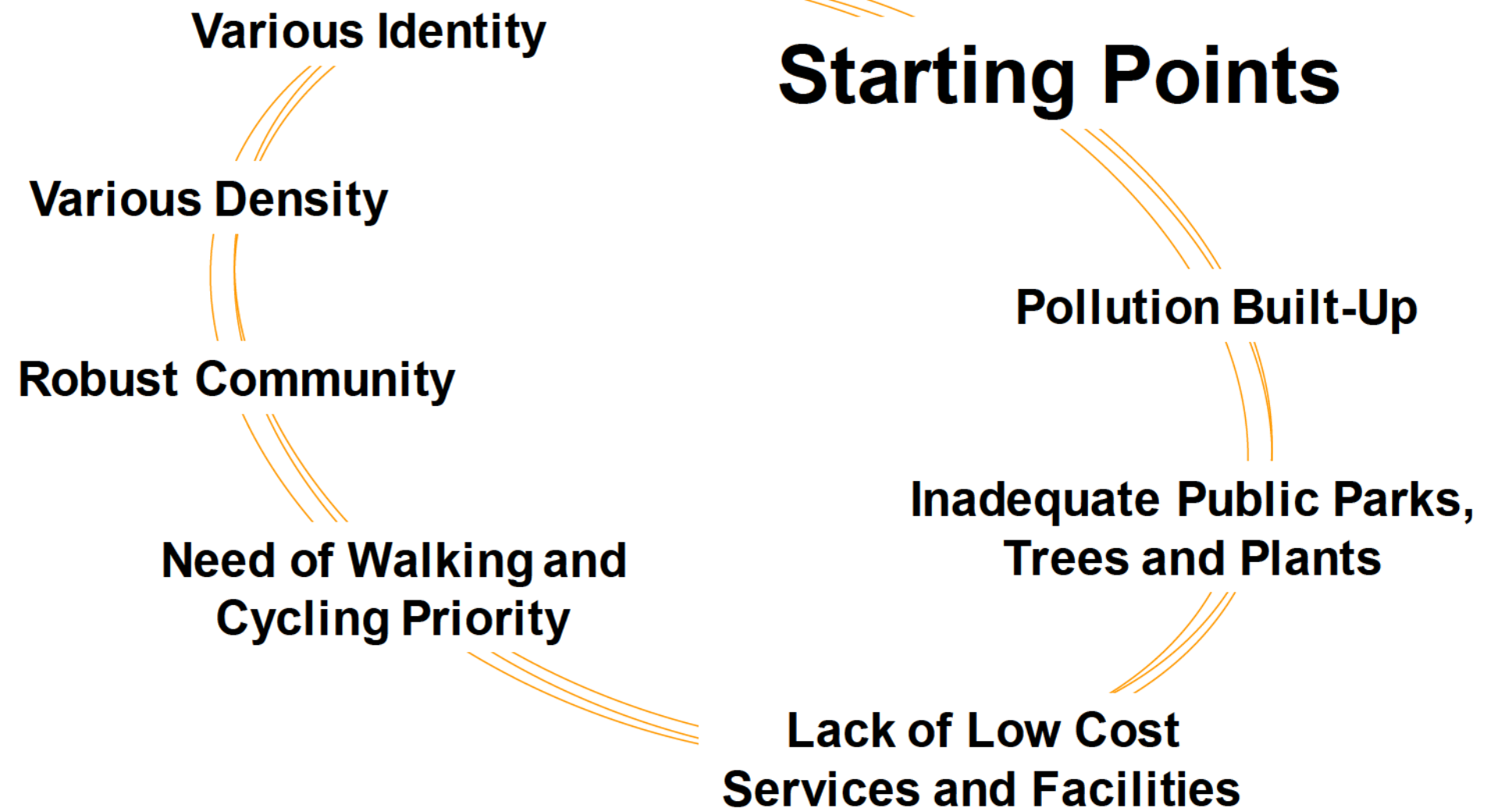
It is important to know how people use the place and what people think about it. We asked people to draw memory maps where they do activities: some of these are good for our starting points.



For many people, the common areas they use are only few areas which offer low cost services and facilities and greenery.



There are few areas people think of as comfort areas to walk whilst others have poor sidewalks, lack of greenery, too much traffic and pollution.



Besides, people would like to live in the low density area most.



In the case of high density, there has to be green spaces as the key issue.



2

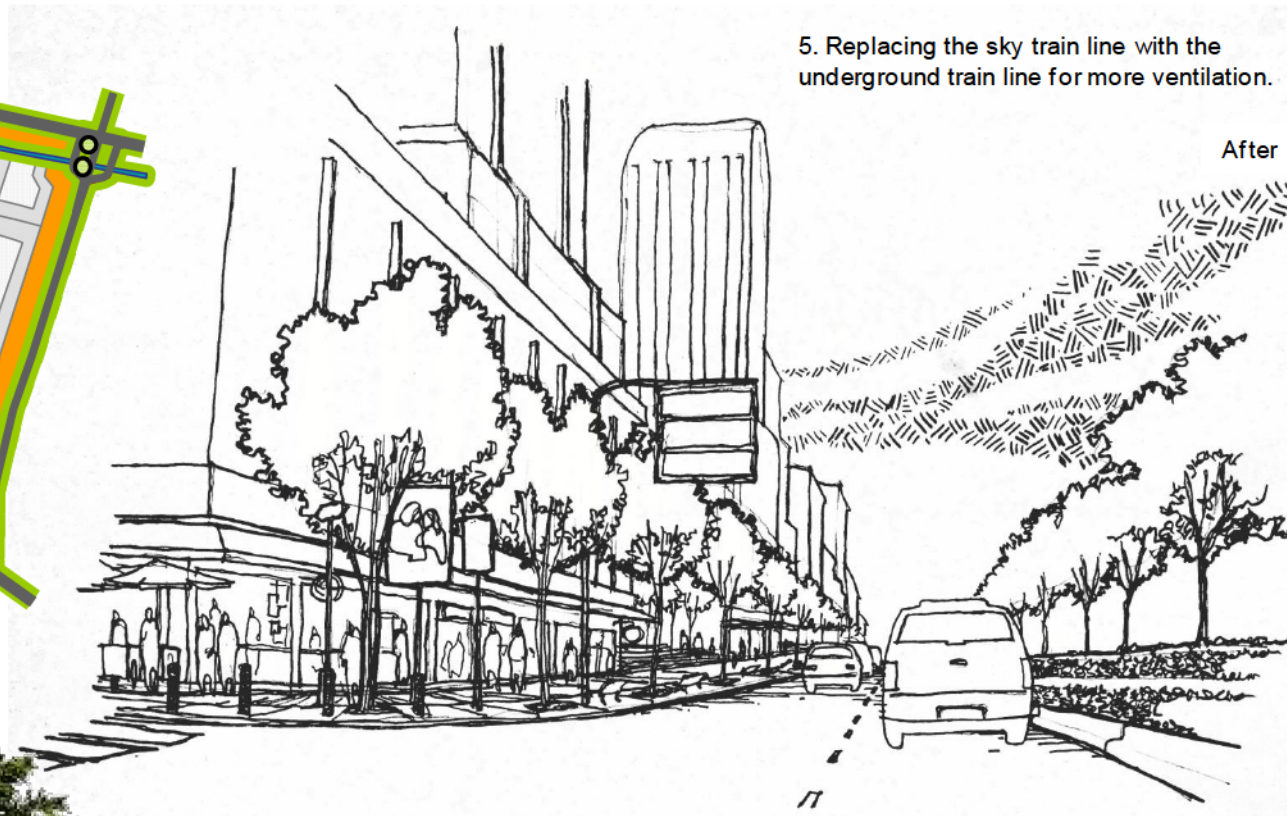
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# Sukhumvit as Healthy Place to Do Business

In the future, Sukhumvit might be the most modern area of Bangkok. This panel shows some ideas for giving the areas along arterial roads more of work place, transport, greenery and shop.



1. It has more pedestrian spaces and plants and trees.



5. Replacing the sky train line with the underground train line for more ventilation.



After



2. Should we have underground train lines on all arterial roads?

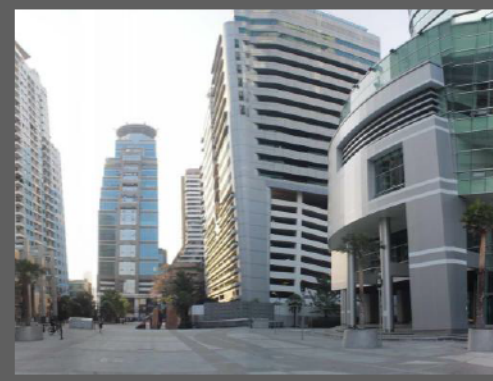


3. More parks and squares we can use.

4. Greenery on buildings



7. It is a place of modern high-rise buildings and variety in shops.

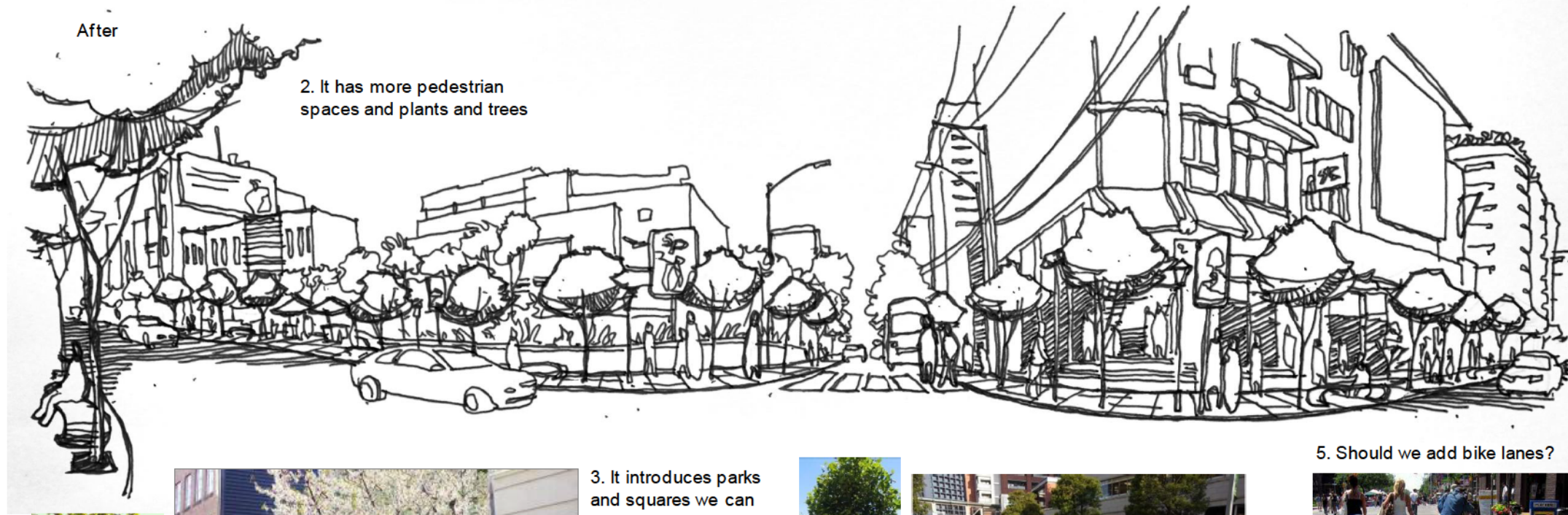


3

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# Sukhumvit as Trendy Neighbourhood

This panel explores ways in which Sukhumvit might be made into a more active and more pedestrian friendly street. We have shown, below, what might be done in the areas along main through traffic routes, with some examples from other places.



1. Should we try to slow cars down?

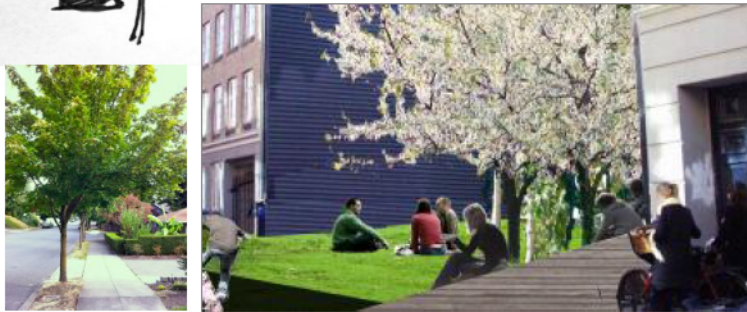


2. It has more pedestrian spaces and plants and trees

6. It includes proper areas for street selling stalls/kiosks.



3. It introduces parks and squares we can use.



4. Outstanding routes with street furniture, lighting, and planting.



5. Should we add bike lanes?



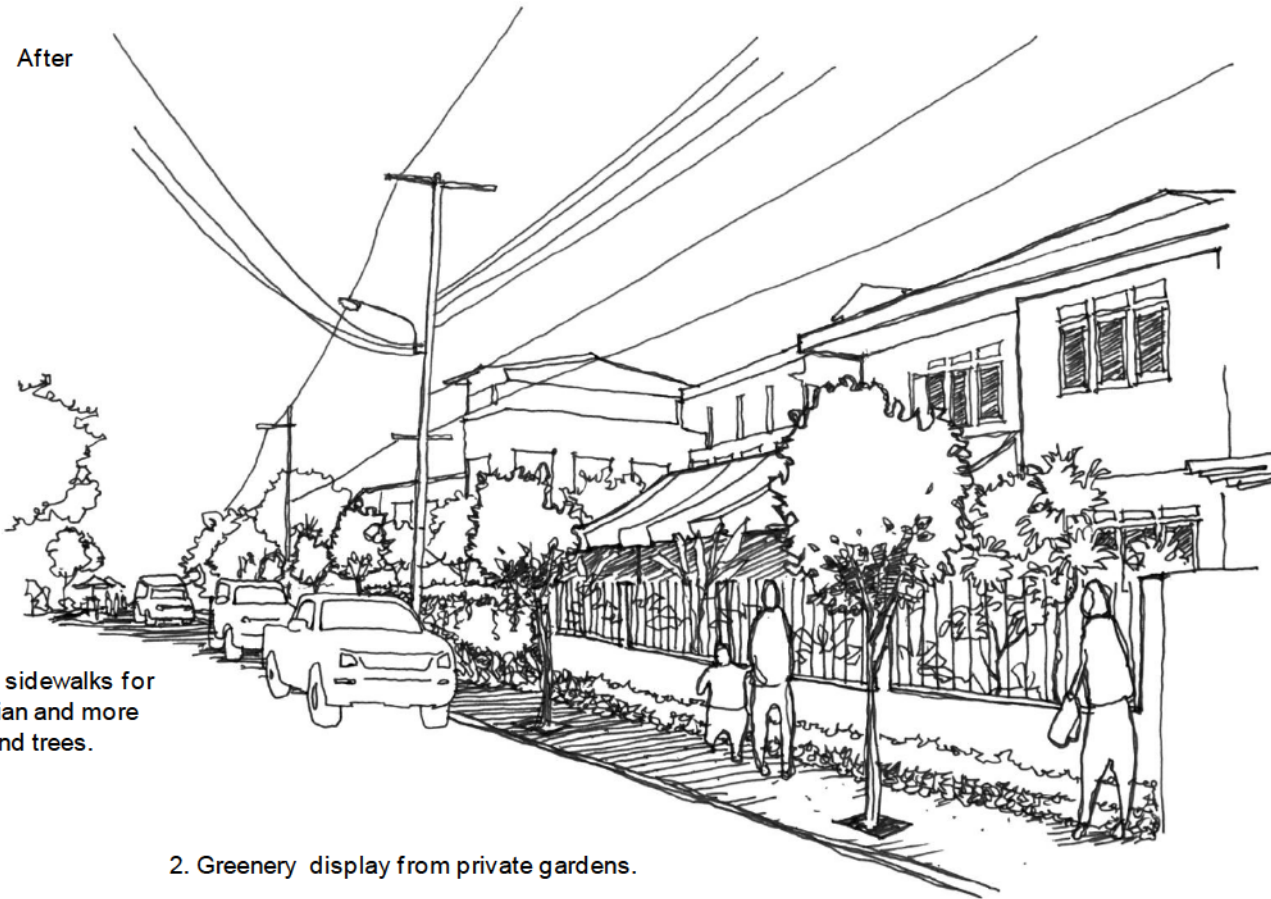
7. It is the most livable street including various building characteristics and uses in the areas along main through traffic routes.



4

Sukhumvit is the living place we love. In this panel, the ideas are all intended to foster a desire for healthy living, and to make all *sois* more of home place characters.

# Sukhumvit as Traditional Home Place



7. Providing run-off from *sois* to Sansab canal.

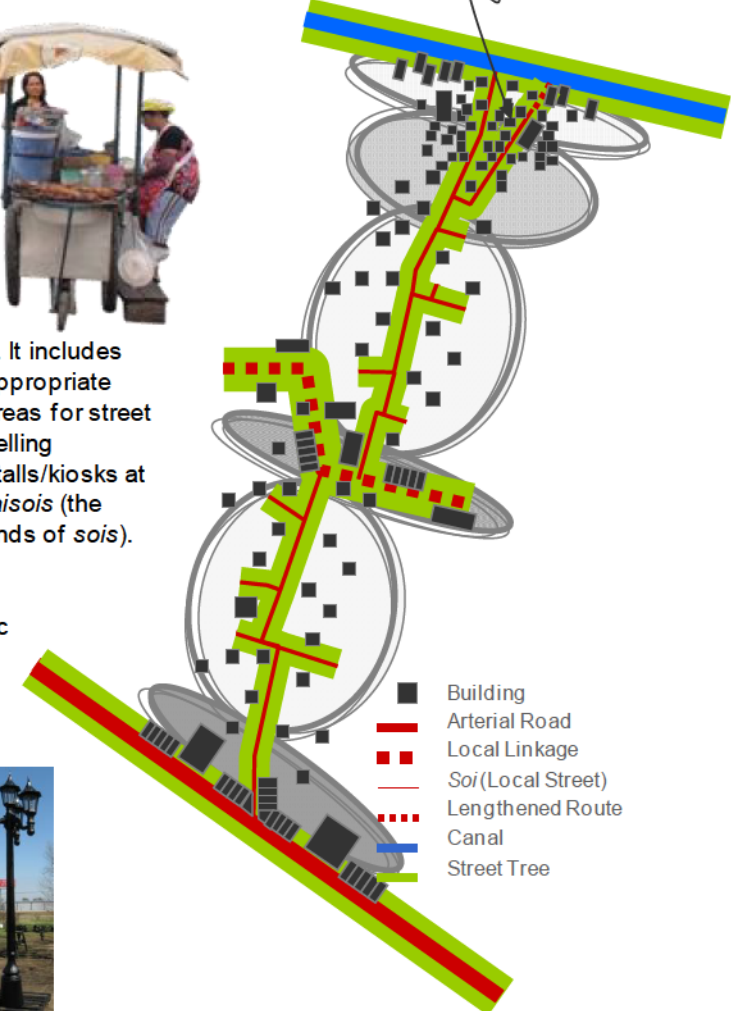


1. It has sidewalks for pedestrian and more plants and trees.

2. Greenery display from private gardens.



6. It includes appropriate areas for street selling stalls/kiosks at *taisois* (the ends of *sois*).



3. Should we try to connect *sois* for easier walking and cycling in neighbourhoods.



4. Slowing cars down.



5. Make it more personal with specific street paving, lighting, and planting.

8. Should all traditional neighbourhoods have to be preserved at each *soi*?



5

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Panel 4 is presented as ‘Sukhumvit as a Trendy Neighbourhood’ because of the required actions to secure a degree of mixed use, activities and built forms, influenced both by traditional socio-spatial patterns and by modern fabrics in the superblock-quarter morphology.

Panel 5 has the theme ‘Sukhumvit as a Traditional Home Place’ in order to represent the actions of sustainability and conservation in the traditional residential areas at the *soi*-based morphology.

In accordance with the panels, the sets of questions are developed in order to assess stakeholders’ opinions. Each set of questions corresponds with each panel representing the design principles. Four main sections are identified as follows

- a. **Starting Points**, The open-ended questions (p.370) are implemented with reference to Panel 2 in order to assess stakeholders’ general opinions for the key issues utilized in the development of the design principles. The questions for collecting these data are also incorporated in the last section of the question sheet (p.374).
- b. **Sukhumvit as a Healthy Place to Do Business**, This section is employed to evaluate the design principles proposed for the superblock as presented in Panel 3. Table E1 shows the relationship between questions and design actions (see also p.366).

Table E1 Questions for Testing the Design Principles for the Superblock Morphology

| Questions  | Relevant Design Principles*  |
|--|--|
| 1. How do you rate the idea of providing more pedestrian spaces and plants and trees?                            | <ul style="list-style-type: none"> <li>• Widening sidewalks.</li> <li>• Planting street trees along all routes.</li> </ul>   |
| 2. How do you rate the idea of having underground train lines following all arterial roads?                      | <ul style="list-style-type: none"> <li>• Lengthening rapid transport lines to cover the superblock layer.</li> </ul>   |
| 3. How do you rate the idea of providing more parks and squares we can use?                                      | <ul style="list-style-type: none"> <li>• Creating a positive modern townscape with responsive ecology and climate.</li> <li>• Increasing soft landscaped open spaces by developing public parks and pocket parks.</li> </ul> |
| 4. How do you rate the idea of displaying greenery on buildings?   | <ul style="list-style-type: none"> <li>• Integrating greenery displays in building settings and spaces.</li> </ul>   |
| 5. How do you rate the idea of replacing the sky train line with an underground train line for more ventilation? | <ul style="list-style-type: none"> <li>• Encouraging natural ventilation by developing an underground train line instead of sky train line.</li> </ul>   |
| 6. How do you rate the idea of including decent areas for street selling stalls/kiosks along arterial roads?     | <ul style="list-style-type: none"> <li>• Providing spaces for street vendors at <i>paksois</i>, the entrances of <i>sois</i>.</li> </ul>   |
| 7. How do you rate the idea of combining modern high-rise buildings and variety in shops along arterial roads?   | <ul style="list-style-type: none"> <li>• Allowing high density development (10.0 FAR) along the superblock’s strips.</li> <li>• Maintaining fine-grained plots of shophouses.</li> </ul>                                     |
| 8. Do you have any other points you want to make about this idea?  | <ul style="list-style-type: none"> <li>• This question encourages participants to fulfil responses to all aspects of design.</li> </ul>  |

\* Design principles are established in CH8.

- c. **Sukhumvit as a Trendy Neighbourhood**, This section is to assess the agreement to the design principles for the superbblock-quarter morphology. Table E2 shows the relationship between questions and design actions as presented in Panel 4 (see also p.372).

Table E2 Questions for Testing the Design Principles for the Superblock-Quarter Morphology

| Questions   | Relevant Design Principles*   |
|---|---|
| 1. How do you rate the idea of providing more pedestrian spaces, plants and trees?  | <ul style="list-style-type: none"> <li>• Providing and widening sidewalks.</li> <li>• Planting street trees along all routes.</li> </ul>  |
| 2. How do you rate the idea of slowing cars down on main through traffic routes?  | <ul style="list-style-type: none"> <li>• Taming private motorized transport.</li> </ul>   |
| 3. How do you rate the idea of providing more parks and squares we can use?   | <ul style="list-style-type: none"> <li>• Increasing soft landscaped open spaces by developing pocket parks.</li> </ul>  |
| 4. How do you rate the idea of outstanding main through traffic routes?   | <ul style="list-style-type: none"> <li>• Re-defining the local linkage as the key path of the local areas.</li> </ul>   |
| 5. How do you rate the idea of adding lanes?  | <ul style="list-style-type: none"> <li>• Adding cycle lanes.</li> </ul>   |
| 6. How do you rate the idea of including proper areas for street selling stalls/kiosks along main through traffic routes? | <ul style="list-style-type: none"> <li>• Providing spaces for street vendors at <i>klangsois</i>, the middle parts of <i>sois</i>.</li> </ul>   |
| 7. How do you rate the idea of having various building characteristics and uses along main through traffic routes?        | <ul style="list-style-type: none"> <li>• Controlling medium density development (5.0 FAR) along the local linkage.</li> <li>• Encouraging a positive mix of modern and local townscape with various built forms linked by greenery.</li> <li>• Maintaining fine-grained plots and buildings along the local linkage.</li> </ul> |
| 8. Do you have any other points you want to make about this idea?   | <ul style="list-style-type: none"> <li>• This question encourages participants to fulfil responses to all aspects of design.</li> </ul>   |

\* Design principles are established in CH8.

- d. **Sukhumvit as a Traditional Home Place**, This section is to ascertain the agreement to the design principles for the *soi*-based morphology. Table E3 shows the relationship between questions and design actions as presented in Panel 5 (see also p.373).

Table E3 Questions used for testing the Design Principles for the *Soi*-Based Morphology

| Questions   | Relevant Design Principles*   |
|---|---|
| 1. How do you rate the idea of providing sidewalks and plants and trees on all <i>sois</i> ?                    | <ul style="list-style-type: none"> <li>• Providing and widening sidewalks.</li> <li>• Planting street trees along all routes.</li> </ul>  |
| 2. How do you rate the idea of displaying private gardens from houses?  | <ul style="list-style-type: none"> <li>• Encouraging greenery display from private gardens.</li> </ul>  |
| 3. How do you rate the idea of connecting <i>sois</i> for easier walking and cycling in neighbourhoods?         | <ul style="list-style-type: none"> <li>• Connecting routes through large blocks.</li> </ul>   |
| 4. How do you rate the idea of slowing cars down on all <i>sois</i> ?   | <ul style="list-style-type: none"> <li>• Taming private motorized transport.</li> </ul>   |
| 5. How do you rate the idea of personalising each <i>soi</i> ?  | <ul style="list-style-type: none"> <li>• Encouraging personalisation of communities along open spaces of <i>sois</i>.</li> </ul>  |
| 6. How do you rate the idea of including appropriate areas for street selling stalls/kiosks at <i>taisois</i> ? | <ul style="list-style-type: none"> <li>• Providing spaces for street vendors at <i>taysois</i>.</li> </ul>  |
| 7. How do you rate the idea of providing water run-off from <i>sois</i> to Sansab canal?                        | <ul style="list-style-type: none"> <li>• Connecting <i>sois</i> to Sansab canal for natural drainage and absorption.</li> </ul>   |
| 8. How do you rate the idea of preserving traditional neighbourhoods?   | <ul style="list-style-type: none"> <li>• Retaining a local morphological distinctiveness by preserving fine-grained patterns of plots and built forms.</li> <li>• Retaining low density development (2.0 FAR) in traditional residential areas.</li> <li>• Retaining significant public realm of <i>sois</i> and avoiding grid pattern of blocks to prevent through traffic.</li> <li>• Preserving riverine communities by avoiding the connection of traffic routes at the ends of <i>sois</i>.</li> </ul> |
| 9. Do you have any other points you want to make about this idea?   | <ul style="list-style-type: none"> <li>• This question encourages participants to fulfil responses to all aspects of design.</li> </ul>   |

\* Design principles are established in CH8.

It should be emphasized that the ordinal scale questions are implemented in order that levels of agreement to alternative solutions can be indicated (see the question sheet in the following pages). They are utilized in the interviews to assess participants' satisfaction with the design principles. However, the mathematic measurement is not implemented in the focus group discussions with residents because the aim is to ascertain numerous brief suggestions for the design principles from a brainstorming of the groups.

Implemented in the focus groups with residents and in the interviews with other stakeholders, the question sheet is presented as follows.

---

# Interview and Focus Group with Key Stakeholders in Sukhumvit

---

|   |  |
|---|--|
| Place of the interview/focus group .....                        | No. ....                               |
| Name of the interviewer/conductor ...Singhanat Sangsehanat..... | .....                                  |
| Name of the participant .....                                   | Key actor code [.....]                 |
| Date ..... / ..... / .....                                      | Time ..... (see code at the last page) |

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## Panel 2: Starting Points

**Do you think there are other important problems and/or factors we should put on the ‘Starting Points’ map?**

### Panel 3: Sukhumvit as a Healthy Place to Do Business

1. How do you rate the idea of providing more pedestrian spaces and plants and trees?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
2. How do you rate the idea of having underground train lines following all arterial roads?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
3. How do you rate the idea of providing more parks and squares we can use?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
4. How do you rate the idea of displaying greenery on buildings?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
5. How do you rate the idea of replacing the sky train line with an underground train line for more ventilation?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
6. How do you rate the idea of including decent areas for street selling stalls/kiosks along arterial roads?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
7. How do you rate the idea of combining modern high-rise buildings and variety in shops along arterial roads?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
8. Do you have any other points you want to make about this idea?

### Panel 4: Sukhumvit as a Trendy Neighbourhood

1. How do you rate the idea of providing more pedestrian spaces and plants and trees?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
2. How do you rate the idea of slowing cars down on main through traffic routes?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
3. How do you rate the idea of providing more parks and squares we can use?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
4. How do you rate the idea of outstanding main through traffic routes?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
5. How do you rate the idea of adding bike lanes?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
6. How do you rate the idea of including proper areas for street selling stalls/kiosks along main through traffic routes?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
7. How do you rate the idea of having various building characteristics and uses along main through traffic routes?  
 Excellent       Good       Bad       Terrible  
 Why have you given this score? .....  
 .....
8. Do you have any other points you want to make about this idea?

### Panel 5: Sukhumvit as a Traditional Home Place

10. How do you rate the idea of providing sidewalks and plants and trees on all *sois*?

Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

11. How do you rate the idea of displaying private gardens from houses?

Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

12. How do you rate the idea of connecting *sois* for easier walking and cycling in neighbourhoods?

Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

13. How do you rate the idea of slowing cars down on all *sois*?

Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

14. How do you rate the idea of personalising each *soi*?

Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

15. How do you rate the idea of including appropriate areas for street selling stalls/kiosks at *taisois* (the ends of *sois*)?

Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

16. How do you rate the idea of providing water run-off from *sois* to Sansab canal?

Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

17. How do you rate the idea of preserving all traditional neighbourhoods?

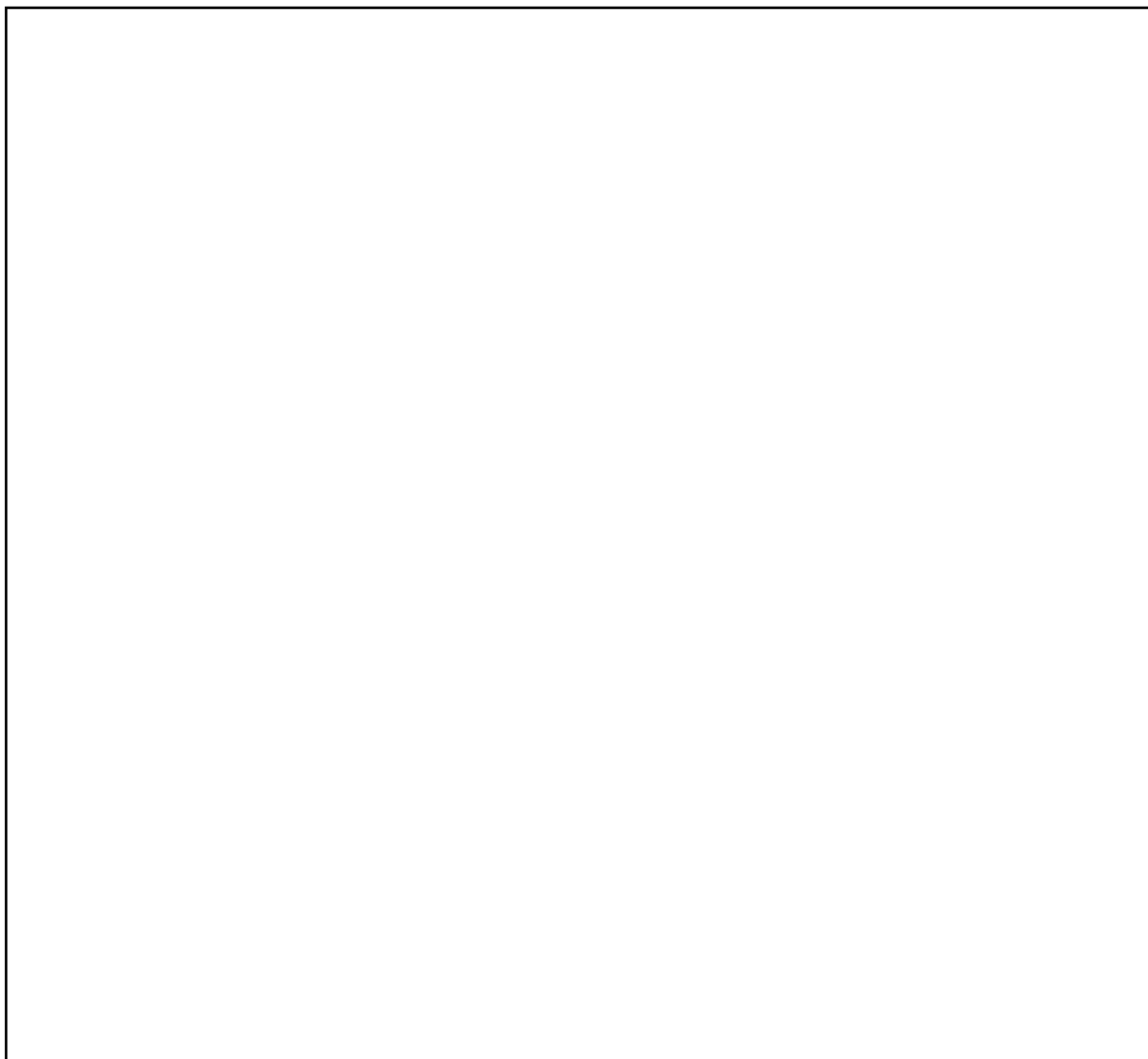
Excellent       Good       Bad       Terrible

Why have you given this score? .....

.....

18. Do you have any other points you want to make about this idea?

Do you have any other visions for Sukhumvit?



Participant Code:

- [ 1 ] Land Owner
- [ 2 ] Investor and Developer
- [ 3 ] Design Profession
- [ 4 ] Central Government
- [ 5 ] Local Government
- [ 6 ] Sub-Local Government
- [ 7 ] Local Politician
- [ 8 ] Small Scale Trader
- [ 9 ] Leader of Community

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## Appendix F

### Instrument for Collecting Key Actors' Roles and Interplay

This appendix presents the questions utilized in the face-to-face semi-structured interviews to ascertain key actors' roles and interplay in the local process of form-productions. This data is crucial to the establishment of implementation strategies in CH8.

Driving the modification of local forms, a relationship between perceptions and adaptations is fundamental as demonstrated in the preliminary conceptual framework (see CH 3). To investigate key actors' roles and interplay, what they perceive and expect for change have to be incorporated in the data collection. To investigate roles and the interplay between actors, two complementary questions are: What are stakeholders' expectations for the urban forms? and How do stakeholders sustain those expectations in the process of form-adaptations? Table F1 shows questions used in the interviews.

Table F1 Questions for Collecting Key Actors' Roles and Interplay in the Process of Form-Productions

| Key Issues  |   | Questions   |   |  |   |
|---|---|---|---|--|---|
|   |   | Investors and Developers  | Public Authorities  | Design Professionals   | Leaders of Communities  |
| What are stakeholders' expectations for the urban forms?                        | What are visions or intentions for shaping the urban forms? | What are your visions for the urban forms in Inner Bangkok?                                     | What are your political visions for the urban forms in Inner Bangkok?                 | What are the key characteristics of the urban forms in Inner Bangkok?                    | What does the urban form of your neighbourhood look like?                 |
|   |   | What key factors or major issues are taken into account when producing these political visions? | What key factors or major issues are taken into account when producing these visions? | What are the strengths and weaknesses of these urban form patterns?                      | Which parts of the area does your community like or dislike? Why?         |
|   |   |   |   | What key factors or major issues are taken into account about these urban form patterns? | What future aspirations does your community have for their neighbourhood? |
|   | How are visions sustained or changed over time?             | How are these key factors sustained or changed over time?                                       | How are these key factors sustained or changed over time?                             | How are these key factors sustained or changed over time?                                | How are these key factors sustained or changed over time?                 |
| Which parts of the area does your community want to change? Please explain why? |   |   |   |  |   |

(Continued)

Table F1 Continued

| Key Questions of the Pilot Case Study  |   | Questions used in the Semi-Structured Interviews   |   |   |  |
|--|---|--|---|---|--|
|  |   | Investors and Developers   | Public Authorities  | Design Professionals  | Leaders of Communities   |
| How do stakeholders sustain those expectations in the process of form-adaptations? | How do stakeholders play their roles with each other? | What are the important political strategies and rules affecting your urban form-development?                         | Who are the key stakeholders affected by your political visions?                          | What are the important political strategies and rules affecting your process of form-productions? | What are the important political strategies and rules affecting the way that your neighbourhood is shaped? |
|  |   | How do practitioners (planners, urban designers and architects) come to play their roles in your work?               | Which key stakeholders could play influential roles in the creation of political visions? | What are the roles of other stakeholders' aspirations and needs affecting urban form-productions? | What are the roles of other stakeholders affecting your community development?                             |
|  |   | In which way can they (practitioners) impact on your decisions?  | In which way can they (key stakeholders) play such roles?                                 | Which stakeholders support your visions? How?   | Which roles support your community development? How?   |
|  |   | How can users and/or potential users' aspirations and needs be incorporated in your works?                           |   | Which stakeholders obstruct your visions? How?  | Which roles obstruct your community development? How?  |
|  |   | In which way can users impact on your decisions?   |   | Which key elements of the urban forms do they (stakeholders) support or obstruct?                 |  |
|  | How do market signals play a role in this process?    | How do market signals play a role in this process?   | How do market signals play a role in this process?  | How do market signals play a role in this process?  |  |
|  | What are the results of various actors' involvement?  | How do you make decisions to resolve all tensions derived from a variety of key stakeholders' roles and their views? | Do your political visions satisfy most key stakeholders?                                  | How do you resolve the tensions derived from a variety of key stakeholders' roles?                | How do you move forward your community development in these situations?                                    |
|  |   | Do you resolve some tensions to satisfy your vision?   | How do key stakeholders respond?  | Do the outcomes of these tensions satisfy your ideas?   | Do the outcomes of these situations satisfy your community?  |
|  |   | Will those results be new key factors of the future urban form developments?   | Will those responses be new key factors of the future urban form developments?            | Will the results be included in the future urban form developments?                               | Will those results be new key factors in your future community developments?                               |

## **Appendix G**

### **Instrument for Collecting Agreement to the Implementation Strategies**

This appendix presents the instrument utilized in the focus group discussion with various stakeholders in order to define key implementation strategies for the design principles (see CH8).

Powerpoint presentation is employed to organize communication content of the group. Summary of the refined design principles is presented to the participants as a platform in the discussion. Issues of mechanism, delivery partners, and funding requirements for delivering the refined design are also shown in order to ascertain stakeholders' ideas and opinions. It should be noted moreover that the communication and negotiation patterns between actors are also observed, influencing the analysis of involvement and participation in the delivery of locally acceptable sustainable urban forms in CHs 8 and 9.

The presentation employed to collect agreement to the implementation strategies is shown as follows.

# Implementation Strategies for Sukhumvit

2 May 2012, 13.30-15.00  
Seminar Room, Prasanmitr Building, 3<sup>rd</sup> Floor,  
Srinakharinwirot University, Sukhumvit, Bangkok



## Aim of the Discussion

To establish key implementation strategies for the design principles of Sukhumvit's locally acceptable sustainable urban forms

## Key Topics

- Summary of the Refined Design Principles
- Alternative Solutions for Delivering the Principles
- Stakeholders to Deliver the Principles

## Summary of the Design Principles



Design Principles Proposed for Sukhumvit



Design Evaluation with Key Stakeholders



### Visions for Sukhumvit

Sukhumvit is an important place in Bangkok. It includes the most modern business districts and a number of traditional residential areas. However, there are many problems so that we have to think how Sukhumvit should be made more desirable.

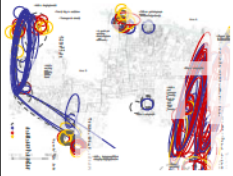
This is the space for telling us how you think Sukhumvit might be improved. This is the latest stage in the research which started three years ago in Oxford Brookes University, England.

The research has already held a number of interviews with local people, developers, practitioners and governors. As well, focus group discussions were carried out with design professions. These were to see what are Sukhumvit's problems and what are the opportunities to improve it.

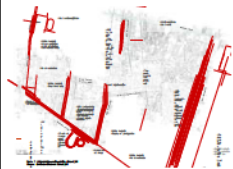
At this time, we have made the visions for Sukhumvit. They are concepts which we would like to have your opinion about. If they prompt you to think of other ideas of your own, please do not hesitate to put them into our discussion.

On this panel, we have mapped out the key problems which people have given through interviews, and our own observations.

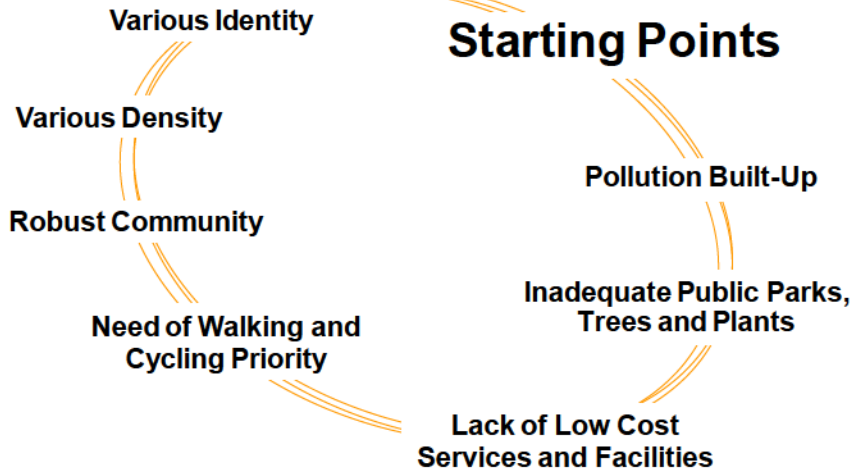
It is important to know how people use the place and what people think about it. We asked people to draw memory maps where they do activities; some of these are good for our starting points.



For many people, the common areas they use are only few areas which offer low cost services and facilities and greenery.



There are few areas people think of as comfort areas to walk whilst others have poor sidewalks, lack of greenery, too much traffic and pollution.



Besides, people would like to live in the low density area most.



In the case of high density, there has to be green spaces as the key issue.

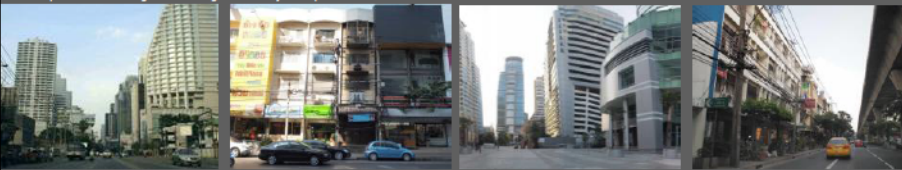


2

In the future, Sukhumvit might be the most modern area of Bangkok. This panel shows some ideas for giving the areas along arterial roads more of work place, transport, greenery and shop.

### Sukhumvit as a Healthy Place to Do Business

- 1. It has more pedestrian spaces and plants and trees.
- 2. Should we have underground train lines on all arterial roads?
- 3. More parks and squares we can use.
- 4. Greenery on buildings
- 5. Replacing the sky train line with the underground train line for more ventilation.
- 6. It includes decent areas for street selling stalls/kiosks.
- 7. It is a place of modern high-rise buildings and variety in shops.



3

## Sukhumvit as a Trendy Neighbourhood

This panel explores ways in which Sukhumvit might be made into a more activities and more pedestrian friendly street. We have shown, below, what might be done in the areas along main through traffic routes, with some examples from other places.

1. Should we try to slow cars down?
2. It has more pedestrian spaces and plants and trees
3. It introduces parks and squares we can use.
4. Outstanding routes with street furniture, lighting, and planting.
5. Should we add bike lanes?
6. It includes proper areas for street selling stalls/kiosks.
7. It is the most livable street including various building characteristics and uses in the areas along main through traffic routes.

4

## Sukhumvit as a Traditional Home Place

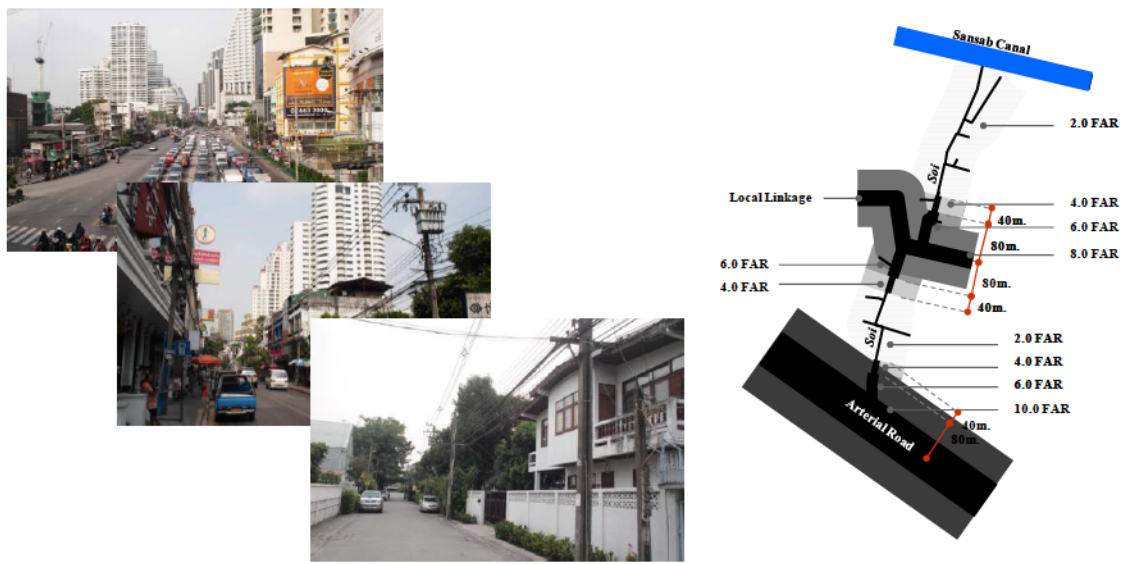
Sukhumvit is the living place we love. In this panel, the ideas are all intended to foster a desire for healthy living, and to make all *sols* more of home place characters.

1. It has sidewalks for pedestrian and more plants and trees.
2. Greenery display from private gardens.
3. Should we try to connect sols for easier walking and cycling in neighbourhoods.
4. Slowing cars down.
5. Make it more personal with specific street paving, lighting, and planting.
6. It includes appropriate areas for street selling stalls/kiosks at falsols (the ends of sols).
7. Providing run-off from sols to Sansab canal.
8. Should all traditional neighbourhoods have to be preserved at each sol?
9. ...

5

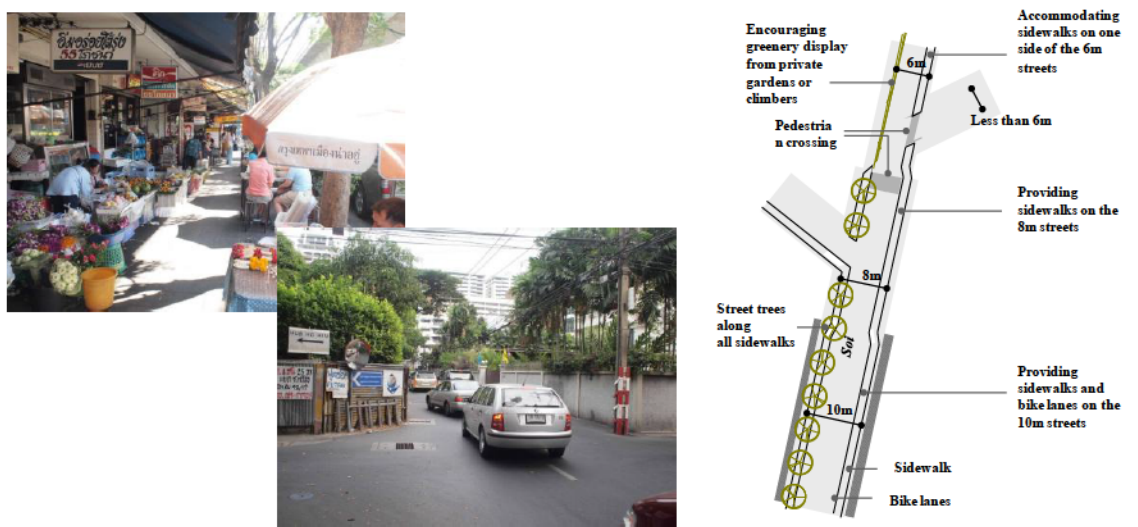
## The Refined Design Principles

- Protecting a positive identity of Sukhumvit.
- Planting street trees and integrating greenery in buildings and spaces.
- Controlling building density in relation to street widths.



## The Refined Design Principles

- Retaining small-scale traders.
- Providing spaces for street vendors.
- Providing pavements and cycle lanes in relation to street widths.
- Remarking the local linkage as the key path of the local areas.



## The Refined Design Principles

- Integrating multi-modes of transport in the local areas.
- Developing well-connected sois and traffic calming in the local areas.
- Lengthening rapid transport lines.
- Replacing the sky train line with an underground train line.



## Key Implementation Strategies

### Existing Tools

- The Bangkok Land Use Plan
- The Building Control Act

### Alternative Solution?

- Supplementary Design Guidance?
- Land Readjustment?
- District and Community Plans?
- Reviewing and Monitoring?



## Key Implementation Strategies

### Who deliver? How?

- Central Government
- Bangkok Metropolitan Administration (BMA)
- Vadhana District Administration (VDA)
- Developers and Investors
- Design Professionals
- Landowners
- Communities



Thank you very much

## Appendix H

### Analysis of Perceptions for Form-Adaptations

Table H1 Users' Genders

| Gender | Frequency | Percent |
|--------|-----------|---------|
| Male   | 49        | 55.7    |
| Female | 39        | 44.3    |
| Total  | 88        | 100.0   |

Table H2 Users' Ages

| Age     | Frequency | Percent |
|---------|-----------|---------|
| 18-25   | 13        | 14.8    |
| 26-35   | 26        | 29.5    |
| 36-45   | 31        | 35.2    |
| 46-55   | 10        | 11.4    |
| 56-65   | 6         | 6.8     |
| > 65    | 1         | 1.1     |
| Missing | 1         | 1.1     |
| Total   | 88        | 100.0   |

Table H3 Users' Occupations

| Occupation         | Frequency | Percent |
|--------------------|-----------|---------|
| Government Officer | 5         | 5.7     |
| Office Worker      | 32        | 36.4    |
| Self-Employed      | 14        | 15.9    |
| Vendor             | 12        | 13.6    |
| Housewife          | 4         | 4.5     |
| Cleaner            | 1         | 1.1     |
| Worker             | 5         | 5.7     |
| Driver             | 5         | 5.7     |
| Other              | 10        | 11.4    |
| Total              | 88        | 100.0   |

Table H4 Groups of Users, Sukhumvit, 2011

| <i>Are you a resident, a worker, and/or a visitor for this area?</i> | Response | Percent |
|--|----------|---------|
| Resident   | 24       | 22.2    |
| Worker   | 71       | 65.7    |
| Visitor  | 13       | 12.0    |
| Total  | 108      | 100.0   |

Table H5 Visitors' Activities in Sukhumvit, 2011

| <i>For a visitor, in which purposes do you visit here?</i> | Response | Percent |
|--|----------|---------|
| Shopping   | 6        | 26.1    |
| Eating   | 8        | 34.8    |
| Meeting  | 7        | 30.4    |
| Others   | 2        | 8.7     |
| Total  | 23       | 100.0   |

Table H6 Users' Modes of Transport in Sukhumvit, 2011

| <i>Which modes of transport do you normally use?</i> | Response | Percent |
|--|----------|---------|
| Train  | 42       | 27.5    |
| Bus  | 30       | 19.6    |
| Boat   | 11       | 7.2     |
| Car  | 27       | 17.6    |
| Motorbike  | 11       | 7.2     |
| Bicycle  | 4        | 2.6     |
| Foot   | 28       | 18.3    |
| Total  | 153      | 100.0   |

Table H7 Users' Satisfaction and Expectation in Modes of Transport in Sukhumvit, 2011

| <i>Would you please rank transportations you use?</i> |           | VG   | G    | M    | B    | VB   | Total | <i>Why have you given this score?</i>  | <i>How could this form of transport be improved?</i>                                |
|---|-----------|------|------|------|------|------|-------|--|---|
| Train   | Frequency | 16   | 17   | 8    | 1    | 0    | 42    | <b>Positive:</b> convenient / fast<br><b>Negative:</b> expensive   | More train lines covering all main movement networks                                |
|   | Percent   | 38.1 | 40.5 | 19.0 | 2.4  | 0    | 100   |  |   |
| Bus   | Frequency | 0    | 4    | 18   | 5    | 3    | 30    | <b>Positive:</b> inexpensive<br><b>Negative:</b> slow journey because of congestion / no air-conditioned           | Better traffic management for decreasing congestion                                 |
|   | Percent   | 0    | 13.3 | 60.0 | 16.7 | 10.0 | 100   |  |   |
| Boat  | Frequency | 0    | 3    | 7    | 1    | 0    | 11    | <b>Positive:</b> fast<br><b>Negative:</b> inadequate safety / deficient boats                                      | Better service and safety   |
|   | Percent   | 0    | 27.3 | 63.6 | 9.1  | 0    | 100   |  |   |
| Car   | Frequency | 4    | 9    | 10   | 4    | 0    | 27    | <b>Positive:</b> convenient / getting direct to destination<br><b>Negative:</b> slow journey because of congestion | Better traffic management for decreasing congestion                                 |
|   | Percent   | 14.8 | 33.3 | 37.0 | 14.8 | 0    | 100   |  |   |
| Motor bike  | Frequency | 3    | 5    | 3    | 0    | 0    | 11    | <b>Positive:</b> fast / getting direct to destination<br><b>Negative:</b> N/A                                      | Motorbike lane provision  |
|   | Percent   | 27.3 | 45.5 | 27.3 | 0    | 0    | 100   |  |   |
| Bicycle   | Frequency | 0    | 3    | 1    | 0    | 0    | 4     | <b>Positive:</b> convenient / fast<br><b>Negative:</b> lack of bike lane   | Precise regulation and design for bicycle users                                     |
|   | Percent   | 0    | 75.0 | 25.0 | 0    | 0    | 100   |  |   |
| Foot  | Frequency | 1    | 9    | 15   | 2    | 1    | 28    | <b>Positive:</b> convenient<br><b>Negative:</b> poor pavement / obstruction from street vendors                    | Wider and better pavement with shadow, street tree, and no congested street vendors |
|   | Percent   | 3.6  | 32.1 | 53.6 | 7.1  | 3.6  | 100   |  |   |

Key Words: VG - Very Good / G - Good / M - Moderate / B - Bad / VB - Very Bad

Note: At each mode of transport, the most frequency is highlighted in blue.

Table H8 Users' Satisfaction in Accessibility of Sukhumvit, 2011

| How easy is it to get to these places/spaces? |      |             |      |     |     |       | Why do you feel that?   |
|---|------|-------------|------|-----|-----|-------|---|
|   | VE   | E           | M    | D   | VD  | Total |   |
| Frequency                                     | 20   | <b>40</b>   | 22   | 5   | 1   | 88    | <ul style="list-style-type: none"> <li>• Many modes of transportation in the areas</li> </ul> |
| Percent                                       | 22.7 | <b>45.5</b> | 25.0 | 5.7 | 1.1 | 100   |   |

Key Words: VE - Very Easy / E - Easy / M - Moderate / D - Difficult / VD - Very Difficult

Note: The most frequency is highlighted in blue.

Table H9 Users' Satisfaction in Walkability of Sukhumvit, 2011

| How easy is it to walk around your neighbourhood/this area? |     |      |             |      |     |       | Why do you feel that?  |
|---|-----|------|-------------|------|-----|-------|--|
|   | VE  | E    | M           | D    | VD  | Total |  |
| Frequency   | 7   | 28   | <b>36</b>   | 14   | 3   | 88    | <ul style="list-style-type: none"> <li>• Poor pavement condition: narrow; broken; and, no sidewalk provision</li> <li>• Obstruction to walk from street vendors</li> <li>• No surveillance - eyes upon the streets at night</li> <li>• Lacks of street tree, shadow, and comfort climate</li> <li>• Effect of traffic and pollution</li> <li>• Long average distance to walk within <i>soi</i> network (<i>soi</i> is a Thai term for local street)</li> </ul> |
| Percent   | 8.0 | 31.8 | <b>40.9</b> | 15.9 | 3.4 | 100   |  |

Key Words: VE - Very Easy / E - Easy / M - Moderate / D - Difficult / VD - Very Difficult

Note: The most frequency is highlighted in blue.

Table H10 Users' Preparation to Access Local Services and Facilities by Walk, Sukhumvit, 2011

| How far are you still willing to walk to access these following places? |      | Miniute |             |            |             |     |             |             |       |       |       |     | Missing | Total |
|---|------|---------|-------------|------------|-------------|-----|-------------|-------------|-------|-------|-------|-----|---------|-------|
|   |      | N/A     | 1-2         | 3-4        | 5-6         | 7-8 | 9-10        | >10         |       |       |       |     |         |       |
|   |      |         |             |            |             |     |             | 11-15       | 16-20 | 21-25 | 26-30 | >30 |         |       |
| Local Shop  | Freq | 5       | 7           | 7          | <b>32</b>   | 1   | 14          | 8           | 5     | 1     | 6     | 1   | 1       | 88    |
|   | Pc   | 5.7     | 8.0         | 8.0        | <b>36.4</b> | 1.1 | 15.9        | 9.1         | 5.7   | 1.1   | 6.8   | 1.1 | 1.1     | 100   |
| District Centre   | Freq | 8       | 4           | 6          | <b>19</b>   | 3   | 18          | 11          | 10    | 1     | 4     | 3   | 1       | 88    |
|   | Pc   | 9.1     | 4.5         | 6.8        | <b>21.6</b> | 3.4 | 20.5        | 12.5        | 11.4  | 1.1   | 4.5   | 3.4 | 1.1     | 100   |
| Bus Station   | Freq | 10      | <b>18</b>   | <b>8</b>   | <b>18</b>   | 2   | 14          | 9           | 2     | 1     | 3     | 2   | 1       | 88    |
|   | Pc   | 11.4    | <b>20.5</b> | <b>9.1</b> | <b>20.5</b> | 2.3 | 15.9        | 10.2        | 2.3   | 1.1   | 3.4   | 2.3 | 1.1     | 100   |
| Boat Station  | Freq | 29      | 3           | 1          | <b>19</b>   | 1   | 18          | 12          | 2     | 1     | 0     | 1   | 1       | 88    |
|   | Pc   | 33.0    | 3.4         | 1.1        | <b>21.6</b> | 1.1 | 20.5        | 13.6        | 2.3   | 1.1   | 0     | 1.1 | 1.1     | 100   |
| Metro Station   | Freq | 15      | 6           | 6          | 13          | 2   | <b>19</b>   | <b>19</b>   | 1     | 1     | 2     | 3   | 1       | 88    |
|   | Pc   | 17.0    | 6.8         | 6.8        | 14.8        | 2.3 | <b>21.6</b> | <b>21.6</b> | 1.1   | 1.1   | 2.3   | 3.4 | 1.1     | 100   |

Note: N/A implies the places participants do not use.

At each type of services and facilities, the most frequency is highlighted in blue.

If the same frequencies are found between two variables, the mid-variable is determined as the highest responded one.

Table H11 Users' Perception of Environmental Features in Encouraging Walkability (Further Than Usual), Sukhumvit, 2011

| How much further (than usual) do these environmental features encourage you to walk? |      | Minute      |     |     |             |      |             |       |       |       |       |      |     | Missing | Total |
|--|------|-------------|-----|-----|-------------|------|-------------|-------|-------|-------|-------|------|-----|---------|-------|
|  |      | N/A         | 1-2 | 3-4 | 5-6         | 7-8  | 9-10        | >10   |       |       |       |      |     |         |       |
|  |      |             |     |     |             |      |             | 11-15 | 16-20 | 21-25 | 26-30 | >30  |     |         |       |
| Nicer Building   | Freq | <b>24</b>   | 7   | 8   | 12          | 1    | 11          | 7     | 6     | 0     | 5     | 6    | 1   | 88      |       |
|  | Pc   | <b>27.3</b> | 8.0 | 9.1 | 13.6        | 1.1  | 12.5        | 8.0   | 6.8   | 0     | 5.7   | 6.8  | 1.1 | 100     |       |
| Wider Pavement   | Freq | 19          | 5   | 4   | <b>24</b>   | 2    | 15          | 4     | 4     | 0     | 7     | 3    | 1   | 88      |       |
|  | Pc   | 21.6        | 5.7 | 4.5 | <b>27.3</b> | 2.3  | 17.0        | 4.5   | 4.5   | 0     | 8.0   | 3.4  | 1.1 | 100     |       |
| More Greenery  | Freq | 5           | 2   | 7   | 12          | 7    | <b>18</b>   | 7     | 7     | 3     | 10    | 9    | 1   | 88      |       |
|  | Pc   | 5.7         | 2.3 | 8.0 | 13.6        | 8.0  | <b>20.5</b> | 8.0   | 8.0   | 3.4   | 11.4  | 10.2 | 1.1 | 100     |       |
| Comfort / Shadow   | Freq | 5           | 1   | 4   | 11          | 11   | <b>17</b>   | 7     | 6     | 1     | 13    | 11   | 1   | 88      |       |
|  | Pc   | 5.7         | 1.1 | 4.5 | 12.5        | 12.5 | <b>19.3</b> | 8.0   | 6.8   | 1.1   | 14.8  | 12.5 | 1.1 | 100     |       |
| More Shop  | Freq | <b>31</b>   | 4   | 7   | 8           | 3    | 12          | 4     | 0     | 0     | 8     | 10   | 1   | 88      |       |
|  | Pc   | <b>35.2</b> | 4.5 | 8.0 | 9.1         | 3.4  | 13.6        | 4.5   | 0     | 0     | 9.1   | 11.4 | 1.1 | 100     |       |
| Less Car   | Freq | <b>24</b>   | 5   | 5   | 10          | 7    | 10          | 6     | 4     | 0     | 14    | 2    | 1   | 88      |       |
|  | Pc   | <b>27.3</b> | 5.7 | 5.7 | 11.4        | 8.0  | 11.4        | 6.8   | 4.5   | 0     | 15.9  | 2.3  | 1.1 | 100     |       |

Note: N/A implies inapplicable features in encouraging people to walk further  
At each environmental feature, the most frequency is highlighted in blue.

Table H12 Users' Perception and Expectation of Public Open Spaces in Sukhumvit, 2011

| Do you consider it important to have parks and squares nearby? |           | Important   | Unimportant | Total | Why is/is not it important?   | If it is important, what features should good they have?  |
|--|-----------|-------------|-------------|-------|---|---|
| Park   | Frequency | <b>82</b>   | 6           | 88    | <ul style="list-style-type: none"> <li>Importance in terms of fresh air, natural ventilation, reducing pollution, greenery display, relax and exercise</li> </ul>   | <ul style="list-style-type: none"> <li>Distributed small-medium size parks throughout all areas</li> <li>Park containing tree, pool, bench, small library, and coffee shop</li> </ul> |
|  | Percent   | <b>93.2</b> | 6.8         | 100   |   |   |
| Square   | Frequency | <b>59</b>   | 29          | 88    | <ul style="list-style-type: none"> <li>Importance for more social interaction, activities, and exercise</li> <li>Unimportance regarding main users are office workers who do not need squares to do activities</li> </ul> | <ul style="list-style-type: none"> <li>Open space comprising sport equipment, tree, and bench</li> </ul>  |
|  | Percent   | <b>67.0</b> | 33.0        | 100   |   |   |

Note: At each category of public spaces, the most frequency is highlighted in blue.

Table H13 Users' Perception of Building Densities, Sukhumvit, 2011

| <i>Would you please group high, medium, and low densities from these images?</i> |   | High Density | Medium Density | Low Density | Total       |     |
|--|---|--------------|----------------|-------------|-------------|-----|
| Represented Images   | 1 | Frequency    | <b>81</b>      | 5           | 2           | 88  |
|  |   | Percent      | <b>92.0</b>    | 5.7         | 2.3         | 100 |
|  | 2 | Frequency    | <b>43</b>      | 35          | 10          | 88  |
|  |   | Percent      | <b>48.9</b>    | 39.8        | 11.4        | 100 |
|  | 3 | Frequency    | 17             | <b>50</b>   | 21          | 88  |
|  |   | Percent      | 19.3           | <b>56.8</b> | 23.9        | 100 |
|  | 4 | Frequency    | <b>46</b>      | 39          | 3           | 88  |
|  |   | Percent      | <b>52.3</b>    | 44.3        | 3.4         | 100 |
|  | 5 | Frequency    | 8              | <b>51</b>   | 29          | 88  |
|  |   | Percent      | 9.1            | <b>58.0</b> | 33.0        | 100 |
|  | 6 | Frequency    | 29             | <b>42</b>   | 17          | 88  |
|  |   | Percent      | 33.0           | <b>47.7</b> | 19.3        | 100 |
|  | 7 | Frequency    | 10             | <b>44</b>   | 34          | 88  |
|  |   | Percent      | 11.4           | <b>50.0</b> | 38.6        | 100 |
|  | 8 | Frequency    | <b>37</b>      | 21          | 30          | 88  |
|  |   | Percent      | <b>42.0</b>    | 23.9        | 34.1        | 100 |
|  | 9 | Frequency    | 2              | 8           | <b>78</b>   | 88  |
|  |   | Percent      | 2.3            | 9.1         | <b>88.6</b> | 100 |

Note: At each represented image, the most frequency is highlighted in blue.

Table H14 Users' Preferable Urban Forms, Sukhumvit, 2011

| <i>Would you please rank three images you would like to live in?</i> |           | Represented Images |             |     |     |      |     |             |      |             |         |       |
|--|-----------|--------------------|-------------|-----|-----|------|-----|-------------|------|-------------|---------|-------|
|  |           | 1                  | 2           | 3   | 4   | 5    | 6   | 7           | 8    | 9           | Missing | Total |
| The First  | Frequency | 6                  | 9           | 3   | 5   | 4    | 1   | 13          | 2    | <b>45</b>   | 0       | 88    |
|  | Percent   | 6.8                | 10.2        | 3.4 | 5.7 | 4.5  | 1.1 | 14.8        | 2.3  | <b>51.1</b> | 0       | 100   |
| The Second   | Frequency | 5                  | 12          | 5   | 2   | 11   | 3   | <b>26</b>   | 10   | 12          | 2       | 88    |
|  | Percent   | 5.7                | 13.6        | 5.7 | 2.3 | 12.5 | 3.4 | <b>29.5</b> | 11.4 | 13.6        | 2.3     | 100   |
| The Third  | Frequency | 4                  | <b>21</b>   | 3   | 7   | 11   | 4   | 19          | 6    | 11          | 2       | 88    |
|  | Percent   | 4.5                | <b>23.9</b> | 3.4 | 8.0 | 12.5 | 4.5 | 21.6        | 6.8  | 12.5        | 2.3     | 100   |

Note: At each represented image for preferable urban forms, the most frequency is highlighted in blue.

Table H15 Users' Perception of Bangkok Identity, 2011

| <i>Which images best represent Bangkok?</i> |          | Represented Images |      |     |      |     |     |     |     |     |       |
|---|----------|--------------------|------|-----|------|-----|-----|-----|-----|-----|-------|
|   |          | 1                  | 2    | 3   | 4    | 5   | 6   | 7   | 8   | 9   | Total |
| Bangkok Identity                            | Response | <b>60</b>          | 30   | 6   | 29   | 8   | 9   | 8   | 17  | 7   | 174   |
|   | Percent  | <b>34.5</b>        | 17.2 | 3.4 | 16.7 | 4.6 | 5.2 | 4.6 | 9.8 | 4.0 | 100   |

Note: The most frequency is highlighted in blue.

Table H16 Users' Recognition of Sukhumvit Identity, 2011

| <i>Do you feel that your neighbourhood/this area is unique?</i> | Yes  | No   | Total | <i>Why do you feel that?</i>  | <i>What are important elements defining that unique?</i>  |
|---|------|------|-------|---|---|
| Frequency   | 72   | 16   | 88    | <ul style="list-style-type: none"> <li>• Crowd</li> <li>• High density</li> <li>• Business district</li> <li>• High class residences</li> <li>• Lifestyle at Soi Thonglor particularly in J-Avenue</li> <li>• Modern buildings accumulating in Asoke Road</li> <li>• Numerous religious institutions</li> </ul> | <ul style="list-style-type: none"> <li>• High-rise buildings</li> <li>• Office Buildings</li> <li>• Condominiums</li> <li>• Sky trains</li> </ul> |
| Percent   | 81.8 | 18.2 | 100   |   |   |

Note: The most frequency is highlighted in blue.

Table H17 Users' Perception of Sukhumvit Identity, 2011

| <i>Which images best represent your neighbourhood/this area?</i> |          | Represented Images |      |     |      |     |     |    |      |      |       |
|--|----------|--------------------|------|-----|------|-----|-----|----|------|------|-------|
|  |          | 1                  | 2    | 3   | 4    | 5   | 6   | 7  | 8    | 9    | Total |
| Sukhumvit Identity   | Response | 21                 | 25   | 5   | 20   | 3   | 3   | 1  | 14   | 15   | 107   |
|  | Percent  | 19.6               | 23.4 | 4.7 | 18.7 | 2.8 | 2.8 | .9 | 13.1 | 14.0 | 100   |

Note: The most frequency is highlighted in blue.

# Appendix I

## Analysis of the Agreement to the Design Principles

Table I1 Numbers of Participants, Sukhumvit, 2012

| Group                  | Frequency | Percent |
|------------------------|-----------|---------|
| Landlord               | 2         | 9.5     |
| Investor and Developer | 4         | 19.0    |
| Designer               | 1         | 4.8     |
| Central Government     | 3         | 14.3    |
| Bangkok Administration | 3         | 14.3    |
| Vadhana Administration | 3         | 14.3    |
| Local Politician       | 1         | 4.8     |
| Small Scale Trader     | 2         | 9.5     |
| Leader of Community    | 2         | 9.5     |
| Total                  | 21        | 100.0   |

Source: Semi-structured interviews in Sukhumvit, 2012

Table I2 Local Acceptance of the Design Actions at the Superblock Morphology

| <i>How do you rate these ideas?</i>  |           | Ex   | G    | B    | T   | Total | <i>Why have you given this score?</i>  |
|--|-----------|------|------|------|-----|-------|--|
| Providing more pedestrian spaces and plants and trees                          | Frequency | 5    | 13   | 3    | 0   | 21    | <b>Positive:</b> effective pedestrian, pollution reduction, fresh air and shadow from trees<br><b>Negative:</b> insufficient road spaces |
|  | Percent   | 23.8 | 61.9 | 14.3 | 0.0 | 100   |  |
| Underground train lines on all arterial roads                                  | Frequency | 1    | 19   | 1    | 0   | 21    | <b>Positive:</b> better urban movement network<br><b>Negative:</b> effect during construction, insufficient road spaces                  |
|  | Percent   | 4.8  | 90.5 | 4.8  | 0.0 | 100   |  |
| Providing more parks and squares   | Frequency | 7    | 14   | 0    | 0   | 21    | <b>Positive:</b> basic need, fresh air, urban greenery<br><b>Negative:</b> N/A   |
|  | Percent   | 33.3 | 66.7 | 0.0  | 0.0 | 100   |  |
| Displaying greenery on buildings   | Frequency | 7    | 14   | 0    | 0   | 21    | <b>Positive:</b> urban greenery<br><b>Negative:</b> N/A  |
|  | Percent   | 33.3 | 66.7 | 0.0  | 0.0 | 100   |  |
| More ventilation by replacing the sky train with the underground train         | Frequency | 3    | 15   | 3    | 0   | 21    | <b>Positive:</b> pollution reduction, better townscape<br><b>Negative:</b> too high budget, questions of feasibility                     |
|  | Percent   | 14.3 | 71.4 | 14.3 | 0.0 | 100   |  |
| Areas for street selling stalls/kiosks along arterial roads                    | Frequency | 7    | 13   | 1    | 0   | 21    | <b>Positive:</b> need of low cost food, cleanliness, better townscape<br><b>Negative:</b> uncontrolled accumulation of street vendors    |
|  | Percent   | 33.3 | 61.9 | 4.8  | 0.0 | 100   |  |
| Combining modern high-rise buildings and variety in shops along arterial roads | Frequency | 1    | 14   | 6    | 0   | 21    | <b>Positive:</b> a variety in shops<br><b>Negative:</b> requirement for development and investment                                       |
|  | Percent   | 4.8  | 66.7 | 28.6 | 0.0 | 100   |  |

Key Word: Ex - Excellent / G - Good / B - Bad / T - Terrible

(Continued)

Note: Outstanding agreement of the design actions is highlighted in blue.  
20 percent of disagreement is highlighted in orange.  
Source: Semi-structured interviews in Sukhumvit, 2012

Table I3 Local Acceptance of the Design Actions at the Superblock-Quarter Morphology

| <i>How do you rate these ideas?</i>   |           | Ex   | G    | B    | T   | Total | <i>Why have you given this score?</i>   |
|---|-----------|------|------|------|-----|-------|---|
| Providing more pedestrian spaces and plants and trees                       | Frequency | 6    | 8    | 7    | 0   | 21    | <b>Positive:</b> effective pedestrian, pollution reduction, fresh air<br><b>Negative:</b> insufficient road spaces, effect to vehicle movement                                |
|   | Percent   | 28.6 | 38.1 | 33.3 | 0.0 | 100   |   |
| Slowing cars down on main through traffic routes                            | Frequency | 3    | 13   | 5    | 0   | 21    | <b>Positive:</b> pollution reduction<br><b>Negative:</b> effect to vehicle movement, various patterns of travel behaviour   |
|   | Percent   | 14.3 | 61.9 | 23.8 | 0.0 | 100   |   |
| Providing more parks and squares  | Frequency | 4    | 16   | 0    | 1   | 21    | <b>Positive:</b> fresh air, recreation<br><b>Negative:</b> N/A  |
|   | Percent   | 19.0 | 76.2 | 0.0  | 4.8 | 100   |   |
| Outstanding main through traffic routes                                     | Frequency | 1    | 20   | 0    | 0   | 21    | <b>Positive:</b> better townscape<br><b>Negative:</b> N/A   |
|   | Percent   | 4.8  | 95.2 | 0.0  | 0.0 | 100   |   |
| Adding bike lanes   | Frequency | 3    | 8    | 10   | 0   | 21    | <b>Positive:</b> good mode of transport, avoiding congestion<br><b>Negative:</b> insufficient road spaces, effect to vehicle movement, irrelevant design with users' behavior |
|   | Percent   | 14.3 | 38.1 | 47.6 | 0.0 | 100   |   |
| Areas for street selling stalls/kiosks along main through traffic routes    | Frequency | 8    | 11   | 2    | 0   | 21    | <b>Positive:</b> need of low cost food, cleanliness, better townscape<br><b>Negative:</b> uncontrolled accumulation of street vendors, insufficient spaces on sidewalks       |
|   | Percent   | 38.1 | 52.4 | 9.5  | 0.0 | 100   |   |
| Various building characteristics and uses along main through traffic routes | Frequency | 0    | 16   | 5    | 0   | 21    | <b>Positive:</b> willingness to control density<br><b>Negative:</b> market signals of development, need of more residential spaces  |
|   | Percent   | 0.0  | 76.2 | 23.8 | 0.0 | 100   |   |

Key Word: Ex - Excellent / G - Good / B - Bad / T - Terrible

Note: Outstanding agreement of the design actions is highlighted in blue.  
20 percent of disagreement is highlighted in orange.  
Source: Semi-structured interviews in Sukhumvit, 2012

Table I4 Local Acceptance of the Design Actions at the *Soi*-Based Morphology

| <i>How do you rate these ideas?</i>   |           | Ex   | G    | B    | T   | Total | <i>Why have you given this score?</i>  |
|---|-----------|------|------|------|-----|-------|--|
| Providing sidewalks and plants and trees on all <i>sois</i>                         | Frequency | 7    | 12   | 2    | 0   | 21    | <b>Positive:</b> basic need, exercise, fresh air<br><b>Negative:</b> insufficient street spaces                                |
|   | Percent   | 33.3 | 57.1 | 9.5  | 0.0 | 100   |  |
| Displaying private gardens from housings  | Frequency | 9    | 12   | 0    | 0   | 21    | <b>Positive:</b> greenery, fresh air<br><b>Negative:</b> N/A   |
|   | Percent   | 42.9 | 57.1 | 0.0  | 0.0 | 100   |  |
| Connecting <i>sois</i> for easier walking and cycling                               | Frequency | 2    | 15   | 4    | 0   | 21    | <b>Positive:</b> effective connection<br><b>Negative:</b> questions of feasibility   |
|   | Percent   | 9.5  | 71.4 | 19.0 | 0.0 | 100   |  |
| Slowing cars down on all <i>sois</i>  | Frequency | 7    | 13   | 1    | 0   | 21    | <b>Positive:</b> less intimidation from traffic, pollution reduction<br><b>Negative:</b> need of through traffic               |
|   | Percent   | 33.3 | 61.9 | 4.8  | 0.0 | 100   |  |
| Personalising each <i>soi</i>   | Frequency | 3    | 18   | 0    | 0   | 21    | <b>Positive:</b> better townscape, livable place<br><b>Negative:</b> N/A   |
|   | Percent   | 14.3 | 85.7 | 0.0  | 0.0 | 100   |  |
| Areas for street selling stalls/kiosks at <i>taisois</i> (the ends of <i>sois</i> ) | Frequency | 7    | 13   | 1    | 0   | 21    | <b>Positive:</b> need of low cost services and facilities<br><b>Negative:</b> narrow street spaces                             |
|   | Percent   | 33.3 | 61.9 | 4.8  | 0.0 | 100   |  |
| Providing run-off from <i>sois</i> to Sansab canal                                  | Frequency | 0    | 4    | 16   | 1   | 21    | <b>Positive:</b> flood prevention<br><b>Negative:</b> unnecessary design when Sukhumvit was not affected by 2011 flood         |
|   | Percent   | 0.0  | 19.0 | 76.2 | 4.8 | 100   |  |
| Preserving all traditional neighbourhoods   | Frequency | 6    | 12   | 3    | 0   | 21    | <b>Positive:</b> willingness of indigenous<br><b>Negative:</b> need of landlords' development, need of more residential spaces |
|   | Percent   | 28.6 | 57.1 | 14.3 | 0.0 | 100   |  |

Key Word: Ex - Excellent / G - Good / B - Bad / T – Terrible

Note: Outstanding agreement of the design actions is highlighted in blue.  
20 percent of disagreement is highlighted in orange.

Source: Semi-structured interviews in Sukhumvit, 2012

## **Appendix J**

Sheet for Evaluating Sustainable Urban Forms, Showing both  
Literature-Based Indicators and Local Responsive Indicators

Table J1 Literature-Based Indicators and Local Responsive Indicators for Evaluating Sustainability

| Literature-Based Indicators* |  | Local Indicators**   |  |  |
|------------------------------|--|--|--|--|
|                              |  | the Superblock   | the Superblock-Quarter   | the <i>Soi</i> -Based Morphology   |
| 1                            | <p><b>Linkage between Centres of High Activities</b></p> <ul style="list-style-type: none"> <li>• Good [3]: New routes should connect into existing movement networks linking important nodes; short linked-up patterns are complementary.</li> <li>• Moderate [2]: All routes are linked as a network but there is no short linked-up patterns connecting important nodes.</li> <li>• Poor [1]: New routes are not united into existing movement networks; short linked-up patterns cannot be found between important nodes.</li> </ul> | <p><b>Linkage between Centres of High Activities</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                  | <p><b>Linkage between Centres of High Activities</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                  | <p><b>Linkage between Centres of High Activities</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                  |
| 2                            | <p><b>Linkage of Public and Private Open Space as Green Corridors</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Many public and private open spaces are soft landscape and linked as natural permeability.</li> <li>• Moderate [2]: Some public and private open spaces are soft landscape and linked as natural permeability.</li> <li>• Poor [1]: Lack of public and private green spaces.</li> </ul>   | <p><b>Linkage of Public and Private Open Space as Green Corridors</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <p><b>Linkage of Public and Private Open Space as Green Corridors</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <p><b>Linkage of Public and Private Open Space as Green Corridors</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> |
| 3                            | <p><b>Linked Green Corridors as Natural Networks</b></p> <ul style="list-style-type: none"> <li>• Good [3]: All green corridors are linked and approach major natural spaces such as park, river and canal.</li> <li>• Moderate [2]: Green corridors can be found but not linked as a network.</li> <li>• Poor [1]: Green corridors and/or major natural spaces cannot be found.</li> </ul>  | <p><b>Linked Green Corridors as Natural Networks</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                  | <p><b>Linked Green Corridors as Natural Networks</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                  | <p><b>Linked Green Corridors as Natural Networks</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                  |

|   |  |   |   |   |
|---|--|---|---|---|
| 4 | <b>Planting and Renewing Street Trees</b> <ul style="list-style-type: none"> <li>• Good [3]: Street trees are planted on most routes.</li> <li>• Moderate [2]: Streets are partially planted with trees.</li> <li>• Poor [1]: A few street trees are planted.</li> </ul>   | <b>Planting and Renewing Street Trees</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>    | <b>Planting and Renewing Street Trees</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>    | <b>Planting and Renewing Street Trees</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>    |
| 5 | <b>Reduced Hard Surfaces and Run-Off</b> <ul style="list-style-type: none"> <li>• Good [3]: land features of natural drainage such as park, river and canal are preserved and/or developed; and excess run-off is provided.</li> <li>• Moderate [2]: land features of natural drainage or excess run-off can be found in some locations.</li> <li>• Poor [1]: natural drainage and absorption and excess run-off are rarely found.</li> </ul>                          | <b>Reduced Hard Surfaces and Run-Off</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>     | <b>Reduced Hard Surfaces and Run-Off</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>     | <b>Reduced Hard Surfaces and Run-Off</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>     |
| 6 | <b>Visually Imaginable Networks of Space</b> <ul style="list-style-type: none"> <li>• Good [3]: Important routes can be seen as a visible choice of routes and destinations.</li> <li>• Moderate [2]: Important routes and destinations are partially noticed from the context.</li> <li>• Poor [1]: Visual permeability cannot be found from important routes.</li> </ul>   | <b>Visually Imaginable Networks of Space</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <b>Visually Imaginable Networks of Space</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <b>Visually Imaginable Networks of Space</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> |
| 7 | <b>Fine Grained Street and Block</b> <ul style="list-style-type: none"> <li>• Good [3]: Area with a maximum block depth at 120 m., identified by the need for pedestrian permeability.</li> <li>• Moderate [2]: Area which contains several street blocks under 120 m. depth but larger blocks are also found.</li> <li>• Poor [1]: Area where most block depths are longer than 120 m.</li> </ul> <p>(Based on Barton <i>et al.</i>, 2003; Rudlin and Falk, 1999)</p> | <b>Fine Grained Street and Block</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>         | <b>Fine Grained Street and Block</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>         | <b>Fine Grained Street and Block</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>         |

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| 8  | <p><b>Fine Grain of Land Subdivisions and Buildings</b></p> <ul style="list-style-type: none"> <li>• Good [3]: A series of small plots and a fine grain of buildings are found in most parts of the area.</li> <li>• Moderate [2]: A mix of large and small plots and of footprint buildings are found across the area.</li> <li>• Poor [1]: Many large plots and large footprints are found in most parts of the area.</li> </ul>   | <p><b>N/A</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>   | <p><b>Fine Grain of Land Subdivisions and Buildings</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <p><b>Fine Grain of Land Subdivisions and Buildings</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  |
| 9  | <p><b>Density of Built Components (FARs)</b></p> <ul style="list-style-type: none"> <li>• Good [3]: A minimum 3 FAR for town centre and/or business district and for urban containment.</li> <li>• Moderate [2]: 2.9-1.5 FARs for walkable urbanism and healthy transports.</li> <li>• Poor [1]: Under 1.5 FAR in which walkability and public transport cannot be encouraged.</li> </ul> <p>(Based on Nozzi, 2010)</p>  | <p><b>Levels of Building Density and Feel of Comfort</b></p> <ul style="list-style-type: none"> <li>• Good [3]: A minimum 3 FAR incorporated by soft landscaping open spaces found throughout urban settings.</li> <li>• Moderate [2]: 2.9-1.5 FARs and/or soft landscaping open spaces are found in some areas.</li> <li>• Poor [1]: Density is lower than 1.5 FAR and soft landscaping open spaces are rarely found.</li> </ul> | <p><b>Levels of Building Density and Feel of Comfort</b></p> <ul style="list-style-type: none"> <li>• Good [3]: 2.9-1.5 FARs incorporated by soft landscaping open spaces found throughout urban settings.</li> <li>• Moderate [2]: Although density is higher than 2.9 FAR, soft landscaping open spaces are found in many locations.</li> <li>• Poor [1]: Density is higher than 2.9 FAR and soft landscaping open spaces are rarely found.</li> </ul> | <p><b>Levels of Building Density and Feel of Comfort</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Density is under 1.5 FAR and soft landscaping can be found throughout urban settings.</li> <li>• Moderate [2]: Although density is higher than 1.5 FAR, soft landscaping open spaces are found in many locations.</li> <li>• Poor [1]: Density is higher than 1.5 FAR and soft landscaping open spaces are rarely found.</li> </ul> |
| 10 | <p><b>Active Frontages</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Well-defined access to buildings is from the public realm at ground floor level; main windows to more public rooms and lively features face public space, such as balconies, roof terraces and shop-fronts.</li> <li>• Moderate [2]: Well-defined entrances at frequent intervals may be found but lack of visual interaction defined by a few main windows and lively features facing public realm.</li> </ul> <p>(Continued)</p> | <p><b>Active Frontages</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <p><b>Active Frontages</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <p><b>N/A</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>   |

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|    | (Continued)<br><ul style="list-style-type: none"> <li>• Poor [1]: Most buildings face public space with deadening elements such as long runs of blank wall.</li> </ul>  |   |   |   |
| 11 | <b>Mixed Building Types, Ages and Tenures</b><br><ul style="list-style-type: none"> <li>• Good [3]: A wide range of building types and ages are mixed across the area; this in turn identifies mixed tenures of the place.</li> <li>• Moderate [2]: The new development of building groups and spaces accumulates as distinctive parts of the area.</li> <li>• Poor [1]: A similarity of building types and ages is found across the area.</li> </ul>   | N/A<br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>                                    | <b>Mixed Building Types, Ages and Tenures</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>         | <b>Mixed Building Types, Ages and Tenures</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>         |
| 12 | <b>Visually Interesting Buildings</b><br><ul style="list-style-type: none"> <li>• Good [3]: Civic and community buildings, memorable buildings and landscape features are located around key public realm and focal points.</li> <li>• Moderate [2]: Some parts of public realm and focal points are concentrated by interesting building groups or landscape features.</li> <li>• Poor [1]: A similarity of buildings and landscape features discourages the distinctiveness of the key public realm.</li> </ul> | <b>Visually Interesting Buildings</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <b>Visually Interesting Buildings</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                 | <b>Visually Interesting Buildings</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                 |
| 13 | <b>Locally Distinctive Building Groups and Spaces</b><br><ul style="list-style-type: none"> <li>• Good [3]: Expressing local distinctiveness, historic or townscape merit, the buildings and spaces, boundary treatments and building lines are preserved.</li> <li>• Moderate [2]: New building groups and spaces overlay traditional townscape in spite of remaining in some areas.</li> </ul> (Continued)  | N/A<br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>                                    | <b>Locally Distinctive Building Groups and Spaces</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <b>Locally Distinctive Building Groups and Spaces</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> |

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|    | (Continued)<br><ul style="list-style-type: none"> <li>• Poor [1]: Traditional buildings and spaces, boundary treatments and building lines cannot be found.</li> </ul>   |  |   |   |
| 14 | <b>Density of Population (Net Density)</b> <ul style="list-style-type: none"> <li>• Good [3]: 494-275 Persons/ha; a maximum 494 is suggested by URBED and 275 is proposed for sustainable urban density by Friends of the Earth.</li> <li>• Moderate [2]: 274-240 Persons/ha - a minimum density for a tram service.</li> <li>• Poor [1]: Under 240 or over 494 Persons/ha. (Based on Carmona <i>et al.</i>, 2003; Rudlin and Falk, 1999)</li> </ul> | <b>Levels of Population Density and Control over Public Realm</b> <ul style="list-style-type: none"> <li>• Good [3]: 494-275 Persons/ha and effective walkability is encouraged across streetscape without barriers of physical permeability.</li> <li>• Moderate [2]: 274-240 Persons/ha and/or narrow pavements and other barriers of walkability are found.</li> <li>• Poor [1]: Under 240 or over 494 Persons/ha and a series of barriers of walkability are found in many locations.</li> </ul> | <b>Levels of Population Density and Control over Public Realm</b> <ul style="list-style-type: none"> <li>• Good [3]: 274-216 Persons/ha and effective walkability is encouraged across streetscape without barriers of physical permeability.</li> <li>• Moderate [2]: Although density is higher than 274 Persons/ha, effective walkability is encouraged across streetscape without barriers of physical permeability.</li> <li>• Poor [1]: Density is higher than 274 Persons/ha and a series of barriers of walkability are found in many locations.</li> </ul> | <b>Levels of Population Density and Control over Public Realm</b> <ul style="list-style-type: none"> <li>• Good [3]: Current Sukhumvit density (216 Persons/ha) is retained and effective walkability is encouraged across streetscape without barriers of physical permeability.</li> <li>• Moderate [2]: Although density is higher than 216 Persons/ha, effective walkability is encouraged across streetscape without barriers of physical permeability.</li> <li>• Poor [1]: Density is higher than 216 Persons/ha and a series of barriers of walkability are found in many locations.</li> </ul> |
| 15 | <b>Mixed Communities</b> <ul style="list-style-type: none"> <li>• Good [3]: A wide range of land utilization and residences are found within a district.</li> <li>• Moderate [2]: A wide range of land utilization and residences is found in a few parts of a district.</li> <li>• Poor [1]: The homogeneity of land use and residences is found throughout a district.</li> </ul>  | <b>Mixed Communities</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <b>Mixed Communities</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <b>Mixed Communities</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   |
| 16 | <b>Viable Range of Uses and Facilities</b> <ul style="list-style-type: none"> <li>• Good [3]: Mixed use area containing: nurseries, local shops, and bus stops within 400m.; primary schools, health centres, local centres, local parks, and light rail stops within 800m.; and, large secondary schools, (Continued)</li> </ul>  | <b>Viable Range of Uses and Facilities</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <b>Viable Range of Uses and Facilities</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <b>Viable Range of Uses and Facilities</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   |

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|    | <p>(Continued)<br/>natural green spaces, district centres within 1,200 m., for instance.</p> <ul style="list-style-type: none"> <li>• Moderate [2]: Area where residential areas are mixed with local shops, local centres or district centres but lack of facilities within appropriate distances to access.</li> <li>• Poor [1]: Area where everyday uses and facilities are separately zoned from each other.</li> </ul> <p>(Based on Barton <i>et al.</i>, 2003)</p>  |  |  |  |
| 17 | <p><b>Employment and Economic Activities</b></p> <ul style="list-style-type: none"> <li>• Good [3]: A wide range of economic exchanges, enterprises and customers is defined by high levels of pedestrian flow. Fine grained street blocks (a maximum 120m. depth) and high population density (494-275 Persons/ha) are fundamental.</li> <li>• Moderate [2]: Limited economic exchanges are found, identified by a mix of coarse and fine grain of street blocks and medium population density (274-240 Persons/ha).</li> <li>• Poor [1]: A few economic exchanges, enterprises and customers, defined by coarse grained street blocks and low population density (under 240 Persons/ha).</li> </ul> | <p><b>Employment and Economic Activities</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <p><b>Employment and Economic Activities</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <p>N/A</p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>   |
| 18 | <p><b>Public Transport Infrastructure</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Area with a 400 m. standard for bus stops and an 800 m. standard for metros.</li> <li>• Moderate [2]: Area with a 400 m. standard for bus stops.</li> <li>• Poor [1]: Area where people cannot access bus stops within 400 m.</li> </ul> <p>(Based on Barton <i>et al.</i>, 2003)</p>  | <p><b>Public Transport and Specific Distances to Access</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Area with a 300 m. standard for bus stops and a 800 m. standard for metros.</li> <li>• Moderate [2]: Area with a 300 m. standard for bus stops.</li> <li>• Poor [1]: Area where people cannot access bus stops within 300 m.</li> </ul> | <p><b>Public Transport and Specific Distances to Access</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Area with a 300 m. standard for bus stops and a 800 m. standard for metros.</li> <li>• Moderate [2]: Area with a 300 m. standard for bus stops.</li> <li>• Poor [1]: Area where people cannot access bus stops within 300 m.</li> </ul> | <p><b>Public Transport and Specific Distances to Access</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Area with a 300 m. standard for bus stops and a 800 m. standard for metros.</li> <li>• Moderate [2]: Area with a 300 m. standard for bus stops.</li> <li>• Poor [1]: Area where people cannot access bus stops within 300 m.</li> </ul> |

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| 19 | <p><b>Layout of Transport Stations as an Integral Part of the Street</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Public transport stations are designed as an integral part of all routes, which are easy to use and available to as many people as possible.</li> <li>• Moderate [2]: Public transport stations are found along the public realm, but not all routes.</li> <li>• Poor [1]: Transport stations are located on a few routes.</li> </ul> | <p><b>Layout of Transport Stations as an Integral Part of the Street</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <p><b>Layout of Transport Stations as an Integral Part of the Street</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <p><b>Layout of Transport Stations as an Integral Part of the Street</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  |
| 20 | <p><b>Multi-Modes of Movement</b></p> <ul style="list-style-type: none"> <li>• Good [3]: A variety of transport options such as metros, buses, private motorized transport, walking and cycling can be found.</li> <li>• Moderate [2]: Several transport choices are found despite lack of some options.</li> <li>• Poor [1]: People have few transportations in the place.</li> </ul>  | <p><b>Multi-Modes of Movement</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <p><b>Multi-Modes of Movement</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <p><b>Modes of Movement and Small-Scale Public Transport</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Small-scale public transport, private motorized transport, walking and cycling can be found.</li> <li>• Moderate [2]: transport choices are found despite lack of some options.</li> <li>• Poor [1]: People have few transportations in the place.</li> </ul>  |
| 21 | <p><b>Walking and Cycling Priority</b></p> <ul style="list-style-type: none"> <li>• Good [3]: All streets are designed to prevent intimidation from traffic.</li> <li>• Moderate [2]: Streets are designed to prevent intimidation from traffic in some areas.</li> <li>• Poor [1]: Walking and cycling are intimidated and impeded by traffic, on most routes.</li> </ul>  | <p><b>Walking and Cycling Encouraged by Greenery</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Greenery and shade are prioritized in encouraging walkability, together with preventing intimidation from traffic.</li> <li>• Moderate [2]: Design for greenery, shade and prevent intimidation from traffic are developed in some locations.</li> <li>• Poor [1]: An attachment of greenery and shade is rarely found and walking is intimidated by traffic.</li> </ul> | <p><b>Walking and Cycling Encouraged by Greenery</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Greenery and shade are prioritized in encouraging walking and cycling, together with preventing intimidation from traffic.</li> <li>• Moderate [2]: Design for greenery, shade and prevent intimidation from traffic are developed in some locations.</li> <li>• Poor [1]: An attachment of greenery and shade is rarely found and walking and cycling is intimidated by traffic.</li> </ul> | <p><b>Walking and Cycling Encouraged by Greenery</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Greenery and shade are prioritized in encouraging walking and cycling, together with preventing intimidation from traffic.</li> <li>• Moderate [2]: Design for greenery, shade and prevent intimidation from traffic are developed in some locations.</li> <li>• Poor [1]: An attachment of greenery and shade is rarely found and walking and cycling is intimidated by traffic.</li> </ul> |

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| 22 | <p><b>Restricted Vehicle Circulation and Speeds</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Comprising local street, distributor street and arterial road within downtown, streets are designed to discourage speeding traffic and its circulation.</li> <li>• Moderate [2]: Speeding traffic and its circulation are discouraged by design in some streets.</li> <li>• Poor [1]: There is no restrictions on vehicle circulation and speeds.</li> </ul>   | <p><b>N/A</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>                                  | <p><b>Restricted Vehicle Circulation and Speeds</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <p><b>Restricted Vehicle Circulation and Speeds</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> |
| 23 | <p><b>Well-Ventilated Spaces</b></p> <ul style="list-style-type: none"> <li>• Good [3]: There are no high long structures, of the same height, perpendicular to the airflow direction and/or no high-rise buildings located along with lower buildings behind.</li> <li>• Moderate [2] High long structures perpendicular to the airflow direction and/or a mix of high- and low-rise buildings are found in some areas.</li> <li>• Poor [1]: Natural ventilation is obviously impeded, defined by a series of high long structures and/or by high- and low-rise buildings broadly located together.</li> </ul> | <p><b>Well-Ventilated Spaces</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>              | <p><b>Well-Ventilated Spaces</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                    | <p><b>Well-Ventilated Spaces</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>                    |
| 24 | <p><b>Greenery Display and Soft Landscape</b></p> <ul style="list-style-type: none"> <li>• Good [3]: Greenery display and soft landscape can be normally found in building settings and spaces.</li> <li>• Moderate [2]: Greenery display and soft landscape can be found in some areas.</li> <li>• Poor [1]: Greenery display and soft landscape are rarely found.</li> </ul>  | <p><b>Greenery Display and Soft Landscape</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul> | <p><b>Greenery Display and Soft Landscape</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>       | <p><b>Greenery Display and Soft Landscape</b></p> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>       |

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| 25 | <b>Gradual Change of Spatial Configuration</b> <ul style="list-style-type: none"> <li>• Good [3]: Locally distinctive building groups and spaces are retained.</li> <li>• Moderate [2]: New building groups and spaces are mixed into locally distinctive configuration.</li> <li>• Poor [1]: Locally distinctive building groups and spaces are replaced by new development in many areas.</li> </ul>                   | <b>N/A</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>   | <b>Gradual Change of Spatial Configuration</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <b>Gradual Change of Spatial Configuration</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  |
| 26 | <b>Legible Settlement through Active Use</b> <ul style="list-style-type: none"> <li>• Good [3]: Concentration of most active uses is found on prime permeable channels.</li> <li>• Moderate [2]: Intensity of most active uses is found on some parts of prime permeable channels.</li> <li>• Poor [1]: Lack of activity concentration along prime permeable channels.</li> </ul>  | <b>Legible Settlement through Active Uses</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <b>Legible Settlement through Active Uses</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <b>Legible Settlement through Active Uses</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   |
| 27 | <b>Legibility through Landmark and Space Disposition</b> <ul style="list-style-type: none"> <li>• Good [3]: Landmarks, gateways, focal points and distinctive spaces can be found in the important nodes.</li> <li>• Moderate [2]: Landmarks, gateways, focal points and distinctive spaces can be found in some nodes.</li> <li>• Poor [1]: Lack of landmarks, gateways, focal points or distinctive spaces.</li> </ul> | <b>Legibility through Landmark and Space Disposition</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <b>Legibility through Landmark and Space Disposition</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <b>Legibility through Landmark and Space Disposition</b> <ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  |
| 28 | <b>Positive Identity and Landscape Character</b> <ul style="list-style-type: none"> <li>• Good [3]: Distinctive patterns of development, landscape and culture are retained; as well, the continuity of scale, massing and height of new development to adjacent traditional built forms is found (Continued)</li> </ul>   | <b>Positive Identity Defined by Locally Responsive Climate and Ecology</b> <ul style="list-style-type: none"> <li>• Good [3]: Despite changes, townscape includes natural features as an integral part of urban settings. (Continued)</li> </ul> | <b>Positive Identity Defined by Locally Responsive Climate and Ecology</b> <ul style="list-style-type: none"> <li>• Good [3]: Natural features are sustained and encouraged as an integral part of traditional townscape. (Continued)</li> </ul> | <b>Positive Identity Defined by Locally Responsive Climate and Ecology</b> <ul style="list-style-type: none"> <li>• Good [3]: Natural features are sustained and encouraged as an integral part of traditional townscape. (Continued)</li> </ul> |

|    |   |   |  |  |
|----|---|---|--|--|
|    | (Continued)<br><ul style="list-style-type: none"> <li>• Moderate [2]: Despite being retained in some areas, the inconsistency between new development and historic patterns of landscape and site characteristics are observed.</li> <li>• Poor [1]: New patterns of development have replaced the distinctive historic patterns of settlement.</li> </ul>  | (Continued)<br><ul style="list-style-type: none"> <li>• Moderate [2]: Despite being found in some areas, natural features are not developed as an integral part of modern townscape of the superblock.</li> <li>• Poor [1]: Lack of natural features in townscape.</li> </ul> | (Continued)<br><ul style="list-style-type: none"> <li>• Moderate [2]: Despite being found in some areas, natural features are not integrated into historic patterns of townscape.</li> <li>• Poor [1]: Lack of natural features in building groups and spaces and historic patterns of landscape are replaced by new development.</li> </ul> | (Continued)<br><ul style="list-style-type: none"> <li>• Moderate [2]: Despite being found in some areas, natural features are not integrated into historic patterns of townscape.</li> <li>• Poor [1]: Lack of natural features in building groups and spaces and historic patterns of landscape are replaced by new development.</li> </ul> |
| 29 | <b>Preserving Significant Public Realm</b><br><ul style="list-style-type: none"> <li>• Good [3]: Contributing to the identity of the place, configuration and elements of prime permeable channels and spaces are preserved.</li> <li>• Moderate [2]: Despite being retained, traditional public realm and permeable channels are affected by new connectivity.</li> <li>• Poor [1]: Traditional prime permeable channels and spaces are superimposed by new movement network.</li> </ul> | N/A<br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>  | N/A<br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is omitted.</i></li> </ul>   | <b>Preserving Significant Public Realm</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   |
| 30 | <b>Personalisation of Communities</b><br><ul style="list-style-type: none"> <li>• Good [3]: Uniqueness and dominance of communities are promoted by socio-spatial patterns including distinctive activities, landscape and building traditions which can be distinguished from one another.</li> <li>• Moderate [2]: Distinctive characteristics of communities can be noticed in some areas.</li> <li>• Poor [1]: Communities cannot be distinguished from one another.</li> </ul>       | <b>Personalisation of Communities</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>   | <b>Personalisation of Communities</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  | <b>Personalisation of Communities</b><br><ul style="list-style-type: none"> <li>• <i>The literature-based indicator is retained.</i></li> </ul>  |

\* Literature-based indicators are developed in CH1, based on: Barton *et al.*, 2003; BCC, 2001; Bentley *et al.*, 1985; Bentley, 1999; Butina Watson and Bentley, 2007; Carmona *et al.*, 2003; Cooper, 2000; DETR, 2000; Givoni, 2003; Haughton and Hunter, 1994; Nozzi, 2010; RUDI, 2009; Rudin and Falk, 1999; SUN, 1996, 1998a; UDAL, 2000; and completed by author.

\*\* Local indicators are modified with respect to perception-based data (CH7).

N/A When participants did not recognize the importance of an urban feature, the local indicators were not applied (CH7).

Note: Local indicators modified from literature-based indicators are highlighted in blue.

## Appendix K

### Evaluation of Sukhumvit's Urban Forms by Using Literature-Based Indicators

Table K1 Sustainability Evaluation of Resource Efficiency

| Literature-Based Indicators* |  | Sustainability Scores** |                    |      |
|------------------------------|--|-------------------------|--------------------|------|
|                              |  | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Public Transport Infrastructure            | 3                       | 1                  | 1    |
| 2                            | Walking and Cycling Priority               | 1                       | 1                  | 1    |
| 3                            | Restricted Vehicle Circulation and Speeds  | 1                       | 1                  | 1    |
| 4                            | Linkage between Centres of High Activities | 3                       | 3                  | 2    |
| 5                            | Fine Grained Street and Block              | 2                       | 2                  | 1    |
| 6                            | Density of Built Components (FARs)         | 3                       | 2                  | 1    |
| 7                            | Density of Population (Net Density)        | 1                       | 1                  | 1    |
| 8                            | Viable Range of Uses and Facilities        | 3                       | 2                  | 1    |
| 9                            | Employment and Economic Activities         | 2                       | 2                  | 1    |
| 10                           | Well-Ventilated Spaces                     | 1                       | 2                  | 3    |
| Average Score                |  | 2.00                    | 1.70               | 1.30 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

Table K2 Sustainability Evaluation of Biotic Support

| Literature-Based Indicators* |   | Sustainability Scores** |                    |      |
|------------------------------|---|-------------------------|--------------------|------|
|                              |   | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Public Transport Infrastructure                             | 3                       | 1                  | 1    |
| 2                            | Linkage of Public and Private Open Space as Green Corridors | 1                       | 1                  | 1    |
| 3                            | Linked Green Corridors as Natural Networks                  | 1                       | 1                  | 1    |
| 4                            | Planting and Renewing Street Trees                          | 2                       | 1                  | 1    |
| 5                            | Density of Population (Net Density)                         | 1                       | 1                  | 1    |
| 6                            | Well-Ventilated Spaces                                      | 1                       | 2                  | 3    |
| 7                            | Greenery Display and Soft Landscape                         | 1                       | 1                  | 2    |
| Average Score                |   | 1.42                    | 1.14               | 1.42 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

Table K3 Sustainability Evaluation of Cleanliness

| Literature-Based Indicators* |   | Sustainability Scores** |                    |      |
|------------------------------|---|-------------------------|--------------------|------|
|                              |   | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Public Transport Infrastructure           | 3                       | 1                  | 1    |
| 2                            | Walking and Cycling Priority              | 1                       | 1                  | 1    |
| 3                            | Restricted Vehicle Circulation and Speeds | 1                       | 1                  | 1    |
| 4                            | Planting and Renewing Street Trees        | 2                       | 1                  | 1    |
| 5                            | Reduced Hard Surfaces and Run-Off         | 1                       | 1                  | 2    |
| 6                            | Fine Grained Street and Block             | 2                       | 2                  | 1    |
| 7                            | Well-Ventilated Spaces                    | 1                       | 2                  | 3    |
| Average Score                |   | 1.57                    | 1.28               | 1.42 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

Table K4 Sustainability Evaluation of Resilience

| Literature-Based Indicators* |   | Sustainability Scores** |                    |      |
|------------------------------|---|-------------------------|--------------------|------|
|                              |   | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Multi-Modes of Movement                       | 3                       | 1                  | 1    |
| 2                            | Fine Grained Street and Block                 | 2                       | 2                  | 1    |
| 3                            | Fine Grain of Land Subdivisions and Buildings | 1                       | 2                  | 3    |
| 4                            | Mixed Building Types, Ages and Tenures        | 2                       | 3                  | 3    |
| 5                            | Viable Range of Uses and Facilities           | 3                       | 2                  | 1    |
| 6                            | Employment and Economic Activities            | 2                       | 2                  | 1    |
| 7                            | Gradual Change of Spatial Configuration       | 1                       | 2                  | 3    |
| Average Score                |   | 2.00                    | 2.00               | 1.85 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

Table K5 Sustainability Evaluation of Variety

| Literature-Based Indicators* |   | Sustainability Scores** |                    |      |
|------------------------------|---|-------------------------|--------------------|------|
|                              |   | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Multi-Modes of Movement                       | 3                       | 1                  | 1    |
| 2                            | Fine Grained Street and Block                 | 2                       | 2                  | 1    |
| 3                            | Fine Grain of Land Subdivisions and Buildings | 1                       | 2                  | 3    |
| 4                            | Active Frontages                              | 2                       | 2                  | 2    |
| 5                            | Mixed Building Types, Ages and Tenures        | 2                       | 3                  | 3    |
| 6                            | Mixed Communities                             | 2                       | 3                  | 3    |
| 7                            | Viable Range of Uses and Facilities           | 3                       | 2                  | 1    |
| 8                            | Employment and Economic Activities            | 2                       | 2                  | 1    |
| Average Score                |   | 2.12                    | 2.12               | 1.87 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

Table K6 Sustainability Evaluation of Accessibility

| Literature-Based Indicators* |  | Sustainability Scores** |                    |      |
|------------------------------|--|-------------------------|--------------------|------|
|                              |  | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Layout of Transport Stations as an Integral Part of the Street | 3                       | 1                  | 1    |
| 2                            | Multi-Modes of Movement  | 3                       | 1                  | 1    |
| 3                            | Linkage between Centres of High Activities                     | 3                       | 3                  | 2    |
| 4                            | Fine Grained Street and Block                                  | 2                       | 2                  | 1    |
| 5                            | Fine Grain of Land Subdivisions and Buildings                  | 1                       | 2                  | 3    |
| 6                            | Viable Range of Uses and Facilities                            | 3                       | 2                  | 1    |
| Average Score                |  | 2.50                    | 1.83               | 1.50 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

Table K7 Sustainability Evaluation of Legibility

| Literature-Based Indicators* |   | Sustainability Scores** |                    |      |
|------------------------------|---|-------------------------|--------------------|------|
|                              |   | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Visually Imaginable Networks of Space             | 3                       | 1                  | 1    |
| 2                            | Visually Interesting Buildings                    | 2                       | 2                  | 1    |
| 3                            | Legible Settlement through Active Use             | 3                       | 3                  | 2    |
| 4                            | Legibility through Landmark and Space Disposition | 3                       | 2                  | 1    |
| Average Score                |   | 2.75                    | 2.00               | 1.25 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

Table K8 Sustainability Evaluation of Identity

| Literature-Based Indicators* |  | Sustainability Scores** |                    |      |
|------------------------------|--|-------------------------|--------------------|------|
|                              |  | Superblock              | Superblock-Quarter | Soi  |
| 1                            | Locally Distinctive Building Groups and Spaces | 2                       | 2                  | 3    |
| 2                            | Positive Identity and Landscape Character      | 1                       | 2                  | 3    |
| 3                            | Preserving Significant Public Realm            | 3                       | 1                  | 2    |
| 4                            | Personalisation of Communities                 | 3                       | 3                  | 2    |
|                              |  | 2.25                    | 2.00               | 2.50 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH6.

## Appendix L

### Perceptual Evaluation of Sukhumvit's Urban Forms by Using Local Indicators

Table L1 Perceptual Evaluation of Resource Efficiency

| Local Indicators* |  | Sustainability Scores** |                    |      |
|-------------------|--|-------------------------|--------------------|------|
|                   |  | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Public Transport and Specific Distances to Access          | 3                       | 1                  | 1    |
| 2                 | Walking and Cycling Encouraged by Greenery                 | 1                       | 1                  | 1    |
| 3                 | Restricted Vehicle Circulation and Speeds                  | -                       | 1                  | 1    |
| 4                 | Linkage between Centres of High Activities                 | 3                       | 3                  | 2    |
| 5                 | Fine Grained Street and Block                              | 2                       | 2                  | 1    |
| 6                 | Levels of Building Density and Feel of Comfort             | 1                       | 1                  | 2    |
| 7                 | Levels of Population Density and Control over Public Realm | 1                       | 1                  | 2    |
| 8                 | Viable Range of Uses and Facilities                        | 3                       | 2                  | 1    |
| 9                 | Employment and Economic Activities                         | 2                       | 2                  | -    |
| 10                | Well-Ventilated Spaces                                     | 1                       | 2                  | 3    |
| Average Score     |  | 1.88                    | 1.60               | 1.55 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

- The indicators are not applied in the evaluation.

Table L2 Perceptual Evaluation of Biotic Support

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Public Transport and Specific Distances to Access           | 3                       | 1                  | 1    |
| 2                 | Linkage of Public and Private Open Space as Green Corridors | 1                       | 1                  | 1    |
| 3                 | Linked Green Corridors as Natural Networks                  | 1                       | 1                  | 1    |
| 4                 | Planting and Renewing Street Trees                          | 2                       | 1                  | 1    |
| 5                 | Levels of Population Density and Control over Public Realm  | 1                       | 1                  | 2    |
| 6                 | Well-Ventilated Spaces                                      | 1                       | 2                  | 3    |
| 7                 | Greenery Display and Soft Landscape                         | 1                       | 1                  | 2    |
| Average Score     |   | 1.42                    | 1.14               | 1.57 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

- The indicators are not applied in the evaluation.

Table L3 Perceptual Evaluation of Cleanliness

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Public Transport and Specific Distances to Access | 3                       | 1                  | 1    |
| 2                 | Walking and Cycling Encouraged by Greenery        | 1                       | 1                  | 1    |
| 3                 | Restricted Vehicle Circulation and Speeds         | -                       | 1                  | 1    |
| 4                 | Planting and Renewing Street Trees                | 2                       | 1                  | 1    |
| 5                 | Reduced Hard Surfaces and Run-Off                 | 1                       | 1                  | 2    |
| 6                 | Fine Grained Street and Block                     | 2                       | 2                  | 1    |
| 7                 | Well-Ventilated Spaces                            | 1                       | 2                  | 3    |
| Average Score     |   | 1.66                    | 1.28               | 1.42 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

- The indicators are not applied in the evaluation.

Table L4 Perceptual Evaluation of Resilience

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Multi-Modes of Movement                       | 3                       | 1                  | 1    |
| 2                 | Fine Grained Street and Block                 | 2                       | 2                  | 1    |
| 3                 | Fine Grain of Land Subdivisions and Buildings | -                       | 2                  | 3    |
| 4                 | Mixed Building Types, Ages and Tenures        | -                       | 3                  | 3    |
| 5                 | Viable Range of Uses and Facilities           | 3                       | 2                  | 1    |
| 6                 | Employment and Economic Activities            | 2                       | 2                  | -    |
| 7                 | Gradual Change of Spatial Configuration       | -                       | 2                  | 3    |
| Average Score     |   | 2.50                    | 2.00               | 2.00 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

- The indicators are not applied in the evaluation.

Table L5 Perceptual Evaluation of Variety

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Multi-Modes of Movement                       | 3                       | 1                  | 1    |
| 2                 | Fine Grained Street and Block                 | 2                       | 2                  | 1    |
| 3                 | Fine Grain of Land Subdivisions and Buildings | -                       | 2                  | 3    |
| 4                 | Active Frontages                              | 2                       | 2                  | -    |
| 5                 | Mixed Building Types, Ages and Tenures        | -                       | 3                  | 3    |
| 6                 | Mixed Communities                             | 2                       | 3                  | 3    |
| 7                 | Viable Range of Uses and Facilities           | 3                       | 2                  | 1    |
| 8                 | Employment and Economic Activities            | 2                       | 2                  | -    |
| Average Score     |   | 2.33                    | 2.12               | 2.00 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

- The indicators are not applied in the evaluation.

Table L6 Perceptual Evaluation of Accessibility

| Local Indicators* |  | Sustainability Scores** |                    |      |
|-------------------|--|-------------------------|--------------------|------|
|                   |  | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Layout of Transport Stations as an Integral Part of the Street | 3                       | 1                  | 1    |
| 2                 | Multi-Modes of Movement  | 3                       | 1                  | 1    |
| 3                 | Linkage between Centres of High Activities                     | 3                       | 3                  | 2    |
| 4                 | Fine Grained Street and Block                                  | 2                       | 2                  | 1    |
| 5                 | Fine Grain of Land Subdivisions and Buildings                  | -                       | 2                  | 3    |
| 6                 | Viable Range of Uses and Facilities                            | 3                       | 2                  | 1    |
| Average Score     |  | 2.80                    | 1.83               | 1.50 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

- The indicators are not applied in the evaluation.

Table L7 Perceptual Evaluation of Legibility

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Visually Imaginable Networks of Space             | 3                       | 1                  | 1    |
| 2                 | Visually Interesting Buildings                    | 2                       | 2                  | 1    |
| 3                 | Legible Settlement through Active Use             | 3                       | 3                  | 2    |
| 4                 | Legibility through Landmark and Space Disposition | 3                       | 2                  | 1    |
| Average Score     |   | 2.75                    | 2.00               | 1.25 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

Table L8 Perceptual Evaluation of Identity

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Locally Distinctive Building Groups and Spaces                      | -                       | 2                  | 3    |
| 2                 | Positive Identity Defined by Locally Responsive Climate and Ecology | 1                       | 1                  | 2    |
| 3                 | Preserving Significant Public Realm                                 | -                       | -                  | 2    |
| 4                 | Personalisation of Communities                                      | 3                       | 3                  | 2    |
| Average Score     |   | 2.00                    | 2.00               | 2.25 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are evaluated for Sukhumvit's urban forms in CH7.

- The indicators are not applied in the evaluation.

## Appendix M

### Perceptual Evaluation of Sukhumvit's Locally Acceptable Sustainable Urban Form by Using Local Indicators

Table M1 Perceptual Evaluation of Resource Efficiency

| Local Indicators* |  | Sustainability Scores** |                    |      |
|-------------------|--|-------------------------|--------------------|------|
|                   |  | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Public Transport and Specific Distances to Access          | 3                       | 1                  | 1    |
| 2                 | Walking and Cycling Encouraged by Greenery                 | 2                       | 2                  | 2    |
| 3                 | Restricted Vehicle Circulation and Speeds                  | -                       | 2                  | 2    |
| 4                 | Linkage between Centres of High Activities                 | 3                       | 3                  | 2    |
| 5                 | Fine Grained Street and Block                              | 2                       | 2                  | 1    |
| 6                 | Levels of Building Density and Feel of Comfort             | 2                       | 2                  | 2    |
| 7                 | Levels of Population Density and Control over Public Realm | 3                       | 2                  | 2    |
| 8                 | Viable Range of Uses and Facilities                        | 3                       | 3                  | 3    |
| 9                 | Employment and Economic Activities                         | 3                       | 3                  | -    |
| 10                | Well-Ventilated Spaces                                     | 2                       | 1                  | 3    |
| Average Score     |  | 2.55                    | 2.10               | 2.00 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

- The indicators are not applied in the evaluation.

Table M2 Perceptual Evaluation of Biotic Support

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Public Transport and Specific Distances to Access           | 3                       | 1                  | 1    |
| 2                 | Linkage of Public and Private Open Space as Green Corridors | 3                       | 2                  | 2    |
| 3                 | Linked Green Corridors as Natural Networks                  | 2                       | 2                  | 2    |
| 4                 | Planting and Renewing Street Trees                          | 3                       | 2                  | 2    |
| 5                 | Levels of Population Density and Control over Public Realm  | 3                       | 2                  | 2    |
| 6                 | Well-Ventilated Spaces                                      | 2                       | 1                  | 3    |
| 7                 | Greenery Display and Soft Landscape                         | 2                       | 2                  | 3    |
| Average Score     |   | 2.57                    | 1.71               | 2.14 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

- The indicators are not applied in the evaluation.

Table M3 Perceptual Evaluation of Cleanliness

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Public Transport and Specific Distances to Access | 3                       | 1                  | 1    |
| 2                 | Walking and Cycling Encouraged by Greenery        | 2                       | 2                  | 2    |
| 3                 | Restricted Vehicle Circulation and Speeds         | -                       | 2                  | 2    |
| 4                 | Planting and Renewing Street Trees                | 3                       | 2                  | 2    |
| 5                 | Reduced Hard Surfaces and Run-Off                 | 2                       | 2                  | 2    |
| 6                 | Fine Grained Street and Block                     | 2                       | 2                  | 1    |
| 7                 | Well-Ventilated Spaces                            | 2                       | 1                  | 3    |
| Average Score     |   | 2.33                    | 1.71               | 1.85 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

- The indicators are not applied in the evaluation.

Table M4 Perceptual Evaluation of Resilience

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Multi-Modes of Movement                       | 3                       | 1                  | 1    |
| 2                 | Fine Grained Street and Block                 | 2                       | 2                  | 1    |
| 3                 | Fine Grain of Land Subdivisions and Buildings | -                       | 1                  | 3    |
| 4                 | Mixed Building Types, Ages and Tenures        | -                       | 2                  | 3    |
| 5                 | Viable Range of Uses and Facilities           | 3                       | 3                  | 3    |
| 6                 | Employment and Economic Activities            | 3                       | 3                  | -    |
| 7                 | Gradual Change of Spatial Configuration       | -                       | 1                  | 3    |
| Average Score     |   | 2.75                    | 1.85               | 2.33 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

- The indicators are not applied in the evaluation.

Table M5 Perceptual Evaluation of Variety

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Multi-Modes of Movement                       | 3                       | 1                  | 1    |
| 2                 | Fine Grained Street and Block                 | 2                       | 2                  | 1    |
| 3                 | Fine Grain of Land Subdivisions and Buildings | -                       | 1                  | 3    |
| 4                 | Active Frontages                              | 1                       | 1                  | -    |
| 5                 | Mixed Building Types, Ages and Tenures        | -                       | 2                  | 3    |
| 6                 | Mixed Communities                             | 3                       | 3                  | 3    |
| 7                 | Viable Range of Uses and Facilities           | 3                       | 3                  | 3    |
| 8                 | Employment and Economic Activities            | 3                       | 3                  | -    |
| Average Score     |   | 2.50                    | 2.00               | 2.33 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

- The indicators are not applied in the evaluation.

Table M6 Perceptual Evaluation of Accessibility

| Local Indicators* |  | Sustainability Scores** |                    |      |
|-------------------|--|-------------------------|--------------------|------|
|                   |  | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Layout of Transport Stations as an Integral Part of the Street | 3                       | 1                  | -    |
| 2                 | Multi-Modes of Movement  | 3                       | 1                  | 1    |
| 3                 | Linkage between Centres of High Activities                     | 3                       | 3                  | 2    |
| 4                 | Fine Grained Street and Block                                  | 2                       | 2                  | 1    |
| 5                 | Fine Grain of Land Subdivisions and Buildings                  | -                       | 1                  | 3    |
| 6                 | Viable Range of Uses and Facilities                            | 3                       | 3                  | 3    |
| Average Score     |  | 2.80                    | 1.83               | 2.00 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

- The indicators are not applied in the evaluation.

Table M7 Perceptual Evaluation of Legibility

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Visually Imaginable Networks of Space             | 3                       | 2                  | 1    |
| 2                 | Visually Interesting Buildings                    | 3                       | 3                  | 1    |
| 3                 | Legible Settlement through Active Use             | 3                       | 3                  | 2    |
| 4                 | Legibility through Landmark and Space Disposition | 3                       | 3                  | 1    |
| Average Score     |   | 3.00                    | 2.75               | 1.25 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

Table M8 Perceptual Evaluation of Identity

| Local Indicators* |   | Sustainability Scores** |                    |      |
|-------------------|---|-------------------------|--------------------|------|
|                   |   | Superblock              | Superblock-Quarter | Soi  |
| 1                 | Locally Distinctive Building Groups and Spaces                      | -                       | 1                  | 3    |
| 2                 | Positive Identity Defined by Locally Responsive Climate and Ecology | 3                       | 2                  | 2    |
| 3                 | Preserving Significant Public Realm                                 | -                       | -                  | 2    |
| 4                 | Personalisation of Communities                                      | 3                       | 2                  | 2    |
| Average Score     |   | 3.00                    | 1.66               | 2.25 |

\* Presented as a work sheet in Appendix J.

\*\* Sustainability scores are assessed for Sukhumvit's future form-modifications in CH8.

- The indicators are not applied in the evaluation.