

Code Green

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Abstract

Spratt and Sutton's book *Climate Code Red* (2008) compellingly outlines the tremendous challenges facing our natural world, making an urgent call to change the way in which we live in it. Like environmental alchemy, these red alarms inspired many green solutions, including the rise of 'ecovillages', one of which is the internationally awarded and aptly titled The Ecovillage, developed by Landmatters Currumbin Valley Pty. Ltd. and located on the Gold Coast, Queensland, Australia. Although the master planning and infrastructure of The Ecovillage – including its ecohamlets, low-impact streets, water-sensitive urban design, communal waste treatment/recycling facilities and expansive green spaces – create the foundation for its success, it is the Architectural and Landscape Code that shapes what grows from that solid base.

It is my assertion that the ideologies embodied in this code document and others like it can be referred to as 'Code Green', a phrase which echoes both urgency and hope and represents a fundamental tool in the creation of sustainable residential design outcomes on a large scale. As a compilation of environmental design exemplars, equipment specifications and minimum standards, sustainable design codes serve as a type of recipe that is able to ensure a best-practice Environmentally Sensitive Design (ESD) outcome, no matter what level of expertise the individual resident, designer, builder or other stakeholder may bring to the project. These codes work on several levels: education, prescription, example, process, reporting, enforcement and maintenance, with the combination of these strategies providing the basis for their success. Written from the perspective of someone who both contributed to and implemented this code in its inaugural year, this paper offers an overview of its history, structure, content and administration, contributing valuable insights, information and experience to the housing industry.

Keywords: biodiversity, body corporate, codes, community, 'dark sky', 'ecohamlet', environmentally sustainable design (ESD), 'Greenway', monitoring.



1 Introduction

‘Code Red’, an internationally recognised symbol of warning, was a concept used by Spratt and Sutton [1] in their similarly titled book, *Climate Code Red*, to make the case for emergency action and warn the world of the impending crisis of climate change. In sync with the growing environmental awareness that this publication reflected, a number of environmentally aware and sensitive residential communities were created on the Gold Coast in Queensland, Australia and throughout the world. With some of these estates winning accolades for their success in the delivery of sustainable urban settlements, as well as accreditation under new environmental rating schemes [2], it can be argued that their developers are part of the green solution. This paper serves to illuminate just how much they rely on their guidelines, covenants, codes and bylaws to facilitate the environmental outcomes central to their vision – the phenomenon referred to here as ‘Code Green’.

2 The code green journey

Although Landmatters’ now world-renowned Currumbin Ecovillage [3] had its origins in the 1980s when the site was purchased from a local farmer, the journey actually began in California in 1975, where a small ‘eco village’ called Village Homes inspired two Landmatters directors, Chris Walton and Kerry Shepherd. After securing the land and forming their vision, they spent the next 20 years creating a ‘world leading, ecologically sustainable and conscious community where people and nature flourish in beauty, harmony and integrity’ [4].

I became involved with The Ecovillage through the Architectural and Landscape Code, one of the fundamental tools used by Landmatters to fulfil this vision. Having spent time working with a law practice on the Architectural Code for the EnviroDevelopment-certified Coomera Waters estate on Queensland’s Gold Coast, the legal team sought degenhartSHEDD’s permission to use this co-drafted Architectural Code as the basis of a code for a new sustainable community: The Ecovillage.

3 Ecovillage principles

A discussion of the Architectural and Landscape Code of The Ecovillage must be prefaced by an understanding of its founding principles: ‘Landmatters ... intends to practically and successfully develop the subject land and achieve a vision of inspiring sustainable living/development practice and awareness by creating an Ecovillage that exemplifies World’s Best Practice in its design, construction and accompanying processes’ [5].

To fulfil this goal, a group of principles were developed within three critical categories: environmental, social and economic [5], reflecting the ‘triple bottom line’ of Queensland’s sustainability rhetoric [6].



3.1 Environmental principles

Although the environmental, social and economic aspects of environmentally sensitive design enjoy equal importance, the environmental principles translate most readily into the format of a code, and are also easily measured; in fact, even the language of the environmental principles speaks of quantity, i.e., ‘restriction’, ‘minimisation’ and ‘maximisation’.

3.1.1 Biodiversity

‘Restore, maintain and enhance biodiversity, acknowledging the intrinsic right to life of all species’ [5]. This principle of biodiversity is supported by such controls as the restriction on the ownership of cats and dogs within the community, thereby reducing the risk of non-indigenous predators to the native fauna. Australia has a rich culture of dog ownership amongst those closely associated with the land, so this control is a clear break from tradition.

3.1.2 Minimise change

‘Strictly minimise impact and change to air, soil and water in any way to ensure equity for all elements of the natural environment, whether living or inanimate’ [5]. This means the site should look the same after the construction of the dwelling as it did before, except, of course, for the existence of the dwelling itself.

3.1.3 Minimise consumption

‘Strictly minimise consumption of resources and energy, both now and in the future’ [5]. This principle is supported strongly by the code through a maximum dwelling size – a direct contradiction to most covenants on the Gold Coast, which historically mandated a *minimum* dwelling size. Mandating smaller homes is a refreshing departure from the ‘McMansion’ [7] trend of the largest house on the smallest lot, and decreases both the building and the ecological footprint.

3.1.4 Minimise impact

‘Minimise impact on the local and global environments, optimising local ecological food and material production opportunities’ [5]. The code responds to this principle by making it a requirement for each dwelling to plan for and provide a vegetable garden and/or orchard, with householders ideally producing more food than they can consume, supporting the social interaction of barter.

3.1.5 Maximise connection

‘Foster a deep sense of human connection to, and interdependence with, the land’ [5]. As an architect, the essence of any design always starts with the site, or land. When the privilege of living in interaction with this land exists – increasingly rare with urbanisation – a code such as The Ecovillage’s can support such interaction both physically (in terms of levels, access, structure and hydrology) and psychologically (with a perpetual synthesis of house and land).



3.2 Social principles

For both clarity and brevity, the seven social principles have been divided into two categories below: those that address issues primarily occurring before and after dwelling construction; and those that directly impact on dwelling design.

3.2.1 Values, regulatory mechanisms and social connectedness

In residential developments, principles concerning values are established primarily during the early community consultation and master planning stages; regulation is a control exercised mostly post-construction; while social connectedness is expressed both before and after dwelling construction.

‘Respect and honour cultural, historical and spiritual values’ [5] was a principle upheld through considerable liaison with long-time residents of the valley during the master planning stage, including the original Indigenous custodians to the extent possible.

‘Ensure regulatory mechanisms that ensure social equity over time’ [5] is a principle addressed by the Village Design Panel (VDP). The VDP is the design assessment authority established under the Community Management Statement, the controlling document of the land-ownership strategy referred to as ‘community title’ (see also 4.2).

‘Promote social connectedness, empathy, ownership and attachment to place and community’ [5] is a principle well ingrained at The Ecovillage – more so than other ‘new’ communities. In fact, recent legal cases brought against the developer Landmatters by the estate’s body corporate demonstrate (albeit in a negative way) the social capital that has been created. A more positive expression of this connectedness is the high take-up of the communal child care program, which was so popular that, being originally open to the public, it had to close down for a time so that it could re-open for Ecovillage residents only.

3.2.2 Social equity, health, safety and comfort, sustainability and aesthetic sensitivity

These principles are much more tangible within the code, as outlined by the examples below.

‘Enable sustainable community by designing for social equity, diversity and interdependence, honouring differences and catering for the needs of individuals through the different stages of life’ [5] is a principle expressed in the code through two primary controls: a minimum ‘Adaptable Housing’ [8] score that contains a bonus for the encouragement of home offices, and a maximum dwelling size (see also 3.1.3).

‘Maximise health, safety and comfort of the built environment to provide enduring quality of life’ [5] is a principle expressed uniquely through the hamlet design concept, whereby dwelling sites are clustered in small groups or ‘ecohamlets’ [9] adjoining a central communal area known as the ‘Greenway’. Greenways have been designed to provide a linking element between the houses within an ecohamlet, with controls stipulating two entry frontages for each residence: one to the access road and one to the Greenway.

‘Promote awareness and education of ecological issues including sustainability’ [5] further reinforces ESD for all dwellings at The Ecovillage, as it is one of the most fundamental outcomes sought by the code. The code requires standards of energy certification above the current state legislation [10], and there are also minimum standards for the incorporation of recycled building materials and the restriction of materials that contain high amounts of embodied energy or disproportionately contribute to greenhouse gas (such as concrete, the third-largest manmade contributor) [11].

‘Utilise aesthetic sensitivity to create a continuing sense of place and beauty that inspires, affirms and ennobles’ [5] is a principle that contradicts the myth that ESD must be somehow aesthetically inferior. While The Ecovillage code embraces the expression of sustainability paraphernalia (e.g., solar panels, water tanks, chicken coops etc.), beauty of the built form is still stressed – the expression coined by developer Chris Walton to best describe the desired aesthetic outcome was that the dwelling should be ‘likened to a jewel’.

This jewel analogy is apt, as a key aesthetic feature of any house at The Ecovillage is its many-faceted nature, expressing a multiplicity of significant facades that include both its street and greenway entries. Unlike its typical street-centric suburban counterpart, an Ecovillage house is more three-dimensional than simply a box sporting a fancy portico. Landscaping too forms a critical component of this theatre-in-the-round aesthetic, particularly through the effective integration of both landscape and architectural design.

3.3 Economic principles

Without mindfulness of economic principles, none of the preceding principles would be realised. The Ecovillage is now truly being tested in this mindfulness, caught awkwardly by the financial crisis at a significant time in its development: just prior to the release of its most prized and affluent precinct, The Highlands. Again, these principles have been separated between those impacting directly on dwelling design and those effected during the master planning stages.

3.3.1 Excellence of design, minimise operation costs, minimise obsolescence, change and reuse

Striving for excellence of design, minimising operating costs and maximising the potential for adaptability and reuse are the key economic considerations that can be embodied in the dwelling design, as demonstrated below.

‘Promote ecovillage economic viability through excellence of design’ [5] is basically the principle of ‘good design sells’, and the first step to *producing* good design is *valuing* good design. Landmatters were mindful of this value in their design processes – including master planning, landscaping and signage, as well as communal buildings and infrastructure – thereby providing exemplars for dwelling designs. The code further extends this philosophy to: appropriate orientation; site constraints; urban design; community interrelationships; and the scale, mass, articulation, textures and colours of the buildings themselves.

‘Ensure minimising of maintenance and operational costs’ [5] is an intrinsic by-product of the reduction in consumption demanded by the environmental and



social principles. For example, producing energy through solar panels, collecting and harvesting rainwater, and recycling and reusing wastewater all significantly reduce operational costs, and the fact that the community is 'off-grid' means that it enjoys a privileged exemption from city water rates.

'Minimise obsolescence through design of enduring component life cycle' [5] is likened to the mandate to use colour-coated steel roofing – although this material has a high embodied energy, its long life expectancy and intrinsic capability for reuse more than offsets its high-energy origins.

'Provide for change and reuse at minimal cost/loss' [5] is a principle expressed through the requirements for building materials to be recyclable, designed to suit standard manufactured product modules, and mechanically fixed (i.e., with screws and bolts, not glue, facilitating demolition and reuse).

3.3.2 Capital appreciation and economic productivity

Capital appreciation and economic productivity are, in contrast, principles embedded mostly within the master planning and infrastructure investment.

'Ensure enduring property value growth' [5] is a challenging principle to achieve through an Architectural and Landscape Code, especially with volatility in local and global markets, but the existence of the code at least offers predictability – and, therefore, some stability – to potential buyers and investors.

'Enable economic productivity and contribution to local and world systems and economies' [5]. The planning instruments and codes of The Ecovillage promote work-at-home solutions; for example, inclusion of a home office within a dwelling design. Typically, work-at-home activities are not properly planned for and must be introduced through a sub-standard design, expensive retrofit, or both. By ensuring that such activities are provided for from the outset, working from home at any stage in the lifecycle of the building is easy and economical.

4 The architectural and landscape code

Chris Walton, Grahaem Metzler, Mick Lyons and a team of some 20 others (including myself) all had a hand in the Architectural and Landscape Code, although it is primarily of Chris Walton's authorship. There are different codes for each of the three precincts – Creek Flats, Valley Terraces and The Highlands – with each code averaging about 70 pages in length. The external costs of drafting the first version of the code (i.e., consultant expenses) totalled over \$100,000 – adding the time invested by Walton himself would double that.

4.1 Architectural and landscape code structure

Each code is made up of two parts: diagrammatic controls or Lot Evaluations, being a micro urban design brief for each lot; and written controls applicable to all lots within the precinct.

4.1.1 Diagrammatic controls

Design Forum Architects (now degenhartSHEDD) prepared a series of Lot Evaluations for all 140 lots at The Ecovillage, with those for The Highlands



sharing an accolade (with Landmatters Pty Ltd) in the Helen Josephson Award for Innovation at the Gold Coast Urban Design Awards in 2009 [12]. A location plan and a lot evaluation from each precinct are illustrated in fig. 2.

4.1.2 Written controls

The written controls of the code contain the usual general sections on enforcement regimes, assessment processes, non-compliance parameters, definitions, references and the means of amending the code. These controls also contain detailed requirements for addressing the design of improvements to the land, soil, energy, water, waste/refuse/recycling, landscaping, community enhancement, accessibility, privacy/security/safety and signage.

4.2 Architectural and landscape code enforcement strategies

The enforcement strategies primarily responsible for maintenance of code compliance include: the VDP review and approval process; the body corporate management structure; and the conditions of approval for the development, which form a separate legal instrument of the local authority.

4.2.1 Village Design Panel (VDP)

The VDP is the administration entity for the code and has historically been operated by a professional advisor, a role our practice fulfilled initially from 2005 to 2006, assessing proposals for the first 25 dwellings.

4.2.2 Body corporate and construction bond

A community title estate has a body corporate, the legal entity made up of members who have ownership of land within its Community Title Scheme and having the power to exercise regulation over those members. This entity provides the mechanism for the payment of a construction bond – a tool providing leverage to ensure compliance with the code in addition to the remedies available under the Body Corporate and Community Management Act and contract law.

4.2.3 Conditions of planning approval

Although a body corporate will reflect the changing views of its members, the Community Management Statement (the legal document that outlines the rules and visions of the body corporate) is legally bound to the conditions of the planning approval for the land. Once those conditions have been stipulated, anyone applying for construction at The Ecovillage must comply with them, further reinforcing the code through an interplay of legislative instruments.

4.3 Architectural and landscape code content

The content of the Architectural and Landscape Code is organised into ten sections that reflect the principles discussed above (see also 3.1, 3.2, 3.3). These sections include land, soil, energy, water, waste, materials, landscape, monitoring, economy, and community.



4.3.1 Land

‘The Land is everything!’ [13] Sustainable design – like good design – always starts with the site, and the code at The Ecovillage provides lot evaluations (see also 4.1.1 and fig. 2) that stipulate the building footprint and associated works, again minimising impact and protecting existing flora and fauna.



Figure 1: Houses at The Ecovillage designed by degenhartSHEDD using a jewel-like built form (left) and 75% recycled materials (right).



Figure 2: (Clockwise from top left) Ecovillage precinct location plan; Creek flat lot evaluation; Valley Terraces lot evaluation; The highlands lot evaluation.

4.3.2 Soil

Soil degradation is one of the single greatest threats to the environment, and this section of the code addresses soil life, hydrology, typography (cut and fill), and maintenance of the site during construction.

4.3.3 Energy

Energy is clearly associated with sustainable appliances such as photovoltaic cells, but getting the basics right is more important. Passive solar design involves providing the optimum orientation, shading, insulation, ventilation and thermal mass, with detailed sun studies being required to ensure best outcomes.

4.3.4 Water

As The Ecovillage is not connected to the city water supply grid, adequate storage is essential, and water tanks ranging from 25kL for a single bedroom dwelling and 37.5kL for a two bedroom dwelling to 49kL for a three bedroom or more dwelling are required.



Figure 3: Community centre (left) and the reuse of rusticated weatherboards.

4.3.5 Waste

Household waste is managed through recycling and composting, but The Ecovillage also requires minimisation of construction waste and provides blackwater and greywater sewerage treatment at communal facilities on-site.

4.3.6 Materials

Materials are critical to sustainable solutions, and a holistic design will address this issue vigorously due to its great potential for large-scale positive outcomes.

For example, as stated in 3.2.2, concrete or cement is the third-largest manmade source of carbon dioxide [11]. It is also the second-most widely used material on earth (after water) [14]; and the fastest-growing source of greenhouse gas. By limiting the use of concrete, and mandating the use of green concrete where it is unavoidable, the code at The Ecovillage is having a real impact on this staggering statistic.

The control of colour too can have some profound effects. In fact, the use of a white colour for all roofs and pavements on a worldwide basis would be equal to removing all cars from the road for eleven years [15]. While many homeowners simply 'just want' to have a black roof, every dark roof is doing harm.

4.3.7 Landscape

The use of endemic, native species is paramount, but there is also an emphasis on edible landscape with vegetable gardens on every lot, orchards, and the keeping of chickens forming part of the landscape planning.

Another unique requirement of the code is the ‘dark sky’ policy, restricting the use of external lighting and enforcing the capturing of interior light at night to allow local fauna to enjoy more natural nocturnal conditions.



Figure 4: A dark-roofed village versus covenant-controlled light roofs.

4.3.8 Monitoring

The code mandates installation of a metering and control system, Ecovision [16], which monitors energy/water supplies and usage, as well as building temperature, on a real-time basis. This information is collected for immediate and historical analysis on both an individual household and community basis.

4.3.9 Economy

Although affordability is difficult to mandate through a code, two principles – at odds to typical industry covenants – are significant in this regard. The first is the application of a *maximum*, rather than *minimum*, house size; and the second is the embracing of recycled and reused materials (see, for example, fig. 1).

4.3.10 Community

This element embodies the concepts of beauty, health, safety, adaptability, accessibility, privacy and the encouragement of social interaction through design. The Community Management Scheme (see 4.2.3) – which provides for the common ownership of community buildings and open space – supports this element, but on a more intimate scale the ecohamlets and Greenways push neighbours to negotiate collective decisions about their immediate environment.

5 Implementation

Having all of the above principles and elements on paper is only the start—the real test is the implementation of the code, a process summed up by these four stages: Educate, Evaluate, Execute, and Enforce.

5.1 Educate

Education is an ongoing process, but one of the most important opportunities is a design meeting with the VDP assessor *before* the design is commenced.

5.2 Evaluate

The design evaluation process at The Ecovillage is thorough and rigorous, not unexpected considering the 70-plus pages of controls. However, the code – and the evaluation process – is essentially just a detailed recipe for sustainable design: all dwellings that follow the code are guaranteed a good ESD outcome.

5.3 Execute

Naturally, the execution – or construction – of the design on-site is the real test of the code, but the rigorous processes and attention to detail virtually assure that the predicted outcome is realised.

5.4 Enforce

Enforcement is the end game that ensures execution, and it mainly relies upon frequent inspection of the estate and a final inspection of the lot and completed dwelling prior to the release of the construction bond.

6 Summary: the big picture

So, can ‘Code Green’ have a positive impact on ‘Code Red’? The Ecovillage suggests that it can, and that design codes with an environmental focus will in fact become increasingly important in the advancement of the sustainability issue within residential environments. With over 23% of Australia’s total greenhouse gas emissions attributable to buildings and their users [17], addressing these issues has the potential for significant impact.

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