



Natural Building Systems Ltd

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Natural Building Systems Ltd "Natural Home"

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Introduction & Background

Quoting from Paper 0101 of the 'BBE Certificate in Ecological Building and Design – Principles of Ecological Building and Design' (1) ...

'Building Biology and Ecology began in 1969, when the Gesundes Bauen - Gesundes Wohnen' (Healthy Building - Healthy Living) Society in Germany began collecting all existing knowledge on healthier and more sustainable building, including building practices that had been disappearing steadily over the previous fifty years.

In August 1989 Building Biology and Ecology was introduced to New Zealand by architect Reinhard Kanuka-Fuchs, and over ten years he was the driving force behind awareness, education and change in this country. The Building Biology and Ecology Institute is now run by graduate students of the original International Correspondence Course, introduced to New Zealand by Reinhard.

The Building Biology & Ecology Institute

The Building Biology & Ecology Institute is committed to creating a healthier, more harmonious & more sustainable environment.

Through education, advocacy & research it aims to make people aware of the health & environmental hazards of modern buildings & construction, and to show them how to create better places to live & work in.

The BBE has trained many health practitioners, builders, architects & designers through its correspondence course, and has helped the public through workshops, consulting, design services & publications



on eco building. The BBE has three offices, in Auckland, Wellington & Hawke's Bay which are run in conjunction with Ecological Architecture practices by graduates of the correspondence course.

Natural Building Systems Limited

Almost everywhere today, residential buildings have no message or meaning. All too often they seem to ignore the nature of the place & the uniqueness of the landscape by presenting an expanse of faceless blocks. This has led to our loss of place in the landscape. We believe that Architecture should respond to the land & our relationship with it. When we design to co-operate with & embrace nature & then build in an organic, environmental way we can create a more holistic & unique style of Architecture than that which is based on temporary, fashionable & wasteful trends.

We show how it is possible to work co-operatively to build a healthy alternative way of life which is natural & connected to the environment. We aim to work with nature rather than against it. In doing so we successfully create homes which are environmentally sensitive, harmonious with the natural features of their sites, consume little energy, accentuate natural daylight, & contain materials that are healthier, ecological, recyclable, or have been derived from sustainable resources.

Our holistic philosophy incorporates an awareness of the environment and knowledge that the way we choose to live not only affects our health but also the health of the environment. Biology and ecology are considered as an integral part of the design & construction process as well as the traditional considerations of aesthetics,



technology and economy. We believe that active participation in the design and construction by the occupant is an essential element of the building process.

Our main goals are healthy affordable homes and buildings for New Zealand, together with, ultimately, large scale eco-developments & villages. We concentrate on low environmental impact, sustainable design & construction. New ideas & technology are incorporated including the use of high tech NZ products & innovations, solar/electric etc., merging traditional & eco-friendly (recycled/re-used) methods & resources with low tech established materials and techniques. We have established & are developing the use of new products & innovations with traditional eco-friendly systems. Our work will have a permanent impact on New Zealand as more and more people realise the tremendous benefits from having a "Natural" home. We believe that by being more integrated with the natural environment we can not only help our Earth, but also give life to our own spirit.

An Alternative Solution

The Natural Building Systems Ltd "Natural Home" incorporates a new design/construction which has been developed through an ongoing research & development program which was started several years ago. It's core aim has been to achieve the best residential home for New Zealanders. For many years the Building Biology & Ecology Institute has been acutely aware that the "Acceptable Solution" for residential home construction in New Zealand has been flawed on many levels from the materials used through to the basic structure.



Through its affiliation with the International Institute of Bau-Biologie which coordinates the global confederacy of Building Biology & Ecology practitioners, a huge body of research & associated information is available to Natural Building Systems Ltd. From this and from our research on New Zealand conditions both climatically & economically, we have been able to arrive at the optimum design/construction model. Because this optimum model is based on a no-compromise criteria both in terms of materials/construction & cost it bears little resemblance to what is indicated as the standard for house construction in New Zealand at present - NZS3604:2011. Thus it falls into an "Alternative Solution" under the current Building Code. Unfortunately the "Alternative Solution" path is more costly & complicated than the "Acceptable Solution" - more so than it needs to be. BCA's are not well equipped in our experience to deal with the "Alternative Solution" approach thus causing delays which in turn increases costs & can push the building phase out beyond the client's or builder's available time envelope. A large focus of our research has been on achieving a higher level of construction efficiency through simpler methods using less materials. Unfortunately as mentioned, the delays caused by going through the "Alternative Solution" approach with BCA's negates a large part of this increased efficiency. DBH has guidance for BCA's with notes on whether the results of tests performed in other countries would be relevant to New Zealand conditions however the question of what sufficient proof would be is not provided. This has implications for the "Natural Home" because a large part of the information for the construction method has been based on what has been developed overseas over many years and widely accepted by the building authorities in those countries. Yet the BCA's will not or cannot take this into account. The CodeMark process is very welcome however this is for product



manufacturers & not for new construction techniques. It appears to use that BRANZ focuses on the Acceptable Solution side of the Code rather than innovation. We welcome the Multi-Proof Building Consent solution & will be taking advantage of it however we are aware that design & site specific variations may negate the advantages.

The housing problem in New Zealand stems from a largely corporate driven "Acceptable Solution" paradigm with it's associated Standard - NZS3604 which makes for a profit-driven narrow-minded, "compliance friendly" building system with a one-system-only mentality which benefits everyone except the people who have to live in the houses. The solution to the housing problem in New Zealand is relatively straight forward. The implementation of a performance based building regulatory framework will result in a more transparent system with clear statements of functional & performance expectations in clear & concise language; faster & more targeted response to market needs by focusing on outcomes rather than specifications thus taking advantage of market capabilities to quickly respond to changes or threats impacting the built environment such as earthquakes or practices which result in defective design/construction; facilitate global operation through reduced ambiguities concerning performance expectations. This provides international credibility, a common market, expanded trade opportunities, support of innovative products/technologies providing export opportunities, simplification of product & system conformity assessment; Facilitates innovation while assuring minimum performance. because performance requirements focus on what must be achieved, but do not tell the designer what materials to use or how to assemble them the designer has considerable flexibility in selecting materials, products & systems that can achieve the required



performance. The requirement that the designer must demonstrate that the required performance has been met imposes an additional level of rigor in the analysis & design beyond that typically seen under a prescriptive regulation. A performance based regulation addresses the challenges with existing buildings through the provision of a clear set of functional & performance objectives & the ability to determine the acceptable level of performance of solutions for existing buildings. An existing report prepared by the Inter-jurisdictional Regulatory Collaboration Committee in February 2010 outlines the fundamental legal & technical principles of performance-based regulatory systems & provides experience of this by other countries. To quote the following foreword by Hon. Maurice Williamson Minister for Building & Housing: "A building regulatory system that minimises red tape whilst facilitating quality buildings, protecting consumers & allowing for innovation, choice and improved productivity is important for the Government and for New Zealanders."

Our recommendation is that a performance-based building regulatory process be introduced. This will allow the innovation which Natural Building Systems Ltd has focussed on to arrive at a higher level of performance in terms of construction efficiency (improving productivity), cost, energy consumption, health & social impact through greatly improved indoor environment.



Manufacturing - pre-fabrication hubs

A key factor in increasing efficiency & decreasing costs & ecological impact in house construction is the pre-fabrication of structural components in small decentralised facilities. These facilities should be located close to ports and/or rail facilities and strategically placed to minimise distances to building sites. These one or two man, individually owned & operated facilities could produce components for about 3 houses per month with scalability for up to 5 per month by employing part time staff as required. Further scalability can be achieved by setting up another facility in a different location within the same geographical area. Supply of components would be on a fixed price basis. By doing this we can increase certainty of the build cost. The manufacturing facilities are the hub of the whole operation - the location of the NBS offices, warehousing, pre-fab of timber structural components, supply depot for cladding systems, kitchen flatpacks, house electronics & electrical systems, etc. Also there would be a depot for the building site "trailers" with specialised equipment that the construction will require and will be used by the builder or owner. Each facility will transport the components to the site as required.

Social Business Enterprise

A key aspect of innovation within the building industry is the need to also innovate in terms of the underlying business philosophy. This the final mechanism in achieving a superior holistic model for house construction. A social business enterprise model should be used. Social business, as the term is commonly used, was first defined by Nobel Peace Prize laureate Prof. Muhammad Yunus.



He described a **social business** is a non-loss, non-dividend company designed to address a social objective within the highly regulated marketplace of today. It is distinct from a non-profit because the business should seek to generate a modest profit but this will be used to expand the company's reach, improve the product or service or in other ways to subsidise the social mission. A **social enterprise** is an organization that applies business strategies to achieving philanthropic goals. Social enterprises can be structured as a for-profit or non-profit.

Many commercial enterprises would consider themselves to have social objectives, but commitment to these objectives is fundamentally motivated by the perception that such commitment will ultimately make the enterprise more financially valuable. Social enterprises differ in that, inversely, they do not aim to offer any benefit to their investors, except where they believe that doing so will ultimately further their capacity to realise their philanthropic goals.

Many entrepreneurs, whilst running a profit focused enterprise that they own, will make charitable gestures through the enterprise, expecting to make a loss in the process. However unless the social aim is the primary purpose of the company this is not considered to be social enterprise. The term is more specific, meaning 'doing charity *by* doing trade', rather than 'doing charity *while* doing trade'. Another example is an unincorporation, which may pursue social responsibility goals that conflict with traditional corporate shareholder primacy, or may donate most of its profits to charity.

By enlisting the services of 5MFK (5 Million Flying Kiwis), the foremost social business enterprise organisation in New Zealand, a social business enterprise model has been formulated which can optimise the social focus of building houses while also providing



business owners and investors with the required financial returns. This has resulted in an underlying philosophy which underpins business decisions and direction.

What is Ecological/Sustainable Building Design?

It is a common theory that Sustainability and Ecology are the same. This is not exactly the case.

Sustainable Design

Sustainable Design is the wise use of our natural resources in buildings. Designing sustainably means that energy, water and material resources are used efficiently and to their best advantage. It is a means of reducing waste by applying smart solutions, while at the same time promoting sustainable development and helping the environment. (from BRANZ, Building Research Association of New Zealand, www.branz.org.nz)

Ecological Design

Ecology, or ecological science, is the scientific study of the distribution and abundance of living organisms and how the distribution and abundance are affected by interactions between the organisms and their environment. [...]The word is derived from the Greek (oikos, "household") and (logos, "study"); therefore "ecology" means the "study of the household [of nature]". The word "ecology" is often used in common parlance as a synonym for the natural environment or environmentalism. Likewise "ecologic" or "ecological" is often taken in the sense of environmentally friendly.



Environmental Design

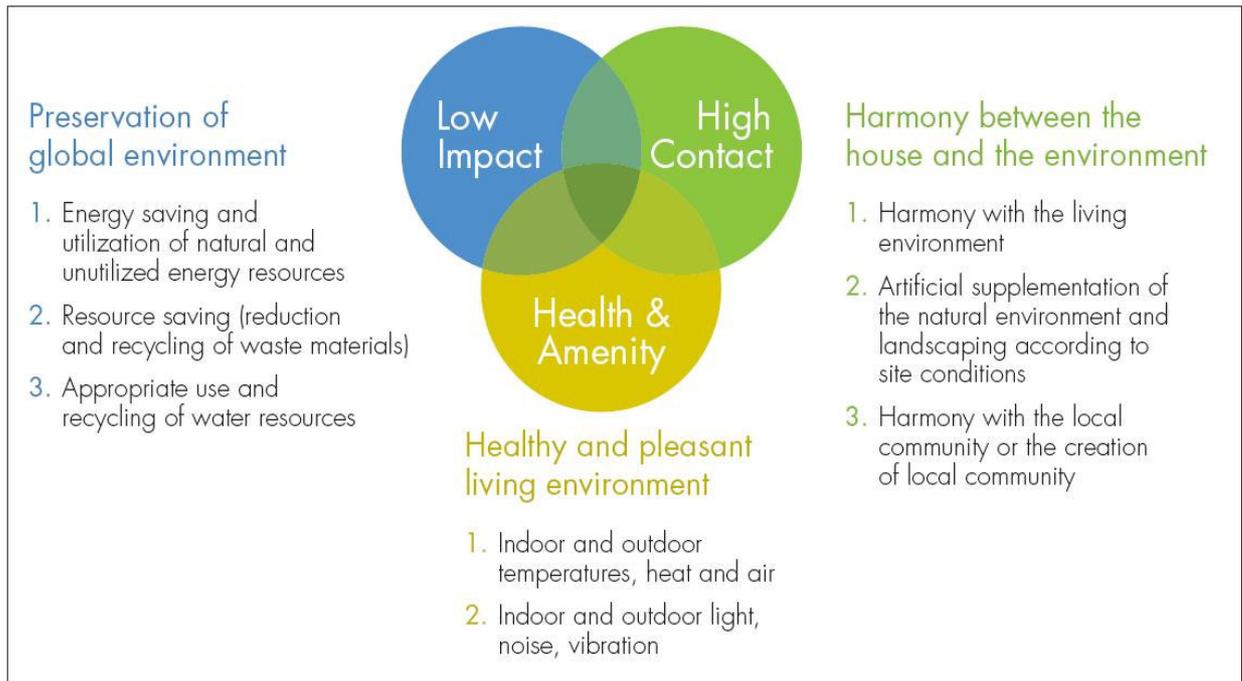
Environmental design refers to taking environmental concerns into consideration when designing plans, programs, policies, buildings, or products. Environmental Design has been defined this way: We live in the world by design. Creating the everyday environment in which we live involves complex systems of cultural meaning, visual communication and the use of tools, technology and materials. As a field of study, Environmental Design encompasses the built, natural, and human environments and focuses on fashioning physical and social interventions informed by human behaviour and environmental processes. Design asks us to find answers to the most fundamental of human questions: how should we live in the world and what should inform our actions? This complex endeavour requires an interdisciplinary approach.

What is Biological Building Design?

Biology is a natural science concerned with the study of life and living organisms. Within the capacity of building design there are two concepts to consider. The effect of the building on the biological entity within the dwelling (the occupants) and the consideration of the building itself as a biological entity. The concept that the house is an organism greatly assists in the development of a healthy home for example the walls of the house can be likened to our skin, protecting us from foreign elements, sheltering us somewhat and also breathing, filtering and regulating the passage of water and airborne elements such as pollutants. This concept greatly assists in designing a



building that is in harmony with nature and therefore the occupants which are in themselves part of nature.



³ Source: Daiwa House Industry Central Research Laboratory, Nara City Japan

