



## **TOWARDS A SUSTAINABLE BUILT ENVIRONMENT: ENVIRONMENTALLY CONSCIOUS PLANNING, DESIGN AND CONSTRUCTION**

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### **Abstract**

Cities, urban areas and other built-up areas must possess a good, healthy living environment which contributes to the general well-being of the regional and global environment. This can be achieved if buildings and other man-made objects are planned and designed in an environmentally appropriate fashion to promote sustainability. This paper is directed towards the ultimate outcome of providing a better built-environment. It reviews how we can enhance environmentally-conscious planning, design and construction in the built environment involving all building professionals.

**Keywords:** Buildings, Sustainability, Built Environment, Building Professional.

### **INTRODUCTION**

The planning, design, construction, and maintenance of buildings have a tremendous impact on our environment and our natural resources. Buildings in particular, are a major source of pollution causing urban air quality problems and contribute to climatic change. How wonderful it will be if only a small surface area could accommodate a large number of people and new large traffic routes but yet sustain a good living environment? How does all this add up? Can the building professionals plan in order to encourage public transport? Or to conserve endangered species? If building professionals do not show their concern for the environment today, the children and grandchildren of tomorrow will have a high price to pay for the environmental degradation which our present generation failed to stop.

It is not easy to be concerned with every aspect of development. What is the best way to plan, design and construct which will safeguard the good living environment now and in the future? And how do we know that we are on the right track?

“Consider the environment when you plan, design and construct!”. It is easy to say, but more difficult to realise. There is plenty of know-how but building professionals must be able to use it in practice. However, building professionals such as planners, architects, surveyors and many others do not speak the same language. How can they get to understand each other? It is a question of building up an image of what is to be achieved, asking the right questions and assessing the different options.

Yet, the building sector is increasingly facing criticism from its clients and a threat from environmental legislation. Nevertheless, unlike most other processed products, a building and its constituent parts often remain significantly longer in use. In addition, a building has to meet changing society and organizational needs before it is finally replaced. Inevitably too, buildings may be altered, or undergo successive fit-outs during their life span.

There may also be a significant number of instances, where a building and/or its facilities become obsolete, redundant, surplus, or abandoned. One must also bear in mind the possibility that a new use may or could be found, especially if the planning responses are favorable and this could extend the life of a building.

Sustainable development has taken on a global dimension, even if in recent years it has increasingly been acknowledged that there is a close mutual interaction between local and global processes. Building professionals, politicians, economists and practitioners have realised that regional differences and particularities have become very important for building a people-based development which is not only goods-based.

## **PRESENT UNDERSTANDING OF SUSTAINABILITY**

Sustainability is arguably the most vital concern in the design of the built-environment today. As the world becomes ever more densely populated, with the majority of people now living in cities, it is essential for architects, engineers and urban planners to be fully aware of the impact of their activities on the natural environment, as well as the effects of buildings on their occupants. Therefore, sustainability is a new way of thinking that addresses the problems caused by the built environment. Some useful definitions of sustainability and its development-related concept are:

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of needs, in particularly the essential needs of the world’s poor, to which overriding priority should be given; and the idea of limitation imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.”  
(Source: *WCED-World Commission on Environment and Development (1987). Our Common Future, Oxford University Press, Great Britain*)

“Sustainability is a system state in which no internal or external constraints are violated that would threaten the stability of the system into the foreseeable future. Given this definition, a sustainable system is one in which the following constraints are met:

- 1) Stakeholder Satisfaction  $\geq$  Basic needs met
- 2) Resource Base Impact  $\geq$  No or neutral impacts
- 3) Ecosystem Impact  $\geq$  No or neutral impacts.”

(Christopher McCarthy & Guy Battle, 2001)

Before building professionals begin to explore ways to make the built-environment more sustainable they must first develop an operational definition of sustainability as it applies to built-facilities. A useful way of defining how sustainability compares to traditional ways of planning, designing and constructing is illustrated by the following figure 1.

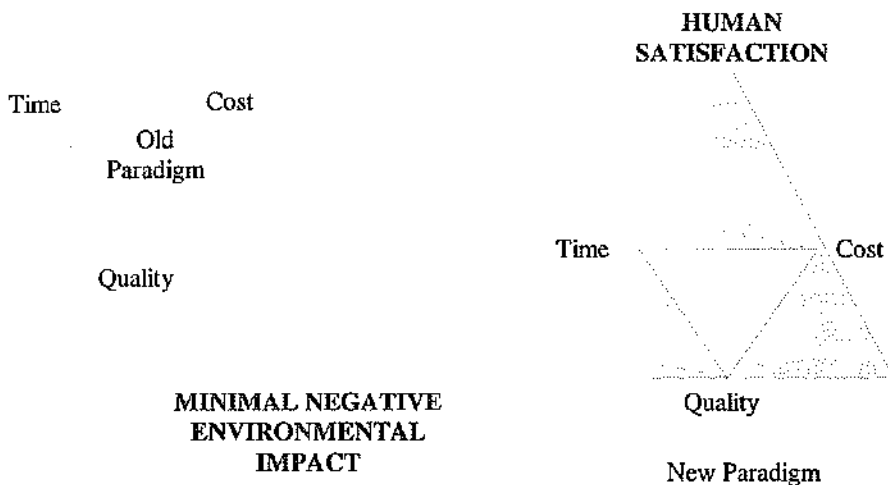


FIGURE 1: A Paradigm Shift to Sustainable Built Environment  
Source: J. O'Rourke & Martin N. (1982)

The figure illustrate that, while building professionals should continue to value concepts such as time, cost and quality as ways of evaluating built environment projects, they must now embed them within a larger context of considerations.

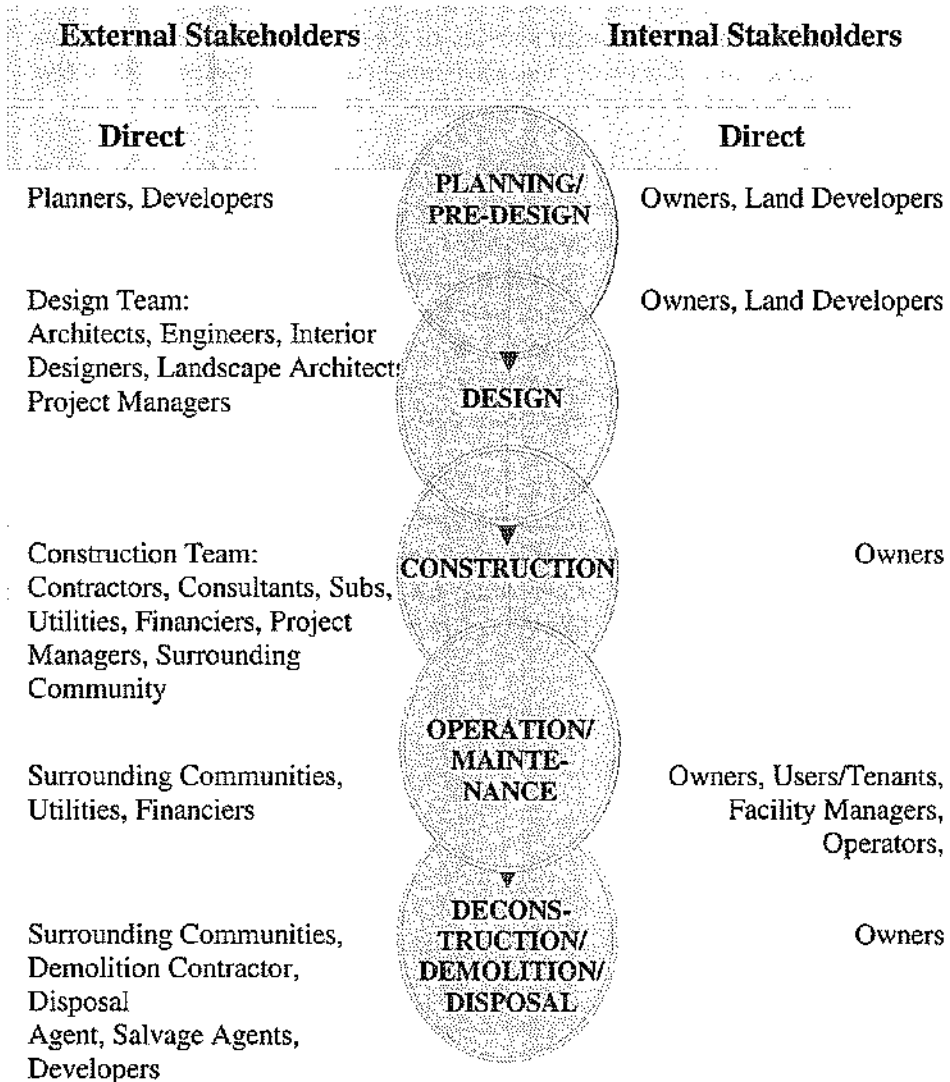


FIGURE 2: Stakeholders of the Built Environment

## A SUSTAINABLE BUILT ENVIRONMENT

The built environment is often the most visible sign of 'development' in its widest sense. It has many significant environmental, social and economic impacts. In order to ensure that development at this level is sustainable, it must address all the policies and issues which have already been mentioned. Development must be planned, designed, built, maintained and altered in ways that: protect natural resources, reduce or prevent pollution, enable access to facilities, prevent crime, protect biodiversity, meet local needs and protect distinctiveness. Action is needed at local levels to ensure this occurs at each stage of the development. Much can be done to ensure that all these considerations are implemented in a coordinated fashion. For instance, we need to understand the life cycle of the built environment and its stakeholders (figure 2).

Building professionals should also be aware of all operational criteria for achieving sustainability at the global level which includes whatever that they plan, design, construct, operate, maintain and deconstruct.

Thus, the term sustainability could be defined as "the suitability or inclination to be kept in existence or maintained" (Esmond Reid, 1988). This definition of sustainability leads to the following questions:

- 1) Who or what should be sustained?

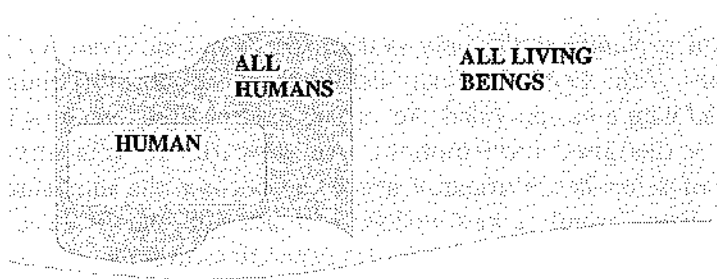


FIGURE 3: Possible Sets of Beneficiaries

2) Who or what should be doing the sustaining?

Role of natural ecosystems:

- ❖ Replenishing resource bases
- ❖ Assimilating waste and converting it into useful things

Role of human:

- ❖ Protecting the regenerative capacities of ecosystems
- ❖ Maintaining basic life support systems (air, water, land)
- ❖ Creating and maintaining human infrastructure and institutions to distribute and protect the resources generated by the life support systems, i.e., meet human needs (anthropocentrism)

Since building professionals are humans and humans are the beneficiaries of anthropocentric sustainability, they should therefore, assume responsibility to maintain that sustainability. In terms of the built environment, stakeholders in all roles must have the interest in sustainability for reasons ranging from potential profit to a simple conviction that it is the right thing to do. These stakeholders include users, owners, planners, designers and constructors of built environment, as well as the academic and research community which supports its continued evolution.

## SUSTAINABILITY FOR THE GLOBAL EARTH SYSTEM

On this planet, *Nature* is the only system which has survived for almost the entire history of the Earth. Thus any definition of sustainability must be based on the model nature has provided. According to Orr (1994), we now live almost totally in a designed environment. As stewards of this environment, building professionals are urgently needed to become the intellectual leaders who might help formulate new visions of place and clarify the actions that will preserve the nation's quality of life for generations to come.

In terms of built environment, there are three objectives of sustainability from the perspective of Earth as a whole (Christopher McCarthy & Guy Battle, 2001) (Figure 4).

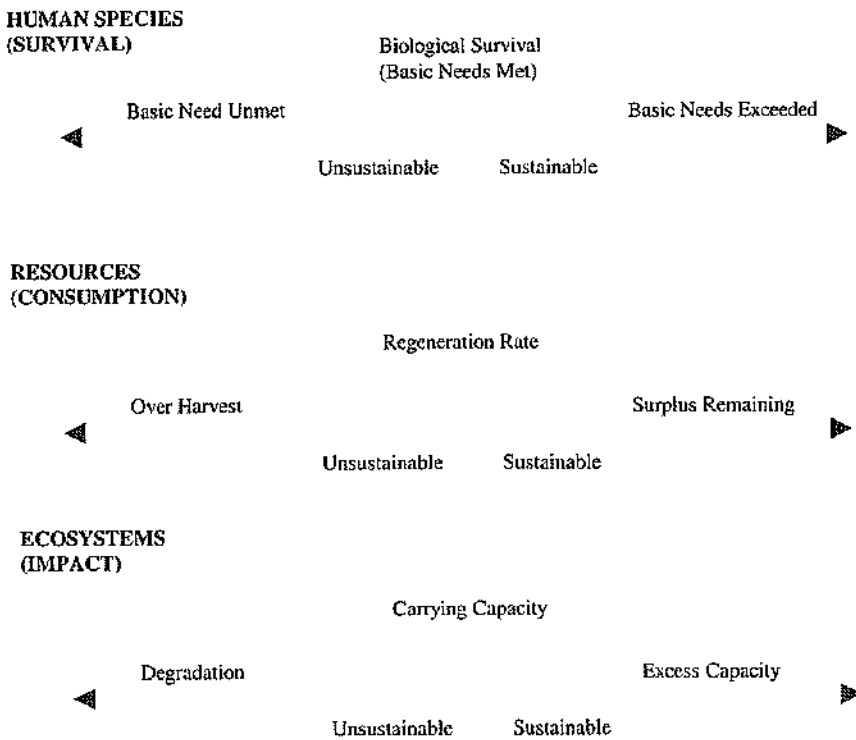


FIGURE 4: Three Objectives of Sustainability.

## CONCLUDING REMARKS

The challenge for all building professionals is that they will have to be able to undertake smart planning, design, construction and maintenance in the context of environmental consciousness. Therefore, they should use a minimum of non-renewable energy, produce a minimum of pollution, and incur a minimum of energy dollars, while increasing the comfort, health, and safety of the people who live and work in them.

The achievement of a sustainable built environment requires the interaction of all stakeholders within the ecological, social and economic aspects. If only one part is achieved but the other two are not, this could mean that other goals have been neglected. Therefore, the physical structure, or how building areas, traffic routes are located, is a key issue in the work towards achieving a sustainable

built environment. As a result, planners, architects, contractors and numerous other building professionals need to know how to develop, operate and maintain essential human, physical and natural urban assets with appropriate and innovative technologies in order to ensure the quality of urban life and environment.

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