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## Property development: In search of an environmental sensitive development model

### Abstract

The Quantity Surveyor (at times acting as principal agent or project manager) must become more pro-active, in the sense that returns, development costs, price, risk analyses and assessments are now crucial. To the quantity surveyor, this may sound like music to the ears, but if the profession is only concerned with the financial aspect of risk and return, there is an inherent danger that not only this generation, but also more specifically future generations, will be confronted with all the negative effects. This article proposes a model to assist with the management of the total impact of property development in an urban context. It also addresses the influence of property development on the rural environment.

**Keywords:** property development, environment, model.

### EIENDOMSONTWIKKELING EN DIE OMGEWING: DIE SOEKE NA 'N OMGEWINGSSENSITIEWE ONTWIKKELINGSMODEL

Die bourekenaar (soms in die rol van hoofagent of projekbestuurder) moet meer pro-aktief optree, in dié sin dat opbrengs, ontwikkelingskoste, prys, risiko-ontleding en -beoordeling tans deurslaggewend is. Vir die bourekenaar mag dit soos musiek klink maar as die beroep slegs die finansiële aspek van risiko en opbrengs raaksien, bestaan daar 'n inherente gevaar dat nie alleen die huidige geslag nie, maar ook meer spesifiek, toekomstige geslagte, al die negatiewe effekte daarvan sal moet konfronteer. Hierdie artikel stel 'n model voor wat kan bydra tot die bestuur van die totale impak van eiendomsontwikkeling in 'n stedelike konteks. Die artikel beskou ook die invloed van eiendomsontwikkeling op die landelike omgewing.

**Sleutelwoorde:** eiendomsontwikkeling, omgewing, model.

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## 1. Introduction

Winston Churchill once said that "we shape our buildings and then our buildings shape us". This succinct statement illustrates how the built environment impacts on humans and nature.

The role of cost engineering, project management and quantity surveying, a left-brain function sometimes performed in a right-brain context, must be considered in terms of development and the environment. The professions must adopt a sympathetic and pro-active attitude because environmental impact is intimately related to cost and long-term risks.

The following environmental influences are relevant:

### *Direct influences*

- The building site
- Plants on the site
- Trees
- Sunlight
- Environment
- Nature
- Micro-ecology/species.

### *Indirect influences*

- Use of electricity and other forms of energy
- Use of water
- Air-conditioning
- Material mining
- Rehabilitation
- Industry attitude
- Philosophy about our place
- Indirect environments
- Energy.

It needs to be recognised that cost should include the impact on the environment. Risk should be regarded more as financial risk. Environment implies considerably more than what is perceived on the surface. It must be realised that development for economic return only is a self-destructive attitude, even from the profession's point of view.

The quantity surveyor (at times acting as principal agent or project manager) must become more pro-active, in the sense that returns, development costs, price, risk analyses and assessments are now crucial. To the quantity surveyor, this may sound like music to the ears, but if the profession only considers the financial aspect of risk and return, there is an inherent danger that not only this generation, but also more specifically future generations, will be confronted with this.

## **2. The environmental impact**

### **2.1 Activities and influence**

Economic and human actions influence the environment at various levels, to various degrees and in respect of urban, regional and rural activities, as well as resources:

- Local economy: employment, wealth
- Natural environment: wildlife, air, water, nature
- Aesthetics and culture: delight, usefulness, landmark
- Public and private services: security, recreation, transport, health, housing
- Social impacts: displacement, hazards, privacy, creativity (Wathern, 1991: 11).

Sustainable development is important to future life and the relationship between human activity and the survival of nature. Agenda 21 is a comprehensive blueprint for global action, into the twenty-first century, by governments, United Nations organisations, development agencies, non-governmental organisations, and the business community, in all areas of economic and social development and environmental protection. Sustainable development means meeting the economic, social, and environmental needs of the present generation, without compromising future generations' ability to meet their needs. Economic and social development as well as environmental protection are interdependent and mutually reinforcing components of sustainable development (Desai in Inoguchi *et al.*, 1999: 235).

To understand current trends and to manage the future of human kind, it is important to recognise the inter-relationship of the 'old' and 'new' attitudes within a city and rural context. Some of these are elucidated below.

## 2.2 Rural environment

- *Happiness*
  - Old: Happiness was obtained by purchasing goods
  - New: Happiness basically emanates from good relations with families, friends, colleagues, communities and nature
  
- *Other species*
  - Old: The riches of the earth are to be exploited by humans, and in particular by corporations
  - New: We survive solely because of our interdependence with the rich web of microbial, plant, animal and even insect life, which supports us
  
- *The future*
  - Old: Present generations count, since the "discount rate" means that future values have no economic significance in the present
  - New: The new rule should be: "Consider the effects of any action on the seventh generation" (Callenbach, 1999: 22).

## 2.3 Environmental impact studies

A major shortcoming in many environmental impact studies has been their inability to establish the time frame indicating when impacts are likely to be manifested. Since impacts are site-specific, it is important to determine their distribution. Impact studies must therefore provide useful and timeous information (Wathern 1988:8). Land information utilities and government land agencies cannot function effectively without accurate, affordable and timely information. Land information represents one of their primary product lines (Le Roux 2.1.1: 2.2.2).

## 2.4 Environmental subject matter

The following subject-matter forms an integral part of the environmental professional's background or should be available to the professional developer:

- Basic physio-biological and socio-economic principles and theories
- Social Impact Assessment and Integrated Environmental Management (IEM)
- Environmental Law
- Urban analysis
- Sustainability

- Green Business and Resources Economics
- Bio-diversity and basic ecological principles
- Industrial ecology and waste issues
- Research methodology and communication
- Quantitative and qualitative analytical techniques
- Professional ethics and business skills (Dewar & Shippey, 2001).

Informed persons with a combination of various professional skills should assess and address environmental risk.

### **3. Risk, the environment, nature and human activity**

#### **3.1 Assessment**

To manage the risk of environmental damage and deterioration in nature, these aspects must be assessed, described and their influence established as accurately as possible. Several problems with respect to risk assessment may be identified. To be useful and reliable, such an assessment must also take into account the more difficult non-quantifiable influences.

Risk assessments tend to be quantitative appraisals; they are essentially statistical analyses of likely events based upon certain probabilities of occurrence. The use of risk assessment has certain implications, especially for non-numerate decision-makers. Firstly, it suffers from a potential weakness similar to that of all quantitative predictions of change. Non-quantified parameters must either be forced into a numerical guise, based upon arbitrary considerations, or be ignored. Secondly, decision-makers may treat such highly quantified assessments reverentially, affording them greater credibility than is warranted and weighting them more highly than more descriptive treatments of likely impacts. Economic and environmental analyses tend to be treated separately when, in fact, they are closely interrelated (Wathern, 1999: 21).

Pollution as an environmental risk is a major factor that must be assessed in terms of significant harm. The possibility of significant harm being caused should be gauged in relation to:

- The nature and extent of harm
- The time scale within which the harm may occur
- The vulnerability of the receptors which may be harmed
- Appropriate guideline standards.

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Generally speaking the more severe the harm, the more immediate its effect; or, the greater the vulnerability of the receptor. (Richards, 1997: 11). In order to determine whether a site presents an environmental risk, or could do so in future, it is necessary to understand whether there are contaminants, their nature and concentration, and the site-specific risks associated with their presence (Andrews in Wathern, 1999: 27).

### **3.2 The human influence**

Human activity exercises the greatest influence on the environment and entails the most significant risk of damage and pollution, therefore, some human activity and influence must be the focus of assessment. Food, fresh water and energy constitute the core of contemporary and future environmental concerns, all of which being intertwined in an intricate web of ecological interdependence.

Ultimately, the consumption of these elements by humans, and therefore the market, is what really constitutes pollution, contamination as well as environmental and natural damage. Market forces are fundamentally flawed in coping with this environmental dilemma (Chung-In in Chasek, 2000).

Human efforts to sustain higher living standards for increasing numbers of people have been accompanied by two serious ecological consequences. One is ecological scarcity and the diminishing carrying capacity of the planet earth, while the other is pervasive environmental degradation stemming from the misuse and abuse of the ecosystem. While environmental degradation has seriously undermined the quality of life, ecological scarcity, especially involving a vital resource such as food, water and energy, has threatened the foundation of organic survival of national populations and the global populace (Chung-In in Chasek, 2000).

The way energy is produced and used, is at the root of many causes of environmental pollution and damage. For example, air pollution and acid rain are largely due to the burning of fossil fuels and urban transportation. Greenhouse warming and climatic change are also due mainly to the burning of fossil fuels (Goldenberg & Chasek, 2000: 64).

### 3.3 Architecture, the environment and human experience

The built environment and architecture as human activity and experience not only influence the environment at all levels, but also impact directly on human experience. Referring to architecture, Luke (1994) uses Soleri's project to show the influence, effect and role of this profession:

- Architecture denotes the alterations made to nature by the organic, the physiological and the mental
- Architecture materially expresses what society does
- Any radical social transformation also demands not only a reordering of ideas and institutions, but also society's most basic information technology
- Ecological development is part of theological and technological evolution.

### 3.4 Risk and biodiversity

Biodiversity is one of the most important elements of nature and the experience of life, as well as the sustainability of all life forms. If biodiversity is threatened, life itself will be threatened and ultimately human life will be at risk.

The loss of biological diversity may take on many forms, but at its heart is the extinction of species. Species extinction is a natural process, however, it is beyond question that the rate at which man causes extinction, directly or indirectly, far exceeds any reasonable estimates of background extinction rates. Man may exterminate species by using various types of impact, which can be divided into two broad categories: direct (hunting, collection and persecution), and indirect (habitat destruction and modification). Over-hunting is perhaps the most obvious direct cause of extinction in animals. In terms of overall loss of biodiversity, however, the latter factor is undoubtedly far less important than the indirect causes of habitat modification and loss (Groombridge, 1992: XV). The maintenance of biological diversity may be carried out either on site or off site.

- *In situ conservation*

The maintenance of a significant proportion of the world's biological diversity at present only seems feasible by maintaining organisms in their wild state and within their existing range.

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- *Ex situ conservation*

Viable populations of many organisms may be maintained under cultivation or in captivity. This is clearly only feasible at present for a small percentage of organisms (Groombrige, 1992: xv-xvi). In the South African context, the protection of the better-known species has become an economic activity. Many property development projects in rural areas are currently under construction not only for various income-generating reasons, but also to stop the loss of biodiversity and the risk of damage to ecosystems. The development professional may play an important role in respect of sensible development as developers and professionals understand the following premises:

- Economic return can only be secured within a long-term context
- The influence of land, soil and grasslands on species
- Suitability of habitat for the specific species to be established
- Genetic integrity — the smaller the unit (development), the larger the risk
- The aim of the development:
  - Ecotourism
  - Trophy-hunting
  - Harvesting
- Fencing
- Cost and size of development
- Climate
- Species-mix
- Integrity and protection focus
- Quality and grazing patterns
- Social conduct of species
- Gender relationships
- Sheltering (Smit, 2000: 27-28).

Humans and more specifically governments, developers and non-government agencies are now responsible for managing the risk and for introducing a comprehensive strategic approach. The development professional must take cognisance of these aspects in order to ensure pro-active participation in the process.

#### **4. The professions and the environment: education of the cost consultant**

Environmental management and assessment are a thriving industry, however, it faces the risk of being discredited and marginalised unless educational institutions, professional bodies and government-standards assurance initiatives can adopt a coherent and comprehensive approach to training future environmental scientists in the appropriate disciplines. It is vital to take the challenge beyond discussion and to proceed to action. What ultimately matters is the creation of better, and sustainable, human environments and this goal will not be achieved without a vision, co-operation among various role players, capacity-building, and hard work (Dewar & Shippey, 2001 ).

In respect of environmental matters and functions that are of concern to quantity surveyors, the following are important:

- Risk assessment and analysis
- Decision analysis
- Siting studies
- Project objective adjudication
- Assigning design
- Viability studies
- Cost planning and control.

It is obvious that the professions have a role to play in protecting the environment and that cost is a major factor in assessing the impact of our activities on the environment. Le Corbusier (1929) reflected on attitude in an urban context:

*Our constant aim, which we must pursue with patience and cunning, must be to throw out of action all the forces that make for the opposite of Joy – that is to say, Despair. Despairing Cities! The despair of cities! [...]*

*It is the city's business to make itself permanent, and this depends on considerations other than those of calculation. It is only Architecture which can give all the things which go beyond calculation.*

The professions that deal with costs, prices, calculations, economy, cost control, audits, etc should take note. Professions in the development industries should also be concerned about the influence of rural development on nature and wildlife, in respect of:

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- Responsible development
- Responsible caring for wildlife
- Humane practices
- Legislation
- Treatment of the environment and species
- Monitoring of actions
- Awareness (Opperman, 2000: 24-26).

Planning and creativity, also in an environmental sense, must play a mutually supportive role to ensure success. Quantity surveyors and cost engineers play an important role in these processes. Professional education is defined as a system of formal education that prepares novices for highly skilled occupations by means of a combination of theory and practice and that culminates in an institution conferring a qualification. Students need to learn the unique critical thinking required by their future profession, the social context and values of that profession, and how they, as future professionals, may best communicate with clients, patients and colleagues (Curry *et al.*, 1993).

The key seems to be mutual understanding, co-operation, sharing, partnership and mutual focus. In this respect we may learn from other species: a pride of lions is a good example of social interaction and structure aimed at achieving mutual goals. The lesson that business may derive from a pride of lions as a team is the following:

- Each individual member is powerful
- The total focus is on clear-cut and realistic goals
- Team members are alert to communication
- Incentives motivate and reward success
- Spirit consists of trust, confidence, respect and pride
- The structure is flat
- Strict selection ensures that there are no passengers
- Training is intense
- Image enhances function
- Synergy — the pride is more powerful than the sum of the strengths of its individuals.

The unremitting application of these ten power points puts the pride in a win-win situation: the pride and its members thrive. The business and the individuals thrive (Thomas, 1995: 59).

## 5. Examples of hope

### 5.1 Rural development

On the Hoarusib's northern banks in Namibia, people live in harmony with their harsh environment, nature and wildlife. Ehrens Karatjaiva (Herero sub-elder and farmer) explains:

*The elephants are down there in the river bed where there is water and food. There's no reason for them to come up here, so my people sleep safely. You just have to be very careful not to bump into them by mistake when you're walking in the river to get to the water [...]. Ehrens is pragmatic about the dangers of sharing your land with elephants, because he believes the elephants are one of the main drawcards for tourists to the area. Our wildlife is our future, he declares. There's nothing else out here that could bring development to a place like Purros (Weinberg, 2001: 143).*

This indicates how wildlife and people live together in nature, allowing them to bring in the financial resources needed to sustain their way of life. There are many examples of new approaches that may be adopted once again to bring people who have lived for years with wildlife in a natural environment in touch with their inheritance, but then in an economically sustainable manner. Some of the best examples of such an approach, aimed at promoting ecology, land ownership, development and economic opportunity, are found in Masailand in Kenya where great success has been achieved (See Berger & Ntiati in Weinberg, 2001: 75).

*In the shade of a Mopane tree in a dry river bed in the heart of Koakaveld, Namibia, a Himba elder by the name of Wapenga, asks a question: 'What is the way forward?' he asks (Weinberg, 2001: 8-9).*

Wapenga's simple but crucial question elicits different answers. Each country has a different conservation policy, each region a contrasting set of ecological, political, economic and social dynamics:

- In Kenya, local people live side by side with wildlife
- In South Africa, there are fences and indigenous people who live outside most of the reserves
- In Zimbabwe, hunting is the key income-earner for many local people

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- In Mozambique, now free from civil war, tourists are flocking back, but the country has no proper conservation management, thus, this beautiful environment is under threat
- Namibia has a very progressive policy, that allows local people, like himself, to declare a conservancy. Once a conservancy has been established, interested parties may approach the local people and propose a partnership to set up a lodge, safari operation or a hunting concession (Weinberg, 2001: 8-9).

Wapenga's question is echoed throughout the African landscape by millions of indigenous people. In essence, it asks how indigenous people may benefit from the resources they have cared for all these years (Weinberg, 2001: 8-9).

### 5.2 Wildlife, nature development

*People who have destroyed all their wildlife and live without it are not complete* (Chief Liabon (spiritual leader) of the Masai (Kenya)) (Weinberg, 2001: 7).

In the SA context, good news for nature, wildlife and the environment is that more eco-friendly wildlife farms are being established for diverse reasons. However, as far as ecological reasons are concerned, the following should be mentioned:

- Lower production of livestock per unit
- Plant spectrum can sustain a greater variety and larger numbers of wildlife
- Game and wildlife have higher levels of resistance to parasites and diseases
- Game is less affected by droughts, etc
- Game adapt more easily to poor weather and nature conditions (Smit, 2000: 25).

It cannot be ignored that protected areas and rural development, aimed at promoting game reserves, game farms and ecotourism, are positive developments in respect of environmental protection, nature and wildlife.

## **6. Environmental models**

### **6.1 Determinants**

To design development models that address environmental problems and risks, the determinants that have to be accommodated in an environmental model must be noted:

- Green building standards
- Pest management
- Effects of chemicals, hazardous material and waste
- Air quality
- Biodiversity
- Energy, climate and ozone depletion
- Agriculture and wildlife
- Parks and open spaces
  
- Transportation
- Water
- Environmental justice
- Risks
- Education and information (Callenbach, 1999: 25-27)
  
- Culture
- Partnerships
- Governance
- Direct development effect
- Networks
  
- Lifestyles
- Industrial effect
- Recycling (Aoshima in Inoguchi *et al.*, 1999: xiii-xviii).

These are not the only determinants that can be identified, but they may be the most important determinants. The model stresses that a comprehensive strategic approach is necessary, integrating inputs from all role players, as well as aspects involved in managing the effect of development on environment and nature.

## **7. The structure of the model**

### **7.1 Environmental model**

Duursema's (1999) model may form a basis for environmental and property development, but could perhaps be adapted to ensure the inclusion of the latest information and theory (Figure 1).

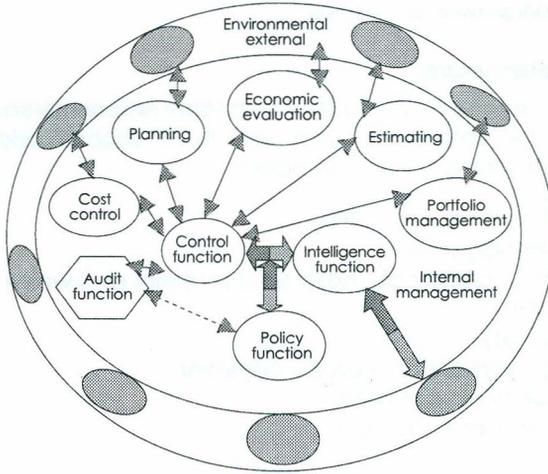


Figure 1: Environmental model (Duursema, 1999: A8)

Duursema's (1999) contribution in respect of activity and environmental influence is also important:

*Every single activity and action that we perform is part of an environment that forms part of a bigger environment. We do not work in isolation and need to interact with the different environments internally as well as externally (Duursema, 1999: A10).*

Not all the functions are a full-time job but could be performed by setting up various meetings, such as, for example, an intelligence meeting. The agendas of the various meetings must be drawn up to address the relevant issues.

## 7.2 Function and product

The success of a project or product is subject to more than the usual architectural, engineering and quantity surveying functions. A fresh approach by the professions would enhance the impact and value of professional services. This does not mean that the professions become everything to everybody; rather, the professions take the total effect of influence and project seriously.

A definition of project success could be as follows:

*A project is successful when it meets the needs of the owner in respect of risk, cost, scope, time and quality and society's demand for a healthy and nature friendly environment in an architectural sound cultural context (Duursema, 1999: A10).*

The functions of a successful project may be listed as follows:

- Budget, cost and price
- Architectural context, scope and design
- Time and programme
- Risk
- Environmental impact and influence on nature
- Cultural effect and the place in city/rural context
- Psychological influence
- Quality approach
- Constructability.

Taking into account the above functions, the product will be a successful quality-producing project.

### 7.3 The proposed model

The proposed model takes into account the functions and techniques to indicate the various links and the interaction needed for the success of the project. The following diagram illustrates the main elements of the model related to risk, budget and cost (Figure 2):

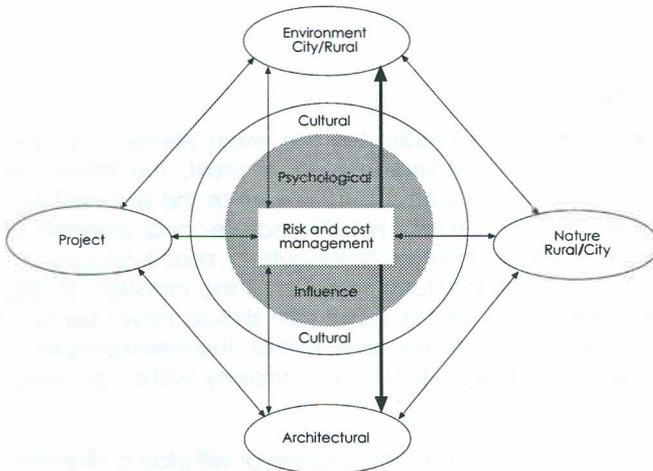


Figure 2: The main elements of risk, budget and cost

The following diagram illustrates the proposed model (Figure 3):

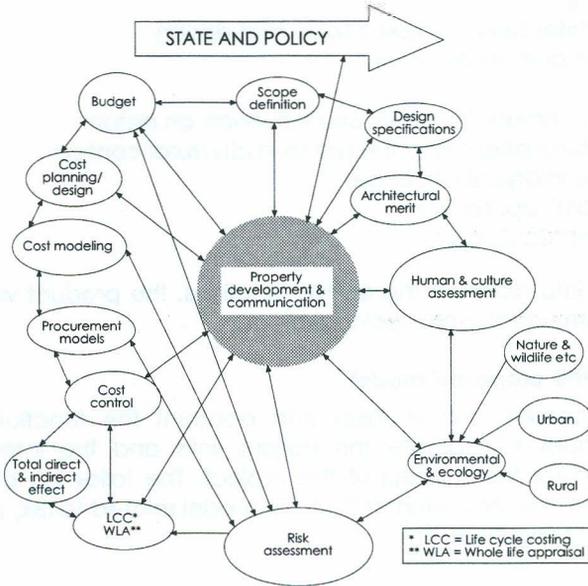


Figure 3: The model

#### 7.4 Conclusion

The proposed model indicates the main elements of property development in an environmental context, the influences that need to be taken into account, as well as the essential functions to ensure that the project result is nature- and environmentally-friendly, and also accommodates culture, space and psychology, while the total architectural effect and the creation of places of the soul are not neglected. The aim should never be to create new functions and functionalities; rather, the intention is to prompt role-players to design and plan property within an integrative mode.

The cost engineer and quantity surveyor will play a vital role in the construction of the city of the future, but they must, in a proactive sense, ensure that the role is extended to the rural environment where their skills are also needed. We live in a total ecosystem where one cannot survive without the health of the other; indeed, urban and rural planning, design and construction are interlinked. The effective management of and accountability for finances available are crucial.

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