

**Livable Street In Urban Environment: An Adaptive Design Approach**<sup>1</sup>Alireza Bandarabad, <sup>2</sup>Azadeh Shahcheraghi<sup>1</sup>Assistant Professor, Department of Urban Planning, Islamic Azad University, Central Tehran Branch, Tehran, Iran<sup>2</sup>Assistant Professor, Department of Architecture, Islamic Azad University, Science and Research Branch, Tehran, Iran

Alireza Bandarabad, Azadeh Shahcheraghi: Livable Street In Urban Environment: An Adaptive Design Approach

**ABSTRACT**

To implement the concept of livability in a city, it is necessary to find the urban design options and qualities. In a small scale of urban design, the concept of livable street design should be developed. Because of the linkage between sustainability and livability concepts, the idea of sustainable urban street design has been identified as a base of an adaptive approach to find the livable aspects and the design options. In this paper the key definitions of livability and livable city and the relations with urban sustainable development have been described through the descriptive-analytic method. Then with an adaptation method the livability factors which can be added to the sustainable ones modified and therefore, five livable aspect and fourteen design options has been identified. To develop the concept of livable street design, the assessment of the aspects and options may be the subject of future researches in different case studies.

**Key words:** Livability, Livable city, Livable street design, Sustainable Street, Environment**Introduction**

To be livable is one of the most critical aspects of the 21st century city. In order to develop this idea, the most livable cities around the world have been selected annually by the related organizations. Concepts of livability include a range of different definitions which are mainly focused on the "quality of life" issue. Similar to sustainability, livability is an abstract concept in urban planning. Therefore, in order to use the term in urban design field an array of design principles and guidelines should be identified and the quality of urban design should be enhanced. Although the sustainable street design idea is still in its infancy (Bevan *et al.* 2007), on the basis of the relations between sustainability and livability, the sustainable guidelines can be used as a pattern to identify the livable design criteria. Despite such relations, the sustainable design options mainly focus on the ecological aspects. So, the "social values" and "quality of life" aspects seem to be considered in the livable design process. The purpose of this paper is to test this adaptive consideration in a small scale in urban areas and then propose the most suitable design concepts and options for a livable street.

*Key Descriptions Of A Livable City:*

There have been many definitions for livability, livable city and the relations between sustainability and livability. As Crowhurst Lennard and Lennard (1987) have suggested, "Livable cities pay attention to the creation of architecture, streetscape and public space design that facilitate the presence of city dwellers in the public domain and in the heart of the city. Such cities are also committed to reducing traffic and to resolving problems of safety, pollution and noise by utilizing a variety of mechanism." Casellati (1997) has defined livability as one experience his or herself as a real persons in the city. [6, 8]

"The coin of livability has two faces. Livelihood is one of them. Ecological sustainability is the other. Livelihood means jobs close enough to decent housing with wages commensurate with rents and access to the services that make for a healthful habitat. Livelihood must also be sustainable.... To be livable, a city must put both sides of the coin together, providing livelihood for its citizens, ordinary as well as affluent, in ways that preserve the quality of environment ".(Evans *et al.* 2002) Livability refers to an urban system that contributes to the physical, social and mental well being and personal development of all its inhabitants. It is about delightful and desirable urban spaces that offer and reflect cultural and sacred enrichment. Key principles that gives substance to this theme are equity, dignity,

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accessibility, conviviality, participation and empowerment (cities PLUS, 2003). [7, 10, 11]

*Livable Street:*

Discussions about livable streets date back to early 1980s. Appleyard (1981) issued a charter about livable street named ideal street suggesting streets “the most important of our urban environment.” The ideal street: A charter of street-dwellers’ right consists of the following principles:

- Street as a secure territory
- Street as a livable and healthy environment
- Street as a community
- Street as a neighborly territory
- Street as a place for play and learn
- Street as green and .... Land
- Street as a unique historic place [1]

Design principles about livable cities would help to adaptive research presented in this paper. Crowhurst Lennard & Lennard (1987) pioneered categories for urban space design principles on the basis of social principles for livable cities. The categories include:

-Pedestrian networks facilitate access to these urban places by all – especially children, the elderly and the handicapped.

-Livable urban spaces are located at the heart of the city or neighborhood, and exemplify the essence of the community.

-The size of the urban space and the scale of the surrounding buildings are directly related to the social life of the space.

-Livable urban spaces foster a sense of belonging by the design of the threshold experience and by a sense of visual enclosure.

-All natural elements increase a sensual enjoyment of the present and prompt spontaneous comments among co-users of the space.

-Intricacy and variety of surrounding buildings, unpredictable changes in views, and hidden architectural treasures stimulate curiosity and interest in the setting and encourage exploration.

-Intimate and personal territories adjacent to significant and historic buildings give structure to meaningful experience and crystallize memories.

-Architectural backdrops, level changes, floor textures and focal points orient people in the space and facilitate differentiated use of the space.

-Appropriately designed seating, ledges, walls, planters, rails and steps allow people of every age, status and ability to feel at home in the space.

-Orientation and dimensions of seating arrangements permitting eye contact, facial and voice recognition facilitate significant interpersonal contact and communication among those present. [8]

-There is also a focus on children needs on livable streets. As S.Appleyard (2005) says "The underlying message is clear: cars rule our streets, effectively isolating our children from the surrounding community Supporting “youth livability” by achieving “street livability” objectives also helps engage children and adults in their street and community, ultimately making streets and public places safer for everyone". [2]

*Sustainable Street: Another Experience:*

Attention to the streets plays an important role in implementing sustainable urban development ideas. The urban population is increasing reaching 80% in the United States." Cities consume a big part of energy produced around the world. The transportation sector consumes about 28 percent of the energy as well. On the other hand the urban areas occupied by street right of way are between 25 to 40 percent". (Bevan et al. 2007)

Globally, particularly in northern United States and Canada, there has been defined sustainable street design options to accommodate both pedestrian and vehicular transportation leading to reduction in energy consumption and traffic intensity. Additionally, the impact on natural environment will be minimized and the recycled materials are used in constructions. As the result of such options the biodiversity is protected and healthy urban communities are supported. The historical and cultural context reflects, mixed land uses supported, and therefore the local economy and the people's participation in environmental maintenance will be strengthened.

In this paper the results issued by CH2M HILL in the United States about sustainable street design options are considered as a reference. CH2M HILL codified five main aspects to obtain sustainable street and then provided 161 options for design. The summary of CH2M HILL’s sustainable urban street options is provided in Table 1. [5]

**Table 1:** CH2M HILL design options Source: Bevan et al. 2005

SUSTAINABLE ASPECT		A FEW EXAMPLES OF OPTIONS
Reduced Energy Consumption	Support non-motorized travel	<input type="checkbox"/> Traffic Signal Coordination/Optimization
	Support energy efficient movement of people and goods	<input type="checkbox"/> Low Energy Lighting
	Use resources with lower operations	<input type="checkbox"/> Transit Lanes <input type="checkbox"/> Bike Lanes <input type="checkbox"/> Transit Signal Priority
Reduce Consumption of Material Resources	Use recycled materials in construction	<input type="checkbox"/> Recycled Aggregates
	Require less infrastructure in solution	<input type="checkbox"/> Narrow Traffic Lanes
	Increase durability and life of design solution	<input type="checkbox"/> Fewer Luminaire Poles/Catenary Lighting System <input type="checkbox"/> Higher Strength Concrete Pavements

Reduce Impacts to Environmental Resources	Minimize impact on natural environment	<input type="checkbox"/> Precast or Modular Construction Elements
	Encourage and support biodiversity	<input type="checkbox"/> Rain Gardens for Storm Water Infiltration
	Reflect historical and cultural context	<input type="checkbox"/> Diverse Plant/Tree Selections <input type="checkbox"/> Interconnected Bioretention Swales <input type="checkbox"/> Storm Water Infiltration Basins in Planter Strips <input type="checkbox"/> Porous Pavement for Traffic Lanes
Support Healthy Urban Communities	Incorporate features that support community and livability	<input type="checkbox"/> Trash and Recycling Receptacles <input type="checkbox"/> Noise Reducing Pavement Materials
	Incorporate features that support public services	<input type="checkbox"/> Public Art <input type="checkbox"/> Pedestrian Refuges in Medians
	Incorporate features that enhance public health, safety and security	<input type="checkbox"/> Emergency Vehicle Access
Support Sustainability During Implementation	Support local economic, social and resource management needs during construction	<input type="checkbox"/> Reclamation of Demolition Materials <input type="checkbox"/> Use of Renewable Fuels for Construction Equipment <input type="checkbox"/> Use of Locally Obtained Materials
	Reduce environmental and community impacts during construction	<input type="checkbox"/> Driveways for Access to Affected Businesses <input type="checkbox"/> Minimize Construction "Footprint"

In the Pictures blow there are some examples provided for more clarification:



**Fig. 1:** Sandy Boulevard, USA Image: Nevue / Nguen **Fig. 2:** Sandy Boulevard, USA, Image: Nevue / Nguen

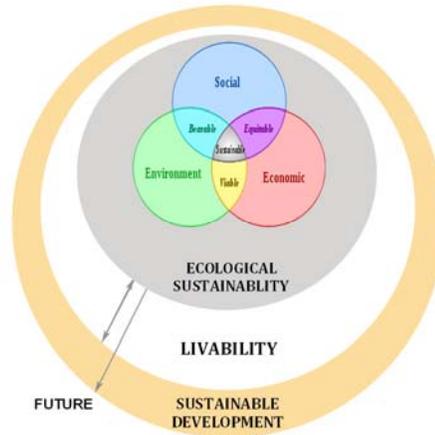
*Sustainable Development And Livability:*

The relation between urban sustainability and livability would play an important role for the adaptation of design criteria. Since the emergence of both terms is almost simultaneous and there are many common areas, it seems that there is a kind of inter-relation between these concepts. Key definitions of a livable city show that in a path to sustainable development the city should be livable in terms of all the social, economical and physical aspects after it meets the needs of its ecological sustainability.

For example, Sustainable Architecture aims at producing buildings that are adapted to local social-economic, cultural and environmental contexts, having in mind the consequences to future generations.[9] Within this frame, the top priority must be to minimize energy consumption in buildings (both in terms of maintenance and embodied energy), through the use of passive design strategies. (Dehghan *et al.*, 2011) This relationship can be found in the conceptual model presented in Figure 3. [4,13]

*Adaptation Of Design Criteria:*

In order to promote the ecological sustainability the main aspect that livability focuses on is the social one. This aspect and its options are the prime elements on which the adaptation may be implemented. On the other hand, there are a variety of climates in which the circumstances of livability differ from other area. For example in a hot arid zone city, since there is not a sufficient bearable climate circumstances, the streets are used as a way for only motorized travels and small businesses for people daily needs.(Bandarabad, 2009). With the consideration of all above items, Table 2 aims to show livable aspects of an urban street design on the basis of the sustainable design options. It means that all the sustainable street design options are acceptable mostly in terms of supporting ecological sustainability. Then, in order to implement urban livability in a street scale, we suggest the last two columns in Table 2 as additional options in order to enhance the livable street design characteristics.



**Fig. 3:** Livability and Sustainability inter-relation, Source: Bandarabad, 2011

**Table 2:** Adaptation of livable street design options on the basis of sustainable definition, Source: Authors

SUSTAINABLE ASPECT	Options	LIVABLE ASPECT	Options
Reduced Energy Consumption	Support non-motorized travel	Street Size Appropriation	Support green areas in down town streets
	Support energy efficient movement of people and goods		Support the climate appropriation (right of way)
	Use resources with lower operations		Apply space to encourage direct communication
Reduce Consumption of Material Resources	Use recycled materials in construction	Support Meaningful Physical Environment	Apply intricate and curiously views, sense of visual enclosure
	Require less infrastructure in solution		Support historical buildings renovation
	Increase durability and life of design solution		Incorporate urban façade codes
Reduce Impacts to Environmental Resources	Minimize impact on natural environment	Support Urban Resiliency	Support the population density size in time of disaster
	Encourage and support biodiversity		Support secure urban infra- structure
	Reflect historical and cultural context		Educate community members to confront disaster
Support Healthy Urban Communities	Incorporate features that support community and livability	Support Urban Healthy Communities	Enhance sense of belonging
	Incorporate features that support public services		Incorporate features that enhance sense of present spontaneous
	Incorporate features that enhance public health, safety and security		
Support Sustainability During Implementation	Support local economic, social and resource management needs during construction	Support Equitable Accessibility	Support flexible land use to attain vitality
	Reduce environmental and community impacts during construction		Support permeability for all urban fabrics
			Support secure access for all (children, elderly, ...)

*Conclusion:*

To achieve a livable city “quality of urban design” needs to be enhanced as well as “quality of life”. This issue in a small scale urban design can be obtained through urban street design. Because of close relationship between livability and urban sustainability, the sustainable urban street design options are considered as a pattern to adapt the livable street design options. After clarification of the relations between sustainability and livability of a city in a conceptual model, we concluded how the factors in which livable street design option can be modified. These criteria include a range of options considering the key livability descriptions and environmental circumstances such as climatic issues.

To enhance livability, social and resiliency factors are the most important points that should be considered to complete the sustainable design views. Therefore, five livable design aspects including street size appropriation, support meaningful physical environment, support urban resiliency, support healthy urban communities, and support equitable accessibility identified to promote livability of a street. Moreover, these aspects include fourteen design options which could be more while any probable localization process. The assessment of aspects and options may be the subject of future researches in different case studies.

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