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In considering what constitutes a healthy environment, the theories of Ando, Pallasmaa, Millet and Norberg-Schulz were consulted.

THEORY

1 THE PROBLEM

The issue of health is a primary concern in contemporary society. Stress, unhealthy eating habits and lack of exercise are all contributing to the degradation of health. In South Africa, about 33 people die per day as a result of heart attacks; 60 because of a stroke; and 32 men and 68 women die as a result of being overweight (www.heartfoundation.co.za).

THE RAT RACE

Health is closely linked to lifestyle. Life in contemporary society is often rushed, stressed and unhealthy. For those with careers, life is focussed on work, and on being successful. The healthy work/play balance very often tips more towards the work side. Consequently, workers often suffer from stress and related illnesses. Only in the absence of health does it become a priority - often too late.

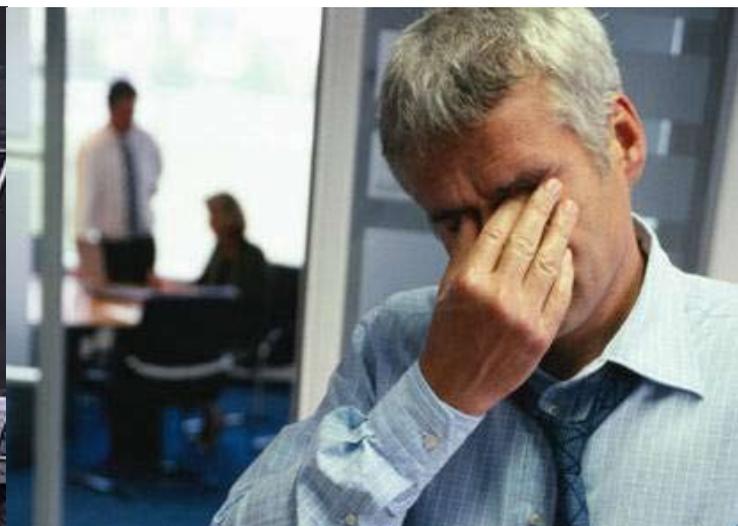
As a result of this stressful lifestyle the issue of personal health is a popular subject. Various forms of media deal specifically with this issue, such as the Shape, Longevity and Men's Health magazines; television programmes like *Your Good Health*; and dedicated websites like www.health24.com. People are concerned about their health and need to become pro-active in order to improve it.

WORKING IN THE CITY, LIVING IN THE SUBURBS

The physical shape of the city also impacts on lifestyle. In Tshwane, residential and work areas are mostly segregated. The Pretoria CBD is traditionally a mono-function city, and workers commute into the city from the suburbs. Heavy traffic to and from the CBD means that workers spend many hours a day commuting between work and home. In addition to this, there is also a scarcity of amenities catering to the needs of professionals in the city. Due to this scarcity, activities that could be done in lunch hour have to be done outside office hours, and in residential areas. This leaves even less time for home life, leaving people emotionally unfulfilled. The link between emotions and health is well-known. More time spent with family results in happier, healthier workers.

In addition to stress, workers may also suffer from mental fatigue. While stress is caused by anticipation of a dreaded event, mental fatigue is the result of constant work. To combat mental fatigue, workers need a healthy work/play balance (Kaplan & Kaplan, 1989: 178).

A healthy balance between work and play and a healthy home life is very important to maintain overall wellbeing.



BUILDING ENVIRONMENTS

Human environments may also contribute to the degradation of human health. Workers spend many working hours inside office buildings. These office buildings often host artificial environments, inadequate lighting and ventilation, and are disconnected from their surroundings. Some of these buildings may also suffer from Sick Building Syndrome (SBS). Sick building syndrome causes chronic symptoms (such as sinus and dry eyes) and detracts from employee productiveness (Day, 1993: 36). Unhealthy environments contribute to feelings of lethargy in their users, and even lead to depression in some cases.

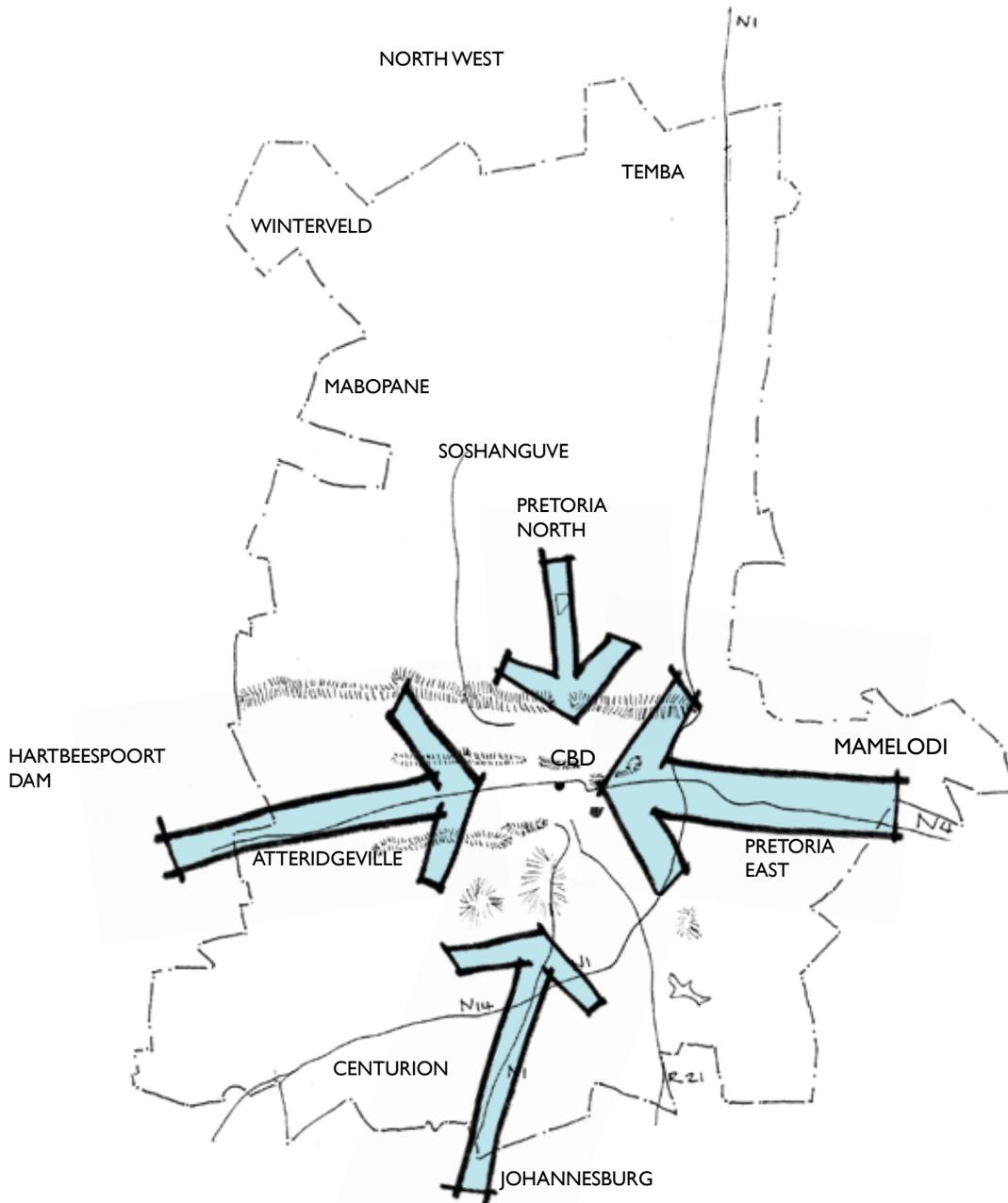


Fig 1.3 DAILY COMMUTING INTO THE CBD



2 THE SOLUTION

SHIFTING THE FOCUS FROM ILLNESS TO WELLNESS

Health is defined by the *Oxford Dictionary* “the state of being free from illness or injury.” This is the view often held about health in society. An alternative and more holistic definition of health is provided by *Mosby’s Dictionary of Complementary and Alternative Medicine* as “a state of well-being that takes into account an individual’s physical, mental, and emotional vitality and desires”. Health should be viewed as a positive aspect of life, which encompasses all actions, and which is involved in all facets of life.

Alexander (1977:252) advocates this focus on wellness and not on illness: “A system of health care which is actually capable of keeping people healthy, in both body and mind, must put its emphasis on health, not sickness.” Focussing on health means focussing on daily activities which promote health.

The practice of health must be made into a habit. There are many facets to health, including exercise, social contact and stress-relief. In order for people to live healthier lives, these facets need to be introduced into their daily routines in the CBD.

Instead of spending lunch hours inside, working (which contributes to stress), workers should have the opportunity to spend this time improving their health, be it physically or emotionally. Lunch hour could be better utilised to include exercise and de-stressing. The extra time usually spent on these activities after office hours can be utilised by relaxing at home. This extra time for relaxation will also contribute to a healthier lifestyle.

Health is not just related to illness. Health should be seen as a lifestyle.

HEALTH PROMOTION

The concept of *health promotion* has been present in the international arena since the mid-1980s. ‘Health promotion’ is defined (www.wikipedia.org) as “the process of enabling people to increase control over their health and its determinants, and thereby improving their health.”

Many international companies have implemented health promotion policies. These policies ensure that employees exercise healthier behaviour, which has a positive impact on their productivity.

Health promotion is possible on a bigger scale. Instead of individual companies implementing policies, a central scheme catering to the employees of many companies can benefit a whole area.

SICK BUILDING SYNDROME

Sick building syndrome can be avoided by careful design. Natural resources such as the wind (natural ventilation) and the sun (daylighting) may be used to create thermal and physical comfort in buildings. Architecture needs to support the health of its occupants, not detract from it. Architecture has the possibility to uplift its occupants, and this opportunity should not be missed. Architecture should never be the source of illness or misery; it should promote the well-being of those who use it.

3 THEORY

INTRODUCTION

The negative legacy of the Modern is a preoccupation with functionality, which led to deep buildings, regulated thermally by central mechanical ventilation. This deep module is still widely used in commercial architecture in South Africa. These buildings often have no connection to their context, and their occupants are wheels in a cog, only there to be as productive as possible. These buildings often house passive spaces in which the occupants are unconscious of their environment.

Ando (1991: 18) states that “up to now, society has not allowed the building of things which cannot be explained in terms of functionality.” He argues that the ‘irrational’, seemingly non-functional quality of allowing nature into architecture is important. He also contests the view of building-occupants as production machines - “...people are not just parts to be plugged into functional spaces but creative, active beings” (Ando, 1991: 18). These ‘creative beings’ need to interact with the spaces they find themselves in.

In contemporary architecture, the focus seems to have shifted from functionality to commercial viability. Spaces are planned to allow for maximum use, and quality is often disregarded in order to cut costs. The comfort and health of the final occupant is very often a neglected component in the design of these buildings. Many of these spaces are too small for comfortable occupation, and are of a generic character.

A new vision is needed, in which architecture concentrates on the wellbeing of the human occupant. Although the current preoccupation with ‘sustainable’ practices often leads to more habitable, occupant-friendly buildings, it is still focused on technology instead of the occupant. In this thesis the author will argue for an architecture centred on the *experience* of architecture which is centred on the occupant, and not on the technology.

Life in contemporary society is often disconnected from the natural environment. Various external stimuli in present-day living also contribute to a disconnection from the self. In order to be truly healthy, humans need to *feel* healthy. Quality of architectural spaces may contribute to this feeling of health.

In order to create an awareness of the self, spaces need to be activated, and a dialogue established between the architecture and the occupant. Awareness of the self will facilitate the awareness of health. Healthy architecture should aim to bring humans in contact with nature, and to make them aware of their own being. For architecture to possess and encourage life, it must engage the user in experiencing the architecture. Pallasmaa (2005: 11) refers to ‘life-enhancing’ architecture, which has to “address all the senses simultaneously and fuse our image of self with our experience of the world.”

In this theoretical discussion, the theories of Tadao Ando on Nature; Juhani Pallasmaa and Christian Norberg-Schulz on Phenomenology and Marietta S. Millet on light are predominantly used as points of reference. The focus is on the metaphysical aspects of healthy buildings, and the author suggests that a deeper connection to nature and to the self contributes to overall health.

METAPHYSICAL ASPECTS OF HEALTHY BUILDINGS

The everyday life-world contains the tangible as well as the intangible (Norberg-Schulz, 1979: 6). In the same way, health is not only a physical state, but also has emotional facets. Physical health can be improved through architectural ergonomics and physically healthy buildings, while the emotional side of physical health is connected to metaphysical aspects of the architecture.

Phenomenology opposes the Modern idea of purely functional architecture, and the house as a “machine for living in” (le Corbusier). Norberg-Schulz (1979: 6) argues that architecture contains meaning, which is evident in the concept of existential space (the basic relationship between man and his environment). Another dimension exists in architecture, which relates to the psychological experience of architecture.

This experience cannot be quantified.

Day (1993: 16) discusses the importance of both the physical and metaphysical aspects of healthy environments: “Architecture has responsibilities to minimize pollution and ecological damage, responsibilities to minimize adverse biological effects on occupants, responsibilities to be sensitive to and act harmoniously in the surroundings, responsibility to the human individualities who will come in contact with the building, responsibilities not only in the visual aesthetic sphere and through the outer senses but also to the intangible but perceptible ‘spirit of place.’”

Norberg-Schulz places a lot of emphasis on the spirit of place (*genius loci*), and its effect on the human experience of architecture. Places have meaning resulting from their association with certain events, uses and history. His concept of *existential space* refers to the basic relationship between man and his environment. He (Norberg-Schulz, 1979: 8) refers to ‘place’ as a “...qualitative, “total” phenomenon, which we cannot reduce to any of its properties... without losing its concrete nature out of sight.”

Pallasmaa (2005: 7) agrees with this notion, stating that “[t]he way spaces feel, the sound and smell of these places, has equal weight to the way things look.”

In order to create a holistically healthy architecture, this metaphysical, connotative aspect of architecture needs to be addressed. A healthy environment should appeal to the psyche, and should *feel* healthy to its occupants.

Kaplan & Kaplan, in the publication *The Experience of Nature: A Psychological Perspective* (1989) investigate the psychological experience of nature, and concludes that contact with nature, even in the smallest degree, has healing properties. Patients in hospital rooms with a view on the outside, recovered faster than those in rooms with windows facing other buildings (Ulrich 1984 cited in Kaplan & Kaplan, 1989). This proves that being in contact with nature makes humans *feel* healthier.



This psychological effect of nature on human health will be exploited in this thesis, in order to create an *emotionally healthy architecture*.

CONTACT WITH NATURE

Nature is often absent in cities. Urban sprawl leads to city centres that are many kilometres away from ‘natural’ amenities. Urban parks and landscaping connect humans to nature to some extent, but in these are irregular connections. Norberg-Schulz states that “[f]or modern urban man the friendship with a natural environment is reduced to fragmentary relations” (1979: 21).

The contemporary city overwhelms humans with information. Cities contribute to visual and aural over stimulation. This detracts the attention from the inner self and disperses it on the cluttered surroundings. In order to reconnect with their inner being, so that they can benefit from true emotional health, humans need to reconnect with nature. The healing power of nature has been proven by Kaplan & Kaplan (see above), and in order to experience this power, humans need to form a new bond with nature. Ando (1991: 460) states that “human life is not intended to oppose nature... but rather to draw nature into an intimate association in order to find union with it.”

The Pretoria CBD is especially disconnected from nature, as it has an incoherent open space system, and many of these open spaces are underutilized due to lack of maintenance and security risks (Sindane, 2006).

Connection to nature may be re-introduced into this urban context in delicate ways. On an urban scale, the *Discover Pretoria* framework aims at reconnecting open spaces in the CBD, and on an architectural scale, this thesis suggests reconnecting to nature by engaging in a subtle dialogue with it. The connection between man and nature need not be explicit; the glimpse of a ray of light is enough to make the occupant aware of nature. The four elements of nature - earth, fire (light), wind (air) and water – may be used to emphasize the role of nature in the man-made environment of the city.

“...man is an integral part of the environment, and ... it can only lead to human alienation and environmental disruption if he forgets that”

Norberg-Schulz, 1979: 23.

UTILISING THE FOUR ELEMENTS OF NATURE TO FACILITATE CONTACT WITH NATURE

The classic four elements of nature emphasize the connection between man and nature. Ando (1991: 19) believes that “nature in the form of water, light and sky restores architecture from a metaphysical to an earthly plane and gives life to architecture”

Of the four elements – earth, light, air and water, the main focus is on light as form-giver, as it has a long legacy in architecture. The author believes that light plays an integral role in the experience of space, and in human health.

EARTH

The presence of earth is given significance by the contrast with the sky. Earth is what grounds us; sky is what sets us free. Norberg-Schulz states that “[t]he sky primarily has “cosmic” implications, whereas the earth may satisfy man’s need for protection and intimacy” (Norberg-Schulz, 1979: 24). This contrast between earth and sky make them inseparable from each other. Neither can exist in the absence of the other.

Norberg-Schulz states that man dwells *between* earth and sky. Thus, the focus of a space may be either on the earth, or on the sky, while at the same time incorporating both.

AIR (WIND)

In this case, 'air' may be translated into 'natural ventilation'. Artificial environments often rely solely on air conditioning for the flow of clean air, but the author believes that natural ventilation is a healthier alternative, especially considering the presence of Sick Building Syndrome in many air-conditioned buildings.

WATER

Places which host water attract people. Properties surrounding dams are sought-after. In the absence of a large body of water, smaller water features may be introduced to connect humans with the healing effect of water. Ando holds the opinion that there is a profound relationship between water and the human spirit (1991: 12).

Water has many characteristics - "it becomes a point of gathering, a source of power, a place of culture and reflection, or a place of limits and imagination" (Betsky, 1995: 12). Architectural properties of water include reflection, movement, tension and acoustic buffering.

The sound of falling water is serene; reflections in water reconnect humans with their environment; the presence of water has a cooling effect on its surroundings. Children play in water on summer days, while parents watch from the sidelines. Water can be both a tranquil and an interactive element.

Betsky proposes the use of water in architecture to oppose the disconnection between humans and nature. She (Betsky, 1995: 11) states that "...if buildings divorce us from nature, both to protect us from the elements and to erect a more rational human realm in its stead... the sensual play of water reconnects us."

LIGHT (FIRE)

Light possesses an almost spiritual quality. It reflects the passage of time, and has physical healing properties, as it produces vitamin D in the body (www.ajcn.org). Light can have a significant presence in architecture. Except for its physical qualities, light also possesses metaphysical qualities.

The intensity of light influences the experience of space. Dark spaces appear to be mysterious; illuminated spaces exhibit their contents. The contrast between the two forms a psychological barrier. Light may be focussed on one spot to emphasise it or diffused to create a homogenous quality of light. The combination of these uses contributes to the complexity of the experience of architecture.

Different levels of light suggest different activities and different levels of interaction with the space. The contrast and manipulation of light and shadow holds many possibilities for the architecture. Pallasmaa (2005: 47) states that "in great architectural spaces, there is a constant deep breathing of shadow and light; shadow inhales and illumination exhales light."

Light is connected to the temporal rhythms of nature. The quality of light changes as the day progresses, and transforms with the seasons. This passage of time is visible in the aging of materials; the play of shadows on a wall. Involving the occupants of the architecture in the passage of time enhances their experience of nature. Ando (1993, cited in Heneghan, 1993: 10), states that "the isolated fragments of light suggest the entire natural world."



Fig 1.6 - 1.8 LIGHT + SKY

“...light, moving in compliance with time reveals the existence of an architecture that is profoundly implicated in the interrelatedness of man and nature”

Tadao Ando, 1993: 24.

INTERACTION WITH SPACE/ AWARENESS OF THE SELF/ DIALOGUE WITH THE OCCUPANT

Body-awareness and awareness of being-in-the-world are pre-requisites to health-awareness. Pallasmaa (2005:64) articulates this: “We behold, touch, listen and measure the world with our entire bodily existence, and the experiential world becomes organised and articulated around the centre of the body.”

An architecture that establishes a dialogue with the occupant makes that occupant aware of his experience and may be used to make him aware of his role in his own health. Pallasmaa states that “architecture articulates the experience of being-in-the-world and strengthens our reality and self” (2005: 11).

This interaction with the environment may be exploited to both ends of the spectrum: *interactive spaces* that make the occupant aware of his own being, and *contemplative spaces*, in which the occupant is unaware of the self. In-between spaces may also exist, in which the occupant is alternatively aware and unaware of his environment.

“Our bodies and movements are in constant interaction with the environment; the world and the self inform and redefine each other constantly. The percept of the body and the image of the world turn into one single continuous existential experience; there is no body separate from its domicile in space, and there is no space unrelated to the unconscious image of the perceiving self.”

Pallasmaa, 2005: 40



CONCLUSION

Architecture influences the daily lives of its occupants. This places a great responsibility on architects, which has often been neglected. Building environments need to support the health of their occupants, and not to negatively influence it.

A healthy environment is one where the occupant is aware of the environment. This refers to two aspects – the natural environment, and the passing of the hours and changing of the seasons; and the immediate physical and metaphysical environment, which is the quality of the architecture.

The metaphysical aspect of architecture may be embraced to expose the spirit of nature and health to its occupants. Connecting humans with their natural environment should contribute to their sense of health and contentment.

Pallasmaa (1995: 71) states that “architecture reflects, materialises and eternalises ideas and images of ideal life.” In this case, the ‘ideal life’ is a healthy life, and architecture has the potential to exhibit this ideal. A healthy life is an interactive life, which is connected to the self, and to nature.

From a psychological point of view, contact with nature has many benefits, including being satisfying to experience; supporting human functioning; permitting people to move about and to explore with comfort and confidence; and fostering the recovery from mental fatigue (Kaplan & Kaplan, 1989: 196).

“Architecture emancipates us from the embrace of the present and allows us to experience the slow, healing flow of time.”

Pallasmaa, 2005: 52.



3 LITERATURE STUDY + RESEARCH METHODOLOGY

Health in an architectural sense relates to the physical as well as the metaphysical. Thus, the author followed two divergent paths in sourcing information. The first collection of information relates to theory on architecture (metaphysical) and the second collection relates to the technical aspects (physical) of creating healthy environments.

For the theoretical investigation, the focus is mainly on nature, and inviting nature into architecture. Phenomenology and psychological data are used as supporting theories on the metaphysical aspects of space, and how they influence the occupant, and thus also his health.

Three authors were identified and examined. Tadao Ando, the acclaimed Japanese architect, theorises about the role of nature in architecture. Various writings by Ando were consulted, including the publication *Tadao Ando: Buildings Projects Writing (1984)* by Kenneth Frampton.

Marietta S. Millet is a professor of architecture at the University of Washington in Seattle. She is a partner in Loveland/Millet Lighting Consultants, and has received many awards for her work with lighting. Her publication *Light Revealing Architecture (1996)* was consulted.

Christian Norberg-Schulz is an architect and theorist, who is interested in Phenomenology. He theorizes about the metaphysical realm of architecture, and the genius loci of places. His book *Genius Loci: Towards a Phenomenology of Architecture* explores these concepts.

Juhani Pallasmaa is an architect and former professor of architecture at the Helsinki University of Technology. The author consulted his book *The Eyes of the Skin: Architecture and the Senses (2005)*, and his article *Hapticity and Time: Notes on a Fragile Architecture (2000)* on the metaphysical aspect of architecture.

A questionnaire (see Appendix C) was formulated in order to quantify the factors which people perceive to detract from or improve their working environments. The opinions of one hundred people were analysed, and these conclusion were made: interior environments which have no contact with the outside; allow for no social interaction; and host artificial environments are perceived to be 'unhealthy', while environments which allow the users control over thermal comfort; allow for views to the outside; and are conducive to social interaction are perceived to be 'healthy'.

Where the technical aspects of healthy environments are concerned, passive systems were researched via *Naturally Ventilated Buildings: Buildings for the Senses, the Economy and Society (1997)* by Clements-Croome and *Sustainability at the Cutting Edge: Emerging technologies for low energy buildings (2007)* by P.F. Smith. A senior researcher at the Council for Scientific and Industrial Research, and one of the creators of the South African Green Star rating tool, Llwellyn van Wyk, was also consulted for advice on sustainability issues.

Materials were researched by consulting the web sites of material suppliers. Sizes of structural members were calculated from formulas from *Building Construction Illustrated* by F.D.K. Ching and C. Adams, and standard steel members were sourced from *South African Steel Construction Handbook by the South African Institute of Steel Construction (1987)*.