

Ecopolis
**Towards an Integrated Theory for the Design,
Development and Maintenance of
Ecological Cities**

VOLUME 1

Including:

Propositions – Epistemology – Perspectives – Projects

Parts A & B



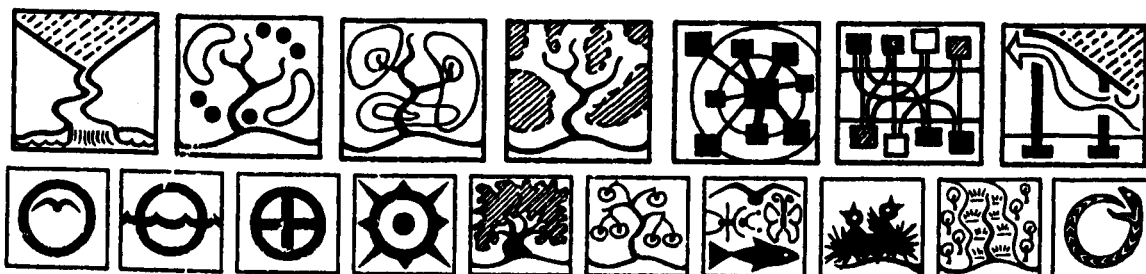
Ecopolis

Towards an Integrated Theory for the Design, Development and Maintenance of Ecological Cities

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Charter of Calcutta¹

We are at a turning point in history.

Our planetary environment is severely damaged.

Desertification is spreading, the globe is warming.

Entire ecosystems are under threat.

And the City is at the centre of the storm of destruction.

But that is the key!

We must cease seeing the City as a problem.

We must see the City as the solution.

For the City is our home.

It is what we make it to be.

It is where we live.

If we fail to seize the Future,

We will be consumed by the Past.

The Future begins NOW!

Let the Charter of Calcutta be simple and clear,

To be heard by all,

And filled with hope and vision -

The City Can Save the World!

¹ 'Proposed by Paul F. Downton (Australia), endorsed by a panel consisting of Dr. Wale Odeleye (Nigeria), Prof. Christine Boyer (USA), Mr. Dean Ackemecht (Switzerland) and Prof. Santosh Ghosh (India) and adopted in the Concluding Session of the International Conference and Exhibition on Architecture of Cities held in Calcutta on the 20th. November, 1990 and organised by the Indian Institute of Architects, West Bengal Chapter.'



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¹ The decorated letters that are used to identify each of the three main parts of the thesis are by the author and were first used in the annotated bibliography co-edited by the author and David Munn.



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ABSTRACT

This thesis is about creating and maintaining 'ecological cities'. It contains four sets of propositions about the necessary conditions for making ecocities. It sets the creation of human settlement in an ecological context and demonstrates through case study analyses that practical approaches to urbanism can be made with a theory of city-making grounded in principles of direct democracy and cooperative community processes.

It is argued that these principles are inherent in theories and practices that have produced, or are intended to produce, urban settings that are ecologically responsive and socially successful. Part A of the thesis identifies theorists, practitioners, places and philosophies in support of this contention.

At the heart of this academic work lies an abiding concern with implementation. The author has been an advocate, activist and architect in the three inner-urban ecological development projects described in Part B of the thesis. This empirical action research into 'what was planned' and 'what happened' contributed to the construction of knowledge in the 'Ecopolis' theory.

Part C describes selected material pertinent to the synthesis of the Ecopolis propositions and sets out design and planning tools for achieving Sustainable Human Ecological Development (SHED). Indications are given as to how those tools relate to the implementation of the Part B case studies. SHED is about the totality of human decisions and choices made in order to provide and maintain conditions for human habitation within the biosphere. Linkages rather than barriers, commonality rather than difference, integration rather than separation and mutual aid rather than competition describe this totality.

The thesis concludes that allied understandings of buildings, cities and living systems can be placed in a framework that facilitates creation of 'urban systems consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes', and that the role of community patronage is central because of its intimate relationship to the nature and intent of those human purposes.

Finally, if cities are a form of extended phenotype for the human organism, then further research is urgently needed into the evolutionary role of city-making.

DECLARATION

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

Figures, Tables, Diagrams, Icons, Drawings, Photographs, Plans, Architectural Designs and other illustrative material are all by the author unless otherwise stated.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

Signed

Date 8 MARCH 2002

ACKNOWLEDGMENTS

Now I sit by the window and watch the cars
I fear I'll do some damage one fine day
But I would not be convicted by a jury of my peers
Still crazy after all these years.
(Paul Simon 1974)

During the past decade I have found myself in the role of either advocate, client, architect, developer, builder, educator¹, researcher, theorist or potential resident in relation to one or another of the ecocity projects that are the subjects of the case studies in this thesis. The entire experience has conditioned and invaded my private life beyond the point where I have felt that I have any real choice about it and it has required a good deal of tolerance and understanding on the part of those people most close to me – to all of you, my heartfelt thanks.

I want to acknowledge and thank all those members of Urban Ecology Australia, volunteers and interns, who have had energy and courage to give to the task of testing these ideas in the real world of the living community, especially: Emilis Prelgauskas, whose enthusiasm for the ideas of Ecopolis and Urban Ecology in the early years helped to sustain our collective momentum and get things to move beyond rhetoric; Sharon Ede whose constant questing after knowledge and information and determination to share it remains an inspiration; and David Munn, Urban Ecology Australia's first Life Member, who has been responsible for introducing me to more literature than anyone else – ever! David is the single biggest reason that the Centre for Urban Ecology has such a wonderful library and without him there would have been no Urban Ecology Bibliography. Over the years David has given me an almost complete library of the works of Lewis Mumford, works which remain a touchstone for my own endeavours as a researcher and writer on cities.

My special thanks to Richard Register, for demonstrating that non-professional, activist organisations can be effective vehicles for testing the strength and value of ecocity ideas, and to Richard and his cohorts for convening the First International Ecological City Conference where they had the courage to, unwittingly, launch that part of my career that has put me on a number of national and international conference platforms since 1991.

¹ I am obliged to thank the University of South Australia for providing part-time study leave for writing up this thesis.

Thanks are also due to Dr. Jeffrey Cook for supporting my efforts in researching architectural regionalism, Pliny Fisk for his inspiration and Dr. Steven Szokolay for his role in bringing me to the shores of Australia, the place that has provided the opportunities for taking the Ecopolis idea from theory into practice.

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Our children, Dafydd, Seren and Rhiannon have put up with enormous intrusion on their lives over the many years that I have pursued this ecopolitan obsession. They have grown up with these ideas and have seen my time taken away from them. Thanks for your patience kids.

My partner in life, Chérie Hoyle, has supported my ambitions and suffered the consequences; she has been the essential organisational force behind the creation of Urban Ecology Australia and its ecocity projects. She has lived the pleasure and pain of these ecopolitan experimentations as much as I have and quite simply, without her, this thesis and the projects that spawned it would not exist. Words don't say it well enough, but - thank you, Chérie.

Paul F Downton

Adelaide, February 2002

PREFACE

THE CITY IS MY UNIVERSITY

‘Many of the radicals of 30 years ago, burning with fervor for fundamental change, have since withdrawn into the university system they once denounced, the parliamentary positions they formerly disdained, and the business enterprises they furiously attacked.’

(Bookchin 1995 p.229)

vivendo discimus
(By living we learn)²

Preamble

In the last few years there has been increasing interest and a rising tide of published material concerning the idea of ‘green’, ‘sustainable’, ‘compact’, ‘environmental’ and ‘ecological’ cities. The evolution of Ecopolis as a theory is clearly influenced by particular writers and theorists but it has also been a product of life experience.

The genesis of this thesis can be traced back to the a preoccupation with regional identity and individual expression in architecture which began with the author’s personal discovery of Frank Lloyd Wright’s ‘organic’ philosophy of architecture circa 1968. At the age of seventeen, before entering university, the author developed a strong environmental awareness and was a founding member of an environmental organisation in Wells, Somerset called ‘Abacus’.

The radical politics of the time was informed by reaction against the Vietnam War, the ubiquitous threat of instant annihilation from global nuclear war, and the so-called ‘Oil Crisis’. The author’s awareness of the political dimension of architecture evolved through exposure to the politically charged environment of Wales in Cardiff where he undertook undergraduate degrees in architecture, wrote ‘The Politics of Aesthetics’ (Downton, 1976), got involved in student politics, and invited a group called Street Farm to present their experiments in autonomous, anarchist housing to the students of architecture in Cardiff. Regional awareness has always been very strong in the islands of Britain, and for this Englishman it was reinforced by the years spent in Wales. The difference in the form of urban settlement in the regions of industrial South Wales and rural South-west England is very marked, despite the short distance between them, easily spanned over the Bristol Channel by the Severn Bridge.

² Patrick Geddes’ motto (see Chapter 4).

As a student of architecture the author tried to design environmentally appropriate buildings and became active in community organisations fighting against the apparently universal forces which threatened to turn the old residential areas of cities like Caerdydd (Cardiff) and Abertawe (Swansea) into ghettos of high-rise office blocks. It was then that work began on projects in which one can find the beginnings of this present thesis, in particular the final year joint project with David Peace Pickles cited in Chapter 5 which proposed the redevelopment of a factory site in the medieval town of Beverley in Yorkshire using local materials, traditional architectural and urban form and construction, with the re-establishment of local craft and building skills as part of the development process. This project was later exhibited and published (Downton and Pickles, 1976). Other early forays into investigating strategies for ecological building included an unpublished paper on 'Zero Energy Building' (circa 1977) which set out a methodology for creating resource and location-limited architecture for long-term ecological sustainability.

In September 1982, just when the Palestinian camps of Sabra and Shatilla in Beirut were being pounded into rubble and the infamous massacres of civilians took place, the author arrived in Jordan to teach architecture at Yarmouk University. The two years spent with his family in that country taught much about both the ephemeral and eternal nature of building. Ephemeral, because things get blown up; eternal, because ancient classical architecture still stands there in biblical landscapes.

It was during the time in Jordan that the author began to sense more deeply the ebb and flow of history and its relationship to the physical dependency of architecture on a resource base, in turn determined by culture, economics and politics. Architecture, it seemed, belonged to its time and place and the choice of these was consequent upon human decisions. Perception of these relationships was sharpened by observing the manipulation of people, politics and resources as the Israeli state created 'facts on the ground' and used architecture as a weapon of war on the West Bank.

Learning more about Islam and the history of the three great monotheistic religions of the region (Judaism, Christianity and Islam), it was possible to identify the central role of the natural climate in shaping human affairs and in the development of culture and politics. The author had always seen that architecture was clearly linked to climate - a building envelope, after all, is essentially a climatic modifier - but the new realisation was that the cultural component of architecture was also conditioned by the climate.

Regionalism

Arriving in South Australia in July 1984 the author was struck by the general absence of climatic response evident in the architecture. This again underlined the power of the cultural imperative in making buildings by demonstrating how it could over-ride other considerations. When it came to formalising an initial research topic for pursuing a higher degree, all the above were subsumed in the proposed topic of architectural regionalism.

An initial aim to generate 'a theory of architectural regionalism' has been turned into continuing academic and practical work on ideas of 'urban ecology', tested in practice by the ecocity projects that form the case studies in Chapters 7, 8 and 9, and related activities. These programs owe much of their intellectual underpinning to this thesis and both point the way towards further productive research. Research must have practical application in the practice of architecture and the creation of human settlement which belongs to its place, people and region. This author's architectural and urban planning concerns simultaneously inform, and are informed by, the idea of 'dwelling' as a cultural, social and technological response to the fact of being alive in a living universe.

All this has been given further impetus by the discovery of so much congruence and converging energy in the diversity of information and ideas in the various fields of endeavour that combine in the field of ecological cities. The hope is that this thesis will in some small way contribute towards, and amplify, the synergies and synthesis that come from the bringing together of academic research, visionary dreamings and political activism so that 'ecological cities' do not remain a chimera, nor end up on the scrapheap of capitalist assimilation.

For good or for ill, a city amplifies the activities of the human organism. If those activities undermine the basis for the continued existence of that organism they are inherently dysfunctional, if they sustain or recreate the conditions for its continued existence they are ecologically viable. This thesis seeks an understanding of what is viable and how to design human settlement to create and sustain that viability.

The global environmental crisis is a crisis of civilisation. Over its 10,000 year history, city making and its coevolved cousin agriculture, has changed the face of the planet. Since industrialisation the pace has quickened, partly due to an exponentially increasing population and partly because of the rapacious nature of industrial development. Cities may have started as human scale creations but their impact on the environment was limited only by the available technology and a pre-fossil fuel energy

base. Once cheap energy started to fuel the engine of civilisation, cities grew fast and furious and the phenomenon of urbanisation measured development against the scale of mega-machines rather than people. The author's Ecopolis concept of development is a response to this history. It is an attempt to return to the human scale in city making, to return to the idea of city as community, and to make the city the centre of restorative activity rather than destruction. That kind of city is an ecological city - a city in dynamic balance within itself and with the nature of the land which supports it.

The concept of 'ecological corridors' was inspired by knowledge of revegetation programs being undertaken by Trees For Life in South Australia when the author's partner, Chérie Hoyle, was working as their office manager in 1988-90. The story of The Man Who Planted Trees and the campaigns of Richard St. Barbe Baker did much to inform the idea that revegetation could restore ecosystem function with multiple, synergistic benefits. The other two key 'lessons' from this vicarious experience of Trees For Life was that the community was a powerful source of energy as a workforce able undertake ecological projects with very little in the way of financial resources. The linkage between county and city folk was fundamental to the TFL program and inspired confidence in the idea that the two were not only functionally inter-related, but that the two communities could be brought together through shared purpose focussed on ecological restoration. Trees For Life continues to provide a sharply defined illustration of the strength of community resolve in the service of nature.

Much of the information and inspiration for this thesis has come from outside the walls of academe. Taking cues from Patrick Geddes and Lewis Mumford, two men who made enormous strides towards understanding what was required for the design of ecologically integrated urban systems (Kitchen 1975, Miller 1989) and in whose footsteps he is happy to try and tread, this author regards the city itself as his university.

Words

This PhD is about identifying things that work through the analysis of case studies, relating them to extant theories, supplementing with additional material as appropriate, and integrating the whole if possible. Any appearance of linearity in the structure of this dissertation is a consequence of the need to organise material in a literary format and is not necessarily implicit in the theory.

As a child of the fifties and victim and perpetrator of the radicalism of the 1960s and 70s, the author learned that language is powerful, and that it could be damaging, undermining the capacity for clear thinking with its capacity for conveying two or more meanings by surreptitious means. Since at least 1975 he has consciously sought to

avoid the thoughtless use of the male pronoun and irrelevant inflections of gender. When quoting a text that has failed to do the same, though it may strike some readers as tedious, the traditional method of calling attention to textual oddities (sic) has been employed because the job of creating gender-neutral language is far from done.

The author has tried to avoid obfuscation, believing it to be a kind of obscurantism that is the refuge of intellectual scoundrels.

Weaving the Thesis

This thesis may be seen as the picking up of several threads of thought in an interweaving of ideas and experiences drawn from various realms. The warp of social and cultural ideas and activities are given shape, pattern and form by the weft of construction, manufacture and design. This thesis then, is the fabric created by the weft of creative consciousness crossing the warp of society. It is a tapestry, a coat of many colours, a carpet or a wall hanging³. In any case, it represents an effort to find viable patterns in the making of human settlement that can be comfortably fitted on the body of Gaea.⁴

THE WARP ('the threads stretched lengthwise in a loom to be crossed by the weft.'⁵)

- Strands of Environmentalism
- Strands of Community Politics
- Strands of Libertarianism

And from the built environment:

THE WEFT ('the threads woven across a warp to make fabric.')

- Strands of Green Urbanism
- Strands of Green Architecture
- Strands of Green Design

The warp is made by the longest threads. The length of those threads can be taken as representative of time for, taking Stewart Brand's metaphor, cultural and social

³ Van der Ryn and Cowan also employ the imagery and metaphor of weaving in a similar fashion in their introductory chapter to 'Ecological Design'. This would seem to be another instance of the unconscious convergence of ideas that seems to accompany the way of thinking precipitated by ecological philosophising.

⁴ Spelt 'Gaea' as it is the more correct spelling than the commonly used 'Gaia'. Kirkpatrick Sale uses Gaea.

⁵ Unless otherwise stated, the word definitions employed in this dissertation are taken from The Australian Concise Oxford Dictionary, Second Edition 1992.

change happen slowest. The weft of making and doing are the shorter, 'busier' threads representing the quicker changes associated with self-conscious creative endeavour.

The weaving can also be seen in terms of the warp of biophysical reality supporting the weft of human society – an intersection of 'natural' and human environments. These thematic metaphors are combined in the Ecopolis Development Principles, a set of precepts that, in one form or another, have informed the developing theory and practice of Ecopolis for the best part of a decade.

Building the SHED

In attempting to describe the synthesis, such as it is, of the Ecopolis theory, the author has used the organisational device of 'The SHED' (Chapter 14). A series of steps take us from one kind of shed, a watershed, to another, the shed as a building. In using 'shed' as label and metaphor in this way, there is a return to the theme of weaving, for the shed is also the opening between the warp threads in a loom through which the shuttle carries the weft.

Spirituality is not one of the great strands of the warp or the weft. But neither is it neglected in this dissertation, because to do so would be to neglect the most powerful manifestation of human mindfulness through the millennia. Rather, spirituality is dealt with as an emerging property of civilisation, and it is up to the individual reader whether they wish to see its patterns as intrinsic to the tapestry of human affairs, as evidence for the beauty of a divine purpose, or merely an interesting, colourful excrescence on the body politic.

There are two major agenda in the discourse that follows. One is the reason for the dissertation, which is to begin the construction of a credible and usable theory for the design, development and maintenance of ecological cities – this is strongly represented in the 'weft' of the writing. The other is to describe a field of action in which the struggle for social justice can be sustained in the face of globalising forces that are eroding the power of the state whilst reducing the role of citizens to that of mere consumers. The author contends that the ecocity proposition regarding 'ecological culture' is inherently libertarian in its scope and content and hopes that this dissertation goes some way towards establishing the veracity of this proposition. The idea that effective long-term environmental responsibility can only be guaranteed by the creation of an ecological culture is explicit in the Ecopolis idea – it is the 'warp' that, hopefully, is made visible in the fabric of this thesis. Such a culture can only come about as the result of systemic social change. The quality of that change depends on informed individuals being able to act effectively and to do that they need an appropriate power

base, or field of action. The theme underlying the development of this theory is that if we can fully understand the historical and potential role of the city as the place where we make and shape economic, social, cultural (including spiritual) and *ecological* reality, we will have the base from which to engage in the praxis of evolving an ecological culture.

From Rhetoric to Reality

It has been nearly twelve years since the author stood on a platform in Berkeley, California in the opening plenary session of the First International Ecological City Conference and said, 'An ecocity has never yet existed. Before it can be made it needs people to make an ecological culture. We are those people. We must build now as we need to live, and live to build the ecological future, for what we build now is the future, and every moment counts.' (Canfield (ed) 1990 p.19). Earlier, in a keynote presentation, this author made the claim that 'I believe every single attempt at anything which works towards achieving an ecological city is worth trying. There is no single solution, because it is about a way of life, and it is a situation in which everyone can make a difference.' (Canfield (ed) 1990 p.12)

The author has been responsible for a good deal more rhetoric in the meantime, but has also tried to find ways to live up to those exhortations by working with some truly marvelous people on the task of making ecocities a reality. It has been an exhausting but rewarding time during which it has been impossible not to be continually conscious of the need to record our collective experiences in these experiments with ecocity-making. A resulting conviction is that it is imperative for the collective success of 'every single attempt at anything' for there to be at least the hint of a coherent theoretical framework, for even the most libertarian models of social change need structure. This is directly analogous to the role of the city itself, that is, to provide a well structured framework within which individuals become citizens in order to fulfil their greatest potential whilst simultaneously supporting, and being supported by all the other individuals that make up its citizenry.

This thesis was not inspired by previous academic examples, however illustrious and apt. It was inspired by the radical visions of architects, designers and dreamers who dared to insist that it really was possible to make ecological cities. This is reflected in the author's preoccupation with implementation and advocacy that provides a major theme for the structure of this thesis. It was driven by a deep personal conviction about the way we live and the way we might live (to paraphrase William Morris) that found

the work of these other dreamers and researchers resonating strongly with the author's own experience as an urban and environmental activist since 1970.

Although this thesis represents a determined attempt to maintain sufficient 'distance' from the issues to aspire to a degree of *relative* objectivity and to write from an academic viewpoint, this is inevitably written as an architect and advocate as well as an academic.

It may be suspected that this thesis has been constructed in a similar manner to the way its author designs buildings. Thus there are those things to which there was an aesthetic attraction; there is an underlying belief system that is brought to bear in the process and outcomes of analysis; there are things 'known' through experience and training about how different elements 'should' be put together; and there is a sense of obligation, or duty, to the people who will use and have some kind of relationship with the whole assemblage.

Cities are simultaneously the most vulnerable and powerful of human institutions. This thesis is dedicated to their sustenance and evolution as the agents of change for creating a world in which humans have learned to live at peace with themselves and as, ecocity pioneer Richard Register would say (in an etymologically disputable manner), 'in balance with nature'.

Paul F Downton

May 2000/May 2001/February 2002

CHAPTER 1

INTRODUCTION AND GROUND PLAN



Increasingly across the globe people have come to live in big cities. And it is in those cities many live that mobile and spatially extensive way of life which is characteristic of modernity. Given this, it is research and action designed to *make this modern and urban* way of life more environmentally sustainable which will contribute most to the cause of sustainability... The real challenge facing us is not one of building eco-villages, but of making the modern city, and the way of life lived in it, environmentally sustainable. (Barton 2000 p.28)



FIGURE 1:
The Halifax
EcoCity Project –
South Gate
(Source: Drawing
by the author)

And is it not a dream which none of you remember having dreamt,
that builded your city and fashioned all there is in it?
(Gibran 1926/1979 p.109)

1.1 The Idea of Ecopolis

Towards the end of the Twentieth Century numerous initiatives took place that addressed 'sustainability' or proffered concepts of 'ecocities' and the terms 'green city', 'sustainable city' and 'ecocity' have entered the lexicon. The New Urbanists, for instance, represent one of the most powerful movements for urban change since Garden City advocates influenced new town and suburban development in the first half of the 20th Century, and they explicitly address the concept of 'sustainability.' However, closer examination of their program uncovers a fundamentally conservative ethic that is as much to do with notions of returning to imagined safe havens of the past as it is to shaping the future (see Chapter 4.6.1 New Urbanism). Concerns about this 'back to the future' approach may be shared by other researchers who are suspicious when issues of

equity and social justice seem to slip below the horizon. Writing in a European context, Ravetz of Manchester University's Centre for Urban and Regional Ecology, asks us to

Imagine a city where all the best principles of environmental management are applied: within a few years this ideal eco-city becomes clean, green and beautiful. But as a result, property prices shoot up, local businesses are forced out, there are labour shortages and a wave of homeless migrants. (Ravetz 2000)

The author of this thesis holds that it is not logically consistent to describe an ecocity as simultaneously clean, green, beautiful *and* socially dysfunctional (as with some contemporary observations of the 'ecocity' of Curitiba in Brazil¹) and that the social framework and values that underlie the making of human settlement are critical to the creation and definition of an ecological city. This thesis proposes an approach to constructing an integrated approach to ecocity making that is founded on principles of social justice and direct democracy. The author has called this idea 'Ecopolis'. 'Ecopolis' is drawn from 'eco' (strictly, from the Greek *oikos* – house, but conventionally understood to mean 'environmental') and '*polis*'² (a self-governing city 'where people come together, not just by birth and habit, but consciously, in pursuit of a better life' (Mumford 1991 p.156)). It is explicitly about radical change in our urban civilisation and the conscious creation and use of cities as catalysts for social change. At the same time, cities have to be inclusive environments as by their very definition and the necessities of their functions they are places for people of all persuasions. Society needs to support innovation and encourage experimentation and exploration of various approaches to city-making in order to ensure a healthy rootstock for future civic development. The Ecopolis thesis includes the idea that a radical community-based approach to city-making can reconcile requirements for inclusiveness and stability with innovation, exploration and change.

1.1.1 Projects and Praxis

This research looks at the development of selected creative processes and experiments in the making of human settlement and reviews historical precedents and current examples of projects and theoretical approaches to ecological settlement

¹ See Chapter 6.5 Curitiba the 'Ecocity'.

² 'Whatever the city possessed the citizen considered his (sic) own birthright: between citizens as between friends there were to be no secrets, no professional walls, no presumption of inequality. The freeborn citizen owed nothing to princely favour or to his economic or social function: he resumed the place he had once had in village culture, that of being first of all a man, endowed with every human dimension, to whom every part of life was open and accessible. This at least was the ideal. And it is by its capacity to formulate that ideal – not by its failure to achieve it – that we still properly measure the Greek polis.' (Mumford 1990 p.188)

manufacture that either inform, inspire, or provide a critical foil to the proposed (and necessarily incomplete) theory of Ecopolis. Sketches, technical drawings, cartoons, photographs and diagrams are important components of the research effort and expression, but the biggest test of the nascent theory has been the effort to engage in a praxis that is both a response to, and the driving force behind the theory. That testing has been taking place over a period of 10 years through the three ecocity projects described in the case studies of chapters 7, 8 and 9 (Part B of the thesis). These projects are all based in South Australia and have been developed to various levels of completion. Each project has been a result of the author's commitment to taking the theory of Ecopolis into practice and has required his engagement in the design, development and maintenance processes for ecocities described in this thesis³.

This thesis is explicitly about ecological cities. It is not about 'ecovillages', although it does consider ecovillages in the review of existing theories (Chapter 4) and in consideration of the evidence for existing human settlements with ecocity characteristics (Chapter 6). Ecocity pioneer and theorist Richard Register defines an ecocity as 'an ecologically healthy city', but claims that no such city exists (Register 1987 p3). Cities are the drivers of environmental degradation and the challenge is to make them agents of ecological repair (Downton 1989; Girardet 1993). The idea of making ecological cities is a rather large one. Its scope is enormous although its advocates differ about goals (Roelofs 1996 p.3). Not surprisingly, writers in the field fail to address every aspect with equal vigour; some stress energy, some transport, some community, and so on (Roelofs 1996, Arkin et al 1992).

The first public use of the term 'Ecopolis' in the sense intended by this thesis, was at the Ecopolitics IV Conference held in Adelaide, South Australia in 1989 when the author presented his paper 'Ecopolis - The New Frontier', later published in the proceedings of the conference (Young and Dyer 1990). Subsequent media interest resulted in published newspaper and electronic media use of the term and an illustrated article 'Ecopolis Now!' was published in *Habitat*⁴ in August 1991 outlining some of the main aspects of the evolving theory (Downton 1991b). As a consequence of information received through involvement with the EcoCity 2 conference in 1992 the author became aware of the use of the term in China and Eastern Europe. Since EcoCity 2 the term has been adopted by a number of organisations including Jerry Brown's 'We

³ During most of this time the author maintained a full-time position as a lecturer in architecture at the University of South Australia. He left academia in July 2001 to work full-time on the Christie Walk project – the third case study documented in this thesis.

The People' organisation in Oakland (Brown 2000). Brown ran for office and was elected on an 'Oakland Ecopolis' platform.

The theory of Ecopolis to which this thesis aspires is a development of the ideas that were first articulated in the original Ecopolitics paper presented in 1989. It describes an approach based on broad community participation. Its limitations are inherent in the scope of the topic – a complete description of the greater whole can only be achieved after it has been brought into actual existence.

1.1.2 The Propositions

This thesis has been constructed around an armature of advocacy as a basis for the theory and with a consistent concern with implementation as a core component of the problematic. The thesis has been a vehicle for research in action, testing certain propositions about how and why ecocities might best be made. There are four sets of propositions about the necessary conditions for making ecocities:⁵

1.1.2.1 Proposition 1: CITY-REGION: City-regions determine the ecological parameters of civilisation

- Cities are a habitat for human survival and evolution.
- Cities are places for procuring, managing and distributing resources for the mutual benefit of their inhabitants and are inseparable from their hinterlands.
- Human impacts on the processes of the biosphere are mediated by land-use patterns that achieve their quintessential expression in city-region morphologies and processes.
- Cities are the primary means by which humans act on the biosphere.
- Ecological cities are urban systems consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes.

1.1.2.2 Proposition 2: INTEGRATED KNOWLEDGE: Ecocity concepts generate an imperative to integrate extant knowledge

- The concepts, principles and techniques already exist that are required to create human settlements that fit within the ecological systems of the biosphere whilst sustaining their biogeochemical functionality.

⁴ Journal of the Australian Conservation Foundation.

⁵ See Chapter 13.10 Ecopolis Propositions – The Sound Bite Version for a 'short form' of the Propositions.

- Concepts, principles and techniques already exist which are capable of creating urban systems consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes, but they are not yet embedded in a cultural framework (arts, sciences, humanities, vernacular and popular culture) that integrates and facilitates their application in the design, development and maintenance of such systems.
- Architecture and urban design are major components of culture and must be conceptually expanded to recognise the central place of human settlement as an evolving agent of change in the biosphere.

1.1.2.3 Proposition 3: CULTURAL CHANGE: Creation of an ecological civilisation requires conscious, systemic cultural change

- The collective consciousness and unconsciousness of human inter-relationships with the biosphere is embedded in culture.
- Ecological cities cannot exist except as the consequence of the creation and maintenance of societies capable of sustaining the responsiveness necessary for managing such settlements.
- The inter-dependent nature of elements in urban ecosystems requires communication and decision-making structures based on mutual aid - which recognises inter-dependency, and direct democracy - which shortens channels of communication and more closely relates decision-making to place.
- The foundations of society are cultural and lasting social change depends on deep levels of cultural change.
- To create ecological cities it is necessary to effect cultural change.

1.1.2.4 Proposition 4: CULTURAL FRACTALS: Demonstration projects provide the means to catalyse cultural change

- Cultural change can be catalysed by the creation of 'pieces of ecocity' developed as demonstration projects.
- Ecocity demonstration projects must contain sufficient characteristics, in process and form, to represent ecocities in microcosm – what may be thought of as 'cultural fractals'.

- These catalysing ‘cultural fractals’ can only be brought about with a high level of participation from the wider community in their design, development and maintenance.
- That participation represents the conscious engagement of the human community with the living urban ecosystem of which it is a part.

1.1.3 The Three Parts of the Dissertation

The case studies in Part B of this thesis are descriptions of projects that set out to test the propositions that there was enough extant knowledge to go about making ecological cities, that the techniques and technologies were already sufficient to begin the task, and that the key determinant in getting the process under way was to do with some notion of ‘community’ and the idea of active citizenship. The ecocity projects described were all conceived as ‘pieces of ecocity’, as microcosms of the larger whole – cultural fractals.

Thus, although this dissertation describes and analyses various projects and theories and presents a set of theoretical syntheses in Part C, the real thesis is being attempted through praxis - making ecocities in microcosm as described in the case studies of Part B. These case studies go some way towards testing the four propositions. The projects employ ideas and their inter-relationships which are explicated in Part C of this dissertation. All the work is in turn drawn from or related to the study of other places and people working in the field, past or present; the most pertinent of these are briefly described in Part A of the thesis.

Part A reviews practitioners, philosophies and places that address aspects of ecocity-making. This review is used to indicate the manner and extent that this extant work of theory and praxis relates to the three case studies described in Part B. Part C synthesises what has been learned from reviewing extant works and the experience of the case studies to formally present precepts and processes derived from this ongoing work. The idea of ecocities is necessarily about cultural change but the ‘Ecopolis’ thesis posits cultural change as the core requirement for making urban systems consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes. It is in the nature of the subject matter and an inherent characteristic of the thesis position that it has no omega point. Thus the syntheses in Part C are entirely about continuous process.

In Part C of this thesis are rewoven many of the various strands of analysis, theoretical positions and practical examples described in the chapters on Ecological

Cityscapes to create an original synthesis presented as the 'SHED' (Sustainable Human Ecological Development) in Chapter 14. An important part of the overall proposition is to do with the dissemination and replication of ecocity ideas. Simply put, the contention is that as cities are ultimately the built expressions of values held in social, political and cultural processes, the 'real' task is the creation of an ecological culture. Education is a vital part of the process of embedding ecocity precepts and values in the communities that comprise that larger culture but 'education' is understood here in its widest interpretation as a means of transmitting information, knowledge and experience, rather than just to do with formal institutions (see 'Capturing the Transmitters' in Chapter 13). It is about a 'rediscovery' of citizenship. Most importantly, because so much of what people learn in our mass society is not through formal institutions, and because the task of adjusting our cultures globally is urgent and cannot rely on returning everyone to school, it is contended that mainstream popular media provide critical pathways for disseminating ideas. This thesis is informed by a preoccupation with the idea that there is an imperative to communicate effectively at the level of popular culture in order to both precipitate and maintain the changes in human settlement design, development and maintenance needed for humans to be successful as organisms in the ecological community of the biosphere.

1.2 Setting Contexts – Places and People

Cities are more than static structures of stone and concrete. They are also vast processors of food, fuels, and the many raw materials that feed a civilisation. With their complex metabolisms they are huge organisms without precedence in nature; their connections stretch across the globe. (Girardet 1992 p19)

1.2.1 Defining Cities

In the mainstream of popular awareness and in most of the 'built environment' professions cities are conventionally considered to be defined by their built form. This thesis builds on the tradition of Patrick Geddes and Lewis Mumford and their view of 'city and region' which places the built structures of urban systems in an active relationship with the living landscape they occupy (Geddes 1915/1968, Kitchen 1975, Mumford 1961/1991) This relationship is established and determined by the many links that must exist between the buildings and their environment and between built forms and their builders. Cities are thus part of a network of relationships which include their hinterlands and which can be considered, altogether, as an urban ecosystem (Hughes 1975, Girardet 1992, Zeiher 1996). Patrick Geddes' conceptual tool of Place-Work-Folk presented in Appendix I of Kitchen (1975 pp.323-327)) can be reinterpreted as

Ecology-Activity-Community and related to the Ecopolis Development Principles described in Chapter 14.

Boyden et al observed that 'There has been some argument whether it is correct to apply the term 'ecosystem' to a city.' (1981 p.18). Although there may be some dispute about definitions the literature shows that cities, and even buildings, may be regarded as ecosystems (Nix 1972, Boyden et al 1981, Spirn 1984). This thesis contends that, when occupied and functioning as human settlement built environments are 'alive' as much as any ecosystem is alive with their biotic and abiotic components necessarily functionally interlinked (Chapter 11). Thus people and other organisms become integral to the ecological description of any architecture or urban construct.

From this one can conclude that there is a clear distinction between the inhabited and uninhabited states of buildings and cities. The uninhabited state represents the abiotic components 'at rest' in the form of art, whilst the inhabited, active state represents the full flowering, or coming into being, of the thing we call a 'building', or a 'city'. Thus, houses are buildings whereas homes are ecosystems. A city, or more correctly, a city-region, is a living ecosystem when it is inhabited⁶. This distinction is proposed as a means of clarifying the difference between the theories and practice of conventional architecture, urban design and planning, and their ecological counterparts that contain the emergent properties of living systems.

Any ecosystem requires functional, unthinking engagement from its constituent organisms. In an ecosystem containing conscious organisms, that engagement must also be conscious. In an ecosystem constructed by conscious organisms in order to support themselves, that engagement is critical, and conscious information exchange becomes central to ecosystem function. Thus an ecological building or city is dependent for its function on engaged, intelligent information exchange. Rather than being a reductionist, Corbusian 'machine for living', an eco-house – and, by extension an ecocity - is an ecosystem for supporting consciousness. That consciousness is expressed through culture.

Planner William Rees observes that '...the 'environmental crisis' is really a symptom of profound human ecological dysfunction resulting from deeply-rooted cultural values.' (Rees 1998 p.6). Culture systemically embeds values in society over time. Community-based 'bottom up' planning strategies, rather than top down planning strategies, are fundamental to the foundation and sustenance of any ecologically viable

⁶ Of course, an ecosystem does not exist *unless* it is alive.

human settlement in the long term. Community-based strategies imply direct democracy and active citizenship and demand approaches to architecture, planning and urban design that are as responsive to the body politic and social demands as they are to the sun, the weather, and the living processes of the biosphere. Historically, civilisations appear to have been carrying in themselves 'the seeds of their own destruction' (Douglas 1974 p.43); to counter this trend, the viability of human settlement depends on maintaining systemic, sustained, ecologically and societally responsible social structures capable of ensuring the self-replicating conditions required for their continued existence.

1.2.2 Types of Cities



FIGURE 2: Icons for the 3 City Types (see Chapter 8.4.1 The Urban Design Workshop)

Kevin Lynch, whose urban design theories of 'good city form' have inspired and informed two generations of planners and designers, introduced a typology which identified three types of city - the 'celestial', the 'mechanical' and the 'organic'⁷, and allowed that the 'organic' type could be considered to have the

characteristics of an organism, rather than, for instance, a machine (Lynch 1981). Lynch's work was informed by urban design, planning and architectural epistemologies rather than the life sciences. Lewis Mumford, whose enormous body of work on the history and theory of cities remains, arguably, unsurpassed in its scope and depth nearly half a century after his death, was an advocate of the organic city model and through his description of 'cities in history' elucidated a view of cities as entities which possessed discernible boundaries in both space and time - cities had edges and they lived and died (Mumford 1961/1991). James Sholto Douglas would seem to think that cities are alive because he asserts that towns and cities are viable ecosystems that are '...delicate and precariously balanced and any shift in equilibrium will cause their ageing and death.' (Douglas 1974 p.152). Jane Jacobs, viewing cities primarily from a planning, rather than life sciences perspective, helped to establish the modern view of cities as dynamic (if not wholly 'alive') entities through the publication of such influential texts as 'The Death and Life of Great American Cities' (Jacobs 1962). In his seminal work 'The City in the Image of Man' Soleri describes a putative life cycle for an 'archology' with a metamorphosis and disassembling 'when functional obsolescence overshadows the

⁷ This typology was employed by the author as the basis of workshop exercises in urban design as part of community processes in support of the Whyalla EcoCity Development, see Case Study II, Chapter 8.

liveliness of the city.' (Soleri 1973/1969 p.35). The contribution of these and other theorists to the development of this thesis is discussed in Chapter 4.

There has been a steady move towards 'green' architecture and planning around the globe during the last quarter of a century. In Europe there have been strong, central government moves to introduce 'ecocity' programs in the management and development of existing urban centres and there have also been a number of neighbourhood scale projects that exhibit high levels of ecological performance developed by organisations with a bias towards 'social housing' (Kennedy & Kennedy 1997, Scheurer 1998). In England the country's 'peak' environmental organisation Friends of the Earth has published both books and campaign literature in support of sustainable cities (Elkin et al 1991) and there are some impressive new housing projects that exhibit ecocity characteristics, including designs by the Vales. At the time of the oil crisis researchers Brenda and Robert Vale were in Cambridge University in England studying 'autonomous houses' and in 1975 they published the first book on design and planning for self-sufficiency which was technically rigorous, by 1991 they had published 'Green Architecture' with a final chapter that included 'Ground rules for the green city' (Vale and Vale 1991 pp169-180). The much-lauded English 'Hi-Tech' architect Richard Rogers has recently published what amounts to an ecocity polemic (Rogers and Gumuchdjan 1997). The OECD has run conferences and programs on 'Ecocities' in Europe and Australia (Foulshan & Munday Pty Ltd 1994). In China and Russia there have been state-supported efforts to research and develop ecocity models for understanding and manipulating urban ecosystems although it is difficult to determine to what extent these theoretical constructs are being applied in practice (Wang et al 1990, Wang et al 1991a) although Wang et al claim that 'Chinese urban ecology studies, unlike traditional ecological study, pay more attention to the human dimension of urban ecosystem and the reciprocal relationships between citizens and its natural, economic and social environment and between city and its micro- and macro-environs.' (1991a p.3)⁸. In South America the city of Curitiba (Chapter 6.5) is routinely identified as an 'ecocity' because of its adoption of a number of practical, reportedly successful, strategies for dealing with transport, resource recycling and education (Rabinovich 1992, Rabinovich and Leitman 1996, Ravazzani and Fagnani 1999) but it is debatable whether the collective effectiveness of those actions amounts to a coherent theory.

⁸ Rusong Wang was a keynote speaker at EcoCity 2, Adelaide, April 1992.

In Australia, academics Peter Newman and Jeff Kenworthy undertook original research which demonstrated that the transport energy consumption of cities is proportional to city density (Newman and Kenworthy 1989). Peter Newman was invited to speak at the First International Ecological City Conference in Berkeley by Richard Register and Urban Ecology in 1990 and went on to become an advocate for 'sustainable' cities and a politically cautious, but forceful, supporter of ecocity concepts. He also spoke at EcoCity 2, the Second International EcoCity Conference, in Adelaide 1992.

Urban Ecology Australia introduced the term 'ecocity' to Australia in 1990. The term entered the lexicon of the environment movement after the Greenhouse Association of South Australia hosted Richard Register as keynote speaker at the national Greenhouse 91 Conference in Brighton, South Australia. In 1992 David Engwicht also took the humane/sustainable transport orientated argument to its logical conclusion after years of working with anti-freeway groups in Brisbane and published 'Towards an Ecocity - Calming the Traffic' (1992). At the time he was under the impression that he had coined the term 'ecocity' and was unaware of its use by activists in the USA and Australia until the advent of EcoCity 2 - The Second International Ecological City Conference, held in Adelaide in April 1992 (personal communication with the author February 1992).

A number of community organisations around the world either advocate, or directly or indirectly support 'green', 'sustainable', 'environmental' or 'ecological' city programs, eg. Urban Ecology, USA; Ecocity Builders, USA; Planet Drum, USA; Oekos Biodelezia, Italy; Friends of the Earth, England; Sustainable Urban Neighbourhood, England; Urban Ecology Australia, Australia. An important aspect of the Ecopolis theory is that there must be significant, articulate and continual community input to any ecocity program and that there is an obligation for advocacy to be allied to any educational components associated with ecocity community programs. Education, advocacy and activism are dealt with in Chapter 12.

Another important aspect of the theory is that ecocity concepts inherently require a trans-sectoral, inter-disciplinary approach to provide both appropriate ideas and effective organisation for their implementation. Some of the epistemological implications of this approach are explored in the next chapter.

CHAPTER 2

AN EPISTEMOLOGY FOR URBAN ECOLOGY

Clearly, there is no universally accepted single concept or model of the city. We must assess the varied approaches and ideas of students of the city from different disciplines and ideologies.

(Douglas 1983 p.1)

The barriers that separate academic disciplines are stronger than the links, a fact that mitigates against an understanding of the urban ecosystem.

(Spirn 1984 p.240)

Architects tend to think architecture matters. Not everyone else does.

(Day 1990/1995 p.7)

2.1 An Heuristic Hybrid?

...there is a knife moving here. A very deadly one; an intellectual scalpel so swift and so sharp you sometimes don't see it moving. You get the illusion that all those parts are just there and are being named as they exist. But they can be named quite differently and organised quite differently depending on how the knife moves. (Pirsig 1974 p.79)

There are inherent limitations in architectural and planning epistemology when it comes to the consideration of the built environment in an ecological context. Despite the plethora of architectural courses worldwide with 'theory' in their titles, no clear model of 'architectural theory' has ever emerged in them (Lang 1987 p.2), so it is hardly surprising that there are no schools of architecture in Australia with programs constructed on the foundations of an *environmental* system of knowledge. This thesis ranges widely across the boundaries of architecture, design, geography, biology, sociology, economics and political philosophy. As a consequence it challenges conventional knowledge in the disciplines of architecture and planning. In response to the limitations of that knowledge there has been an attempt to bring together disparate methodologies including those contained in architecture, design and life sciences. The thesis is compelled to be inter-, or trans-disciplinary,¹ in order to properly address the subject of study. This places it firmly in the traditions of Environmental Studies and its commitment to transdisciplinary structures in which intellectual integration is achieved

¹ In the Review of Graduate Centre for Environmental Studies, Frank Fisher was cited for the following definitions: 'Interdiscipline – A juxtaposition of disciplines so that each is affected by the others; Transdiscipline – A science that recognises the limits to discipline and to generality, ie. that recognises the embedded interlocking, non-isolable nature of all knowledge and therefore the essentially unreal (although heuristically valuable) nature of reduced specialist knowledge.' (Young 1989 p.3)

other than by 'the linear accumulation of subject matter.'² It is hoped that the placing of this thesis in the context of environmental studies will assist in achieving three related things:

- The location of architecture, planning and urban design in an environmental context where they can be clearly identified as sub-sets of urban ecology,
- An ecologically rigorous description of the activities of city-making for which architects and other urban professionals claim responsibility.
- A system of knowledge and praxis for the design and development of human settlement that engages the wider community.

This contextual imperative is reinforced by the advocacy that is at the heart of the research activity informing this thesis. In seeking to engage the university environment of academic inquiry and discourse with the community realm, an epistemological decision was made that is congruent with the propositions at the heart of this thesis. By being a participant in the research that informs the thesis, the author has had to be self-conscious about the creation of any knowledge that results, and recognise that advocacy provides the frame for this knowledge.

That this research does not fit neatly within a conventionally prescribed field of study reinforces the value of the broad church of environmental studies represented by Mawson Graduate Centre for Environmental Studies at the University of Adelaide. Environmental studies programs are about 'trans-disciplinarianism'. They are where graduates from many disciplines are brought together 'in a bid to produce flexible analytical tools needed to address problems associated with amorphous organic systems.' (Doyle 1997 p.39). Cities comply readily with the definition of 'amorphous organic systems' and their problems seem to be well beyond solution by any single discipline of thought or enquiry.

There is precedence for the multi- or trans-disciplinary approach in the work of the pioneers of what might be termed modern urban ecology as an academic endeavour:

² In 1989, as the Planning Group Coordinator at the South Australian Institute of Technology the author prepared a 'Proposal for a Trans-Institutional Centre for the Environment and Sustainable Development'. In a letter tabled in response to the proposal, discussing the Master's degree program at The Centre for Environmental Studies, the then-director Dr John Young, commented that 'the transdisciplinary structure of the new course emphasises the unique focus of Environmental Studies as a subject defined by the inter-related nature of the problems it addresses, which cannot be absorbed into the traditional disciplines. As you pointed out, universities of late have come to be modeled on pin-factories, with their infinite compartmentalised specialisms. Environmental Studies is forced by necessity to re-create the university.' (personal communication 1989)

In the present study, therefore, we are necessarily concerned with many variables of a kind that would normally not come within the orbit of the biologist who studies the ecology of a natural ecosystem. Needless to say, this transdisciplinary and comprehensive approach, ranging as it does across many areas of academic specialism in the natural sciences, social sciences and humanities, is not without its problems. (Boyden et al, 1981, p.19)

Despite the work of Boyden et al on the city ecology of Hong Kong in the 1970s (Boyden et al 1981) there has been no study of an entire city looked at as an ecosystem until the current Baltimore Ecosystem Study directed by ecologist Steward Pickett of the Institute of Ecosystem Studies in New York (Hamilton 1999 p.39). Their work promises to provide the kind of tools that planners need to be able to model and predict the behaviour of microclimate, vegetation or hydrology when built environments are modified and developed (Hamilton 1999 p.42). This scientific work does not, in itself, promise to deliver more sustainable communities because that can only be achieved through socio-cultural and political activity but without science the notion of ecological cities could never be more than a chimera. The science makes the task of creating viable urban ecosystems more likely, by improving our understanding of how biophysical systems function. As Sears aptly noted ‘...science does not exist so that we can outwit nature – an impossible task – but rather to comprehend it and guide ourselves accordingly.’ (Sears 1962 p.23). The problematic trans-disciplinary path referred to by Boyden et al is trod in this dissertation by an architect with limited formal scientific training, whilst the architectural world-view is, as we shall see, based in humanism and the arts. One might argue that the trans-disciplinary path is really many paths, crossing and re-crossing one another as they explore the territory of enquiry. The idea of layered, braided pathways echoes the metaphor of weaving presented in the Preface.

In compiling this dissertation there has been a constant interplay between practice and ideas. This interplay has been initiated and sustained by the author’s involvement with ‘live’ projects that have been designed to put ecocity ideas into practice (see Chapters 6, 7 and 8). As an academic researcher, the decision to engage with the community whilst being based in academia was an epistemological decision intended to generate empirical information without the boundaries of traditional disciplines. As a result, the work would seem to fit within the broader traditions of environmental studies and its scope would also seem to be congruent with that of social ecology as described by Bookchin (Bookchin 1981 pp.14-22)³. In relation to architectural theory-making this dissertation deals with *models*, *hypotheses* and *normative theory*. It is about having a

³ Bookchin’s relevance to this thesis is further indicated in Chapter 4.7.6 The Limits of the City.

model, or 'way of perceiving reality that imposes a structure on that reality' (Lang 1987 p.13) (what Lang also calls a philosophical position); it is about predicting outcomes from certain actions, ie. having hypotheses; and it is normative – being to some extent concerned with design principles and standards and having an ideological position on what constitutes good urban design, for instance. It is the author's hope that the sources, nature and limitations of knowledge of environmental studies, social ecology and architecture may all be expanded slightly by this thesis.

2.1.1 Hemisphericism and Sustainability

This thesis aims to be 'non-hemisphericist'; to be sufficiently holistic in its approach that it will be relevant to both hemispheres and all climatic, biogeographic and cultural regions of the planet. This goal requires that any conclusions drawn are cognisant of global cultural contexts.

In this dissertation the term 'sustainability' has been used relatively sparingly because it has become such a loosely employed and poorly defined term. For the purpose of this thesis sustainability is not about 'self'-sufficiency; sustainability is a social enterprise. Therefore, community processes have to be inherent in any 'ecocity' methodology.

The terms 'green', 'sustainable' and 'ecological' are nowhere as slippery as in discussions of architecture and planning. It is unwise to treat them as equivalent. 'Green' and 'ecological' cities are often used deliberately as meaning the same – the author has been as guilty of this any other writer. This can lead to epistemological confusion. Although Register tells us that an ecocity has yet to exist although 'In old European cities and towns...we see hints of the ecocity...' (Register 1987 p.3) Ward assures us that 'Before the explosion in the population in the nineteenth century, cities were green.' (Ward 1989 p.96).

2.1.2 Reconciliation of Urban and Non-urban Epistemologies

If cities are to be the fulcrums for leveraging global change the theory of their design and making needs to address the pre-industrial and non-urban cultures that are both extant or buried in the urban-industrial psyche. The role of traditional and indigenous cultures in relation to modern urbanism has to be one of informing the deep cultural roots of being – bioregionalism offers a way to do this, combining scientifically derived knowledge of resource and ecological limits with an appreciation of the cultures of the people of a place (Berg 1991, Sale 1991 p.42) (see also Chapters 3 and 4). But tribal cultures do not hold the magic key to solving environmental, social or

spiritual problems for the predominantly urban species that now holds sway over the state of the planet. In his lucid introduction to 'The Limits of the City', Murray Bookchin succinctly makes the case for seeing the positive side of civic realm and the limitations of tribal culture.

...I am concerned not only with the uniqueness and limits of various cities but also with the city as a distinctly human and cultural terrain. The city is more, in my view, than an epiphenomenon of a broader division of labor between agriculture and crafts or barter and commerce; it is a world *in its own right* (author's emphasis) that goes beyond familial, tribal, economic and social ties to establish a uniquely political universe of its own. For all its collectivism and strong bonds of solidarity, tribal society was surprisingly parochial. Based on kinship, however fictitious its reality, the tribe rooted its affiliations in lineage ties...The city, by contrast, over a long period of development, created a more universal terrain – the realm of the citizen. Civic rights depended upon residence rather than a shared ethnic background...*where...*the 'stranger' could first find a home and the protection of laws, and later, citizenship as one among equals, not the arbitrary treatment that characterizes the status of visitors to tribal communities. (Bookchin, 1986, pp.6-7)

With the rise of interest in tribal cultures and attempts to reconcile modern industrial civilisation with its history of economic exploitation, social and cultural oppression (Maybury-Lewis 1992), this view is somewhat at odds with those held by many people in what is collectively known as the 'environment movement'. The 'myth of the common goal' and the tendency of environmentalists to perceive constructive criticism as destructive dissent (Doyle 2000) make it difficult to advance views that can be seen as contrary to prevailing wisdom, but when it comes to cities, the environment movement has displayed very little wisdom; new urbanist Andres Duany suggests that 'The environmental movement needs expertise in urbanism....At the moment they are very inexpert, you still get environmentalists who prefer low-density housing.' (Zimmerman 2001 p.30). Notwithstanding the observation by Doyle that 'On the urban front much imaginative work by Australian environmentalists is under way.' (Doyle 2000 p.216) environmental activists tend to skirt around the task of making our urban civilisation fit the patterns of biosphere. There has been a pattern of general avoidance of urban environmentalism across the board. When the Australian federal government began exploring ESD policies in 1990, nine sectors were identified as key areas to address and the built environment was conspicuous by its absence⁴. Internationally, Rees makes the point that 'cities have been given short shrift in the mainstream sustainability debate.' (Rees 1998 p.3).

⁴ An omission that was also noticeable when the Commission for the Future ran the 1988 Greenhouse conferences across Australia – see also the Introduction to Part B of this thesis.

In this dissertation it is proposed that the problem of how to reconcile the wisdom that is in non-urban and indigenous peoples' domains with the urban prospect is through the practice of bioregionalism, discussed in Part II of Chapter 11.

2.1.3 Architecture, Cross-talk and Points of View

In 1925, the French architect Le Corbusier proudly praised the fact that cities were an assault on nature. (Gardner in Canfield (ed) 1990 p.10)

Architects design buildings, but they also design cities (see, for instance, the work of Soleri, Le Corbusier, and Wright referred to in Chapter 4) and, as the above quote from Le Corbusier suggests, architectural 'culture heroes' have left a philosophical legacy that is not necessarily sympathetic to environmental concerns. The scope of architectural design is wide. Architects tend to be very protective about the extent of their design domain but one can regard the scope of design per se to be so wide that it encompasses virtually all human activity. Rapoport suggests that all artificial environments are designed 'in the sense that they embody human decisions and choices and modify the world in some purposeful way.' (Rapoport 1980 p.291). If 'The work of a tribesman burning off, laying out a camp or village or building a dwelling is as much an act of design as the planner's or architect's act of dreaming up ideal cities or creating beautiful buildings.' (Rapoport 1980 p.291) then the democratisation of architecture may be seen as implicit in the view that design is a normal component of human action in the environment. What is 'architecture' and what is not is defined by culture.

So also the 'symbolic universe' of architecture... is entirely a product of the societal universe. (Mänty 1999 p.104)

For architects, architecture is about principled, even high-minded endeavour, or about the craft of building, or about both, or something in between, depending on one's philosophical (or ideological) position. Architects are capable of arguing vehemently about subtleties of design that might entirely escape the uninitiated – and of giving design awards to projects that are popularly disliked. The symbolic universe of architecture exists according to a given point of view, so that there are, in effect, any number of such universes. If the architecting of built form is to have any relevance to the wider community (which is a fundamental precept of participatory, community-oriented concepts of planning and design) it must carry appropriate meaning. It is unlikely that architects can establish that meaning by talking among themselves for, as Lang observes 'Professions are not good at monitoring themselves or the quality of their work. Expecting practitioners to broadcast weaknesses in their design solutions and in the theoretical assumptions on which those solutions are based may be asking too much.' (Lang 1987 p.248).

The language employed by architectural critics and theorists can appear almost willfully obscurantist and even apparently fundamental terms used in the language of design lack shared definitions by those using the words. For instance, discussions about 'spatial' issues by planners and geographers generally embody different concepts from those intended by architectural usage of the term. Planners and geographers mean 'distribution in space/location on a map' whereas architects mean the three-dimensional modeling of space. There are thus both dimensional ('2D' vs. '3D') and scale differences. This lack of shared definitions for common terms extends to other fields of study and practice. Despite the propensity for geographers to embrace environmentalism through the politics of academia (Doyle & Walker 1996), an ecologist's concept of space may be different again. In recent years the concept of 'environmental space' has been introduced into the lexicon of planning for sustainability. 'It describes the scope for human activities by defining environmental constraints' (McLaren et al 1998 p.6) but one can be certain that, presented with the term, most architects would imagine quite different interpretations. If architects have difficulty communicating with each other and with other disciplines because of their specialised use of language, then it is not surprising if they have difficulty in communicating with the wider community.

A dialogue with the community has to be an integral part of the larger architectural endeavour. Historically, and particularly during the 20th century, there has been little evidence of this dialogue. Nevertheless 'Every artefact is expected to have certain properties, or characteristics, or qualities, after being put through the processes of designing and building.' (Mänty 1999 p.41). The challenge, then, is to link a popular culture of ecology with the making of architecture and the design of cities – and thence to link the perception of properties, characteristics and qualities of the resulting built form with 'appropriate' social values. But with the notable exception of Alexander et al (1977, 1987) it is typical of even the most profound texts on principles in architecture that they do not consider society as a determinant of architectural language nor do they acknowledge the natural world as a living system but tend to regard it as an inanimate backdrop to design.

The architectural fashion industry remains, for the most part, desperately out of touch with ecological concerns and as long as energy hungry office towers continue to dominate the city landscape we can be sure that the 'ecological city' will remain a

chimera. In the course in Urban Ecology⁵ at the University of South Australia a student interpreted the environmental impact of Adelaide's tallest office block (the 30 storey State Bank) in graphic terms and showed that the energy consumed in creating the building was equivalent to the energy released by six Hiroshima-sized atomic bombs! The impact of urban development is enormous. To quote geographer Ian Douglas:

The urban eco-system is the most elaborate geographical control-system or integrated resource-management system in human experience. (Douglas 1983)

2.1.4 City as Ecosystem

A city is an ecosystem – an intricate web of interacting organisms involving energy transfer and materials cycling. (Gill & Bonnett 1973 p.3)

Ecology is an evolving science. According to Gill & Bonnett ‘Species diversification stabilizes the system: the greater number of species, the more stable the systems.’ (Gill & Bonnett 1973 p.3) but Haila and Levins argue that this is not true and that local communities seem to possess the highest diversity in sites subjected to recurring environmental disturbances (Haila and Levins 1992 p.8). Haila and Levins explore the broader issues of the relationship of ecology to society considering ecology in its several meanings as the nature, the science, the idea and the movement. (Haila and Levins 1992 p.ix)

In the primary precept of the Ecopolis theory⁶ there is an attempt to adopt an ethical position which correctly informs and frames the reference for any outcomes of the theory. Haila and Levins distinguish between moralistic and ethical attitudes about nature and provided an excellent discussion of the issues in their chapter ‘What Program can Ecology set for Society?’ (Haila and Levins 1992). Rejecting the cultural construct that sees only a narrow, instrumental view of nature as merely a collection of usable elements, and calling for an ‘appreciation of nature as a value by itself’, they nevertheless recognise the necessity for humans to accept their interventionist role in ecology.

Moralism claiming that humans have no right to intervene with nature is equally unintelligible as claiming that lions are ‘immoral’ when eating gazelles, or pikes be ‘immoral’ when attacking roaches... We are creatures of nature and live of nature, and we simply have no choice in this respect. *What matters is not whether we modify nature or not, but how, and for what purpose, we do so.* (Haila and Levins 1992 p.11) (Author's emphasis)

⁵ Initiated by the author, and after becoming a core subject in 1998, this course was dropped in 2001 in favour of a non-specific program for making ‘environment’ a part of the whole BArch course structure.

⁶ That ecological cities are urban systems consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes.

Haila and Levins caution against setting up a 'cheap opposition' between instrumentality and appreciation and go on to propose that 'we should figure out ways of integrating ecological knowledge with social affairs without constructing prescriptive rules.' (Haila and Levins 1992 p.12). This is precisely the intent of the nascent Ecopolis theory and the purpose of the Seven Steps process described in Chapter 14. As cultural creatures we are not ignorant of our impact on our environment but neither do we possess sufficient knowledge to predict the consequences of our activities. Barry Commoner's exhortation that nature knows best implies a final ignorance on our part whilst one of Eugene Odum's 'ecological vignettes' tells us that 'Nature is mute, she does not give us explicit advice; she only forbids, sometimes only post factum.' (Odum 1998 p.13).

2.1.5 Defining Urban Ecology

Beginning with Kropotkin's Mutual Aid the study of human ecology has taken a more positive turn: witness Huntington's studies of civilisation and climate, the urban investigations of the Chicago school of sociologists, and above all, Patrick Geddes's lifelong effort to develop a sociology on the basis of biology, and a social art on the positive foundation of our biological, psychological and sociological knowledge...

In emphasizing the importance of this new orientation toward the living and the organic, I expressly rule out false biological analogies between societies and organisms... (Mumford 1938 p.302-303)

To understand the world as a living system and be able to practice design in that context requires a system of knowledge that links design to the needs of individual humans, society and nature. Whether we look at individual buildings, social dynamics, or the demands on environmental space, we find that urbanisation is at the core of contemporary concerns. Urbanisation is the effective replacement of 'natural' ecosystems by an artificial system:

Urbanization is the ultimate replacement of all natural elements (soil, hydrologic system, vegetation, and fauna) by man-made (sic) ones: roadway, sewage network, lighting and heating apparatus, living and working constructions. Whereas in the forest, the field, and the garden, man is an influent, in the city he has practically suppressed other members of any possible biocenosis⁷, barring those that are completely domesticated (dogs, canaries, goldfish), or the inquilines⁸ (rats, houseflies), and the parasites (lice, fleas). The natural order has been so far disrupted that the recurrent menace from weeds, trees, and animals is very remote. (Dansereau 1957 p.263)

⁷ Biocenosis is the participation of various organisms in the nutritive elements of the environment, or better, in all the resources of the environment: space, food, shelter, etc.' (Dansereau 1957 p.238). An association of different organisms forming a community; the relationship existing between such organisms (Concise Oxford Dictionary 1992).

⁸ Inquiline – an animal living in the home of another (Concise Oxford Australian Dictionary 1992)

The idea of 'replacement' is relative. It implies separation between nature and humanity when, ultimately, humans are clearly part of nature, entirely dependant on the same bio-geo-chemical processes that sustain all other living things. The concept of urban ecology can perhaps best be understood as a means of reconciling the 'natural' and the 'artificial' in a systematic way that seeks connectivity between diverse areas of knowledge and ways of comprehending the world:

Urban ecology means simply an attempt to combine two different elements, natural and 'man-made', in an urban context. Ontologically this task is not simple, because in the Western scientific tradition these two elements have been separated and analysed in isolation. Urban ecology combines expert knowledge from the different sciences, especially the natural and social sciences. (Koskiaho 1994 p.27)

Having established a system of knowledge for analysing the artificial, urban ecosystem, how does one employ that analysis in constructing such systems? What is the role for architecture, planning and design? Koskiaho (1994 p.55), citing Levy and Naess, identifies four categories for urban ecology projects but suggests that a sharp distinction between them is not practically possible:

1. Repairing and partial: ecological renewal of districts and single buildings
2. Preventative and partial: ecological rebuilding of new development areas or of single buildings
3. Repairing and structural: changes in the town's infrastructure due to ecological considerations
4. Preventative and structural: ecological principles for future patterns of built up areas and transport systems

Three of the four categories address repairing and rebuilding rather than new building. The emphasis is on a remaking of the existing built environment.⁹

This European concept of 'urban ecology projects' (Jensen 1994 p.39) is informed by social concerns but is primarily to do with built form construction as a means to improve environmental conditions. Until the advent of activist 'ecocity' groups, the American understanding of the term 'urban ecology' tended to relate to sociological studies with relatively little emphasis on environmental conditions. In the book 'Invisible Homeless: A New Urban Ecology' for instance, we find an historical account and analysis of homelessness in America since the Civil War. The ecology refers to social ecology and there is no overt connection made with broader environmental factors apart from obvious references to physical deprivation. This is a pertinent text in relation to environmental epidemiology. (Ropers 1988).

⁹ Looking ahead to the 'synthesis' component of this dissertation, it is worth noting that Shadow Planning (see Chapter 13) can be seen as a category 4 activity leading to more detailed consideration of individual retrofit and new building design at the level of categories 1 and 2.

After establishing that the ecological city concept is part of the gamut of practical urban ecological responses, although he observes that it is not 'a constant entity' Koskiahio finds there are four typologies of ecocity approaches' (1994 p.61):

1. The first approach: a protest against western culture, new philosophies, biocity – mostly represented by the 'alternative' movement, this is seen as too focussed on small communities to be relevant to the problems of existing 'very urban' environments;
2. The second approach: from natural sciences – mostly represented by biologists and engineers, this is perhaps too materialistic, lacking 'understanding of social and human factors';
3. The third approach: a practical city planning approach – mostly represented by architects and urban planners, this is in danger of 'technologisation of the whole ecologisation in city planning (technopolis)';
4. The fourth approach: human and social critique – mostly represented by human and social scientists, this is seen as providing challenging critiques, but little else.

This author hopes that the present dissertation can be seen to represent an approach which attempts to combine the valuable contributions of each of the four typologies, albeit with a necessary tendency to simultaneously carry the problems of each.

2.2 Further Words on Architecture and Ecology

Buildings are amongst the most powerful 'transmitters'¹⁰ in any culture. Architects have long seen themselves as guardians of imagined (and occasionally real) values as expressed through the built environment. In order to excogitate the relationship of architectural theory to the nature and limitations of the ecological world-view expounded by this thesis it may be instructive to relate notions of sustainability and ecology to some aspects of architectural theory.

2.2.1 Greening the Discourse

Architectural discourse and criticism tends towards the manufacture of apologia for a certain style or approach to architecture. The cynical view of architectural theory sees it as a field in which academic writing is no more trustworthy than the rhetoric of stylemongers. Nevertheless, the embrace of 'sustainability' has been a striking feature of architectural publishing in recent years. The *Architectural Review* is one of the most venerable and respected publications in the world of architecture. It is a measure of the growing impact of ecological concerns on the profession that in the last few years it has run a series of issues on 'green' themes (1993, 1996, 1997, 1998, 1999, 2000).

Le Corbusier rose to fame in the early part of the 20th century and became a culture hero for architects with his visions of high-rise towers set in great parks with huge highways and aircraft filling the sky. Every house was a cog in the machine-for-living that he mistook for a city. His book 'The Radiant City' is one of the great classic texts of dystopian urban-industrial madness. It may be that 'From our standpoint today it is hard to grasp the sense of innocence, beauty and liberation that the machine offered to someone like Le Corbusier in the '20s.' (Farmer 1997 p.114) but as we have seen, he celebrated the violence against nature done by city-making. It is hard to see how he might be seriously considered to have provided any worthwhile contributions to 'green', 'sustainable', or 'ecological; architecture and planning. Yet in 1996 a publication claiming to be about the growing environmental sensibility in architecture¹¹ contains revisionist readings of Corbusier's work that seek to place his work in a positively green light (Farmer 1996)¹².

Architectural journals are cultural artifacts but they also seek to define the culture of which they are part. The world of architects constitutes one of the most influential sub-cultures of the modern era. Its gurus tend to be individualistic hero-figures, its sages and soothsayers speak through the pages of glossy magazines in which image is usually of much greater import and impact than words. If the words serve any purpose, it is to direct the reading of the images, to set out the expectations of how they should be interpreted.

In her editorial for the 1999 'Greening Architecture' issue of the *Architectural Review*, Catherine Slessor provides a brief history of the emergence of sustainability as a movement in architecture (Slessor 1999 p.29). Her essay is a good example of the kind of style and approach typical of the more accessible genre of architectural writing

¹⁰ A phrase borrowed from Andres Duany.

¹¹ Published by WWF-UK.

¹² Revisionism would seem to be a major characteristic of architectural theory. An outstanding example can be seen in the way that the early fascist and anti-Semitic pronouncements and texts by Philip Johnson have been progressively 'overlooked' as his fame as an influential architect increased.

'Whatever we may think of Philip Johnson's qualifications as a designer or of the individuals and movements that he has promoted over the years, there can be no question that he has played a key role in shaping twentieth century architectural discourse. Johnson has been an architectural trendsetter, promoting the International Style, Mies van der Rohe, classicism and historical eclecticism, postmodernism, deconstructivism, and now a kind of Scharounian neoexpressionism. That his own design skills might be weak and that he sometimes took ideas from others and presented them as his own does not change the impact he has had on the discourse.' (Varnelis 1994)

'Between 1932 and 1940, Johnson was an antisemite, fascist sympathizer, and active propagandist for the Nazi government. The discipline of architecture has been largely silent on the issue of Johnson's right-wing past...' (Varnelis 1994)

and her observations give some insight into the current state of thinking about 'sustainability' in what one might call the 'enlightened mainstream' of architectural theory. The following attempts to elucidate Slessor's essay and its relationship to the 'mindset' of the architectural sub-culture.

The title 'Touching the Earth Lightly' is an overt reference to '...an Aboriginal saying quoted by Glenn Murcutt. Steeped in Aboriginal culture, it also embodies a wider ecological resonance.' (Slessor 1999 p.39). Notwithstanding the tautology of '*an Aboriginal saying...steeped in Aboriginal culture*, there is the remnant of 'noble savage' romanticisation in the reference (especially given the absence of any Aboriginal architectural culture) whilst the authority of the quote is derived, not from its aboriginality but from its use by Glen Murcutt, who enjoys acclaim as just that kind of guru-like, individualistic hero-figure that the architectural sub-culture seems to require for its intellectual sustenance.

In a by-line Slessor tells us that 'Synthesizing the lesson of tradition with the advances of technology is crucial, if humankind is to meet the challenges of the current environmental cataclysm and re-evaluate its troubled relationship with the planet.' (Slessor 1999 p.29).

There are three important components to this statement:

- Firstly, the value of traditional and modern technological practice is recognised as part of an on-going synthesis. This stands in stark contrast to the Modernist agenda which, in various manifestations since its initial rise to dominance during the fascist era of the early-mid Twentieth Century, has held sway as the intellectual armature of architecture with its insistence on the need to abandon pre-industrial practice and knowledge and thus be 'liberated' from the past. In her call for a synthesis of traditional knowledge with advancing technology Slessor echoes the ethos of 'critical regionalism' expounded by Frampton (Frampton 1980/96, Frampton 1987).¹³
- Secondly, ecological concerns are expressed as both global and immediate – the challenge is that of "the current environmental cataclysm". This is a far

¹³ Frampton articulates an approach to architecture that places all technology, knowledge and the science of building (tectonics), understanding of culture, and response to place, in the stream of history for fishing out as required by architects who choose to reflect the particularities of the place, time and people for where, when and whom they are employed. (Critical Regionalism is also dealt with in Chapter 4.3.3 and 12.6.2)

cry from the 'whoops the oil is running out' scenario that drove the push for energy efficiency in the 1970s. It accepts, with alarm, that we are in the deluge and that action is required.

- Thirdly, a 'Gaian'¹⁴ sensibility is expressed in the recognition that humans, as a global species, have to re-evaluate a "troubled relationship with the planet". It was simply unthinkable, in a serious professional journal, to use language that spoke of relating to a planet as an entity prior to the widespread dissemination of Lovelock and Margulis' Gaia Hypothesis. Imperfectly understood though it may be, the Gaia Hypothesis has given rise to a new way of conceiving of, and discussing global environmental issues that see them as intrinsically linked, not just to one another, and not just to the actions of humankind, but also to the *way of being* that humans adopt and enjoy. This ecological connection of culture to its environmental context, always inherent in vernacular architecture, is now being revisited and celebrated in the evolving architectural idiom of which Slessor's essay is itself a partial reflection.

This Gaian reflection is magnified in the first sentence of her first paragraph when Slessor implicitly acknowledges the spiritual dimension of global environmentalism, saying that 'Sustainability has become an elusive, mantric ideal for the late twentieth century...'. But perhaps the most important sentence is the one that implies a more complete approach to making architecture, an approach that is entirely congruent with, even integral to, that advocated by this thesis –

'...the emergence of sustainability as a movement is clearly to be encouraged, for it offers the prospect of a holistic response to the present environmental crisis and makes much-needed connections between nature, culture, economics, politics and technology.' (Slessor 1999 p.29)

Architects are directly responsible for shaping only a small part of the built environment, but society's most important structures are almost invariably architect designed. Architects are unusual in that they are taught to see 'the bigger picture', to understand the role of the microcosm in the macro – the how and why of making sure that the nail holds the horseshoe in order to win the war. Architects spend many years developing their skills, some of which are very practical and to do with the technics of construction, some of which deal with understanding the vagaries of climate and culture, and some of which are quite arcane. The extraordinarily broad scope of

¹⁴ The author presumes an awareness of the Gaia Hypothesis on the part of the reader.

architectural education is unusual (particularly when compared with mathematics or physics, for instance) and has made architecture a difficult discipline to fit within the framework of universities in the modern era. The study and comprehension of topics as disparate as mud-brick manufacture, contract law and aesthetics is intrinsic to architecture. Thus Slessor is correct to say that architects have always been known as generalists ‘...assimilating a wide variety of information and converting it into a solution.’ (Slessor 1999 p.29)

Slessor sees ‘sustainability’ as a challenge to architects to employ their multi-faceted skills to solve environmental problems because sustainability ‘...encompasses areas as diverse as ethics, economics, sociology, ecology, history and biology.’ Although the span of subject matter dealt with by architects during their education and in practice may be as broad as those which come under the rubric of sustainability, the manner in which they deal with them may not be immediately transferable. Conventionally, despite the wealth of material they learn to assimilate, architects are trained to produce finite objects within finite time scales whereas sustainability is about on-going process. It is thus perhaps optimistic to suggest, as Slessor does, that ‘The analytical and deductive skills of architects can be used to make sense of the complex systems and interactions of global ecology.’ (Slessor 1999 p.29) but it is in this requirement for architects to cover a wide spectrum of issues and have an understanding of connectivity, that one can discern some of the essential links between the discipline of architecture and that of environmental studies.

For all the intelligence represented in Slessor’s essay and the clear links it draws between the practice of architecture and the need for architects to engage with environmental issues in a profound and meaningful way, and despite its celebration of vernacular heritage, it ultimately fails to connect with the broader community in either its language or its content. Although the words ‘systems’, ‘interactions’ and ‘community’ appear in the text, the essay is coded to speak to those immersed in the architectural sub-culture and betrays an abiding preoccupation with form rather than process - somehow, the invigoration and inspiration of ‘natural forms’ and ‘quotidian’ (commonplace) construction represent an ‘immemorial dialogue’ between architecture and ecology’. (Slessor 1999 p.29)

Finally, in illustrating her essay Slessor has done what architectural writers usually do and provided images with words attached that are intended to direct the reading of the image (Figure 3). To an architect, the images which accompany the essay are obviously selected for their superficial graphic similarity (both have swelling forms

composed in the centre of the photograph). But whereas the Iranian wind towers can be readily understood in relation to the caption ‘Wind towers in Iran used to cool underground cisterns. Such structures reveal the depth of knowledge and practical technology possessed by traditional societies.’ Murcutt’s house is unlikely to be read in the terms described in its caption by anyone who hasn’t had the benefit of a formal architectural education ‘Sitting on the ground lightly – Glenn Murcutt’s Fredericks House at Jamberoo, New South Wales, resonates with culture and landscape.’ (Slessor 1999 p.29).

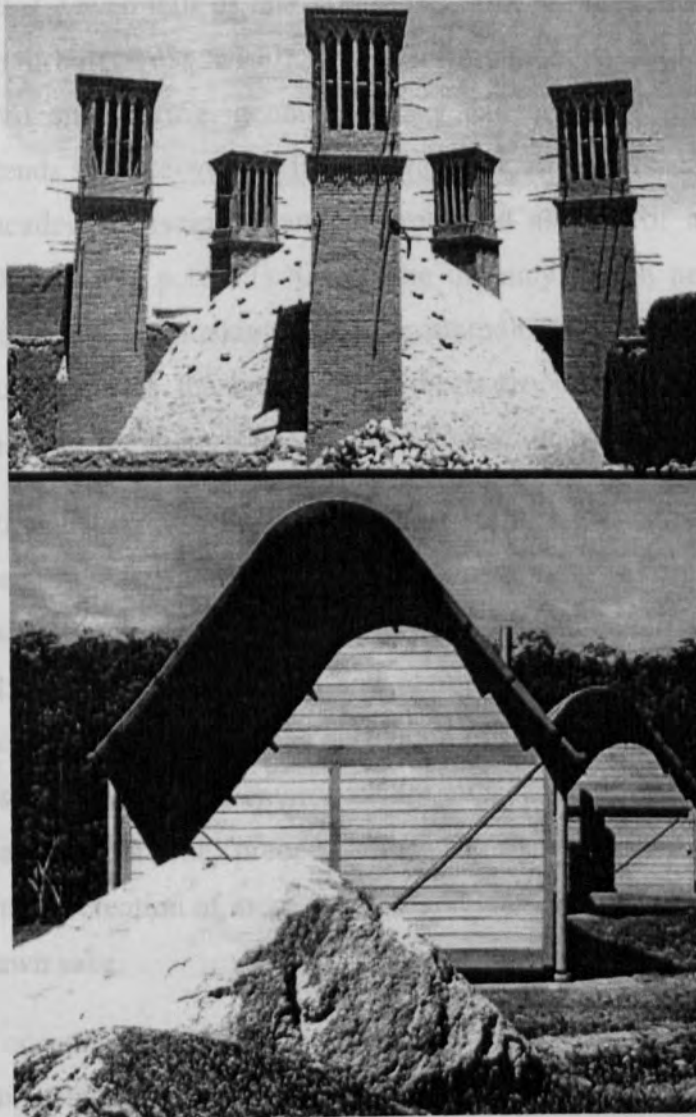


FIGURE 3: The particularity of architecturally trained perception
 (Top) ‘Wind towers in Iran used to cool underground cisterns. Such structures reveal the depth of knowledge and practical technology possessed by traditional societies.’
 (Below) ‘Sitting on the ground lightly – Glenn Murcutt’s Fredericks House at Jamberoo, New South Wales, resonates with culture and landscape.’
 (Source: Slessor 1999 p.28)

2.3 Towards Sustainable Human Ecological Development



FIGURE 4: The Seven Steps of SHED (see Chapter 14)

The task is to integrate a cross-disciplinary knowledge base within a framework that supports design and development of towns and cities in an ecological and socially responsible context. Owen tells us that ‘There is... a wide range of texts on the natural environment in urban areas within the disciplines of hydrology, climatology, horticulture, civil engineering, geomorphology and ecology.’ but ‘Much of their content, which tends to be re-worked from text to text, is expressed in the terminology of the parent academic discipline and is presented as part of a discrete field of knowledge.’ (Owen 1991 p.16-17). Given the urgency of the need to address the environmental impact of city-making and the epistemological confusion that is endemic in architecture and planning, the author of this thesis proposes that they be redefined as the art and science, theory and practice, of creating sustainable human settlement.

The traditionalists (most clearly represented in the mainstream of architectural education and readily identifiable across the very wide range of architectural practice) hold to the view that architecture is principally and fundamentally concerned with the intellectual and technological creation and manipulation of artifacts, with a strong emphasis on the aesthetic implications and value of that manipulation. There is some concern with resulting social and environmental impacts but that concern is not central to what are essentially ‘artistic’ preoccupations. Innovation is valued to the extent to which it supports the creation of more artifacts and lends value to the central activity of design - for its own sake.

‘Design’ occupies centre stage and contemplation of design provides the paradigms within which architecture is generated. This is, typically, self-referential - most books on architectural design are about architects and what they have designed rather than the how and why of the design process, and assessment of environmental impact of any design is almost invariably confined to aesthetics.

Traditional ‘mainstream’ planners, on the other hand, tend to be less concerned with aesthetics and more interested in the functional aspects of things. So we find that it matters less what individual houses and buildings look like than how the lives of their inhabitants and users are affected by them. The appearance of a town or city is less

important in the final analysis than how effective it is at operating as a focus for trade, industry, habitation and social interaction. Planners have clearly articulated concerns and codified responses to the placement of human artifacts in the landscape and there is a large body of knowledge and its application regarding connected issues such as water supply and service provision - knowledge which implies some understanding of the physical connections between the artificial processes of making settlement and those natural processes which shape and make the landscape.

Although planning is more usually about 'process' than architecture and its obsession with artifacts, the dominant processes which provide the parameters within which planning operates are artificially generated. The most obvious and powerful parameters are generated by the economic system. Environmental impacts may be acknowledged but they are subsumed in the context of the prevailing economic order and its associated value systems. Planning rarely challenges the status quo and its role is essentially to extrapolate trends and develop policies and organisational forms which reflect the perceived needs of those who set the trends.

So, to put it crudely - architecture is to do with a self-referencing, object-orientated craft activity - planning is to do with placing the objects of architecture in patterns which do not adversely affect the dominant economic order. Any connection between these activities and the state of the planet's ecological health are mediated by their respective preoccupations and are thus seen as incidental or peripheral to the central tasks of architectural creativity or pragmatic planning.

Many architects and planners are dissatisfied with, and disaffected by, this state of affairs but the intellectual and political structures of their disciplines do little to help them change it.

Architecture and planning are primarily concerned with the creation of human settlement, ie. places for people to live. In order to do this water and food must be obtained (for 'settlement' implies staying) and shelter must be erected (to create desirable micro-climates and to keep out unwanted people, beasts or other things). All these activities have an immediate impact on the environment, both animate and inanimate. The creation of the built environment is, arguably, the most damaging human activity short of warfare. In the developed world 50% of greenhouse gas emissions can be attributed to the making and maintenance of the built environment and both historically and presently, the establishment of every urban centre has necessitated the ecologically destructive invasion of agriculture into its hinterland.

Whereas it is possible to identify design processes in both conscious and unconscious activities which manifest artifacts amenable to design-orientated analysis, it remains an inescapable, scientifically verifiable fact that the environment is affected as a primary consequence of the creation of any aspect of human settlement. For instance, it may or may not be the case that a piece of wood is crafted into an implement for the purpose of, say, making a clearing for agriculture or shelter construction, but obtaining the piece of wood necessarily entails affecting a tree, even if it is only to remove a dead branch from the forest floor - thus depriving the soil of a nutrient source.

In other words, the artifacts and economics associated with architecture and planning are of less consequence than their impact on ecosystems.

This being the case, the academic disciplines and professional practices of architecture and planning should both accept that environmental (and thus ecological) manipulation is their core activity and requires an appropriate theoretical framework. This would not deny the importance of all those activities and concerns, both theoretical and practical, with which architecture and planning have traditionally been associated, but it would assert the need to maintain global ecological health (or satisfactory ecological functionality) as a prerequisite for the development of human settlement which had any hope of being sustainable in the long-term.

Placing the goal of creating sustainable human settlement at the core of architecture and planning would clearly determine environmental priorities for their respective professional and academic realms. The concept of 'sustainable human ecological development' would make it plain that the process of design (and all its wonderful creative energies), the role of economics (with all its powerful mechanisms) and the organisation of human society (with its need for culture, equity and challenge) have to be subservient to the irreducible fact that for our species to thrive in its adopted habitat of the city, it must respect ecological imperatives above all else. If ecology is the study of the relationship between living things and their environment then architecture and planning might best find their place in a new science of urban ecology.

By encouraging all those concerned with the creation of human settlement to recognise the complex and interdependent nature of the environment on which they act, it might be that we can escape from the rather too prevalent idea that some kind of technical fix will rescue civilisation or the planet from disaster. City and country would

be seen as part of a whole rather than conflicting and separate entities and the concept of an 'ecological city' might no longer appear to be a contradiction in terms.

That contradiction evaporates when it is understood that all cities already exist in an ecological context. The issue then becomes one of defining the relative position of cities to their ecological contexts. An holistic approach to architecture and planning would, of necessity, place these human endeavours firmly in an ecological context. Architecture and planning are inextricably tied up with the urbanisation of this planet and urbanisation is at the core of the environmental dilemma. But how do we understand that dilemma with the tools of a culture that has created it in the first place?

2.4 Romantic Science

...the reductionist triumph of modern biology: the idea that we can understand nature most effectively by dismantling it. (Lewin, p.31, 1994)

The educators in schools and tertiary institutions must cease propagating the now outdated notion of detached, objective scientific observation, which by definition is totally impossible. (Engwicht 1992 p.81)

Arthur Koestler observed that the 'citadel of orthodoxy' upon which the sciences of life were constructed in the first half of the twentieth century is resting on 'monumental superstitions' including :

...that the only scientific method worth that name is quantitative measurement; and, consequently, that complex phenomena must be reduced to simple elements accessible to such treatment, without undue worry whether the specific characteristics of a complex phenomenon...may be lost in the process. (Koestler 1975 p.3)

The Biosphere 2 project for enclosing 1.2 hectares of artificially created ecosystem in a steel and glass megastructure¹⁵ has been criticised for not being 'proper science' but it can be seen as a project very much in the romantic tradition of holistic 'total system' observation and testing (Lewin 1992 p.12). Biosphere 2 is a good example of how even if the whole is not greater than the sum of the parts it is certainly not the same, and of the necessity for attention to inter-relationships and processes, rather than discrete objects, as a means of understanding living systems.

2.4.1 Picking Flowers

There are different ways to do science and concerns with the limitations of reductionism have been expressed for as long as science has been a recognised activity. At the end of the nineteenth and in the early part of the twentieth century in Germany there was a romantic movement in science defining science as 'any study which

¹⁵ See Chapter 4.2.10.

proceeds logically and rationally'. In a radio interview for the ABC Science Show in 1989 Carol Adams observed that:

...one other characteristic of the romantic movement is that its model is organic rather than mechanistic. Instead of saying what we will do with nature as scientists is break it down into little pieces and study each individual piece, rather than that, what scientists who are romantic are saying is, 'we the scientists are part of the organic whole of the universe and we must study the universe as a whole. We must therefore see ourselves as part of that whole of the universe. (Adams 1989)

Observation and study of 'Lines of force...and...inter-relationships rather than discrete, mechanistic particles' (Adams 1989) are what characterise the romantic science viewpoint. Adams went on to contrast the empiricist with the romantic view by describing how 'the empiricist' studies a flower by picking it, taking the leaves off, taking it apart and saying 'Aha, I now understand that flower!' whereas 'the romantic' would sit down next to the flower, study it, think about it, meditate on it - then go away. The difference being that the empiricist destroys the object of study whilst the romantic maintains the flower's integrity as a living organism.

In pursuing the idea that inhabited cities are living systems, it is important to recognise that the purpose of all human settlement manufacture (from the hut to the metropolis) is to accommodate creatures with consciousness. That consciousness is impossible to define on the basis of reductionism. Theodore Roszak damned 'The Strange Interplay of Objectivity and Alienation' in his magnum opus 'Where the Wasteland Ends' (Roszak 1974 p.107) and suggests that 'As a phase in the history of consciousness, the building of the artificial environment may best be understood as an ever deepening condition of idolatry.' (Roszak 1974 p.109). We have seen that that idolatry may be readily identified in the architectural sub-culture where object fixated world-views idolise and idealise the making of fashionable artifacts¹⁶. At the larger scale, architects often fail to consider how much the creation of architecture is intimately linked with the patterns of human settlement to which is a major contributor.

Architecture is a social art. It is the result of a complex mixture of processes embedded in living systems. The 'truth seeking' aspects of this study are better achieved by looking at the 'whole' and through comparative analysis of 'wholes' in relation to human activity rather than reduction of the subject to so many inert bits and pieces. As Koestler wrote in respect of behaviourism:

¹⁶ To the extent that in professional publications, the 'higher' the art of architecture, the less likely there are to be people in the photographs.

The attempt to reduce the complex activities of man (sic) to the hypothetical 'atoms of behaviour' found in lower mammals produced next to nothing that is relevant - just as the chemical analysis of bricks and mortar will tell you next to nothing about the architecture of a building. (Koestler 1975 p.9)

Thus, in order to relate the functionality of architecture and city planning to living systems, this dissertation is written in something of the romantic tradition, seeking to understand its subject by studying the inter-relationships of things as well as analysing the discrete pieces; looking at both the whole and the parts.

Gestalt theorists would claim that a flower dissected for analysis is no longer the flower that attracted the attention of the erstwhile analyst. In this study the pieces of architecture, culture, politics and so on (though some of these 'pieces' themselves include studies in relationships) are there in a similar way to the parts of a dissected flower. Yet the attempt here is to reconstitute a clear picture of the flower. A monocular view would be unbalanced and parts must co-exist with wholes for either to exist at all. To quote Koestler again:

The two-term part-whole paradigm is deeply engrained in our unconscious habits of thought. It will make a great difference to our mental outlook when we succeed in breaking away from it. (Koestler 1975 p.49)

Reality then, is multi-valent, many faceted and superficially 'messy'. It is certainly complex. It is a reality which results from, and is an expression of, the social and political realities that actually manufacture places of collective human habitation. It needs to be understood that the making of the built environment is firmly set into the context of politics and this thesis addresses the role of politics in Chapter 11. Historically, 'culture' studied as anthropology or sociology has attempted to maintain an ostensibly 'objective' viewpoint implying 'value-free' assessments, observations and conclusions, but nothing is value-free if it is in the realm of human affairs. Politics is nothing if not about values.

2.4.2 Objectivity, Subjectivity and the Third Way

The issue of objectivity is always tricky. Strictly speaking, as Engwicht observed, it is not possible (Engwicht 1992 p.81). Everyone has their own unique version of the history we all share. It is not possible to write without bias because one is human. That human beings are biased towards this or that point of view is an inescapable fact of life. That such 'biased' viewpoints can result in conflict is not a new observation. For instance, the Middle East, which was a preoccupation of the author during the germinating stages of study that resulted in this thesis, has provided some of the best known and well chronicled stories of human conflict. To write about any aspect of it

one cannot help but enter the arena of conflict in which spectators must take sides to understand the game better. To criticise those who feign objectivity is to invite criticism oneself, and protestations of any kind deny impartiality by their very existence! But the honest attempt to tell a story often requires telling the tale from both sides or all. The true story of the bird killed in flight is the story of the birds' life and the life of its hunter, joined together. Fate twists and blends all truths to produce the total truth, which includes the lives and lies of all within it. Thus it is in the Middle East, and, in particular, the Holy Land; where so much of our cultural and moral growth began. This thesis does not claim to be 'objective' in the sense of providing a 'value-free' report or analysis of any aspect of the topic, which is human settlement, but it does claim to try and fit the stories of birds and hunters well enough together that each might see more clearly how they both belong in the same story. With such knowledge, the bird may choose to alter its flight, the hunter might forgo his (sic) game. But that is their decision, not the story-teller's.

The author's earlier researches on regionalism and the manufacture of human settlement were focussed on the Middle East. One might reasonably claim that all writing on the Middle East is partisan. There are so many respectable varieties of opinion on Middle Eastern issues that even those who attempt to be non-partisan are liable to lend support to one or another of those opinions! The problem in writing about that part of the Middle East which is known variously and inclusively as Jordan, Palestine and Israel (this range of perceptions itself being a fine example of how difficult it is to convincingly define 'regions') is to be able to be critical of the Israelis, for instance, without being seen as an Arab partisan (or anti-Semitic) and vice versa. This recurring dilemma which all serious writers about the Middle East must confront, has been a prod to the author's concern to develop a means of analysing and discussing the built environment which is neither culture-bound nor self-deluding or otherwise either dishonest or unfair.

To use an architectural analogy, words can frame a view of things as a traditional window does - transparent and with the direction and framing of the view quite obvious. One knows where one stands as the curtains are drawn back and the picture is revealed. The purported objectivity that may be offered instead may be dishonest by comparison. There are many papers in which the authors' prejudices are intended to be concealed, where there is no overt value system because scientific method is presumed to have banished human foibles from the scene. These works are not like windows at all, but are more akin to the glazed cladding in Richard Rogers' offices for Lloyds in

London, offering the promise of extensive views through walls of glass, but making it dimpled and obscure with many layers and a great deal of hot air passing between the sheets, with only a thin defensive slit through which the observer is grudgingly granted a view. Separated not only from nature by the city then, but separated from the human nature of the city by the building.

Cameron (1998) suggest that 'hierarchical separations of humans from nature' can be 'moved toward a reconciling space of respectful relationship.' But a relationship requires mutual responses that are pertinent to each other and thus capable of development. Is it possible to have respect on the part of one party in a relationship and not with the other? If not, then a 'respectful relationship' with nature is not achievable because however much we may be convinced that we respect nature, nature cannot 'respect' us, it cannot feel 'deferential esteem' towards us, it can only provide the means for us to be alive. At the same time, it might be argued, we are in any case part of nature (in which case maybe we can at least respect ourselves), and we might accept that we are nature's route to consciousness.

How then, to employ that consciousness?

Much that purports to be 'objective' in academic investigations is only disguised as such. By quoting particular sources and authorities with appropriate selectivity a reasonably clever student of any subject can achieve the semblance of a well-researched and balanced approach. Any human's selection of material written by another is bound to contain subjective assessments, whether explicit or not. We are all, at least in part, the result of years of conditioning by particular environments, none of which can seriously be considered 'value free'. It is difficult to regard authors who discuss at length their attempts to remain 'objective' without the suspicion that they 'doth protest too much'.

Subjective views cannot be cleared from the mind, but they can be put into context.

The author has been an active participant in this research to the point where it is extremely difficult to claim any credibility as an observer of events. Most of the activity surrounding the three UEA-Ecopolis case study projects is reported from the view of someone who was often simultaneously a co-initiator, advocate, theorist, co-designer of participatory processes, architect-planner, and, particularly in relation to the Christie Walk development, builder, developer and intending resident. This dissertation needs to be read and understood in the context of very strong advocacy and involvement on the

part of its author. This author has a professional architectural background, has taken a directive role in relation to the projects described, and can be identified as having taken a leadership role in the 'modern ecocity movement' which is predicated on a belief that the design of cities is too important to be left to professionals because 'The democratic nature of the ecocity movement is fundamental to its existence.' (Orszanski 1993 p.13 and 14).



PART A

ECOLOGICAL CITYSCAPES: THEORY & PRACTICE



INTRODUCTION

Our environment has become too important to leave to the experts...

(Crosby 1973 p.63)

A.1 People, Places and Philosophies

Part A identifies people, places and philosophies that have particular relevance to this thesis and includes brief reviews of existing theories of architecture and the ecology of human settlement which either explicitly or implicitly possess an ecocity agenda with its many diverse issues¹. Chapter 3 briefly discusses how different points of view provide both a rich source of ideas but also some contradictory opinions about what is sustainable in urban architecture and design. Architectural and planning ideas need to be embedded in an ecological framework that can provide the basis for integrating the cumulative knowledge that is presently dispersed. Regionalism is seen as way to consciously integrate the making of buildings with the ecology of their cultural and physical landscape. In Chapter 4 an attempt is made to discern the type and extent of the influence of key theorists and practitioners².

Chapter 5 looks at examples of 'sustainable' planning and development in New Urbanist, social activist and ecovillage environments. It then changes focus to discuss Curitiba and Calcutta as examples of urbanisation that display the primary characteristics of a major city in a developing country and that also display certain characteristics of ecocity function which have been achieved through a process of development that has not necessarily been driven by ecocity precepts. Calcutta is compared with Curitiba in Brazil, a developing country city that calls itself an 'ecological city' and brief mention is made, for comparative purposes, of Adelaide,

¹ Including, for example: water management, energy systems, air quality, waste and resource management, construction materials selection and use, food security, biological systems design, habitats for non-human species, disease vectors and amelioration, aesthetics, urban design, place making, bioregionalism, geomancy, spirituality, the role of professionals, gender, education, civil liberties, civics, competition, cooperation, and the role of community.

² The author did consider deleting, or relegating to the appendices, the very long Chapter 4 'Relevant Theorists' but it was retained in this Part A as a means of identifying, and explicating the sources of inspiration and ideas that have led to both this dissertation and the three projects described in the later Part B case studies.

South Australia³. Curitiba is receiving international acclaim as a prototypical ecocity but there are a number of aspects of ecocity design, development and maintenance that are not addressed in a manner likely to ultimately support its definition as a ‘true’ ecocity. This is discussed. These examples are selected on the basis of Calcutta being a quintessential third world city, Curitiba being the only city of any size to identify itself as an ‘ecocity’, and Adelaide because it represents an almost cartoon-like manifestation of a sprawl city – the antithesis of the compact city form favoured by ecocity advocates.

The chapter concludes with an indication of how the conceptualisation of Ecopolis can be traced back to some formative work by the author on ‘anti-Modernist’ urban design and theory undertaken in an English context.

The words ‘sustainable’, ‘green’ and ‘ecological’ recur in commentary and debate but apart from the usual reiteration that explains sustainability in one or another reworkings of the ‘sustainable development’ definition from the 1987 Brundtland Commission,⁴ there is rarely any clear sense or formal explanation of which is which and whether there is any qualitative difference between them. For all the talk about sustainability in architecture, planning and design, it is hard not to agree with landscape architect Carol Franklin who, in discussing the definition of ‘ecological landscape design’ says ‘...one reason that the name ‘sustainable design’ is so acceptable is that it suggests that if we just develop carefully and responsibly we can continue to over-populate the earth and to build what we like.’ Whereas the notion of ‘oikos’ is to do with interrelationships and is ‘a more difficult concept to grasp in all its implications.’ (Franklin 1999 p.17)

Approaches to sustainability range from professional planners anxious to make the world’s urban structures work better within the framework of existing political and economic constraints to citizen planners and activists of the ecocity movement who see a need to challenge, and if necessary change, that framework as a prerequisite for

³ The author has some familiarity with each of these cities and they have been locations for significant international conferences that deal with the subject matter of this thesis; Adelaide was host to EcoCity 2, the Second International Ecological City Conference, Curitiba was host to EcoCity IV, and Calcutta hosted the International Conference on Architecture of Cities for which the author’s ‘Charter of Calcutta’ was drafted and adopted in the formal closing session of the conference. This ‘charter’ has been informally adopted by various individuals and organisations since its dissemination in the early 1980s and has achieved a kind of manifesto status as a ‘pro-city’ environmental summary (see Chapter 13).

⁴ The United Nations Commission on Environment and Development, otherwise known as the Brundtland Commission after the chair, Gro Brundtland, defined sustainable development as ‘Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’

sustainability. One approach is about application of appropriate techniques within the social context of the status quo, the other is about social change itself. In the former 'technical fix' model any project or development program is just itself, in the ecocity activists' view a project or development program becomes '... a microcosm of the whole interdependence of life forms on the planet.' (Clements 1992). Community education has to be integral to urban sustainability if only to ensure the professionals are speaking the same language as the citizens.



CHAPTER 3

ARCHITECTURE, URBANISM & ECOLOGICAL PERSPECTIVES

Unfortunately, the guiding metaphors of those who shape the built environment still reflect a nineteenth-century epistemology. Until our everyday activities preserve ecological integrity *by design*, their cumulative impact will continue to be devastating.

(Cowan & Van der Ryn 1996 p.18)

As we address the new millennium, sustainability should not be seen simply as a corrective force, but as a new mandate for architecture.

(Slessor 2000 p.17)

This chapter introduces some of the antecedents for ecocity ideas, relates urban ecological analyses to architectural and urban planning outcomes, and discusses place-specific architectural practice as a means of achieving ecologically responsible design.

3.1 Points of view

As discussed in the previous chapter, there is a tendency to see solutions to problems in terms that are most familiar to those who do the seeing. This limits the

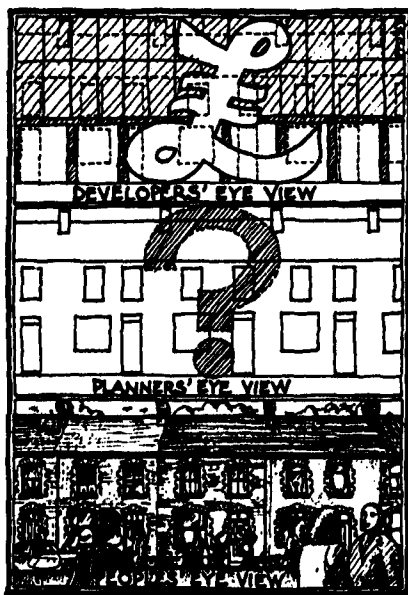


FIGURE 5: Points of view
(Source – Dumbleton 1977 –
Illustration by PFD)

extent to which problems are fully and effectively addressed. Thus engineers see the solution to a problem like salination in terms of engineering rather than biology, social workers identify a need for more social work to solve social problems, governments see a need for more government, industry sees the need for more production, academics see the need for more education - and architects see the need for more architecture!¹

But just as 'more architecture' is no solution, neither is 'more planning'. In 'After the Planners' Robert Goodman (Goodman 1972) provides a critique of planning that still holds true. After working with

¹ 'Give a boy a hammer and all he can see are nails.' (unattributed)

dispossessed communities in urban America he concluded, simply, that 'it was not lack of expertise that was at the root of these communities' problems.' (Goodman 1972 p.51)². Just as one's view is conditioned by who one is, one's cultural background, social circumstances and education or training, so perspectives on urbanism can be conditioned by adoption, or otherwise, of an ecological view. The architectural perspective on cities is not only lacking an ecological sense, it is often too preoccupied by architecture to see the bigger picture offered by other disciplines.

Great building cultures are those in which there is a consensus about building types and even more importantly how one type joins to the next ... that building culture depends on some rule, imposed by edict or by cultural consensus, some real constraint ... whichever it is, the very best people as well as the very worst will tend to do better under rigorous constraints. Since there are very few great architects, good cities can't be built with great architecture - they can only be built as well designed cities. Architects believe that cities will be saved by great buildings but they won't be - cities will be saved by great city plans and a consensus about how you build in them. (Ward 1986 p.19)

3.1.1 Antecedents and Antitheses

Back in the 6th century AD, under Justinian Law, there were legal rights to what we now call solar access, two millennia ago Vitruvius was exhorting people to build so as to suit the climate of the region (Gwilt (trans.) 1867), and solar architecture and urban design has a 2,500 year history (Butti and Perlin 1980). One of the earliest published treatises with relevance to the concept of ecocities is 'The Ten Books of Marcus Vitruvius Pollio' which dates from just after the time of Julius Cæsar (Gwilt (trans.) 1867). It seems that for many centuries, environmental sensitivity has been ignored rather than unknown but even in the modern era there do not appear to be any overarching, coherent approaches to the making of ecological cities although there are a handful of inspirational theorists and some sustained attempts to compile pertinent ideas and, to a lesser extent, methodologies. (Alexander et al 1987, Register 1987³, Soleri 1969 and 1987, Rogers and Gumuchdjian 1997, Vale and Vale 1991).

² Goodman's book was an important text in the formative years of the present author's efforts at urban activism in the mid-1970s with a group called Cardiff Housing Action in South Wales. It helped to inform his developing critique of city-making which was also conditioned by its evolution in a strongly environmentalist context. Part of the evidence for the impact and activities of that period are in those illustrations for this dissertation (including the one on the previous page) taken from his work as illustrator for 'The Second Blitz: The Demolition & Rebuilding of Town Centres in South Wales' (Dumbleton 1977).

³ At the time of writing, Richard Register had a manuscript in progress that promises to provide an ecocity theory which builds on his work on 'ecocitology' (Personal communication). As of January 2002 that manuscript had just been made available as a published book called 'Ecocities'.

Although they may have existed for decades or millennia, the roots of ecocity ideas reach deep into diverse soil types where even the protagonists do not necessarily agree with each other.

3.1.1.1 Gardens and Cities

Howard's 'Garden City' is of particular importance to the growth of ecocity ideas. Roelofs states unequivocally that his Garden City was a major influence on green city advocates (Roelofs 1996 p.14) and the concept is routinely cited by writers on 'green' architecture and planning (Farmer 1996, Roelofs 1996). Howard's proposed cities certainly contained ecocity precepts, with proposals for light, air and sunshine for all, and the proposition that work, leisure and home be kept within reasonable proximity of each other⁴ and served by efficient transport systems. Howard recognised that a city is dependent on a productive landscape and so made appropriate provision in his plans. He also recognised that the land tenure system could either encourage exploitation or help prevent it, and so he proposed community land ownership schemes that protected property from speculation (Beever 1988, Howard 1985).

Jane Jacobs has also been a powerful influence on the thinking of ecocity advocates⁵ like Register (Register 1987) and her influence on modern planning has been extensive (see Chapter 4.2.6). According to Jacobs though, Howard '...not only hated the wrongs and mistakes of the city, he hated the city and thought it an outright evil and an affront to nature that so many people should get themselves into an agglomeration. His prescription for saving the people was to do the city in.' (Jacobs 1962/1984 p.27)

Le Corbusier, on the other hand, celebrated the city as 'an assault on nature' (Gardner 1990 p.10). His vision of an ideal city is infamous for having made respectable the notions of high-rise, tower block living that eventually so disenchanted the urban populace in the 'west'. Although it has been shown to have little value as a model for development outside of Hong Kong and Singapore where territorial imperatives have been paramount, the high-rise housing model is integral to Curitiba's planning (Ravazzani and Fagnani 1999) and is very much part of the Soleri/Register vision of high density ecocities.

Soleri's arcologies may be extraordinary (see Chapter 4) but city visionaries have proffered much strange fare in the 20th century. Inspired by the promise of new technologies, the industrial era futurists responded in anything but authentically urban

⁴ Although separated by rigid zoning.

⁵ And, indeed, on planners generally.

ways. If Howard would 'do the city in' by turning it into a garden (Jacobs 1962/1984), Corbusier would have obliterated much of Paris by turning it into a park in order to build his Ville Radieuse (Jenger 1996 p.50, Frampton 1996 pp.178-185), Frank Lloyd Wright was determined to see the city replaced by a new kind of 'countryside' of extreme, architected sprawl (Wright 1945, 1963a), and others, like Garnier, were envisaging an ideal 'city-for-industry' in which greenery was used for 'insulation' between 'rationally dispersed usage zones' (Collins in Wiebensen 1968?, p.7).

Howard also wanted to see the city separated into places of simplified, relatively self-contained functions set in a heavily controlled economic environment, and this was one of his 'powerful and city-destroying ideas' according to Jacobs (Jacobs 1962/1984 p.28). Jacobs was offended by Howard's utopianism, his insistence on the wholesomeness of suburban 'small town' housing and his dismissal of 'the intricate, many-faceted, cultural life of the metropolis.' (Jacobs 1962/1984 p.29). She saw Howard's ideas as paternalistic and authoritarian, with 'good planning' conceived as 'a series of static acts' (Jacobs 1962/1984 p.29). Howard's ideas could also be seen as a reaction to prevailing circumstances in an England at the height of industrial development. 'He saw the great city, the London of his day, not as a faulty machine but as an unstable social structure created by economic forces, by the process of industrialisation which had upset the balance of town and country, industry and agriculture.' (Bevers 1988 p.183). One of Howard's most recent biographers, Bevers suggests that this remedy of the marriage of town and country, in the form envisaged by Howard, was now 'little more than a historical curiosity' but maintains that the idea may still have relevance to countries experiencing rapid industrialisation (Bevers 1988).

3.1.1.2 Conservative or Conservationist?

The conflicting approaches represented by Jacobs' celebration of the metropolis and Howard's commitment to horticulture remain at the core of the 'sustainable city' debate. Nowhere is the width of the divide between current sustainable city approaches greater than in England, home of the Garden City.

Early efforts in modern design were marked by a concern to develop healthier, greener and more humanitarian environments; English garden cities and new towns reflect this reformist spirit. (Rogers 1989 p.67).

Prince Charles' attacks on modern design were critical contributions to the rise of community architecture in the British Islands and the revival of the idea that people are entitled to enjoy healthier, greener and more humanitarian environments. His efforts to

raise public interest in architecture and planning were, arguably, more successful than the efforts made by the architectural and planning professions. His vision of Britain was one in which traditional building and urban forms dominated (Charles, Prince of Wales 1989). In putting his principles into practice he engaged Leon Krier to design an extension to the town of Dorchester in England along semi-traditional lines (see Chapter 5). His quasi-vernacular vision is a response to an historical circumstance in which 'Half a century of planning activity has transformed the built environment, but has failed to capture the public's sympathies.' (Economakis 1993 p.7) Nevertheless, English architects like Richard Rogers remain determined modernists, and in penning a polemic against the revivalist initiatives of Prince Charles Rogers claims that

Before we can hope to overcome the ugly legacy of the last decades we must recognise both the fragile beauty of the universe and the enormity of the environmental crisis which is threatening mankind... We delude ourselves if we think that returning to a make-believe past can solve this crisis. In fact the danger we face is not being too modern but rather not being modern enough. (Rogers 1989 p.69) . .

Rogers' 'sustainable city' vision could not be further removed from that of Charles for his is a world in which '...buildings will dematerialise...The buildings of the future -...will be less like the immutable classical temples of the past and more like moving, thinking, organic robots.' (Rogers and Gumuchdjan 1997 p.165).

Contradictions abound in this realm. Although it is potentially radical, a 'green' approach to design is being adopted in a spirit of conservatism rather than conservationism, whether it be in the urban design of places like Seaside and Windsor in Florida by Duany and Plater-Zyberk or Poundbury by Krier (Kunstler 1998 pp.150-152, Duany and Plater-Zyberk 1993, Krier 1989, 1993), or the hi-tech Anglo-Teutonic architecture of Rogers, Foster et al (Rogers and Gumuchdjan 1997, Davey 1997b). The design conservatives see green design as a foundation for anti-modernist approaches to space and form, the modernists see it as the development of a 'healthy' tradition, and the progressives see the radicalism in it as the basis of an approach to design unfettered by historicism.

It is often difficult to discern any logical continuity between the different fashion phases of architecture. And if there is any, it has little to do with ecological sensibilities, as architects remain obsessed with aesthetics and form-making to the virtual exclusion of anything else – 'Perhaps the fundamental continuity between Modernist and Postmodernist architects derives from the reassertion of the power of form, and hence the primacy of design, to the exclusion of other strategies for improving cities and living conditions.' (Ghirardo 1996 p.27). Relating the activities of architects to

urbanism, Ghirardo asserts that design clearly ought to be part of any urban program, but that it cannot be used for mere form-giving as an isolated component. If the integration of architecture at the purely formal level is lacking, there would seem to be little hope for anything more profound and subtle.

It has been claimed that the work of the iconoclast Robert Venturi ‘...opened up a new pluralistic permissive architecture, a contextualism of outlook, and a concern for the environment.’ (Watkin 1996 p.572) but in the mainstream of architectural practice and in the shaping of urban environments, design is not seen as integral to ecology, and vice versa, whilst instrumental, ‘technical fix’ conceptions of ecological design and development are characterised by worthy, but dull, contributions such as the adoption of ‘sustainable practices’ in the construction industry (Langston 1997)

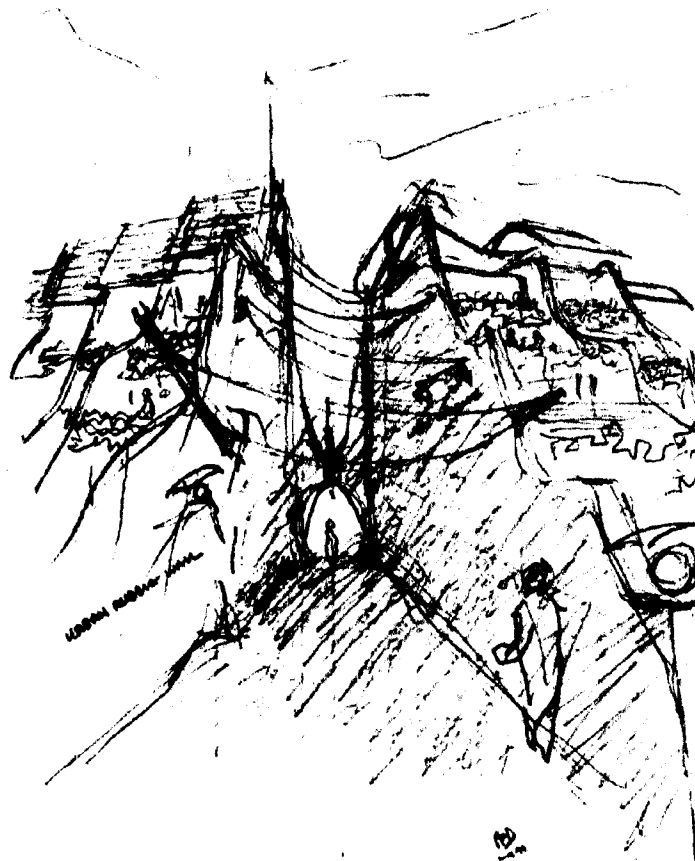


FIGURE 6: Sketch for urban rubble wall
(Drawing by author April 1991)

3.2 Integration

3.2.1 The Second Generation of Ecological Design

If there is to be effective, meaningful shift towards an integration of ecology, architecture and urbanism an effective, meaningful shift in thinking is required. If what Cowan and Van der Ryn term the 'first generation' of ecological design was about small-scale experimentation and gradual adoption of 'alternative' building techniques, renewable energy, and so forth, then

The second generation of ecological design must effectively weave the insights of literally dozens of disciplines. It must create a viable ecological design craft within a genuine culture of sustainability rather than getting entangled in interdisciplinary disputes and turf wars. It is time to bring forth new ecologies of design that are rich with cultural and epistemological diversity. (Cowan and Van der Ryn 1996 p.32)

This is an ideological position. Yet the issue here is to maintain a system of values without resorting to ideological constipation.⁶ Prefacing his tome on *Flesh and Stone* ('a history of the city told through people's bodily experience') Sennett quotes Aristotle 'A city is composed of different kinds of men; similar people cannot bring a city into existence.' (Sennett 1996) Even more than the buildings they contain, cities are the containers for politics and debate, and although they may be shaped or destroyed by these invisible human forces, they cannot be constructed or sustained by them.

'Ecopolis' was conceived with such ideas of socio-political inclusivity in mind. Somehow it had to embrace a wide spectrum of human affairs, society and politics, yet it needed to have clear purpose derived from ideological and political understandings. Any ideological positioning thus had to do with avoiding dogma, and any political understandings had to be about the politics of community rather than any ideas of card carrying political correctness. The key to integrating the disparate agendas of the community was to focus on the community itself as a living thing and to place it in an ecological framework that linked all the socio-political workings of that community with the environmental functions of the city. Fortunately, there have been some pertinent studies of human settlement ecology that offer useful grist to the milling of this problem in the making of built environments. It would seem, for instance, that the 'second generation of ecological design' is part of the 'fifth ecological phase of human existence'.

⁶ Every utopian seems to make the error of believing that successful architecture or city making can proceed on the basis of ideological or political rectitude.

3.2.1.1 Four Ecological Phases of Human Existence

Boyden et al identified four ecological phases of human existence. The following is derived from Chapter 1 'Ecological Perspectives' (Boyden et al 1981 p.9-18) and presents the characteristics of those phases in tabular form:

	Phase 1 – The primeval phase	Phase 2 – The early farming phase	Phase 3 – The early urban phase	Phase 4 – The modern industrial phase
Characteristic Behaviour	Human populations behaving in similar fashion to other omnivorous mammals. Tribal relationships.	Domestication of animals, plants and people. Predominantly tribal relationships.	Larger aggregations of people with 'in-group/out-group' distinctions.	Very large agglomerations of people. Alienation common.
Primary Ecological Impact	Spread of human species across the five inhabitable continents.	Significant increase on Phase 1 impacts, eg. replacement of forests by farmland & transportation of other species around the globe.	Disproportionate impact of cities on the biosphere but natural biogeochemical cycles still intact.	Global damage to ecosystems & disruption of biogeochemical cycles: Nitrogen, phosphorous & carbon cycles.
Key Technologies	Use of fire. Animal & human power only (somatic energy).	Manipulation of biotic processes (monocultures, selective breeding, etc.). Watermills, windmills & ships.	Urban dependency on agriculture. Advent of occupational specialisation.	Introduction of machines powered by extrasomatic energy (partic. fossil fuel). Chemical synthesis of novel compounds.
Duration - Commencement	60-70,000 years ago (2,500 generations).	12,000 years ago (480 generations).	5,000 years ago (200 generations).	200 years ago (8 generations)
Population Doubling Rate	Not estimated	1,500 years or more.	1,500 years.	35 years or less.
Form of Settlement	Nomadic. A few individuals.	Less nomadic. Small groups & villages.	Increasingly urban but few cities larger than 100,000.	Primarily urban. Many cities larger than 1,000,000.
Patterns of Ownership	Tribal & individual possessions that could be carried.	Animals, crops, stored grain in communal ownership.	New concepts of individual & family ownership.	Private ownership & large disparities in wealth.
Conditions of Life	Determined by the environment.	Simplification of diet. Increasing susceptibility to parasites & pathogens.	Narrowing nutritional base. Deficiency diseases and pestilence common.	Improving practices in public health & medicine.

TABLE 1: Four Ecological Phases of Human Existence (adapted by author from Boyden et al 1981)

The authors of 'The ecology of a city and its people' make the point that 'some of the values of modern Western society, such as the contemporary Western Idea of Progress, are, for ecological reasons, incompatible with the long-term survival of civilisation.' (Boyden et al 1981 p.375)⁷. They nevertheless reject doomsday scenarios and propose that there is, or needs to be, a fifth ecological phase of human existence which is ecologically stable and 'compatible with the long-term survival of civilisation' (Boyden et al 1981 p.369). They list the 'Ecological and experiential characteristics of Phase 5' and the 'Societal conditions associated with the transition to Phase 5', making it quite clear that they see the survival of the biosphere, and thus of human beings and their civilisation' as being inextricably entwined. Key elements of their long list of attributes for Phase 5 include:

- maintenance of a state of ecological equilibrium between human society and the biosphere
 - avoidance of human-induced climate change
 - minimum interference with natural biogeochemical cycles
 - a stable population
 - experiential variety
 - a sense of belonging to and responsibility towards neighbourhood
 - aesthetic characteristics conducive to well-being
- (Boyden et al 1981 p.370-371).

These may also be taken as defining attributes of ecocities. In Chapter 13 the reader can begin to ascertain to what extent the Boyden-Millar-Newcombe-O'Neill Phase 5 program fits the Ecopolis theoretical synthesis.

3.2.1.2 Three Urban Phases of Human Settlement

White and Whitney identify three major stages of urban development that correspond approximately with Boyden et al's stages 3 to 5. The following descriptions are based on theirs, with modification by the author (White and Whitney in Stren 1992 p.9-13):

Stage I – Pre-modern Quasi-sustainable Settlements

Found throughout most of the world prior to the industrial revolution and characterised by a system of cities that were supported by the carrying capacity of their hinterlands. Those hinterlands were largely determined by the physical geography of the region and were limited by the technological and economic capacity of their urban centres to recycle waste and deal with transportation costs. The size and number of cities in a particular hinterland depended on their respective powers for extracting food

⁷ There is, nevertheless, an implied acceptance of this conventional idea of progress in the proposition

and resources from rural populations. White and Whitney insist that the coercion and social inequity required to do this means Stage I cities cannot be regarded as fully sustainable.⁸

Stage II – The Colonial/Industrial Revolution Unsustainable Stage

These are the dominant settlement types of the present era in which some settlements have breached the carrying capacity of their hinterlands and expropriated the hinterlands of other settlements by processes of colonisation, amplified by industrial capabilities. Agricultural and industrial advances gave some settlements the ability ‘to accumulate disproportionate amounts of wealth and power, enabling them to increase the carrying capacity of their regions and to appropriate the hinterlands of neighbouring centres, causing the latter to contract or atrophy.’ (White and Whitney in Stren 1992 p.9-13) In some cases this appropriation extended beyond national boundaries in a pattern of colonialism that continues to the present day with rich and powerful centres usurping the resources of other regions, and at the same time undermining the capacity of those regions and their centres to extend their own zones of resource capture. The unequal exchange, economic domination, social inequities and injustice inherent in this pattern of development render such settlements hopelessly ‘unsustainable’

Stage III – Sustainable Cities of the Future

White and Whitney’s model for future sustainability is essentially one in which previously richer and more powerful settlements adopt policies that redistribute their wealth so that settlements previously disadvantaged could repossess their former appropriated carrying capacity. White and Whitney say Stage III settlements would ‘require new political and decision-making structures, global planning and management, and a diminution of national sovereignty far beyond anything envisaged in the Brundtland Report.’ (White and Whitney in Stren 1992 p.9-13) This, however, appears to reflect the bias of one of their primary references, the World Bank, and implies an agenda for globalisation that runs counter to the ethics and temperament of ecocity advocates who are seeking more regional and civic self-determination. The

that humanity can move on to a ‘5th Phase’.

⁸ This recognition of ‘quasi-sustainability’ fits the ambivalent assessment of various authors as to whether or not green/sustainable/ecological cities have ever existed.

analysis seems limited by the language of economics and a focus on historical notions of material equity.⁹

3.2.1.3 Mainstream sustainability

Capello et al define the notion of a sustainable city as 'a concept which refers to the potential of urban agglomeration to ensure an environmentally benign development of a city through focused environmental and energy initiatives which stimulate a balance between economic progress, social equity and environmental quality.' (Capello et al 1999 p.V) Whilst the authors announce their 'optimistic perspective' that cities can play a strategic role in achieving sustainable development and emphasise local initiatives, their work, in the final analysis, is about maintenance of the status quo by way of carefully 'balancing' economic, social and environmental concerns. Their focus is on the European environment. Although Europe is a place of constant change as the epicentre of two world wars and numerous economic and social upheavals, it has maintained a more or less stable population in recent decades and most of its environmental damage and ecological reshaping is a matter of history rather than current concern. There is little that is radical, or outside dominant conceptual frameworks, in the European models of urban sustainability. Their situation is one of refining existing models of urban design, development and maintenance rather than one of having to evolve models for rapidly changing environmental conditions and social demographics (notwithstanding climate change and African immigration). Europe offers useful models for working and workable solutions to a number of urban system problems (particularly in transport, medium-density housing and street design) but lacks the contextual imperative for addressing urban-rural systems relationships and massive population growth rates. These are primarily new world and third world problems. In their discussion of urban sustainability Capello et al confine their attention to urban agglomerations and do not address the broader regional context of urban systems.

In focusing on urban centres, Capello et al claim that there are significant advantages in dealing with energy and environmental issues at this 'local' scale. Of particular interest to this thesis are the observations that:

- urban areas are becoming recognized institutional policy units with a clear competence and with the possibility to operate in a flexible and innovative manner

⁹ There appear to be limits in the scope for imagining the shift in economic power that is available in modern economies exploiting low resource content production and the 'factor 4' equation (doubling wealth – halving resource use) reported to the Club of Rome by Lovins et al (Lovins et al 1997).

- an urban orientation of energy and environmental policy may also encourage a direct involvement of citizens, as such policy initiatives are usually source-based, effect-oriented and visible, so that a sufficient local support base may be generated
- finally, urban areas are also a suitable spatial scale for systematic data collection, monitoring and analysis of proper energy/environmental indicators.

(Capello et al 1999 p.15)

The first point can be seen as supporting one of the contentions of this thesis, that city governments are appropriate vehicles for achieving rapid change, the second point supports direct citizens' engagement in energy and environmental initiatives and the third point reinforces the idea that the urban scale assists in the management of complex systems by making appropriate information more readily accessible and comprehensible.

The experiences with urban sustainability policies so far are rather limited. Clearly, many cities have introduced urban environmental policies, but mostly they are of an ad hoc nature and not integrated in an overall balanced urban development perspective. (Capello et al 1999 p.39)

It is, perhaps, instructive to compare a typical 'mainstream' definition of a 'sustainable' city' with the definition of ecocities advanced in this thesis, ie.

The idea of a sustainable city refers to the future of the city, to effective local policy-making at the interface of economic, social and environmental objectives with a view to long-term continuity of the urban area. (Capello et al 1999 p.249)

versus

Urban systems consciously integrated into the processes of the biosphere with the intent of maintaining the optimum functioning of the biosphere for human purposes.

One looks in, the other looks out. One is focussed on the city, the other is about global patterns of sustenance.

3.2.2 Which Analysis?

Despite the work of Boyden et al which clearly links biophysical urban system issues with human culture there remains a tendency to separate what may be termed 'environmental impacts' and 'livability.' This results in some debate as to the appropriate tool to employ in analysing city ecosystems. For instance, in the chapter on human settlements in the Australian state of the environment report we find that:

The 'ecological footprint' model and other systems that focus on resource flows in settlements help us understand their extended impact on the environment. But they do not help to assess whether or not we can reduce requirements for resources while maintaining or improving livability. (Taylor 1996 p.3-5)

Therefore, the authors (Newman et al) go on to say, in their chapter on human settlements 'the extended metabolism model is used in preference to the ecological footprint model'.

Planners and commentators are beginning to draw particular attention to those aspects of 'sustainability' that are to do with livability and the human experience of urbanism rather than the technical potential of 'alternative' technologies to save energy, resources and water but there remains a gap between knowledge and experience that leaves people mute. Alexander observes that people are emotionally and spiritually effected by the 'ecology movement' but that 'people who speak for ecology' have not yet made that clear (Alexander 1997 p.214).

3.2.3 Health, Technology and Ecology

Sennett describes how 'The designers of the eighteenth century had sought to create a healthy city on the model of a healthy body.' (Sennett 1996 p.347). The building technology of the time was not up to the task, being drafty, stuffy, uncomfortable and thermally inefficient. Now we are contemplating the creation of healthy cities modeled on healthy ecosystems, and as in the 18th century, we find that the present understanding and application of building technologies is insufficient to the task. Now the challenge is to conceive of buildings in the context of an ecosystem, rather than a body, and to see each building as either an organism, or a smaller ecosystem within the larger one of the city. Technological advances are as much to do with application as they are to do with the availability of contrivances.

The technological advances of early industrialism enabled an increasing separation of human beings from nature. Ductwork made possible the provision of air without windows, electric light made interior spaces ever more independent of windows and natural light (and enabled the creation of spaces hitherto impractical), elevators made multi-storey construction viable by eliminating the body's physical effort needed to ascend many flights of stairs. After nearly one-and-a-half-centuries, or 6 generations, of design evolution it has become normal to regard the interiors of buildings as environments quite separate from the exterior, particularly in urban contexts and notwithstanding the modernist device of 'connecting' the outside and the inside with the visual device of unrelieved glazing.¹⁰ In ecological architecture, however, the

¹⁰ The concept of 'interior architecture', for instance, implies that there is such a difference – and independence - between the interior and the exterior of built form that they can be formally separated as distinct 'architectures'. This distinction has been given academic respectability by the renaming of

preoccupation is to do with the functional connection of 'out' and 'in' rather than separation. The difference between out and in becomes the means by which comfort conditions are sustained and the building envelope returns to its role as a flexible mediator between exterior and interior realms rather than a rigid separator.

This difference in conceiving of the problematic and the approach to its solution has been reflected in built form. Industrialism celebrated the capacity of technology to separate with the ironic device of plate glass. Lightly clad and perfectly warm, one could stand indoors and watch the snow fall on a frozen landscape; in the tropics, one could coolly sit and look out at scenery of sweltering heat. Plate glass became an icon for architects seeking building forms that could be shaped independently of climatic concerns. The designer's mental context became more powerful than environmental context. Culture over-rode nature. The natural experiences of life were dis-integrated by the architecture of cities.

In the 'post-industrial' architecture of ecologically informed design, the imperative to seek active connectivity through the building skin may lead to some changes in approach. This has already been demonstrated in the work of Ken Yeang and his bioclimatic high-rise buildings where the 'slick skin' has given way to multi-layered, textural, irregularly sculpted forms (Yeang 1994). This manifestation of different thinking in practice has not been the universal response. Norman Foster and other more traditional 'modernists' have sought to continue making 'slick skins' even as they have addressed permeability and connectivity in the actual construction and performance of their buildings (Davey 1997b). This setting of architecture into the environmental flux and the concomitant rediscovery of how we sense 'place' is reciprocated in the placing of sensory experience at the heart of the architectural problematic – an approach that is the essence of Frampton's 'critical regionalism' (Frampton 1987, 1996). Architectural and bio-regionalism provide important bridges between the theory and praxis of ecocity making and are dealt with in more detail in Chapter 12.7.

'School of Interior Design' as the 'School of Interior Architecture' at the University of South Australia, betraying an epistemological bias that denies fundamental environmental connectivities.

3.3 A Sense of Place

Today, order means lack of contact. (Sennett 1996 p.21)

3.3.1 Placing the Architectural Experience

There is a relatively weak history of concern with the function, existence or concept of place amongst architects, planners or geographers (Relph 1976 p.1). Nevertheless, in modern architectural theory there is one distinct strand of theoretical development which seeks to formulate an expression for place-specific architecture allied to a profound appreciation of the tactile and the experiential. Under the rubric of 'regionalism' this has been not so much a movement as a tendency, not so much a school of thought, as arena of similar thinking. The focus of the regionalist architectural problematic tends to be on the how and why of sensing 'place', on how to build in accordance with the spirit of local construction customs, climate and culture. In this approach to place-making mediated by architecture, the regionalism is not 'vernacularism' just as 'thinking locally' is not synonymous with provincialism.

3.3.1.1 Critical Regionalism

It is a noticeable characteristic of regionalism that it gets accused of a preoccupation with the vernacular, and there is confusion about the relationship between the two, even in the literature (Tzonis and Lefaivre 1987, Amougis et al 1987). This confusion arises, perhaps, because vernacular architecture is, as a general rule and from necessity, suited to its place and purpose, and is thus, to that extent, 'regional'. Kenneth Frampton coined the phrase 'critical regionalism' in order to more clearly differentiate the regionalism from vernacularism, and to emphasise the notion of regionalism as a critique of modernism rather than a simplistic rejection of what is modern (Frampton 1987 1996). At the core of regionalism is an implied critique of the objects and processes of mass-production, mass-society and the 'modernist' worldview.

Critical Regionalism....while it is critical of modernization, nonetheless still refuses to abandon the emancipatory and progressive aspects of the modern architectural legacy. (Frampton 1996 p.327)

The built environment must exist to be experienced, except vicariously. Modernism lays the groundwork for architecture as something to be appreciated at a distance, as a virtual, vicarious experience. The Miesian glass box aesthetic employs machine-replicated components to eliminate decoration and reduce appreciation of the architecture to a detached, cerebral experience. In the organic traditions of architecture¹¹

¹¹ Epitomised in the work of Arts & Crafts architects in Europe and Frank Lloyd Wright in the USA.

where one can discern common ground with the history of ecocity ideas, it is a sensuous experience. Critical regionalism emphasizes the tactile as much as the visual, as Frampton notes,

It is aware that the environment can be experienced in terms other than sight alone. It is sensitive to such complementary perceptions as varying levels of illumination, ambient sensations of heat, cold, humidity and air movement, varying aromas and sounds given off by different materials in different volumes, and even the varying sensations induced by floor finishes.... (Frampton 1996 p.327)

No matter how much a building may be written about, photographed, discussed and dissected, the architecture cannot be fully understood without being moved through, sat in, leaned against, touched and directly experienced.

Experience of place happens through our five senses and, perhaps, other electromagnetic and sensory capabilities. In writing about 'organic architecture', a stream of architectural theory and praxis that has particular relevance to ecocity theory, the author identified the role of these senses in perception and its relationship to the creation of healthy environments:

Seeing - about seeing the reality of a place and understanding the needs of people in their daily lives.

Touching - about textures and the depth of surface to things, feeling the difference between walking on marble or wood, or between touching a handrail of timber or steel.

Smelling - every room and place has its own smell. Research has shown that productivity and well-being are strongly affected by olfactory stimulus. Architecture is aromatherapy on a massive scale.

Tasting - have you ever tasted the mustiness of an old library? Do you sense the plastic on your tongue in new shopping malls and office buildings sealed-in and air-conditioned to sickly mechanical perfection?

Listening - listening to the people who use the buildings and listening to nature for inspiration and direction. Being in buildings is an auditory experience too - we hear buildings as much as we see them.

And it is about our sixth sense. Organic architecture recognises and works with earth energies and avoids electromagnetic pollution. Our watery bodies are weavings of electromagnetic energy in a highly energetic universe and it would be remarkable if it did not affect us. We have evolved over the eons within the Earth's natural resonance of 7.83 cycles per second - which NASA discovered they needed to replicate to keep astronauts in space from getting sick. (Downton 1996c, 1996d)

3.3.1.2 Growing from Place

Regionalism deals with the technology of place-making through the construction of human settlement. It thus deals with the universal problems of shelter-making and structures, the need to respond to climate and circumstance that is at the core of making

architecture. In regionalist architecture the meaning of the building creates the image, rather than the image creating the building¹², ie. the image of the building is not created first as a fetish object by an omnipotent designer, the building grows from the demands of people and place and the meanings inherent in each become manifest through the fabric of the built form in a process in which the architect is an enabler.

Furthermore, regionalist architecture extends the presence of the building beyond the physical boundary of the building's 'sculptural' envelope to include the territory which it occupies or establishes. A regionalist building cannot be understood properly without the context of its site and even when taken in isolation regionalist architecture implies the conditions and circumstances of its site in a way that is alien to 'modernism'. A regionalist building is unlikely to contain the overt historical references endemic in post-modernism, and it establishes its thrall over a definite place rather than an abstract site. The act of building may or may not cease, and can begin or end at any time (Brand 1997), and in the regionalist view of architecture the *time* of the building is an integral component of its place. The presence of regionalist architecture implies a pattern of land settlement related to it and denies the relevance of 'free-standing', or non-site specific architecture, as having anything other than ephemeral importance.

In many ways a house can sum up a region. It can tell about the land - its weather, its materials, its topography, even its safety from invasion. But a house is not predetermined by these elements. A house, however simple, also tells about its inhabitants - where they have come from, what they believe, how they live. At its best, a house is a fusion of commonsense and poetry. Because of its natural and primal role, the house often leaves a mark on subsequent generations of buildings and, in so doing, creates a legacy - a regional identity, perhaps - that can be very powerful indeed. Through the house we sometimes manage to create a precious cultural gift - a genuine sense of place. (Speck and Attoe 1987)

3.3.1.3 Being Critical of Regionalism

A critical view of regionalism suggests that '...all architecture is regional because it responds to the regional market and to the regional culture or counter-culture' (Colasuonno 1989 p.56) and architecture cannot be critical as an object whether it is crafted in place or mass-produced because only the praxis of architecture can be critical - Frampton defined critical regionalism as a kind of practice rather than a type or style of building.

Only thought and action can be critical. When all we produce is immediately turned into consumption there is no possibility for a product to be of a critical nature. (Colasuonno 1989 p.57).

¹² From a statement by Rohan Young, architecture student, during a Critical Regionalism seminar in the author's class at the old South Australian Institute of Technology in second semester 1990.

3.3.1.4 Bioregionalism

Bioregionalism also offers a critical view of the relationship of human settlement manufacture and habitation in a region that accommodates, and is accommodated by Frampton's critical regionalism. In effect, bioregionalism recognises the primacy of nature but simultaneously acknowledges the role of culture in shaping place. But if culture is an agent in the landscape (and the natural area is the medium) then the result is a cultural landscape. As different cultures occupy the landscape, rejuvenation or superimposition takes place. The natural landscape is fundamental, supplying the materials from which the cultural landscape is formed, but 'the shaping force lies in the culture itself. (Sauer 1925 p.46). Frampton offers a similar route to a deeper relationship with place; a cultural intertwining with geography mediated through architecture. His view is essentially western and positivist, whereas with its dual traditions of objective observation and mythic knowing, bioregionalism is perhaps one of the strongest manifestations of western culture returning to its own roots and recognising 'its embeddedness in history, mythology and nature' (Cameron 1998 p.9).

In architecture and urban design this promises an antidote to the modernist preoccupation with the visual which has precipitated architecture's escape into a pseudo-rational universe of aesthetic theory which has suppressed, through architectural 'culturisation', the ability of architects to appreciate the full impact of what they do. It is, perhaps, about the difference between viewing and seeing.

The big dilemma, which Isaac Asimov referred to in one of his books, was the difference between viewing and seeing. That is the difference between the mental, scientific approach and the emotional, spiritual approach. Definitions of regionalism and the response to these definitions by architects, landscape architects and planners can be defined as the difference between viewing and seeing. (Antoine Predock in Amourgis et al 1987 pp.157-158)

This reflects something of the Situationist critique of modern mass society and Debord's proposition that 'All that was once directly lived has become mere representation.' (Debord quoted by Boy 1996)

Critical regionalism is a post-industrial phenomenon. It is part of attempts to create the framework for identity in a pluralist, shifting environment where what you 'do' can change at any time and where consumerism lacks the substance to do anything more than entertain. Regionalism treats the architectural experience as a totality, as part of the life of living, breathing, feeling, fully-functioning human beings and is as anti-theoretical to Post-modernism as it is to modernism. Regionalism parallels the struggle for sensory survival that accompanies all attempts to lift the experience of art and life away

from the view down the tube of a VDU¹³. It seeks to distinguish between the prospects of soul-less repetition and monotony and the promise of art for all. The intertwined histories of industrialisation and urbanisation reinforce the mutual relevance of theoretical frameworks like Critical Regionalism and Bioregionalism with the otherwise apparently unrelated ideas of Situationism and create an imperative to understand relationships between architecture, politics and the making of cities.

By developing a critique of both the aesthetics and the processes of modern industrialism, regionalism offers a route past the de facto consumerism of the object fetishists. By focussing on the experiential reality of construction rather than an intellectual construction of reality, it allows for the development of an architecture which can respond to the rich tapestry of daily life and turn on the full range of human senses. By exploiting the full range of built-form responses to modifying the climate, regionalism creates an architecture which makes a radical return to the task of providing shelter.

By knowing its place in the broader sweep of the ecology of the living landscape, be that city or country, regionalism offers the prospect for the making of architecture - and thus cities - as an integral and intelligent part of human land-use. In that role, critical regionalism may occupy the radical middle ground between the excesses of rationalist obsession and the virtuous absolutism of irrational Luddism or, as Kenneth Frampton might put it, between the Neo-Avant-Gardists and the Neo-Historicists (Frampton 1987). By placing itself firmly in the nexus between the future and past, science and art, regionalism offers firm ground on which to stand and deal with assailants from the dogma of right and left, and with the ageless struggle between substance and image, the real and the lie, at a time when that struggle is intensified as 'virtual reality' and media narcotics blunt the edge of experience.

3.3.1.5 Ecological Architecture

Nature does not negotiate, a species doesn't get a second chance and architecture must comply with the biological demands of ecosystems as much as it must respond to the physics of construction and laws of gravity. Ecological architecture, like critical regionalism, is about making buildings that fit their place in both practical and metaphorical ways.

¹³ VDU - Visual Display Unit, a common piece of late-twentieth century verbal shorthand for a TV, video or computer screen.

Ecological architecture takes nature as the foreground and not as the background, actively works with ecological processes, and uses ecology not only in practical ways but metaphorically, so that organism becomes the metaphor for buildings, not object.

A building is an organism. Some buildings can actually be considered ecosystems, and buildings are part of larger ecosystems. I think this shift in metaphor implies a whole different design process and a different set of concerns than the traditional ones in architecture. (Van der Ryn, 1994)

The 'bottom line' for architects and planners and the underlying theme for the theory and praxis of architecture and design in the Ecopolis thesis is that

Humanity is part of nature, and humans are subject to the same immutable ecological laws as all other species on the planet. (Beder 1993 p.83)



CHAPTER 4

RELEVANT THEORISTS

Beginning with Kropotkin's Mutual Aid the study of human ecology has taken a more positive turn: witness... above all, Patrick Geddes's lifelong effort to develop a sociology on the basis of biology, and a social art on the positive foundation of our biological, psychological and sociological knowledge...
(Mumford 1938 p.302-303)

A full investigation of the works of the theorists identified in this chapter would require a thesis in itself. The purpose here is simply to show how and why these particular people and ideas have influenced the development of the Ecopolis thesis¹.

...there is little published research which has developed methods, techniques or criteria for dealing with the natural environment in planning settlements. (Owen 1991 p.16)

One may classify as 'urban ecologists' or 'ecocity theorists' those whose work contains sufficient concern with urban systems, community affairs, ecosystem function, design issues and their inter-relationships, that they are clearly operating in the realm of ecocity theory². Their work may emphasise one or another aspect of the field, be it design, planning, or politics, but they are pathfinders on the way to ecocity making³. They include Geddes, McHarg, Fisk, Hough, Boyden, Bookchin, Spirn, Soleri, Register, and Mumford.

The categories employed by the author may help to identify some of the patterns of connectivity that inform ecocity ideas.

Visionaries and utopians paint the big picture of what might be possible, 'process people' demonstrate methodologies for achieving some of those possibilities, 'pattern people' identify intrinsic relationships in the making of human settlement that manifest in patterns of design, 'pragmatic people' acknowledge the status quo as the framework for action, 'principled people' consciously connect values and morality to the deed of

¹ There are a number of people and publications that are relevant to the Ecopolis theory but did not directly contribute to its development. If the reader detects an autobiographical undertone here, it is because the ideas brought together in the Ecopolis thesis have mostly been discovered by the author, in the first instance, through a personal journey of exploration rather than a formal academic search.

² Register has coined the term 'ecocitology' to describe his concept of this evolving field of study.

³ That the author has condensed to Seven Steps in the penultimate chapter of this thesis!

making habitation and 'political people' create the invisible foundations of culture for an 'ecological' future⁴. The review of theoretical frameworks is rounded off with some discussion about relationship of perception and aesthetics to ecology and the built environment. In the last section the author provides a summary indication of the relevance of the theorists and theories to Ecopolis.

4.1 Picture People - Visionaries and Utopians

4.1.1 Soleri

Arcologies and Spiritual Complexification

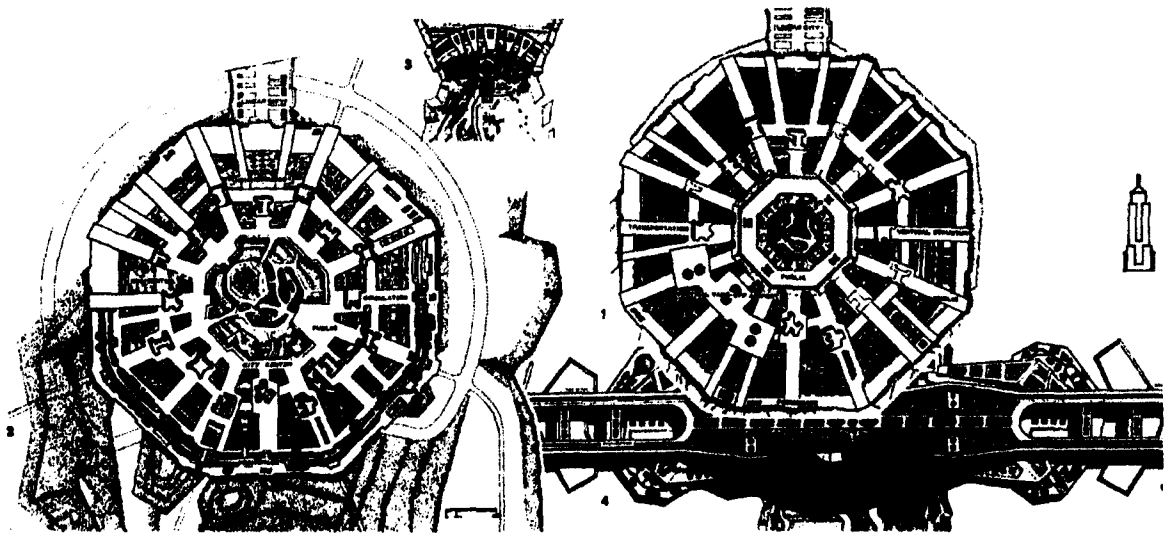


FIGURE 7: Arcology Babel IIC , proposed city for 340,000 people to be constructed over an open mining pit. 850 metres high, 1750 metres in diameter (just over 1 mile). Note Empire State Building for scale to the right. (Source: Soleri 1973a p.63)

There is less and less reason to assume that the human race is purely an aggregate of individual phenomena forced to a promiscuous existence by the limited envelope of the earth. A mental sphere is gradually thickening and ribbing itself around the biosphere. The liveliness of this noosphere, as Teilhard de Chardin calls it, is the conscious and unconscious concern of mankind. (Soleri 1973b p.15)

Growing numbers of 'urbanists' point to the essential nature of the city as a place of community, culture, social invention and shared experience - the 'livable city' where human progress is most evident and where civilised values have their gestation and greatest degree of realisation (Lennard & Lennard 1995 p.1). Italian-American sculptor

⁴ Part of creating such a culture is the need to establish professional approaches to sustainability. Architects and planners around the world have begun to integrate environmental sensibilities into the mainstream of practice, evidenced by the adoption of environmental policies by professional bodies like the RAlA in Australia (1995). In Chicago, June 1993 at the World Congress of Architects convened by the International Union of Architects and the American Institute of Architects the profession adopted a 'Declaration of Interdependence' later formally adopted as policy by the National Council of the Royal Australian Institute of Architects on 1 October, 1993.

and architect Paolo Soleri⁵, a key figure in the development of eco-city theory, and a major influence on US pioneers like Register⁶ maintains that suburban crime rates actually exceed urban crime rates, per capita, and that densification adds to the quality of life. For Soleri, the dysfunctional nature of suburbs is evident in the ‘...waste inherent in the inhuman scale of the suburban scattering with its logistical paradoxes and its unending and negative power of segregation.’ (Soleri 1987 pp.14).

Soleri’s response to this sprawling dysfunctionality was to envisage a coherent urban construction which could take an active role in the protection and evolution of the biosphere. In his view of urbanism cities were potential crucibles for the evolutionary advance of humanity towards a spiritually higher state of being. These he called ‘arcologies’ (ARChitecture + ecOLOGY). Publication of Soleri’s ‘Arcology: The City in the Image of Man’ was greeted with some enthusiasm (Skolimowski 1971). This book is filled with dense, rich drawings and (often obscure) rambling text but the end result is a powerful manifesto for a radically different approach to the creation of human settlement. Soleri has inspired a generation of alternative thinkers with his uncompromising vision of these ‘arcologies’ and has been building one in the Arizona arid lands over the last three decades. His ‘Arcosanti’ is now a major tourist attraction for visitors to the American South-West.

Soleri’s work is inspired by the work of rebel theologian Teilhard de Chardin. He believes that the way we make our cities can actively advance the spiritual evolution of the human species. In his vision, arcologies represent the progress of the cosmos from dispersed atoms to complex organisms with consciousness as ‘matter becomes spirit’(Soleri 1973). Miniaturisation, and complexity are keywords in this vision.

1. Arcology, or Ecological Architecture

This is the definition of urban structure so ‘dense’ as to host life, work, education, culture, leisure, and health for hundreds of thousands of people per square mile. The weak veneer of life ridden with blight and stillness, which megalopolis and suburbs are, is thus transformed and miniaturized into a metropolitan solid, saturated with flux and liveliness. (Soleri 1969/1973 p.31)

Soleri’s arcologies are megastructures. His view of complexity may be simplistic⁷. The structure of his visually complex arcologies is probably simpler than an equivalent traditional urban centre of about the same population. An abiding

⁵ Born in 1919.

⁶ Whose formation of the original ‘Urban Ecology’ activist organisation in 1975 was directly inspired by Soleri’s work.

⁷ Doyle (2000) suggests that the reading of complexity as equivalent to progressive and as having implications of superiority is a Western cultural position (p.76).

characteristic of all his published designs is that, if they were built, they would be exceptionally inflexible environments. Unlike conventional cities or towns where buildings may be constructed or razed to the ground largely independent of the rest of the urban fabric, any alteration in the giant sculptures that are arcologies would have substantial implications for the rest of the structure. This gross inflexibility might be regarded as fundamentally 'unecological' because it so greatly reduces the capacity for the physical adaptation of the city to new circumstances and because it literally concretises social relations and values that may be questionable or inappropriate now, or in the future. Ironically, although there is no small element of authoritarianism in Soleri's vision the partly built arcology of Arcosanti in the Arizona desert would not exist except for the efforts of libertarians, freewheelers and counter-culture advocates all seeking new visions of the city.

Hubbard has demonstrated internal contradictions in Soleri's challenging approach to rethinking urban life, noting that 'because of Soleri's denial to see Arcosanti as a prototype community as well as a construction site, social and economic development has not been seen as important to further the cause of arcology.' (Hubbard 2000 p.8). There are signs that Soleri is trying to resolve this contradiction as he approaches the end of his life; in the last three years he has begun to demonstrate 'a new openness to collaboration' (Hubbard 2000 p.9)

After the Paradox 1999 conference⁸, Soleri announced at a meeting with Arcosanti residents that he is now willing to allow and acknowledge the role which community development plays in building Arcosanti. With tears in his eyes he confessed that since the idea of arcology had come through the individual, he felt that he must be the one responsible for seeing to its creation. He believes that arcology is such an important idea for the evolution of humanity that he could not dare give it over to democratic forces. This, of course, meant that he was the sole director in order to make sure that the project did not get side-tracked or compromised to death. But now he realizes that it is time for a change. He is willing to allow the community to start playing the music... (Hubbard 2000 p.10)

If the inflexibility of Soleri's designs suggest that there are intrinsic barriers to an arcology ever being a bona fide ecocity, then perhaps his failure to embrace community as an active agent in the design and development of arcologies marks him out for exclusion as a viable ecocity theorist⁹. His relevance is not universally accepted; the organisers of EcoCity IV did not initially understand why he should be invited¹⁰ and his work does not rate a mention in Girardet's concise presentation of the urban

⁸ Paradox is a program initiated 'to explore the connection between arcology and cyberspace'.

⁹ The Ecopolis thesis accords with the views of theorists who identify the community and social aspects of green/sustainable/eco-city as defining factors.

¹⁰ Personal communication with Richard Register, April 2000.

problematic and solution in the Gaia Atlas of Cities (Girardet 1992). Nevertheless, for the author and many others in the ecocity movement, since the early 1970s Soleri's work has been an essential inspiration and irritant, constantly challenging notions of what it means to be 'ecological' or 'urban'.¹¹

4.1.2 Register

From Vegetable Cars to Ecocitology

Soleri inspired others to undertake a radical rethink of the city in ecological terms. A common thread binding ecocity theorists and advocates is dislike of the car. Soleri designed cities that completely excluded the car. In the 1970s peace activist Register enjoyed some fame in the USA as the creator of the 'Vegetable Car' – a 'gas guzzler' converted into a planting box as an artistic commentary on the dominant 'car culture'. He has long spoken out against the deadly, daily danger of 'car wars', noting that more people die each year in car smashes than in all the world's wars.



FIGURE 8: Vegetable car sketch (Source: Register 1987 p.95)



FIGURE 9: The Vegetable Car (Source: Postcard published by Urban Ecology, USA)

Register trained as a sculptor and works as a carpenter. He lives as an 'ecocitologist' and is responsible for the first book to be published with 'ecocity' in the title¹². He has published a number of informal (ie. non-academic) papers expounding on the ecocity concept. These include a description and syllabus for a teaching program 'Ecocitology 101'. Register has been working on a theory of 'ecocitology' for a number of years and is currently finalising a book 'Ecocities' that promises to bring together the wealth of experience and ideas he has accumulated during more than three decades of political radicalism¹³ and ecocity visioning¹⁴.

¹¹ To the point of logical absurdity, with proposals like 'Asteromo', an arcology of 70,000 people located somewhere in space! (Soleri 1973a p.116-118)

¹² 'Ecocity Berkeley: Building Cities for a Healthy Future' 1987.

¹³ At the age of 21 he was the originator of the US 1970s 'No War Toys' campaign.

¹⁴ Personal communication with the author.



FIGURE 10: Ecocity downtown (Source: Register 1987 p.95)

Register was one of Soleri's early acolytes and was there on the day Soleri began physical construction of what was supposed to become the first arcology.

It was July 23, (1970) the first day of a new era. I was certain of it. The rainbows assured me. The lightning and the distant rumbling had been reminding me from the moment we first stepped into that distant landscape so dramatic yet welcoming. Though I'd worked on many construction crews, fantasyland theatre and movie sets, and at an archaeological fly camp digging up 1200 year old Indian towns, I'd never helped start a whole new city, much less the first city of a new age. (Register 1996)¹⁵

He soon progressed from belief in rather megalomaniacal grand designs to a commitment to finer grained, human centred, city-making¹⁶.

The terms 'Ecocity Zoning' (Register 1987, 1993a p.9) and 'access by proximity' (Register 1987, 1993b p.48) can be attributed to Register. The SHED Step 5 of 'Proximating' described in Chapter 14 of this thesis owes its inspiration to Register, whose descriptions of the benefits of locating things close together to save energy and resources parallels Mollison's zoning concept in Permaculture. Register was inspired by Soleri's arcological imaginings and his concept of super-dense, car-free, cities exploited three-dimensional form in order to maximise the proximity of people and activity, thus reducing energy and resource requirements and amplifying the potential for social interaction. Register proposes that 'THE primary principle at the base of both evolutionary change and city functioning has to do with access by proximity, that is, the occurrence of many things and functions close together.' (Register 1993b, p.48). Reflecting Soleri and de Chardin's views, he relates this to the evolutionary imperative by observing that evolution 'seems to move toward ever more functions at ever smaller physical distances' (Register 1993b p.48). With a similar concern for reducing

¹⁵ From the manuscript of Register's work-in-progress 'Ecocity', draft chapter 10 'One Person's Ecocity Odyssey', circa 1999.

unnecessary traffic and increasing social interchange, Engwicht concluded that the very purpose of cities was to maximise exchange whilst simultaneously minimising travel (Engwicht 1992 p.12).

Register and his cohorts formed the organisation that was to become Urban Ecology in 1975 and published the tenth anniversary issue of their newsletter in 1986. In the bibliography of recommended readings in *Ecocity Berkeley*, Register lists 16 books, two of which are federal government publications dealing with the energy saving potential of compact cities and the cost of sprawl, the remainder include authors cited in this review of theories, in particular Alexander, Soleri, the Todds, Jacobs, McHarg, Mollison, Van der Ryn, Calthorpe and White (Register 1987). 'Ecocity Berkeley' describes the eco-city vision by using Berkeley as a case study to show how it might be achieved by planning for higher density housing, car-free streets and creek restoration and using mechanisms like transferable development rights. Although Register's images and text can be fanciful, the vision is practical and achievable with its roots in the needs and aspirations of the community.

Register's vision is typified by the drawings reproduced here. Characteristic features of his ecocities include high level bridges, exotic forms, extensive plantings and roof gardens. His vision has not simply been about promoting a particular aesthetic, but an aesthetic that embodies a way of thinking; it displays in its line quality and naive sophistication, an approach to designing human settlement that is clearly opposed to

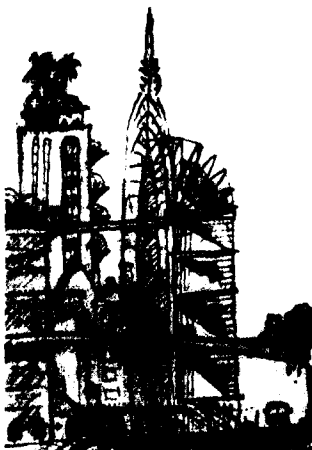


FIGURE 11: Elevated foot & cycle paths in Ecocity downtown (Source: Register 1987 p.102)

rigidity, central control and conformity in the name of economy and consistency. This is not just a series of responses to energy and transport efficiency, pollution reduction, water conservation, and so on, these are ecocities conceived as holistic, highly interactive and unpredictable entities. They include, if only by implication, all of the technology and processes for their existence, but do not dwell on the details. They show what could happen. They represent exercises in imaginative scenario planning.

The Urban Ecology group Register formed in 1975 and Ecocity Builders in 1992 were fairly loosely structured and reliant on a degree of charismatic leadership but they both promoted ideas about greater citizen involvement in the making of cities. Register and Urban Ecology were direct

¹⁶ From Register's work-in-progress 'Ecocity' circa 1999.

influences on the form that Urban Ecology Australia took and his visionary manner of presenting ecocity ideas reinforced the author's predilection for employing provocative imagery in the exposition of ecocity ideas. Since 1990, when the author first met Register at the Ecocity conference in Berkeley¹⁷, a fairly continuous correspondence has been sustained between UE/Ecocity Builders and UEA as part of consciously trying to develop an ecocity movement. Register's 'access by proximity', his proposals for urban planning based on armatures of creek restoration, and his concept of 'shadow planning' (see Chapter 13, Theory III, Education) have all had a significant influence on the development of the ecopolis theory by reinforcing ideas of smaller, denser, city forms; planning around the structures of ecological corridors; and long-range, goal-directed (rather than extrapolative) planning.

4.1.3 Fuller

Geodesic Domes on Spaceship Earth

Bucky Fuller once said something like – if you took all the theories about urbanism and sent them off into orbit around the Sun, the world wouldn't notice. Things would just carry on. But if you took all the hardware in the world and dumped it in the middle of the ocean, within three months millions would die a miserable death. (Anson 1996 p.190).

The creative legacy of Buckminster Fuller deserves attention because his work has both theoretical value, linking whole systems thinking with human settlement conceptualisation and creation, and it has inspired a diverse and influential range of design practitioners. Most ecocity and ecodesign advocates and practitioners eventually refer to the work of Fuller. Not so much because of the artifacts or designs he produced - although he is credited with creating one of the first new structures in centuries when he invented the geodesic dome in the early 1940s (Kahn 1978 p.109)¹⁸ - but for the way he thought, and the way he changed the way we think about design on an endlessly moving planet.

Bucky said that biology balanced entropy. Humans were the most powerful (known) anti-entropic force of all, because we accumulate and purvey knowledge, adding local order

¹⁷ The First International Ecological City Conference (Ecocity 1) was convened by Urban Ecology under the leadership of Register in Berkeley in May/April 1990. The conference linked mainstream with fringe, and wild with respectable, to create a milestone event in the evolution of the ecocity movement. At the time of the conference 'green', 'sustainable' and 'ecological' cities were not on the agenda of governments, planners or mainstream environmentalists. After the author's participation in Ecocity 1 Urban Ecology Australia was in turn inspired by the activism, radicalism and energy of the American organisation. Register was one of the first advocates of rebuilding the world's cities as a practical and positive antidote to war.

¹⁸ The 60 atom buckminsterfullerene molecule was named in his honour, and is typically referred to as a 'Bucky ball' after the diminutive of his name which was apparently his preferred appellation.

to Universe in the same way that a plant synthesizes air, sunlight, and soil nutrients into botanical life. (Baldwin 1996 p.226)

Fuller gave us the concept of 'spaceship earth' before we ever saw the photograph of our biosphere from space. His terminology was mechanistic but apt, and able to strike a chord in the collective consciousness – once the photograph was published. Fuller's whole world view inspired Brand et al to produce a catalog¹⁹ that evolved into a touchstone for the decentralist, organic, anti-authoritarian movement the media learned to call 'hippy'. Hippies built the geodesic domes as statements of the difference between their worldview and that of the 'establishment'. Fuller had designed the geodesic dome as an ultra-efficient industrially produced high-tech structure for that dominant establishment culture of centralised, bureaucratic industrialism (Kahn 1978 p.109).

The influence of Fuller and his ideas have been pervasive and as technology has

advanced the capacity to undertake projects using his principles has increased. The largest dome built during his lifetime was the United States pavilion at Montréal's 'Expo 67' with a diameter of 76.2 metres (Baldwin 1996 p.167)²⁰. Bucky imagined much larger structures, including domes encapsulating Lower Manhattan (Baldwin 1996 p.189) and 'Cloud Nine' sky cities contained in spheres 1 mile (1.6km) in diameter, containing thousands of people, floating in the sky. The spheres would float because

A straightforward surface-to-volume calculation shows that the structural weight of a half-mile (0.8km) diameter sphere would be one-thousandth of the weight of the air inside. When trapped solar energy and human activity heated the air inside just one degree above the surrounding air temperature, even an unskinned sphere would float like a huge hot-air balloon. (Baldwin 1996 p.190).



FIGURE 12: Eden Project domes under construction. (Source: *World Architecture*, Pawley 2001)

¹⁹ The Whole Earth Catalog'.

²⁰ The skin of the dome was burned off in a spectacular fire in May 1976 but left the structure undamaged. In 1995 the dome was refurbished (but left unskinned) as 'La Biosphère' environmental education centre (Baldwin 1996 p.166).

The science of the idea was sound but the technology, he knew, could not exist until some time into the future. In Cornwall, south-west England linked geodesic domes of up to 130 metres span have been built for the 'Eden Project' to contain 23,000 square metres of biomes in the world's largest greenhouse. Opened to the public in the early part of 2001, the structure is lighter than the mass of air it contains (Pawley 2001). The Eden Project demonstrates the convergence of high technology with ecological concerns that was a central tenet of Fuller's philosophy.

4.1.4 Howard

The Garden City

Ebenezer Howard (1850-1928) was both progressive and reactionary. As we have seen in Chapter 3, according to one's critical or ideological position, his ideas for Garden Cities have provided inspiration, disinformation, or both, to past and present generations of planners and urban advocates.

Howard was an original thinker. One of the most intransigent problems of managing cities is to do with establishing and maintaining an optimum size to suit their function. Even if an ideal size can be ascertained, there remains the problem of how to maintain it despite pressures of growth (or, more rarely, retraction). According to Mumford 'The first valid approach to this problem was not made till Ebenezer Howard broached it at the end of the nineteenth century in the book that became 'Garden Cities of Tomorrow.' (Mumford 1991 p.184).

City limits are crucial to the definition of ecocities. It is necessary to establish the boundaries of an ecosystem in order to analyse its operations. Ecocities intrinsically, by definition, require identifiable boundaries, be they 'soft' or 'hard' (see Chapter 10). Howard's insistence on urban limits to growth may be his largest contribution to the development of ecocity theory, but it should be clearly understood that 'garden cities' are not necessarily synonymous with either ecocities or effective urbanism and the idea of Ecopolis is expressly *not* that of a garden city.

4.1.5 Morris

News From Nowhere

Grounded in the practical study of the folk traditions of construction, this (Arts and Crafts) architecture represented a quiet revolution against the assumption that the products of industrialization were superior and offered the only possible future. (Farmer 1996 p.91)

William Morris (1834-1896) started a civil war in England in 1952, the same way that Ernest Callenbach was able to stage the secession of California, Oregon and Washington State from the rest of the United States of America in 1980 – by imagining it. This device of using literature to explore an alternative reality has a long history. Utopian (and dystopian) novels have been effective vehicles for presenting ideas for two reasons: they exploit the preparedness of every reader of fiction to suspend disbelief in order to enter the world imagined by the author, and they allow the author the opportunity to present ideas about society, culture, economics, technology, architecture, planning, politics, or whatever, in an integrated way, without the burden of having to write from the basis of any particular academic discipline or specialism.

Hubbard points out that until Thomas Moore wrote of ‘utopia’ as ‘no’ place, the word was properly spelt ‘Eutopia’ and meant ‘good’ place²¹ – her point being that our understanding of the basic terms of debate in the vexed field of ideal urbanism is not always as well informed as it might be. Literary utopias are, perhaps paradoxically, a means of becoming better informed. Morris’ utopian imaginings and central position in the Arts and Crafts movement (Davey 1995) have made his work enormously influential for many in the ecocity movement, including this author, as may be seen in the style of the ‘New Architecture Movement’ poster he designed with its political message, reflecting Morrisian ideals, ‘Towards a Democratic Architecture’.

Morris’ image of the future was horticultural:

England...became a country of huge and foul workshops and fouler gambling-dens, surrounded by an ill-kept, poverty-stricken farm, pillaged by the masters of the workshops. It is now a garden, where nothing is wasted and nothing is spoilt, with the necessary dwellings, sheds, and workshops scattered up and down the country, all trim and neat and pretty. (Morris 1890/1970 p.61).

This bucolic fantasy was clearly a reaction to the grimy industrialism of his day and it is concordant and contemporary with Howard’s garden city and Kropotkin’s ‘Fields, Factories and Workshops’ (Kropotkin and Ward 1974). Its anti-urban escapism marks it as a troubled source for any ecocity theory, but its influence is still felt, and can be seen carried through the author’s work from the time of the Beverley project in

²¹ Presentation at Ecocity IV conference in Curitiba, Brazil, April 2000.

1974-75 (see the following Chapter 5) to the case studies of Part B. It is worth noting that whereas the Garden City prescription included rigid zoning and separation, Morris' vision scattered the built environment and the functions it housed across the entire landscape, marking his notion of 'urban' as much closer to Wright (see below) than Howard.

4.1.6 Callenbach

Ecotopia

The Ecotopians must be positively allergic to paint. They build with rock, adobe, weathered boards – apparently almost anything that comes to hand, and they lack the aesthetic sense that would lead them to give such materials a coat of concealing paint. They would apparently rather cover a house with vines or bushes than paint it. (Callenbach 1975 p.9)

Ecotopia is Callenbach's vision of a near-future ecological utopia made up of the states of California, Oregon and Washington after their succession from the USA. It captures the optimistic spirit of mid-1970s counter-cultural America, and paints a surprisingly convincing picture of a place in which ecological values are dominant. Callenbach's book was a best-seller and, amongst other things, spawned a journal (*Seriatim*, now out-of-print). A lot of people on America's West Coast refer to themselves as 'ecotopians'. Ecotopia is the twentieth century equivalent of William Morris' *News From Nowhere*.

Despite their 'nowhereness' both Morris and Callenbach's Utopias are place and culture specific. *News From Nowhere* is inseparable from its Thameside location and the radical socialist milieu of its author, Ecotopia is firmly about a particular part of the USA (with the original book cover showing a map of California, Oregon and Washington State as a separate 'country') and is a product of the American West Coast sub-culture.

Roelofs tells us that Callenbach included many now-common green city features in his 1975 descriptions of Ecotopia and that 'his ideas are embodied in the theory and practice of the extensive California urban ecology movement.' (Roelofs 1996 p.14). Register makes explicit reference to Callenbach as a way of describing what ecocity communities might be like:

Imagine an ecologically healthy, culturally vital future, for a moment... about 100 years ahead in time... The giant megalopoli of the world have broken up into galaxies of smaller, more compact, far more diverse communities, similar to those depicted in Ernest Callenbach's rambunctious, prescient novel, *Ecotopia*. (Register 1992b p.28)

Callenbach and Morris together provided the model for communicating the complex interweaving of fact (place specific locations) and fiction (future environments, processes, and imaginary people) needed to represent Ecopolis ideas (see Chapter 12)²².

4.1.7 Wright

Broadacre City

Frank Lloyd Wright's life (1869-1959) was long, his early work was innovative, influential and accessible and the latter part of his remarkable career began when he was past what we would now regard as the conventional age for retirement.

Both Wright and Soleri have been dubbed 'organic' architects by some critics, though it is difficult to conceive of another architectural worldview which could foster such opposites. (Elkington 1974 p.60)

With his architectural credo of organic processes and the idea that built form should exhibit a sensitive response to its environment Wright weaves a major strand of the ecocity vision, but he was not an urbanist. Wright was famously 'anti-city'. In his illustrated polemic 'The Living City' he lays out his ideas for a city of organic architecture, of creative individuals, and self-sufficient communities, covering the landscape in carefully designed suburban sprawl. His vision of Broadacre city was barely a 'city' at all but the logically absurd extrapolation of motor-driven, un-centred, sub-urban spread. The city as pancake. Wright's ideas about cities, like Howard's, are at the heart of the problems with the modern metropolis rather than its solution. As White and White put it 'With Frank Lloyd Wright's city to end all cities, we reached the climax of anti-urbanism' (White and White, 1962, p.209)

Garden and building may now be one. In any good organic structure it is difficult to say where the garden ends and where the house begins or the house ends and the garden begins – and that is all as should be... (Wright, Future of Architecture, p.260-261)

He was questioned about what this might mean for the countryside:

We are talking about the countryside itself developing into a kind of building in which will lie naturally building becoming part of the countryside, buildings belonging there naturally with grace. (Wright, Future of Architecture, p.265-266)

The irony in this is that, by 1939, the English countryside had long been an artificial construct – and a successful one (see Alexander in Chapter 5). Though he

²² Beginning with 'Letter from Kangaroo Avenue' in 1990, followed by 'The Art of Living' 1991, 'Frogs Fight Back' 1992 and 'Whyalla, Why Not?' in 1996 which was used to facilitate community processes in

seemed to have missed the point that an enormous proportion of the world's landscapes have already been shaped by humans through centuries of occupation. Wright's concept of Broadacre City was prescient. He foresaw a landscape entirely worked over by human activity but his major, and perhaps underestimated, contribution was to propose that the human impact on the land be a result of integrated design that served the needs of both the landscape and its occupiers.

By simultaneously recognising that architecture was potentially great art, that it was expressive and culturally important, and then bringing it down to earth with a 'a hod of mortar and some bricks' (Wright, 1945,p.202), Wright sketched the creative complexity of architecture in a manner that connected it with the mundane reality of construction. In this, he was unusual. His awareness of regional subtleties in building was integral to the 'organic' view and the connection of buildings to place that is an essential part of making ecologically viable human settlement (see Chapters 3.3, 12.7 and SHED Steps 1 & 2, Chapter 14).

Wright's impact on architecture has been ubiquitous, by the middle of the 20th century he was described as 'in all probability, the most influential architect of his time.' (Blake 1960 p.9)²³. His influence on the present writer was felt at an early age and, for good or ill, has continued to inform and inspire the author through more than three decades. There is some irony in the knowledge that Wright was such a poor urbanist, but one might conjecture that his anti-city ethos has acted as something of an antibody in the circulation of ecocity ideas.

the public participation program of the Whyalla EcoCity Development consultancy (see Chapter 8).

²³ The quote is taken from a book presented to the author as a school prize for 'Engineering Drawing' in December 1968 – a measure of the early impact of Wright on this writer!

4.2 Process People – Understanding the Nature of Cities

Human activity has encroached upon every realm of nature. Consequently, nature is no longer completely natural. (Fisk and MacMath 1998 p.24)

Much of the relevant work done on urban ecology is concerned with the management of *extant* urban systems and how to make them work better (Boyden et al 1981; Hough 1984, 1995; Spirn 1984). These ‘process people’ are those particularly strong on analysing human settlement in a way that fits it in an ecological context. Their prescriptions are less to do with proclaiming visions of the future and more to do with identifying the processes that might enable us to have one.

4.2.1 Geddes

A View from the Outlook Tower

If there is one person to whom the fundamentals of human ecology and ecocity theory can be attributed, it is Patrick Geddes (1854-1932). A contemporary of Howard (1850-1928), they first met in July 1904 at the first of a series of three lectures Geddes gave to the newly formed Sociological Society (Kitchen 1975 p.218, Beevers 1988 p.98). Although the two men maintained contact over 10 years and shared an holistic approach to planning theory, there does not seem to have been any particular outcome from their acquaintanceship. Howard was a clerk with a rather mechanistic turn of mind whereas Geddes was a biologist by training and ‘...regarded a city as an organism rather than an artifact: its form was to be determined by the activities of its citizens, their relationships with one another and with the environment.’ (Beevers, 1988, p.98).

To introduce and position his work it is difficult to do better than quote from the Introduction to Kitchen’s critically sympathetic biography:

Patrick Geddes believed passionately that, given reasonable social conditions, man (sic) is a cooperative animal. He also believed that, treated properly, the earth is fundamentally a co-operative planet on which to live. He aimed to find out how to achieve those ‘reasonable social conditions’ and to teach people how their environment might be ‘treated properly’. He was the most comprehensive, if least acknowledged, father of civic renewal and bio-social ecology as we are beginning to understand them today.

Born in 1854, his influence is directly felt by only a handful of people. He saw western thought become pessimistic, introspective and hair-splitting; yet to the end of his life in 1932, by his actions even more than by his words, he demonstrated his conviction that education, participatory citizenship, and appreciation of the natural world, would save industrial society. Like the morally-earnest Victorian which he partially was, he had his own Latin motto: *vivendo discimus* – by living we learn: or, fieldwork and civic action are better than indoor study and book-writing. (Kitchen 1975 p.15)

Geddes was one of the first to recognise that, with the rise of industrialism, urban centres were no longer 'cities' as Plato might have understood them, and that the term needed redefinition. He put forward the term 'city region' to convey the idea of an expanded sphere of influence (Bendixon 1975 p.45) and held that humanity had the wherewithal to leave the smokestacks of early industrialism and enter a 'neotechnic age' with the promise of relief from drudgery and waste (Geddes 1968/1915 p.85)²⁴.

(There is a)...better future now dawning – in which the applied physical sciences are advancing beyond their clumsy and noisy first apprenticeship, with its wasteful and dirty beginnings, towards a finer skill, a more subtle and more economic mastery of natural energies; and in which these, moreover, are increasingly supplemented by a corresponding advance of the organic sciences, with their new valuations of life, organic as well as human. (Geddes 1968/1915 p.93).

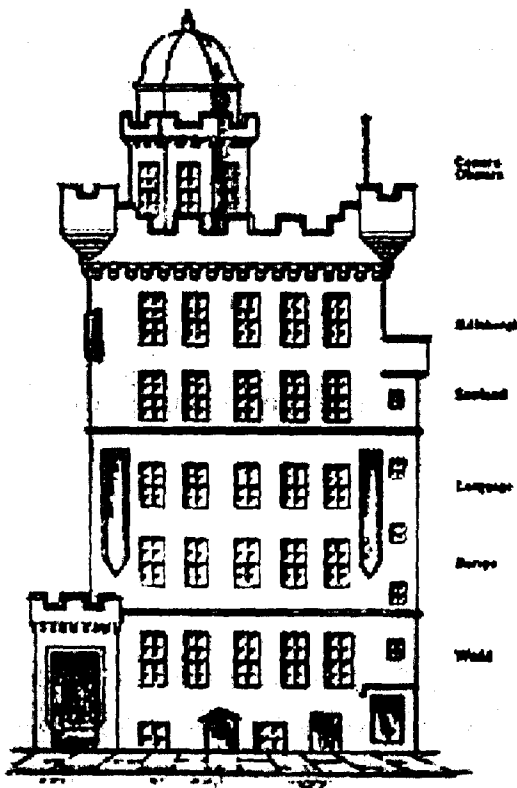


FIGURE 13: The Outlook Tower

(Source: <http://www.cce.ed.ac.uk/geddes/outtow.htm>)

In 1892 Geddes took over a building at the top of Edinburgh's High Street and transformed it into the Patrick Geddes Centre For Planning Studies. Part of the building became the 'Outlook Tower' which was intended to be Geddes' supreme 'thinking machine'. The tower was conceived as a tool for regional analysis and as the 'world's first sociological laboratory'. Each level presented a view of the world from the global scale to the local and from its top, via a camera obscura, the viewer could see a panorama of the region in which the city was placed²⁵.

Geddes developed a deep fascination with the organization of human societies and their spatial manifestation in the city and the country. Geddes propagated a highly individualistic theory of societies and cities drawing from regional theories in biology and geography, philosophical ideas (especially those of Plato) and political anarchist thought. (McGrath 1998)

²⁴ Similar to the 'post-industrialism' of later parlance, Geddes' concept of 'neotechnic' has some of the overtones of Bookchin's post-scarcity anarchism.

²⁵ The Outlook Tower <http://www.cce.ed.ac.uk/geddes/outtow.htm> accessed 14 April 2001.

Geddes was supportive of what he called 'constructive anarchism'. Honoré (Elie) and Elysée Reclus, both prominent in the international anarchist movement, influenced Geddes with their stress on the organic relation of the city to the country and predictions of their eventual integration (Wiebensen, 1968? P.16). Elysée, like Kropotkin, was an eminent geographer and Elie was a respected anthropologist. Both were well-known to Geddes who often engaged Elysée to lecture in his summer school programs (Wiebenson, 1968? P.16). Reclus and his brother's son, Paul, produced the major globes and relief models for the displays in Geddes' Outlook Tower (Kitchen 1975 p.136). Reporters working for *The Scotsman* were instructed not to cover events at the Tower because of its known associations with anarchists. Stained-glass windows to the stair landing in the Outlook Tower contained images designed to symbolise ideas that Geddes valued, and they included the anarchist black flag.

His widespread interests were not the result of a pursuit of pure knowledge, but of an attempt to clarify and emphasize - in an increasingly specialized world - the inter-relations between all branches of knowledge. (McGrath 1998)

At the time of the First World War with its novel display of technological power and horror, Geddes was writing about the peaceful transformation of 'cities in evolution'. Although Geddes was not well known in his own lifetime and published little his work was enormously influential, leaving its traces in much modern thinking about urbanism and human relations with the planet. Kitchen called him 'founding father of town planning and environmentalism' (Kitchen 1975), Lewis Mumford was impressed that 'Geddes coupled thought to action, and action to life, and life itself to all the highest manifestations of sense, feeling, and experience...' (Mumford 1963 p.384). Through his work, Mumford discerned that Geddes was practising 'the reclamation of science by citizenship', and, through his wide-ranging activities, was bringing together 'provinces of thought: isolated and sterilized by their failure to begin and end with that unity which is life.' (Mumford 1963 p.386). Geddes' inclusive and integrating approach to human knowledge and civilisation was capable of bridging the cultures so that 'Far from rejecting the primitive elements in our civilisation (he) insisted that they were an integral part of man's (sic) inheritance...' (Mumford 1963 p.388).

In Geddes' life and the sundered fragments of the modern world were restored to unity, not by returning to their original simplicity, but by going forward to a more highly developed synthesis and to a more inclusive pattern of action: a synthesis that was always open to the test of fresh action, to the challenge of fresh experience, to the incursion of fresh ideas and ideals. (Mumford 1963 p.389).

4.2.2 Mumford

Cities, Technics, Ecology and the Green Matrix of Regionalism

Lewis Mumford (1895-1990) was one of the most consummate urban theorists and historians of the city. His work is notable, amongst other things, for its consistent emphasis on understanding the city in context with its region. He was an early proponent of an ecological worldview. His work on the evolution of cities built on the foundations laid by Geddes and, like Geddes, he was an advocate of regionalism and his work informs Ecopolis Proposition 1, that city-regions determined the ecological parameters of civilisation.

The maintenance of the regional setting, the green matrix, is essential for the culture of cities. Where this setting has been defaced, despoiled, or obliterated, the deterioration of the city must follow, for the relationship is symbiotic. The difficulty of maintaining this balance has been temporarily increased, not merely by the incontinent spread of low-grade urban tissue everywhere, dribbling off into endless roadside stands, motels, garages, motor sales agencies, and building lots, but by the rapid industrialization of farming itself, which has turned it from a way of life into a mechanical processing business no different in content or aim or outlook from any other metropolitan occupation....What is vital is the preservation of the green matrix in which urban communities, big and small, are set: above all the necessity to prevent the uncontrolled growth of urban tissue from effacing this matrix and upsetting the entire ecological pattern of city and country. (Mumford 1961/1991²⁶)

The ecocity vision typically contains that curious tension between the global and the local which is so much part of the post-industrial condition, with an appeal to regional allegiances on the one hand and planet-wide responsibilities on the other.

We can no longer leave soils and landscapes and agricultural possibilities out of our calculations in considering the future of either industries or cities. For the era of the callous pioneer, who laid waste to a particular area, looted its natural resources, and moved on, is over: there is no place left to move. We have reached the end of our journey, and in the main, we must retrace our steps, and, region by region, learn to do intelligently and co-operatively what we hitherto did in such disregard of the elementary decencies of life. The grasp of the region as a dynamic social reality is a first step toward a constructive policy of planning, housing, and urban renewal....

In its recognition of the region as a basic configuration in human life; in its acceptance of natural diversities as well as natural associations and uniformities; in its recognition of the region as a permanent sphere of cultural influences and as a center of economic activities, as well as an implicit geographical fact - here lies the vital common element in the regionalist movement. So far from being archaic and reactionary, regionalism belongs to the future

(Mumford 1938 p.305-306)

Writing before the advent of the internet, Mumford saw the human prospect such that:

We must now conceive the city...not primarily as a place of business or government, but as an essential organ for expressing and actualizing the new human personality – that of 'One World Man' (sic). The old separation of man and nature, of townsman and countryman, of Greek and barbarian, of citizen and foreigner, can no longer be maintained: for communication, the entire planet is becoming a village; and as a result, the smallest neighbourhood or precinct must be planned as a working model of the larger world. (Mumford, 1961/1991 *City in History*, p.652-653)

This critical, but hopeful, stance taken by Mumford typifies his approach and it may well be that his influence on the author has not only been through the expression of ideas and historical analysis (the essential idea of a 'cultural fractal' is implicit in the 'working model' concept) but also in the tone of critical optimism that pervades Mumfordian tomes.

4.2.3 McHarg

Designing with Nature

It is not a choice of either the city or the countryside: both are essential, but today it is nature, beleaguered in the country, too scarce in the city which has become precious. (McHarg 1971 p.5)

Ian McHarg took the intellectual baton from Mumford (who had taken it from Geddes) and applied ecological thinking to the problems of planning human settlement. In the Introduction to McHarg's seminal work 'Design with Nature' Mumford called him 'an inspired ecologist' (McHarg 1971 p.vii).

Let us accept the proposition that nature is process, that it is interacting, that it responds to laws, representing values and opportunities for human use with certain limitations and even prohibitions to certain of these. (McHarg 1971 p.7)

McHarg applied his perceptions of nature and propositions of process to the task of designing a system for 'designing with nature'. His resulting approach, developed over many years, was tested through practical application in difficult environments, typically where urban development pressures threatened nature. With case studies undertaken in places like the Potomac basin that cradles Washington DC, the Baltimore region and metropolitan regions elsewhere in the USA, McHarg used a technique of 'layering' various analytical maps of a region one over the other so that the patterns of the place were revealed: thus hydrology, geology, soils, drainage, historical landmarks, vegetation, wildlife habitats, slope, and scenic values might all be layered to disclose the places most likely to be suitable for recreation, residential development, etc. This powerful technique was employed without the benefit of computers and was the preamble to the computer-generated geographic information systems that are now regarded as essential to environmental planning.

²⁶ The City in History, Graphic Section Four, Plate 58

The legacy of McHarg can be seen across the planning world, in such competent publications as Hendler's well-illustrated 'Caring for the Land' (Hendler 1977) which is almost cartoon-like in its clarity, in the work of ecologically responsive planners like Hough, whose work continues to develop McHarg's insights on process and form, and in the systematic approach to ecological design propounded by Fisk and Vittori. McHarg's methodology of analysis by uncovering layers of patterning in the natural and human landscape was a revelation to the author when he stumbled across his text in 1975 and it has long since continued to inform the Ecopolis idea and underlying mode of thinking. This can be seen, to some extent, in the layered analyses of the Halifax EcoCity Project (Chapter 7) and Whyalla Ecocity Development (Chapter 8) where 'ecological (habitat) corridors' form armatures for inner-city urban design (see HEP and WED diagrams adjacent, right).



FIGURE 14: Halifax EcoCity Project and Whyalla Ecocity Development - EcoCity Layers & Links (drawings by the author)

4.2.4 Hough

Cities as Natural Process

Hough looked at the city and saw that it was a human construction that could not be separated from the processes of nature. He described the necessary relationships that exist between human habitation and living systems and prescribed process-based approaches to designing and developing urban environments that fitted the processes of nature. He identified urban ecology as the basis for shaping cities (Hough 1995 pp5-32) and climate as '...a common thread that influences all the other natural and human processes of water, plants, animals, urban farming and city life.' (Hough 1995 p.285). His view is broad and embraces human ecology, seeing community activity as inseparable from the achievement of workable built environments.

Published in 1984 'City Form and Natural Process: Towards a New Urban Vernacular' was the basis of the later 'Cities and Natural Process' (1995). In the Preface to the later book Hough notes that there has been such a change in people's perceptions of nature within cities that 'An awareness that natural processes and human affairs are inseparable issues is beginning to emerge.' (Hough 1995). Part of that emerging awareness is his own realisation that '...initiating change to the way things

are done is influenced, at least initially, more by changes to deeply rooted values and traditions, than by economic imperatives.' (Hough 1995).

Alongside Spirn's 'Granite Garden' and McHarg's 'Design with Nature', Hough's work has provided some of the best available textbooks for students of urban ecology until very recently.

4.2.5 Spirn

In the Granite Garden

It is time to expand what has been a romantic attachment to the ornaments of nature into a commitment to reshape the city in harmony with the workings of nature. (Spirn 1984 p.37).

Landscape architect Ann Whiston Spirn has a poetic and practical view of the city that attracted Jane Jacobs' admiration²⁷. Her 'Granite Garden' speaks of urban nature and human design and deals with the city elementally including four sections on Air, Earth, Water and Life.

Spirn has inspired the confidence of the author in holding to the view that the Ecopolis approach is based on a fundamentally correct view of urbanism and design. She says, quite simply, 'The city is part of nature.' (Spirn 1984 p.4)

4.2.6 Jacobs

The Death and Life of Cities

Grand visions of future cities have never been turned directly into reality. The utopianism, and implicit authoritarianism, of all such visions has always generated both excitement and foreboding. There have always been those who saw an imperative to work with facts rather than fantasy and within the frameworks of existing urban environments rather than on plans for imaginary places. Geddes was one such, another was Jane Jacobs. Both held powerful visions of how cities might be, but neither were utopians. A measure of how Jacobs' work was received can be gained from the observations of Theo Crosby:

Her analysis of the processes by which planners have destroyed cities is devastating, and her pointers towards the real nature of city life and economy are the only civilised counter to the comic book vapourings of the super technologists, and the blind bureaucracy of planning orthodoxy.

Mrs Jacobs' message is simply to revalue and regenerate what we have – the old streets with their contact and *camaraderie*, the economic use of old buildings, the necessity for diversity and the dangers of radical redevelopment. Above all, she stresses the possibility

²⁷ From the book jacket comments on 'The Granite Garden'.

of regeneration through social and administrative means rather than through new construction. (Crosby 1973 p.64)

This kind of sympathy links the outlook of urban theorists as diverse as Geddes and Prince Charles²⁸. It is a view antipathetic to the propositions of Soleri, though his musings on urbanism contain some reflection of the same sensibility particularly in regard to the benevolence of the 'urban effect' (Soleri 1987 p.93). The propositions of this thesis are predicated on the importance of the elements that overlap in these views. Thus Soleri's crusade against sprawl is joined with Jacobs' passion for the life of cities and Geddes' clear vision of the profound interdependence of city and region. Whereas the 'big picture' visionaries tend to start with images of new cities as physical form, Jacobs saw urban renewal beginning best with a renewal of citizenship, an activist position that finds its most succinct expression in the work of Bookchin²⁹. Jacobs offers useful rejoinders to those who would try and reduce urban problems to too few dimensions. The car is certainly part of the urban problematic, for instance, but Jacobs cautions:

Automobiles are often conveniently tagged as the villains responsible for the ills of cities and the disappointments and futilities of city planning. But the destructive effects of automobiles are much less a cause than a symptom of our incompetence at city building. (Jacobs 1962/1984 p.17)

With her emphasis on revaluing and regeneration, Jacobs offers a philosophical position for ecocity making that is applicable to all urban environments. In the case of the Los Angeles Ecovillage (see Chapter 5) one can see the Jacobs' philosophy being put to the test by a community organisation, effecting the creation of a piece of ecological city in downtown LA³⁰.

4.2.7 Chinese and Russian Urban Ecologists

The Green is Red

There is a tradition of ecological enquiry from what was the Soviet Union that stems back to some of the earliest work on ecology by Vernadsky, one of the pioneers of ecology and key exponent of the concept of the biosphere (Lapo 1982). Extensive scientific studies on human settlements have been undertaken in conjunction with the Man and Biosphere program (Bozhukova and Kavtaradze 1983, General Editorial Board

²⁸ Whose exhortations to work with the existing and traditional fabric of towns and cities preceded his commitment to building new ones.

²⁹ Bookchin valued Jacob's economic analysis of cities. 'It remains a lasting contribution of Jane Jacobs to have demonstrated in a very compelling way that our economic well-being depends on cities, not on nation-states.' (Bookchin 1995 p.202-203)

1988). In China there has also been a long-standing interest in urban ecology³¹ although Wang, editor of Human Systems Ecology in Beijing, notes that the definition of human ecology 'is so general that most disciplines in either natural or social sciences and most walks of human activities can claim their work is concerned with the relationship between human being and its environment' (Wang in Wang et al 1990 p.1)

4.2.8 Fisk and Vittori

Maximising the Potential of Building Systems



FIGURE 15: Advanced Green Builder Demonstration Home, Austin
(Source: Jodidio 1998 p.46)

There is a hint of the mad scientist about Pliny Fisk III. (Lerner 1997 p.19)

Pliny Fisk and Gail Vittori have, through their research and design work with the Center for Maximum Potential Building Systems (Max's Pot)³² at Austin, Texas, created images of ecological design that are mix of mechanical and earthy, using indigenous and recycled industrial building materials. Their real success has been in establishing the ideas of mapping and tracking as integral to construction, taking McHarg's 'layering' techniques and developing it as a means of identifying the 'at a distance' impacts of building. Fisk and Vittori's determinedly holistic approach to building '...sees built form as a product of an enlightened understanding of the environment in which it is set.' (Haslam 1997 p.54). By favouring local building materials and techniques the architecture 'takes into account the metabolism of the local environment' (Fisk quoted by Lerner 1997 p.29)⁸³. Writing on behalf of Max's Pot, Fisk is optimistic about what can be achieved with an 'appropriate' approach:

³⁰ Dialogue between Lois Arkin of the LA Ecovillage and UEA has mutually reinforced their community based ethos and determination to achieve ecocity goals in difficult inner-urban environments.

³¹ As a result of the call for papers for the EcoCity 2 Conference by UEA, the conference organisers discovered that Professor Rusong Wang was a professor of Urban Ecology and that the subject had been extant in China for the best part of a decade. Consequently he was invited to be one of the main speakers at the EcoCity 2 conference. Further development of links between UEA and Wang and his group has been stymied by UEA's concern about China's human rights record.

³² A non-profit organisation formed in 1975.

⁸³ Much of the material for building in metropolitan Adelaide is from the region, close to the city. This reduces transport energy costs with the result that the delivered price of concrete aggregate in Adelaide is about half that of Sydney (SA Dept of Mines and Energy 1991).

We feel that the initial building process, the working metabolism of structures, even the final death of those artifacts, can work in harmony with the natural world around us. (Fisk (ed) undated-a).

Fisk's concept of regional mapping defines the ecological and economical context and '...is used as a tool to identify plant species, soil types, rainfall, wind strength and insolation. As such it defines the biome or bio-region – an area with a distinct set of climatic, vegetation and soil characteristics.' The economic connectivity of mapping is reflected in its use as '...a statistical base to identify human resources such as transport networks, manufacturing processes and job skills.' (Haslam 1997 p.54)

In the work of Fisk, Vittori and Max's Pot there is linkage of architecture and ecology with social concerns, as part of seeking 'to restore the co-operative imperative between natural and human systems to ensure their mutual survival.' Their uncompromisingly regionalist philosophy is 'born out of a rigorous understanding of context'. Again, it is possible to identify the theme of architecture as part of a social endeavour, people *with* environment, old *with* new 'akin to the tradition of a local building knowledge, but using the benefits of the computer age.' (Haslam 1997 p.56)

As he stands surrounded by a useful profusion of tools, drill presses, lathes, and racks of clamps of all sizes, it is not hard to see that he belongs to the nuts-and-bolts school of environmentally responsible architecture. (Lerner 1997 p.21)

Supported by the administrative and research skills of his wife and co-director, Gail Vittori³³, the practical focus of all Fisk's work is closely linked to a theory about minimising transport distances, eliminating wastes through material reuse and use of

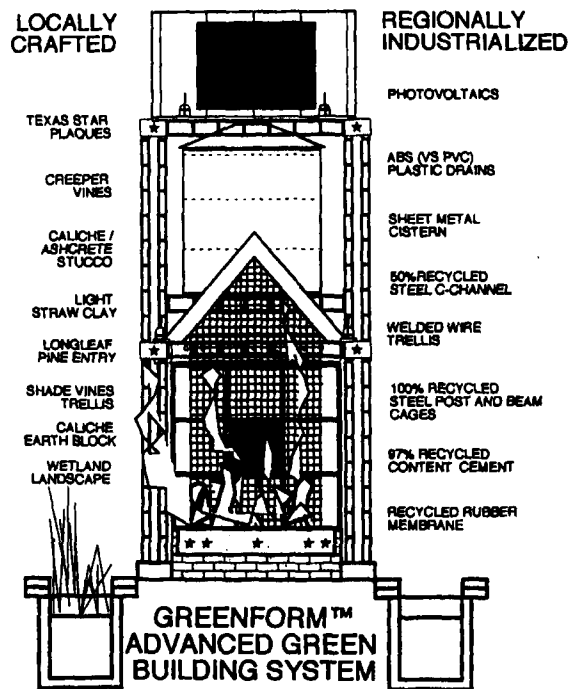


diagram of construction elements

FIGURE 16: Max's Pot Construction Elements. Schematic section showing key construction elements in the Max'sPot Demonstration Home and their provenance. (Source: Haslam 1997 p.54)

³³ The relationship and roles of Vittori and Fisk appears to closely parallel that of the author and his partner and co-worker, Chérie Hoyle.

local construction resources.³⁴ His ‘hands-on’ approach to ecological design struck a chord with this author and added inspirational fuel to the commitment to praxis that underlies the Ecopolis idea. His work on rewriting architectural and engineering guidelines for the state of Texas led to the development of Austin’s Green Builder Program which ‘was honoured by the United Nations at the Earth Summit as one of the twelve exemplary local government initiatives around the world.’ (Lerner 1997 p.35). Although most of Max’s Pot work is not set in an urban context³⁵ it offers important lessons for designing and developing in urban ecosystems.

It can be said that the approach of Fisk and Vittori is radical in that they appear to have sought out every conceivable way to make their house and workplace environmentally responsible, right down to... its eventual dismantlement so that the construction materials will not be wasted. (Jodidio 1998 p.47)

4.2.9 New Alchemy and the Todds

Bioshelters and Living Machines

When I first walked into one of John Todd’s bioshelters and living machines, I was struck not only by the fact that it worked, but by the fact that it was beautiful, in the sense of peacefulness that they have. I think that some of these outlaw designers, who are the pioneers of the area of ecological design, by offering us a chance to actually see and feel ecological design, even if it’s very local, are prefiguring the kind of design process that has to happen in the future. (Bateson quoted in Zelov & Cousineau 1997 p.322)

The work of the New Alchemists has been pivotal in the movement towards ecological design. They stand between the radicalism of fundamental thinkers like Fuller and the pragmatic interpretations and theoretical reworkings of practitioners like McDonnough.

Originating partly in a series of seminars held for biology students and born during the 1969-70 American academic year, the New Alchemy Institute began by asking if there were ‘biological analogues by which human populations might sustain themselves other than the present exploitive, dangerous, and biologically insupportable technologies?’ and whether humanity could ‘...coexist in a mutually supportive and beneficial way within the biosphere...?’ (Todd 1977 p.x)

Ecological design is about having an holistic scientific view, informed by humanism. Such an approach was outlined by John Todd in ‘A Modest Proposal’ in 1970. His proposed ‘biotechnologies for small communities’ (Todd 1977) were first

³⁴ Fisk and Vittori were among the first to use strawbale in modern construction and Fisk’s experimentation with flyash as a cement substitute inspired the author’s determination to use flyash content concrete in the Christie Walk project.

³⁵ Max’s Pot have experimented with environmentally responsible materials and techniques intended to support flexible and participatory approaches to making urban space.

realised experimentally in the late 1960s and early 1970s and have since led to a number of initiatives including the design and manufacture of 'living machines' that now treat sewage in locations ranging from American small towns to a chocolate factory in New South Wales³⁶. These biotechnologies have now been available for some time but such practical programs and projects were not possible until the right historical circumstances allowed for their development, and their continued development has been dependent on other technological improvements.

New Alchemy, while still a child of necessity, is also very much of this moment. Much of the work would be impossible without the profound biological knowledge of the present. Similarly, modern technology has provided us with materials that enable us to open structures to light and to monitor subtle ecological interactions that would have been unavailable to us until recently. (Todd 1977 p.144)

The practical ecological technologies resulting from the work of the Todds and the New Alchemists has also informed the work and ideas of many others. The Todds and the New Alchemists have worked with some of the other people identified in this chapter, including architect Malcolm Wells (Todd & Todd 1994 p.52) and among the mentors acknowledged by the Todds can be found Bookchin, Fuller, Brand and Bateson – reinforcing the sense that there is a strong community of ideas at the heart of developing ecological design theory. The Todds have made their operational principles explicit from the beginning of the New Alchemist enterprise. In 1984 they put forward a set of 'Emerging Precepts of Biological Design' which was reiterated and reinforced in 1994 (Todd & Todd 1994). They write that 'The years between the two editions have served to prove...that the original precepts underlying sustainable ecological design are not only valid but among the few promising epistemologies for the human future.' (Todd & Todd 1994 p.19) The New Alchemy Precepts are guidelines for design which 'grew from the confluence of New Alchemy's work with that of a number of other people who had been thinking along similar lines.' (Todd & Todd 1994 p.19) It is unclear why some precepts are 'shoulds' and others are 'musts' but it is interesting to compare them with the later Hannover Principles of McDonough (see below) which also stresses its 'evolutionary' nature. McDonough appears to have been consciously or unconsciously influenced by the New Alchemists. Apart from the adoption of the same number of principles (nine) there is an obvious confluence of ideas and evidence of a fundamentally similar outlook.

³⁶ 'Solar Aquatics' was initially identified to provide appropriate facilities for the Halifax EcoCity Project but turned out to be very expensive. 'Living Machines', is a direct spin-off from the New Alchemy Institute and in a commissioned report to the developers eventually selected for the Halifax Depot site,

TABLE 2: The New Alchemy Emerging Precepts of Biological Design & The Hannover Principles (compiled by the author)

New Alchemy Precepts of Biological Design	The Hannover Principles <i>Re-ordered and with emphases by Downton</i>
1. The living world is the matrix for all design.	2. Recognize interdependence. <i>The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognizing even distant effects.</i>
2. Design should follow, not oppose, the laws of life.	9. Seek constant improvement by the sharing of knowledge. Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and <i>re-establish the integral relationship between natural processes and human activity.</i>
3. Biological equity must determine design.	4. Accept responsibility for the consequences of design decisions upon human well-being, <i>the viability of natural systems and their right to co-exist.</i>
4. Design must reflect bioregionality.	5. Create safe objects of long-term value. Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.
5. Projects should be based on renewable energy sources.	7. <i>Rely on natural energy flows.</i> Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.
6. Design should be sustainable through the integration of living systems.	6. Eliminate the concept of waste. Evaluate and <i>optimize the full life-cycle of products and processes, to approach the state of natural systems, in which there is no waste.</i>
7. Design should be co-evolutionary with the natural world.	1. Insist on rights of <i>humanity and nature to co-exist in a healthy, supportive, diverse and sustainable condition.</i>
8. Building and design should help heal the planet.	8. Understand the limitations of design. No human creation lasts forever and design does not solve all problems. <i>Those who create and plan should practice humility in the face of nature.</i> Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.
9. Design should follow a sacred ecology.	3. <i>Respect relationships between spirit and matter.</i> Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.
The formulation of these early precepts as they are applied and tested will contribute, in time, to the creation of a science of applied ecology which will serve in turn as a foundation for future technological design.	The Hannover Principles should be seen as a living document committed to the transformation and growth in the understanding of our interdependence with nature, so that they may adapt as our knowledge of the world evolves.

the author, through Ecopolis Pty Ltd, proposed a long-term goal of employing a series of these Living Machines in the nearby parklands.

A focus of New Alchemy has been the creation of 'living machines' conceived as operating in the manner of ecosystems. The Todds define a living machine as '...a device made up of living organisms of all types and usually housed within a casing or structure made of extremely light-weight materials. Like a conventional machine, it is comprised of interrelated parts that function together in the performance of some type of work.' (Todd & Todd 1994 p.167).

When the late Buckminster Fuller attended the opening of the Pillow Dome, the first of New Alchemy's second generation of bioshelters in June, 1982, he inspected the building and then turned to us with a radiant and approving smile. He announced, 'This is what I always wanted to see happen with my architecture – this integration with biology.' (Todd & Todd 1994 p.64).

4.2.10 Biosphere 2

Off the Planet

Biosphere 2 is ecological architecture inside out. It is architecture containing an ecosystem rather than architecture in the context of an ecosystem. The project is 'engineering, biological stocking, sealing-off, and operating a materially-closed, energetically and informationally open, free energy accumulating life system' modelled on the workings of 'Biosphere I', planet Earth (Allen & Nelson 1989 p.55). John Allen, the man behind the project, is variously described by media and detractors as 'some kind of nut'. The expressed intent of Biosphere 2 includes the goal of prototyping 'off-planet' settlement.³⁷ It was conceived one of the first steps to Mars (Maranto 1987) and is in the tradition of the off-planet aspirations of O'Neill's space colonies (O'Neill 1975, 1981) and Soleri's artificial asteroids (Soleri 1973a). This 200 million dollar (US) attempt to bottle an ecosystem, privately funded by billionaire



FIGURE 17: Biosphere 2, Oracle, Arizona. Dome of pressure equalisation 'lung' in foreground. (Source: Allen 1991 p.65)

³⁷ 'The major motivation behind creating Biosphere II and developing the capacity to create other micro-scale viable biospheric systems is to assist the biosphere to evolve off planet Earth into potential life regions of our solar system, and eventually throughout the galaxy and cosmos.' (Allen & Nelson 1989 p.54)

recluse Edward Bass (Meredith 1991), has raised many challenging questions about the viability of constructed ecosystems.

McHarg's Cubicle

The Biosphere II project is the first attempt to create a biospheric total system on what is thought to be the requisite scale of 5 million cubic feet. (Space Biospheres Ventures 1986)

Following the idea that the earth is an evolving organism and that biospheres are potentially replicable assemblages, Biosphere 2 is the most recent of very few serious experiments that have tried to create a variant of 'McHarg's Cubicle' – a capsule containing a mostly closed system³⁸ of air, water, algae, bacteria, light and a human (Sagan 1999 p.162). In the 'bionautic' view of the world, the intervention of humans in planetary processes provides a consciousness for the evolving entity of 'Biosphere 1' and 'the biosphere becomes more powerful, more aware of and able to direct its own evolution' (Sagan 1990 p.125). A not-dissimilar ethos underlies the concept of ecocities as the means by which we 'can save the world'. Regardless of differences in emphasis, the underlying proposition is that humans are such powerful manipulators of processes in the biosphere in any case, it is a rational and desirable (even survivalist) response for a technological civilisation to be ever-more conscious of its impacts and to seek not only to minimise those impacts but engage in restorative, directed activity to enhance the sustainability of the living systems. Some of the outcomes that were hoped for from Biosphere 2 included the development of expertise in better managing 'island' ecosystems and designing 'cities that pump their dirt into the dirt, instead of into the air', they also included being able 'to construct ecosystems anywhere on earth...for a price'. (Maranto 1987 p.43). As an experiment Biosphere 2 has been regarded as an inspiration and a failure; it has certainly provided a remarkable educational facility, now run by Columbia University. The attempt at a total systems approach with its integration of built form and ecosystem function make the project of interest for the design of ecocities. The problem of maintaining healthy natural systems in a quasi-symbiotic relationship with complex buildings is an acute case in microcosm of the problem faced by cities as they try to maintain a healthy symbiotic relationship with their host environments. The author visited Biosphere 2 in the months just prior to its completion in April 1990 and Project architect Phil Hawes wrote strongly in support of the Halifax EcoCity Project in 1993.

³⁸ Light is imported, heat is exported.

4.2.11 Berg and Sale

The Bioregional Imperative

The first of all of Gaea's daughters was Themis, to whom she entrusted the laws of nature, and it is the diligent study of those laws that we can best guide ourselves in reconstructing human societies for a bioregional world. (Sale 1991 p.49)

Sale tells us that Peter Berg and ecologist Raymond Dasmann brought the term 'bioregion' into the lingua franca of environmentalism sometime in the mid-1970s. It is defined by 'its life forms, its topography and its biota, rather than by human dictates; a region governed by nature, not legislature.' (Sale 1991 p.43). Sale suggest that a feel for the concept can be gained by

1. 'Knowing the land' which, for the urban dweller, includes 'learning the details of the trade and resource-dependency between city and country and the population limits appropriate to the region's carrying capacity';
2. 'Learning the lore' and recognising that 'Every place has a history, a record of how both the human and natural possibilities of the region have been explored' and that record may be embodied in myth and legend as much as in library or book;
3. 'Developing the potential' to see what 'can best be realized within the boundaries of the region, using all the biotic and geological resources to their fullest, constrained only by the logic of necessity and the principles of ecology', and
4. 'Liberating the self' from distant and impersonal market forces, governments and bureaucracies and finding a sense of oneness with the natural world (Sale 1991 p.44-47). 'Knowing, learning, developing, liberating – these, then, are some of the processes most central to the bioregional idea.' (Sale 1991 p.47).

The specificity of 'place' is pivotally important. (Coyote 1978 p.97)

Peter Coyote (in 1978, chairman of the California Arts Council, and one of the founders of the Diggers) writes that the ancient, stable continuity of primitive cultures is inescapably bound up with an understanding of place. The 'earth they stand on' is not a general concept but very specific, evolved from the reality of a place and its history of human habitation (Ferlinghetti et al 1978). Coyote noted that Peter Berg named this understanding *living-in-place* and defined it as:

...following the necessities and pleasures of life as they are uniquely presented by a given place, and evolving ways to ensure long-term inhabitation of that place. (Coyote 1978 p.97)

Ideas about living in a place are essentially political ideas because, of necessity, they have to do with social organisation and political economy. Culture contains politics and politics represents a major part of culture.¹

Sale writes of the interaction between city and country as a 'social symbiosis' which, in a bioregional world, would bring the benefits of the country to the city, and vice versa (Sale 1991 p.113). His prescription for bioregional urbanism favours ecological cities with populations of between 25,000 and 250,000 depending on regional carrying capacity, after which cities need to be divided and communities dispersed in decentralised, smaller concentrations (Sale 1991 p.116).

Bioregionalism developed as a movement, fueled and informed by the ideas of Berg, et al, which deliberately set out to link politics with place, yet at the same time it sought to avoid the reactionary 'blood and soil' approach to politics which characterised movements like Zionism or Hitler's National Socialism.

Statism and centrism are the reasons for the destruction of communities throughout the world whether they be local, regional or national.....Here we must distinguish between the community of people and its political clothing. The prime loyalty of people is owed to their community, to their nation, rather than to the state. (Gwynfor Evans quoted by Berg 1981)

With regard to its implementation, Sale observes that bioregionalism has the virtue of being possible only via a gradual process - 'low, steady, continuous, and methodical, not revolutionary and cataclysmic.' (Sale 1991 p.176).

Berg and the bioregionalists are important contributors to the tapestry of ideas that constitute the Ecopolis theory and sporadic dialogue between Berg and the author has helped to maintain the integrity of that fabric.²

¹ The roots of the ecocity movement represented by Register, Berg, et al, can be found in the history of the American counterculture. Bookchin identifies Berkeley's People's Park as 'the beginning of the Revolutionary Ecology Movement' spawning a 'Blueprint for a Communal Environment' that gave '...new communal, eco-viable ways of organising our lives...', while people's politics provided '...the means to resist the System.' (Bookchin 1986 p.153). A powerful aspect of that dissent was that it emphasised having fun as a strategy for precipitating change and focussed on rearranging consciousness rather than the means of production. Berg was a very active member of the counter-culture and the work he has done with his partner Judy Goldsack and Planet Drum has been about re-thinking, re-invention, re-discovery, and re-inhabitation of place as deliberate means to achieve systemic change in the culture of society.

² The author first met Berg at the Ecocity 1 conference in 1990. Berg and Goldsack were guests of the author and his partner when they visited Adelaide in 1993.

4.2.12 Papanek

Designing for the Real World

Papanek gained international attention for his ideas after the publication of 'Design for the Real World' in the 1960s. The theme of the book was that design should be a response to the real conditions of people, their bodies, and their lives. Introduced to Papanek's work as a student of architecture in the early 1970s, the author is still acutely aware of the impact of his ideas.

In more recent years Papanek strongly embraced the ecology movement - unsurprisingly, given the content and tone of his work - and, perhaps more surprisingly, acknowledged the spiritual dimension of design.

It is not difficult to find buildings that evoke the spiritual in us. What stirs this recognition of the spiritual and fills us with awe works on deep levels of our psyche. The eidetic image is constructed from the harmonic relationships between various parts of our bodies. Our biogenetic heritage also shapes our satisfaction from a preconscious recognition of the Fibonacci series, the golden rectangle, spirals, and rhythms connected to our heartbeat and the seasonal cycles. (Papanek 1995 p.237)

Papanek's comments demonstrate part of the connectivity of current thinking about aesthetics and nature, reaching back to D'Arcy Thompson and the mysteries of sacred geometry and forward to the concepts of biophilia and its claims for a kind of 'hard-wired' aesthetic preference for nature in the human psyche (see below). Papanek writes that design is 'goal-directed play' and speaks with the authority of a philosopher and practitioner who has already changed our view of what design is all about. We are getting past the questions of how things merely look or work, he says, and are now asking how they relate, so we find that this book contains chapters on 'Sensing a Dwelling' and 'The Biotechnology of Communities' (Papanek 1995).

4.2.13 Van der Ryn

Ecological Architecture and Intellectual Coherence

One of the most coherent and integrated published attempts to deal with sustainability, the built environment, and the need for holistic planning is that by Sim Van Der Ryn and Stuart Cowan, who argue that 'Sustainability needs to be firmly grounded in the nitty-gritty details of design' (Van Der Ryn and Cowan, 1996 p.ix). Recognising that ecological problems derive from deep seated, cultural problems, they note that conventional design 'Divides systems along boundaries that do not reflect the underlying natural processes.' (p.27).

Van der Ryn's Design

Principles:

1. Solutions Grow from Place
2. Ecological Accounting Informs Design
3. Design with Nature
4. Everyone is a Designer
5. Make Nature Visible

TABLE 3: Van der Ryn's Design Principles
(Cowan and Van der Ryn 1996)

Van der Ryn was the architect behind Berkeley's retrofitted Integral Urban House³ in 1974 (see Chapter 6.2.1) and his stint as State Architect for California during the Brown era gave him an extraordinary opportunity to put ecological design approaches into practice.⁴ He has maintained an uncompromising commitment to those approaches whilst Calthorpe, who once worked closely with Sim Van der Ryn, co-authoring 'Sustainable Communities', has taken a

lead role in the New Urbanist movement (see 'The Village People and the New Urbanists' below). Their 'ideological split' was because Van der Ryn felt 'that simply having higher densities and saving land was too narrow' and because he thought it important to create models that weave nature back in.' (Wheeler and Okamoto 1994 p.17). Van der Ryn and Calthorpe have independently continued to develop their work on linking ecological architecture and planning ideas to a broader vision of sustainable communities and design practice (Cowan and Van der Ryn 1996, Calthorpe 1993).

Van der Ryn acknowledges the influence on his own work of Frank Lloyd Wright 'the most important architect of the 20th century' (Wheeler and Okamoto 1994 p.1) and claims that he is 'basically a libertarian and anarchist at heart.' (Wheeler and Okamoto 1994 p.17). He insists that ecology has to provide the framework for the entire design process and maintains that not only is a building an organism 'Some buildings can actually be considered ecosystems.' (Wheeler and Okamoto 1994 p.1).

4.2.14 Yeang

Architect and Bioclimatician

Yeang has produced remarkable, innovative, technologically sophisticated high-rise buildings and several publications that promote his propositions regarding ecological architectural design philosophy and techniques. Unlike Rogers, who is a late arrival on the 'ecoarchitect' scene (Chapter 3), Yeang has a pedigree that goes back to his student years as a researcher at the progressive Architectural Association in London. As long ago as 1974 he was writing on biological analogies in design, calling for design to be based on an understanding of biological systems and quoting Mumford from 1934

³ Visited by the author in 1977.

‘we now realise that the machines at their finest best are lame counterfeits of living organisms’ (Yeang 1974). His ‘bioclimatic’ high-rise buildings have transformed architectural thinking about multi-storey structures and their potential for climate-sensitive design. They provide inspirational evidence for the prospects of multi-storey structures capable of fitting with ecocity programs.

Yeang addresses the ecological context of his architecture and proposes a design strategy in which rehabilitation increases in proportion to the diminished integrity of the original ecosystem. (Yeang 1999 p.5). The Ecopolis ‘synthesis’ allows for the incorporation of these, and other, approaches to analysis and design through the framework of the ‘SHED’ (Chapter 14).



FIGURE 18: Editt Tower - The Prototype Ecological Tower, Singapore by T. R. Hamzah & Yeang (Source: <http://www.trhamzah-yeang.com/project-editt.html>, accessed 28 April 2001)

Ecosystem Hierarchy	Site Data Requirements	Design Strategy
Ecologically Mature	Complete Ecosystem Analysis and Mapping	<ul style="list-style-type: none"> • Preserve • Conserve • Develop only on no-impact areas
Ecologically Immature	Complete Ecosystem Analysis and Mapping	<ul style="list-style-type: none"> • Preserve • Conserve • Develop on least-impact areas
Ecologically Simplified	Complete Ecosystem Analysis and Mapping	<ul style="list-style-type: none"> • Preserve • Conserve • Increase biodiversity • Develop on low impact areas
Mixed-Artificial	Partial Ecosystem Analysis and Mapping	<ul style="list-style-type: none"> • Increase biodiversity • Develop on low impact areas
Monoculture	Partial Ecosystem Analysis and Mapping	<ul style="list-style-type: none"> • Increase biodiversity • Develop in areas of non-productive potential • Rehabilitate the ecosystem
Zeroculture	Mapping of remaining ecosystem components (eg. hydrology, remaining trees, etc.)	<ul style="list-style-type: none"> • Increase biodiversity and organic mass • Rehabilitate the ecosystem

TABLE 4: Ecosystems Hierarchy and Design Strategy (from Yeang 1999)

⁴ Brown is presently Mayor of Oakland, California, elected on a platform of ‘Ecopolis Oakland’ for which he acknowledges the inspiration of the author’s Ecopolis concept (personal communication 12 April 1997). Brown’s mayoral website displays the ‘Charter of Calcutta’.

4.3 Pattern People – Putting the Pieces Together

4.3.1 Alexander

People, Patterns and Process

The suburb is an obsolete and contradictory form of human settlement. (Alexander et al, 1977, p.30)

When the author first began making a serious effort to promulgate the set of ideas that is 'Ecopolis', he was anxious not to confound the meaning of the concept by the use of images. The concept itself was about process rather than product. For three years, he avoided presenting images of what an 'ecopolis' was and restricted himself to the painting of word pictures, and the description of processes and ideas. This strategy initially developed as a personal reaction to a tendency he had noticed, as an architect, for people to show more interest in drawings than the quality of the architecture that the drawings represented. But aesthetics is inseparable from building, and if it is important that the making cities and built environments is done according to a given set of principles or precepts that are about process rather than appearance, then the issue in communication becomes one of process too.

Alexander has addressed this problem with some alacrity and dedication over three decades. His 'pattern language' offers a system for linking specific aesthetic and built form outcomes to a process grounded in perceptions that appear to be common to most human populations.

Alexander's work appeals to the non-professional, but offers a set of ideas derived from a rigorous intellectual context. In the 1970s, Christopher Alexander, with the assistance of Sara Ishikawa, Murray Silverstein and colleagues at the Centre for Environmental Structure in Berkeley, California developed what was intended to be 'an entirely new attitude to architecture and planning'. His approach to architecture, building and planning was intended to provide an alternative to 'gradually replace current ideas and practice.' To some extent his hopes have been realised as his publications, in particular 'The Timeless Way of Building', 'A Pattern Language' and 'The Oregon Experiment', have become touchstone volumes for responsive, humanistic, organic design. What became known as Alexander's approach to planning, architecture and design has been widely recognized as offering a more humane alternative to mechanistic modernism. The work of Alexander and his cohorts has provided an abiding contribution to the problem of how to synthesis human ecological analysis in terms of practical architecture and design. According to Broadbent the Pattern Language represents 'a thoroughly Empirical, perhaps even Pragmatic,

approach to Towns, Buildings and Construction.’ (Broadbent 1990 p.234) with its ‘straight linear sequence’ for working through 253 ‘patterns’ that create dwelling within a community within a region (Alexander et al 1977). There is a great deal of complementarity between Alexander’s work and the intent of this thesis.

In *Notes on the Synthesis of Form* (Alexander 1964) Alexander showed an early inclination to regard design in terms that were congruent with the thinking of life sciences. He argued that every design problem begins with an effort to fit form with its context – ‘The form is the solution to the problem; the context defines the problem’ (Alexander 1964 p.15). So, he says, design is not just about form alone but ‘the ensemble comprising the form and its context.’ (Alexander 1964 p.15) and he noted that the ‘biological ensemble’ of organism and physical environment was a familiar case in point in which ‘we are used to describing the fit between the two as well-adaptedness.’ (Alexander 1964 p.15). He went on to propose that in urbanism, the ‘ensemble’ is ‘the city and its habits’. His overall proposition was that the design of objects cannot properly be considered outside of their context, and that concepts and categories associated with their perception can become misleading or distort consequences on the basis of values, eg. ‘England’s nineteenth century low-cost slums were conceived only after monetary values had explicitly been given greater importance through the concept of ‘economics’ invented not long before.’ (Alexander 1964 p.70). In developing his thesis, Alexander ended up with abstruse looking diagrams and formulae that obfuscated more than they illuminated, but put most simply his main insight would appear to have been ‘it is not only the result which is important, but the process too.’ (Alexander 1964 p.133)

In ‘*The Timeless Way of Building*’ Alexander begins with the proposition that ‘A building or town will only be alive to the extent that it is governed by the timeless way.’ (Alexander 1979 p.3) ‘Life’ and ‘being alive’ is the theme of the ‘timeless way’ but the definition of life is about a kind of quality that even inanimate objects may possess, eg. some fires are more ‘alive’ than others. Part of the intent of the ecopolis theory is to bring the power and ‘rightness’ of such ideas into concert with other concepts that share a goal of organic wholeness in order that their synthesis has the potential to reach as deep, and be as strong a force, as life itself. However, as Rudlin and Falk point out, a theory like Alexander’s, based on ideas of natural, organic process, may be more useful as a way of describing past urban developments than it is as a tool for their creation in the future, the reason being that ‘Just as in ecology or medicine, our understanding of such processes does not mean that we can or should recreate them artificially.’ (Rudlin

& Falk 1999 p.234). Alexander's efforts to put his ideas into practice have encountered problems, but the 'organic' method is intrinsically evolutionary and allows for learning adjustment and continuous improvement to take place.

In his later work the issue of process was developed in collaborative efforts with others in ways that led to the creation of a 'pattern language'. This was intended to provide the pieces with which to build processes leading to the design of buildings and places. To be consistent with the overall aims of the evolving philosophy, each piece contained processes that were inherent to its realisation. Thus, process was addressed in a concrete, rather than abstruse, manner. In 'The Oregon Experiment' Alexander and his cohorts describe 'a master plan for the University of Oregon'. But it was a master plan with a difference – intended to define a process capable of being adopted 'by any community, anywhere in the world.' (Alexander et al 1975). The six principles on which the plan was founded are worth re-iterating because they are entirely congruent with the goals of this thesis, which is to describe the beginnings of a theory of ecocity making. Part of that theory is the proposition that there are already extant theories, processes and practices that can be effectively 'unified' in a pattern of use which fits the requirement to design, develop and maintain human settlement that co-evolves with the biosphere. The six principles of the Oregon Experiment were:

1. *The principle of organic order:* Planning and construction will be guided by a process which allows the whole to emerge gradually from local acts.
2. *The principle of participation:* All decisions about what to build, and how to build it, will be in the hands of the users.
3. *The principle of piecemeal growth:* The construction undertaken in each budgetary period will be weighed overwhelmingly towards small projects.
4. *The principle of patterns:* All design and construction will be guided by a collection of communally adopted planning principles called patterns.
5. *The principle of diagnosis:* The well being of the whole will be protected by an annual diagnosis which explains, in detail, which spaces are alive and which ones dead, at any given moment in the history of the community.
6. *The principle of coordination:* Finally, the slow emergence of organic order in the whole will be assured by a funding process which regulates the stream of individual projects put forward by users.

(Alexander et al 1975 p.5-6)

In considering the 'life-lieness' or otherwise of buildings and cities, principle 5 is of particular interest because it effectively suggests the embedding of a healing process in the body corporate, in this case a university considered as an active system rather than a mere collection of built artifacts.

Alexander's work is also important to this thesis for its description of tested, radical ways of engaging non-professionals in the design and development process without any sense of the lingering sense of condescension that can be discerned in other advocates of participation (like the community architecture movement in England). Later chapters discuss the role of participatory design and describe the authors efforts to incorporate such practices in ecocity programs (see 13.4 The Ecopolis Barefoot Architecture Program). Historically, like the architecture it contains and is made by, urban design thinking has been informed by form rather than principle. As Broadbent (Broadbent 1990) pointed out, Alexander addressed this in his pivotal essay *A City is not a Tree*. Alexander agreed that 'It is vital that we discover the property of old towns which gave them life and get it back into our artificial cities. But we cannot do this by remaking English villages, Italian piazzas, and Grand Central Stations.' (Alexander 1972 p.402) Writing 35 years ago, he makes an observation still pertinent in the year 2000, that 'Too many designers today seem to be yearning for the physical and plastic characteristics of the past, instead of searching for the abstract ordering principle which the towns of the past happened to have, and which our modern conceptions of the city have not yet found.' (1972 p.402). Alexander identified the problem as a systemic one due to hierarchic organisation of conceptualisation in city design (the 'tree' structure) rather than thinking based on an understanding of the inter-related patterns of real human behaviour that possesses the structure of a lattice or web. He observed that it was very difficult for people to think in any other way because we appear to have a predisposition for reducing complex thoughts about the world to simplified, 'tree-like' forms. This may explain why the New Urbanist pattern book approach to urban design (see below) has been able to generate so much interest and enthusiasm – it is easy to comprehend and to copy. More complex patterns contain overlap and multiplicity of purpose and intent. To be fair to the Congress of the New Urbanism, their Charter does promote mixed-use, but at the same time it calls for 'urban design codes that serve as predictable guides for change.'⁵ (Congress for the New Urbanism, undated)

The final pattern in Alexander (1977) displays the strength of the approach for ordinary people and design for 'real life' and suggests why, despite accolades from many design professionals, there is an ongoing uneasiness amongst these same professionals regarding the pattern language, for Alexander concludes:

Do not be tricked into believing that modern décor must be slick or psychedelic, or 'natural' or 'modern art,' or 'plants' or anything else that current taste-makers claim. It is

⁵ Principle #8 for *The Neighborhood, the District and the Corridor*.

most beautiful when it comes straight from your life – the things you care for, the things that tell your story. (Alexander, 1977, p.1166)

This is anti-consumerist, and anti-establishment design, but it is design. Design conceived as a rich process of engagement by living creatures with their environment and with each other. It is intrinsically ecological. In order to achieve it the design process is different from the linear, compartmentalized process favoured by industrial society, it needs to be developmental, and it requires careful, continuous maintenance. It requires management of a different kind than that bequeathed by militarism and production line manufacturing processes. Alexander warns:

If we have management processes which are categorically unable to respond dynamically, in time, to produce a living structure, then living structure isn't going to occur, right? All that's going to happen is that all this wonderful stuff about sustainable design, about solar energy, about earth materials, about pattern language, you name whatever you want, human participation and so forth, is all going to go down the tube, if, after it's all been thought out, it gets crunched into a management system which is incapable of responding to the way life really unfolds. (Zelov & Cousineau 1997 p.264)

In each of the three case studies described in Part B of this thesis, this tension between the 'living structure' fundamentals of the projects and the deadliness of conventional management structures provided the most difficult and intriguing lessons about ecological development.⁶

4.3.2 Mollison

The Productive Patterns of Permaculture

In Chapter 14, 'Seven Steps' are proposed to achieving ecocity development. Step 6 is 'Patterning'. Although the concept of patterning used here has some parallels with Mollison's 'Patterning' (Mollison 1988 p.8) it is derived more from the work by Alexander et al on a 'pattern language'. As a concept it is also influenced by the scientific enquiry that is discovering patterns in chaos, and emergent qualities in every nook and cranny of the universe (Peitgen and Richter 1986). Just as patterns are not coincidences (Ball 1999) so design is not an accident.

Permaculture is of interest because of its concern with total system, landscape-based analysis and management of human settlement. In relation to the analyses and

⁶ A tentative effort at using Alexander's Pattern Language to analyse one of the Part B case studies, the Christie Walk/Whitmore Square EcoCity Project, was undertaken by UEA intern Nina Creedman during the Southern Hemisphere Summer and Fall of 2000. Creedman identified a number of Alexander's patterns in the design of Christie Walk. Although the design process was not directly informed by the work of Alexander et al, the author's contention is that a commonality of purpose and approach lends validity to the idea that this overall 'organic' humanistic line of thinking has intrinsic qualities and concerns that imply particular outcomes.

processes for site identification, occupation, use and disposal being discussed in this report, Permaculture has potential value as one of the most developed (though undoubtedly still flawed) means of integrating the various issues involved. Rather than attempt an extensive discussion here, the reader is directed to Mollison's publications for further information, with the observation that land-use planning and development cannot be covered adequately in any single documented source and that an integration of methodologies (as proposed below for the Wells' and Ecopolis checklist) awaits sustained and intensive research. Just as Yeomans' 'Keyline' system (Yeomans 1971) is fitted into the Permaculture system (Mollison 1988 pp.158-162) so may Permaculture be fitted into a design system for built environment domains.

Mollison makes large claims for the value of Permaculture. The following passage sets the tone – and identifies a central weakness in his approach, one that is not shared by Alexander:

Permaculture as a design system contains nothing new. It arranges what was always there in a different way, so that it works to conserve energy or to generate more energy than it consumes. What is novel, and often overlooked, is that any system of total commonsense design for human communities is revolutionary! (Mollison, 1988, p.9)

Mollison's intent is clear - he wants to draw 'ordinary' people into the permaculture enterprise by appealing to the universal quality of 'commonsense'. There is some intellectual dishonesty here because anyone with some scientific knowledge is aware of many 'counter-intuitive' and non-commonsensical things in science, and no system of total human settlement design – which is what permaculture purports to be - can afford to lack scientific rigour⁷.

The author has heard on numerous occasions the opinion that 'urban ecology is just like Permaculture', and there are certainly significant commonalities between them but Permaculture seems to occupy that same agrarian-bucolic ground as Garden Cities and Morris' 19th century 'soft' socialism. Permaculture favours the ecovillage rather than the ecocity.

4.3.3 Frampton

Critical Regionalism

Critical regionalism is a theory of architecture that connects building to place-making and ecology through its concern with a sense of place and with process. It 'tends towards the paradoxical creation of a regionally based 'world culture'... (and, at the same time) ...tends to flourish in those cultural interstices which in one way or

⁷ Whether that science be reductionary or holistic.



another are able to escape the optimizing thrust of universal civilisation.' It 'invariably stresses certain site-specific factors... emphasises the tactile as much as the visual...(and)... is opposed to the tendency of 'universal civilization' to optimize the use of air-conditioning, etc.' (Frampton 1996 p.327).

As a linking concept between the concerns of architecture and bioregionalism, this author has found critical regionalism of tremendous use and it is thus dealt with elsewhere in this thesis (see Chapter 12.7 and earlier commentaries in Chapter 3.3).

4.3.4 Brand

How Buildings Learn

The insights of Buckminster Fuller are what initiated this catalog. (Stewart Brand 1968)

Edited by Stewart Brand, the Whole Earth Catalog fed challenging, practical and outrageous ideas and facts into the minds of people who were learning to enjoy learning about the world. Inspired by Fuller, Brand and his cohorts created a point of exchange for radical science, crazies, and some of the world's most creative thinkers about humans and the global ecology. The Whole Earth catalog spawned CoEvolution Quarterly, one of the world's first truly trans-disciplinary journals. 'CQ' published Gregory Bateson writing about the ecology of mind, O'Neill on space colonies, and some of the first articles by Lovelock and Margulis on the Gaia Hypothesis. Special issues dealt with topics such as bioregionalism, media, watersheds, computers, and the rights of non-human species. Brand has thus been a key person in the dissemination of concepts that are integral to the modern environment movement in its many guises⁸.

Architects, says Brand, are wedded to the idea that their designs are permanent monuments whereas real buildings evolve and change as they accommodate and respond to different occupiers and patterns of use (Brand 1997). If Soleri's megastructures are the antithesis of adaptability and authoritarian planning, then Brand shows us the other end of the spectrum, and uses examples of buildings that are known and loved, or hated, according to their capacity to support the changes that flow from a living community. If building is to be ecologically responsive over the long-term it must be adaptable (see Chapter 11 'City Ecology'). In 'How Buildings Learn' Brand deals with construction as a living process, rather than the accumulation of dead objects and he proposes that 'The needed conversion is from architecture based on images to architecture based on process.' (Brand 1994 p.71). Or, as Baldwin puts it '*House is architecture. Housing is a social matter.*' (Baldwin 1996 p.206)

⁸ Particularly that part of it which is not technophobic

This draws into question the approaches to 'ecological' construction that, like Soleri's arcologies, adopt highly engineered, tight-fit design strategies. If the design and development of buildings is going to fit the definition of 'ecological' then it must fit the changing environment of the city through time. This necessarily implies responsiveness to community needs and desires. Buildings 'learn' (Brand 1997) from the occupants with whom they inter-relate as part of the urban ecosystem.

Brand's insights into the way buildings 'learn' and change over time look like ideas that should have already have been familiar to architects and designers, but they were not. Brand's insights extended the conventional horizons of architectural thinking by looking closely at the performance of buildings through time.

Layers in the Long Now

Culture is where the Long Now operates. (Brand 1999 p.38)

Consideration of the making of cities takes us into consideration of timescales that exceed the horizons of conventional commerce and politics. If cities are to be kept on the path of ecological fitness over time there need to be concomitant social and cultural structures and institutions to manage their passage. In 'The Clock of the Long Now' Brand (1999) draws attention to the lack of institutions or decision making systems that deal with very long-term planning⁹. In traditional cultures there was a looking backwards and forwards across several generations, and even within the Western cultural tradition there is ample evidence of some sound, very long-term planning (eg. Planting trees for replacing the timbers of buildings with a maintenance regime stretching over several centuries).

Brand demonstrates the different rate of change in the 'layers' that make up the fabric of built form (Brand 1997) and 'six significant levels of pace and size in the working structure of a robust and adaptable civilisation' (Brand 1999 p.35). These layers can be seen to constitute the basis of a maintenance regime for ecocities – the layers that move quickest needing most on-going maintenance (and acceptance of the need for innovation and change) with the slower layers requiring a more ruminative, long-term strategy that accepts changes only after thorough consideration of the consequences (see also Introduction to Part B). Despite the experience of different cultures through history, there is no readily available model for the kind of decision making and value-maintenance needed for maintaining the ecological development of cities and civilisation across many centuries.

⁹ Except, perhaps, the Roman Catholic church?

4.4 Pragmatic People - Getting from 'Here' to 'There'

4.4.1 Newman and Kenworthy

Auto Dependence

The car-centred, car-dominated, human habitat can now be viewed – like Leninist economics – as an experiment that has failed. (Kunstler 1998 p.59)



Figure 19: Jeff Kenworthy framed by a Curitiba bus shelter.

Peter Newman and Jeff Kenworthy have become the international gurus of traffic and city energy analysis and powerful, accomplished advocates for ecocities. According to Kenworthy and Newman, automobile dependence has shaped our cities into unsustainable forms and only by freeing cities from this dependence can we hope to achieve 'sustainable cities'. Their comprehensive analyses of city transport energy use has informed and developed the debate about the relationship between transport modes, energy use

and urban morphology worldwide. Their critique of energy hungry cities strongly supports Register's advocacy of 'access by proximity', Engwicht's demand for better 'exchange space' and even, arguably, Mollison's call for planning food production on the basis of zoning.

Kenworthy speaks of 'traffic sewers'; noting that Phoenix, Arizona has 1,500 car park spaces per 1,000 jobs whereas Tokyo has only 43; referred to (relatively energy efficient) Asian cities as traffic-saturated rather than auto-dependant; observed that traffic flows like a gas rather than a liquid (which is why, when it is controlled by constricting road networks it compresses rather than bursts the 'sewer pipe'); and he shows convincingly that rail systems are more efficient and more effective than non-rail public transport¹.

Newman and Kenworthy provide trenchant critiques of the car-dependent suburban city. They propose solutions based on traffic calming, light rail and urban villages. With the support of international case studies they illustrate the argument that Australian cities can be much improved by being more responsive to human needs (Newman & Kenworthy 1990, 1992). Their analysis does not extend to details of wider ecological impacts and their approach tends to be geared to making the message palatable to mainstream planners and politicians, giving their work, from this author's point of view, less sense of urgency. Nevertheless, their work has been pivotal in

¹ From Kenworthy's presentation at EcoCity IV.

Australia and worldwide in relation to critiquing ‘car culture’ and promoting ‘sustainable city’ strategies.

Recalling, to some extent, the ‘ecocity versus suscity’ debate stirred by this author at the Ecocity 2 conference in 1992², Newman has suggested that there are two fundamental approaches to reconfiguring urbanism for long term environmental and social viability. He terms these the ‘urban-commons’ view and the ‘rural-commons’ view (Roelofs 1996 p.14). In his verbal portraits of the two kinds of ‘commons’, Newman paints images of what are essentially ‘eco-village’ and ‘eco-city’ options.



FIGURE 20: Model cars stuck to a brick wall as an art installation in Adelaide, South Australia
(Photo by the author)

4.4.2 Engwicht

Calming the Traffic

Also in Australia, David Engwicht discovered his version of the eco-city vision after fighting freeways in Brisbane. The Campaign Against Route Twenty (CART) by Engwicht and his fellow campaigners resulted in victories for the community, changes in planning policies, and a fundamental rethink on the role of streets and the workings of cities. Unaware of the work of Register, Soleri, Berg et al or the work of the author³ and other urban ecologists in Australia, Engwicht wrote a book called ‘Towards an Eco-city’ which, coincidentally, was published at about the same time as the Second International Ecological City Conference in Australia in 1992.

The scope of Engwicht’s writing ranges more widely than Newman and Kenworthy and encompasses ideas on education which, he maintains ‘...needs to change its focus from the accumulation of knowledge to the accumulation of experience and development of the skills needed to interpret and integrate that experience into creative thinking processes.’ (Engwicht 1992 p.81) He proposes that students of engineering and town planning should be educated in life experience by being ‘...sent out to document a week in the life of a rubbish bin, a doorway, a chair, a sculpture, a tree, a step, a light pole, or a bus seat.’ (Engwicht 1992 p.81) so that they can learn the

2 In order to be provocative, the author identified a theoretical dichotomy between an ‘ecocity’ and a ‘suscivity’ (sustainable city) approach to making green cities.

3 Who, with Chérie Hoyle, introduced the first, and at that time the only, workshop on urban environments as part of the Commission for the Future’s Greenhouse 88 Conference (Dendy 1989).

roles of these objects in city life – and learn to adopt ‘eco-relational’ thinking as urban physicians rather than mechanics.

The Newman-Kenworthy-Engwicht analysis supports the idea that traditional city planning, prior to the dominance of cars, created workable, humane environments. Starting from an Australian sprawl perspective and ‘looking backwards’, their overall critique sits well with that of more European-oriented commentators like Sherlock. In *Cities are Good for Us* this London-based architect author (who was chairman of Transport 2000, a UK public transport advocacy group, for five years) makes a well-argued case for high-density, low-rise (four to five storeys) people-orientated cities that service human needs rather than the imperatives of bureaucracy and the private transport lobbies. Sherlock’s views, like those of Newman, Kenworthy and Engwicht, reflects the growing international consensus that close-knit communities, local shops and pubs, safe, attractive streets and good public transport are time-honoured ingredients in a well-tryed and successful recipe for cities that are good for us.

4.4.3 Ted Trainer

Abandoning Affluence

Ted Trainer is a respected Australian theorist⁴ and advocate for a kind of ‘Ecotopianisation’ of the suburbs. His proposal for incrementally transforming suburban sprawl into a productive landscape of active communities is, perhaps, particularly beguiling to the average suburbanite, although his proposition that Australians should ‘abandon affluence’ (Trainer 1985) may not be a popular suggestion to most consumers. Supporters of Trainer’s vision argue that one of the strengths of his



FIGURE 21: Typical urban signage – putting pedestrians in their place.
(Photo by author)

⁴ Other published Australian theorists include Deborah White et al with their prescient publication ‘Seeds for Change’. Driven by the ‘energy crisis’ concerns of the 1970s and published in 1978, this book laid out a number of issues that bear on ecocity theory and relate to ecocity concepts, and is notable for taking the existing city of Melbourne as its case study for change, suggesting that not only was change desirable but that it was achievable on the basis of action focussed in existing communities and cities.

Australian Architect Roger Johnson published a book called ‘The Green City’ in 1979 in which he acknowledges the seminal influence of Geddes and McHarg. In this profusely illustrated, but rather ‘patchwork’ book, he makes a plea for an approach to urban design which is recognisably ‘green’ in current terms, advocating mixed-use development, low energy transport, roof gardens and people-orientated, rather than machine-orientated design but the book generally accentuates aesthetic concerns and neglects fundamental ecosystem issues.

proposal is that 'one can see how we might begin to move towards its realisation' (Bamford 1992 p.665). As an ecocity strategy it lacks the means to address the structural problems of large metropolises and seems largely irrelevant to the conditions of developing country urban environments. The harshest criticism of Trainer's approach is that it can be seen as apologia for sprawl. Nevertheless, his strategy of incremental roll-back for peri-urbanism may be a necessary component of achieving ecocity outcomes in the medium term.

4.4.4 Girardet and the Vales

Inspirational Economy and the Global Urban Condition

Back in England, since the early 1970s there have been three notable contributors to the steady establishment of green architecture and city-making as credible concepts with practical consequences. Brenda and Robert Vale have shown by example that environmentally advanced building is possible within conventional budgets and building programs⁵. The Vales are now based in New Zealand and are part of a team that is putting together a 'Australian Building Environmental Rating System' which promises to provide one of the world's most comprehensive rating systems of its kind⁶.

Herbert Girardet has been published widely and been a consistent advocate of ecovillage and green city ideas since he first wrote 'Garden Villages of Tomorrow' for the 'underground' magazine 'Undercurrents' back in 1976. The Vales' book 'Green Architecture' gives a full account of the purpose, performance and practice of green architecture, citing working examples and visions for a sustainable future. It has become a standard text and contains a final chapter on 'Ground Rules for the Green City' (Vale and Vale 1991), whilst Girardet's 'Gaia Atlas of Cities' (1992) has also become a standard text. It provides a trenchant analysis of the global urban condition which looks at the ecology of settlements and concludes with the proposition that cities should be sustainable, based in ecological principles, and fit for people. In a recent conference presentation in Adelaide Girardet made specific reference to the Christie Walk project as an example of what was needed to move Australian cities towards sustainability⁷.

⁵ As long ago as 1973 the author was inspired by the Vales and their ability to produce low budget, high performance environmental buildings. Their 'no-nonsense' approach still holds great appeal.

⁶ The author was on the Steering Committee for the project as an 'expert advisor'.

⁷ Reported by attendees and UEA members Joan Carlin and Sharon Ede.

4.5 Principled People

4.5.1 Hackney and Charles

Community Architecture

In the mid-1970s the author was one of a number of architects and architectural students concerned about the apparent élitism of the profession. Like many others, he joined and contributed to something called the New Architecture Movement which tackled the profession with radical critiques and the promotion of community architecture.

Architect Rod Hackney became famous for his advocacy of community architecture and with Prince Charles was responsible for orchestrating the massive shift in thinking about the role of architects and architecture in 20th Century Britain. In his book 'The Good, the Bad and the Ugly: Cities in Crisis' he recounts his life and times and provides yet another sobering history of modernism in which he unequivocally identifies Le Corbusier as a negative influence in regard to socially responsible housing.

Royal Blood

Pattern books have long been part of the history of the manufacture of the built environment. Typically, at least in Europe, these pattern books circulated among the wealthier part of society that made up the client base for formal 'architecture', ie. those who could afford to build. In more recent times, we have become used to the wide availability of house plans and magazines devoted to 'the house beautiful'. There are even environmentally orientated versions such as 'The Owner Builder' magazine. One way or another, pattern books have been influential in shaping the built environment⁸. In briefly discussing the 'new urbanists' (below) we will find the use of patterns very much part of their management of urban aesthetics and, to a limited extent, community interaction (via the front porch, for instance).

In one of those curiously contradictory turns that defines 'British' society, the future king of England became an advocate and spokesperson for popular taste in architecture, planning and design. With the publishing of 'A Vision of Britain' Charles cemented his position as champion of the rapidly evolving 'community architecture' movement. He also upset architects - many of whom began baying for royal blood because the Prince's 'non-professional' pronouncements perturbed them so. His well illustrated book probably did more to popularise debate about architecture and cities

⁸ Although it should be noted that such magazines are part of the insidious work of the 'taste-makers' complained of by Alexander.

than any other in 20th century Britain. Leaving aside his predilection for neo-classicism, Charles makes critiques of architecture and planning that are explicit and well aimed.

The point taken from the general thrust of the Prince's critiques is that ordinary modern architecture being done by ordinary modern architects in the context of ordinary places for ordinary clients, is extraordinarily bad. And if that situation is going to be addressed it is no good looking for the exceptional genius that moved great architects to create exceptional architecture. In their absence, something else is needed to ensure a worthwhile built environment that does not offend the majority of the population.

Hence, his provision of a set of guiding principles. The Prince's 'Ten Principles' for urban design are drawn from well-proven antecedents which have universal applicability and read somewhere between common-sense⁹ and wisdom. A planning and design strategy wanting to lay claim to respecting both intellectual endeavour and popular taste might begin by adopting the Prince's Principles as a starting point. They support an approach to design which respects both the users of the buildings and the spaces and landscape they inhabit. These principles appeared in short form, with editorial comment by the author, as a chapter in the booklet published by Urban Ecology Australia in support of the Halifax EcoCity Project (Downton 1994 & 1996).

4.5.2 Day

Places of the Soul

The science of building biology is still in its infancy and many of its assertions are challenged, particularly by industries whose products are threatened. But even in the absence of scientific data we can to some extent feel when a place is healthy and physiologically life-supporting and when it is not. (Day 1995 p.21)

Day developed the arguments for linking physical well-being to emotional and spiritual well-being in his book, using as examples buildings he designed according to certain well defined principles, many of which are drawn from Rudolph Steiner and the work of the Anthroposophists. Day's rigorous attention to health in buildings is paralleled in the 'Principles of Baubiologie' set out by the Institute of Building Biology and Ecology in Germany.

Day's philosophy is that buildings are for people and if they properly reflect the whole nature of what it is to be human then it can be quite appropriate to speak of 'ensouling buildings'. His 'Places of the Soul' is one of those all too rare kinds of book that emanate from architects who practice what they preach. Day sees 'architecture and

⁹ The dangers of which have already been noted – see Mollison above.

environmental design as a healing art'. His prescription for healthy building starts with the person as a soulful being and in the making of 'Cities for Life' he says:

If we listen carefully to the needs of the human soul, differentially weighted and intensified by the urban situation, and to the needs of the spirit of a growing place, many opportunities begin to show themselves. Approaches to design can emerge in which nurture for the human spirit and economic benefit are coincident. (Day 1995 p.179)

Day's gentle approach to architecture and design is also found in the work of one of the pioneers of earth-sheltered building, Malcolm Wells.

4.5.3 Malcolm Wells

Architecting Gently

Wells inspired the author's creation of the 'Frogstick' in 1991 (see 'The Seven Steps' in Chapter 14). With his early (1969) 'Wilderness-Based Checklist' score sheets he designed what would now be termed 'indicators'. These indicators have fifteen criteria and a negative-to-positive scale that goes from destruction and waste to creation and provision of habitat (see diagrams). Most of Wells' criteria relate directly to natural processes, eg. 'stores rainwater', 'uses solar energy', 'provides wildlife habitat', but his fifteenth criterion rates sites, buildings and cities on the basis of whether they are 'ugly' or 'beautiful'. Nothing quite like this appears in any Agenda 21, post-Rio exercises in the making of blanded-out, 'common purpose' indicators such as those described by Bell and Morse (1999).

Wells was one of the first architects to explicitly propose that ecological responsibility, human purpose and aesthetic delight were mutually complementary goals in the making of the built environment (Wells 1981). The theory of making ecological cities requires that they are, at the very least, not mutually exclusive. See below in 'Appearances Do Count' for further discussion on the issue of aesthetics.

Subject for evaluation: WILDERNESS		Subject for evaluation: MANHATTAN	
	-100 always -75 usually -50 sometimes -25 seldom		+25 seldom +50 sometimes +75 usually +100 always
destroys pure air			creates pure air
destroys pure water			creates pure water
wastes rainwater			stores rainwater
produces no food			produces its own food
destroys rich soil			creates rich soil
wastes solar energy			uses solar energy
stores no solar energy			stores solar energy
destroys silence			creates silence
dumps its wastes unused			consumes its own wastes
needs cleaning and repair			maintains itself
disregards nature's cycles			matches nature's cycles
destroys wildlife habitat			provides wildlife habitat
destroys human habitat			provides human habitat
intensifies local weather			moderates local weather
is ugly			is beautiful

negative score, out of a possible 1500	positive score, out of a possible 1500
-	+1500

final score: +1500

© Malcolm Wells 1969

negative score, out of a possible 1500	positive score, out of a possible 1500
-1200	+100

final score: -1100

© Malcolm Wells 1969

TABLE 5: Wells' 'Wilderness-Based Checklists' for Wilderness and Manhattan
(Source Wells 1982 p.34 & 37)

4.6 Village People and New Urbanists

4.6.1 New Urbanism

If there is a point at which private business becomes a matter of public concern, it is being daily exceeded in unplanned and irresponsible urban sprawl. (Sears 1962 p.23)

The new urbanist neighbourhoods treat transport energy efficiency, environmental quality and the creation of community as key goals but are usually non-specific about important ecological aims. (Barton 2000 p.79)

In the last two decades the failure of 'modernist' urban planning has contributed to growing interest in the 'back to the future' program of the 'New Urbanists' with increasing relevance to ecocity design and making as they have begun to incorporate environmentally responsible infrastructure planning to their otherwise aesthetically orientated urban design programs (Kunstler 1998). They are, arguably, not 'true' ecocity advocates or theorists because of their reluctance to see the city as the basis for socio-cultural change. Instead, they are content to accept the imperatives and constraints of the status quo, ie. political and economic structures, values and aesthetic prescriptions derived from immediate historical conditions. They are non-revolutionists and often seem to be more concerned with style than substance. At the same time, the best of New Urbanist work possesses the sensibilities of Alexander who 'ably pointed out, what we perceived to be *things* in our everyday surroundings – buildings, walls, streets, fences – are more properly understood as patterns intersecting with patterns, *relationships* between other relationships.' (Kunstler 1998 p.83).

There has been an extraordinary burgeoning of the anti-sprawl movement in the USA. The quintessential New Urbanists are Andres Duany, a 'refugee' from Castro's Cuba and his partner Elizabeth Plater-Zyberk. They have been extremely successful selling the anti-sprawl New Urbanist message in the USA (Kunstler 1998, Duany and Plater-Zyberk 1993, Duany et al 1989) and Duany has received the approbation of Prince Charles for his carefully 'coded' built environments and the 'extraordinary... modern, classical look' of Seaside, a new resort town development in Florida (Charles, Prince of Wales 1989 p. 14, p.143). Seaside now stands as something of an icon for the 'NU' movement and is 'a favorite target of abuse' for detractors (Kunstler 1998 p.150).

Despite the middle-class aestheticism of many New Urbanist developments, the 'mission statement' of their 'peak body', the Congress for the New Urbanism, is forthright and even radical by Australian standards. It addresses social and environmental issues and proposes what amounts to a wholesale remaking of the metropolitan landscape.

THE CONGRESS FOR THE NEW URBANISM views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community-building challenge.

WE STAND for the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy. (<http://www.cnu.org/>, accessed 7-9-00)

While the New Urbanists do make a muted call for increased democracy ('Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy...'¹⁰), much of their program is based on 'looking backwards'. Much of the appeal may be attributed to 'Middle American' sentimentalism and prejudice, which some new urbanists have unashamedly employed in support of their goals.

According to the Congress for the New Urbanism (CNU), a group of rebellious architects and planners who met here [Portland, Oregon] this past June, the nerds actually first wreaked their revenge in the 1950s.

Immediately following World War II, new urbanists contend, an army of slide-rule-packing math clubbers in high schools from Buffalo to Bakersfield launched careers as civil engineers, mechanical traffic engineers and bureaucrats, and began their life's work--banging out tomes full of rules for urban living. They specified curb size, street widths and setbacks. They wrote zoning rules that outlawed mother-in-law apartments and corner stores in residential areas. They drew up lending requirements and mortgage tax credits that limited the flow of money to one type of housing 'product.'

In short, the nerds dictated all the rules that forced us off the sidewalk and into cars--even for short trips. They thus condemned a couple of generations of former jocks and cheerleaders to spend several hours a week carting their kids around to schools, dental appointments, baseball practice, and dance lessons. (Tremain 2000)

The Charter of the New Urbanism (see Appendix) describes a set of precepts that fit well with most ecocity concerns. The New Urbanist agenda may work well in the context of American prejudices in which it has evolved even though 'It is against the law almost everywhere in the United States to build the kind of places that Americans themselves consider authentic and traditional' (Kunstler 1998 p.109). Its precepts are almost universally relevant, but it suffers from being expressed in language too deeply embedded in the prejudicial American context to speak easily or effectively to those on the planet less blessed, particularly those in less developed countries. Ecocities need to work for all people, everywhere, and the New Urbanism may be evolutionary cul-de-sac.

¹⁰ From The Charter of the New Urbanism; The Block, the Street and the Building; Principle 7 (see Appendix)

Cities are on the front-line of the war against the life support systems of our planet. 'New Urbanism' may be about calling for some sort of truce, but ecocities are about achieving a lasting peace – and about creating a post-war economy of reconciliation and restoration. Despite its recognition of natural facts ('The metropolis has a necessary and fragile relationship to its agrarian hinterland and natural landscapes. The relationship is environmental, economic, and cultural. Farmland and nature are as important to the metropolis as the garden is to the house.') New Urbanism views cities in a landscape of limited horizons – if nature is as important as a garden is to the house, where does that leave apartment living?

Planners are not prepared to be re-educated, but they are accustomed to following the law. (Duany et al 1989 p.71)

It could be argued that the New Urbanists have appealed to planners, not by dint of moral persuasion, but by recognising their role in the government of public space. It could even be argued that their commitment to 'authentic community' (Duany et al 1989 p.71) is, in the context of consumer society, subversive.

Peter Calthorpe expresses the New Urbanist mind-set well, neatly side-stepping the need to come to terms with the imperatives of non-human, living systems whilst at the same time appropriating the language of ecology:

Against this false dichotomy of Modernism and Post Modernism ecology has come to represent, for me, the real counterpoint. Not the literal ecology which deals with natural systems and seems to stop just short of the human habitat – but a broader, more philosophic 'ecology' which teaches that diversity, interdependence, and whole systems are fundamental to health. (Calthorpe 1993 p.11 –12)

Calthorpe's 'The Next American Metropolis' lacks references or an index and is really a pattern book and design brochure. Although its section on 'Guidelines', according to Calthorpe, deals less with aesthetic and architectural principles and more with 'context and direction for the built environment' (Calthorpe 1993 p.41) and contains a sub-section on 'Ecology and Habitat' it clearly places human preoccupations before other ecosystem imperatives. It also contains self-contradictory precepts, eg. In respect of natural features 'Public access should be permitted while important natural features and sensitive habitats are preserved.' (Calthorpe 1993 p.72).

This thesis argues that the search for, and understanding of, limits is at the core of designing and developing in an ecological context. Calthorpe's ethos is different. Although there is commonality in his approach with the author's understanding of urbanism and that expressed by most of the theorists in this chapter, his semantics are confused and his language is tailored to an intellectually uncritical readership. He writes:

This book is part polemic, part tool, part proof by assertion, part manifesto, but mostly, I hope, *common sense*. Beneath the rationales, facts, examples, and guidelines is a simple ethos. This ethos provides a specific aesthetic of place – scaled to the human body, timed to a stride, patterned to ceremony, and *bonded to nature*. It is an aesthetic grounded in the notion that space is not an infinite grid, that time is not relentlessly progressive, that pattern is not formally mechanical, and that *boundaries are not limits*. (Calthorpe 1993 p.11) (author's emphases)

Calthorpe's work represents an effective working compromise between conventional developmental pressures and environmentally sensitive design, and although it does not specifically address the idea of citizen empowerment it does outline physical frameworks for supporting community life. Calthorpe's best defence for the pragmatism that permeates his approach is one that will be familiar to anyone who has tried to act on principles that produce results different from conventional expectations (including this author!), and it is that compromise is inevitable and design ultimately becomes 'the art of the possible' (Calthorpe 1993 p.12). This criticism should also be set against the annotated bibliographic reference in Cowan and Van der Ryn's 'Ecological Design' which calls 'The Next American Metropolis' 'A perceptive study of ecologically sensitive approaches to town planning.' (Cowan & Van der Ryn 1996 p.186). There is little doubt that Calthorpe has been enormously influential in the mainstream of planning, contributing significantly to the rise of 'New Urbanism' and the trend towards planning for 'neo-traditional communities'.

What really betrays the innate conservatism of the New Urbanist approach to urban design is that it invariably favours traditional or neo-traditional architectural expression. Although it would be logically consistent with principles of sustainability and the pattern language approach of Alexander et al to re-interpret vernacular elements in accordance with the critical regionalist approach identified by Frampton, there is, instead, reliance on formulaic building design that can be understood in traditional terms – a school looks like a school, a courthouse looks like a courthouse, etc. This mitigates against a more creative way of bringing 'age old' humanistic and civic concerns into expression in concert with an architectural stratagem of greater subtlety and responsiveness to modern conditions. On the other hand, and herein lies the one of the 'traditionalist aesthetic vs. progressive politics' contradictions of the New Urbanist movement - 'Traditional town planning produces pictorial, or graphic, codes that any normal citizen can comprehend. *This is democratic and ethical as well as practical.*' (Kunstler 1998 p.148, this author's emphasis).

4.6.2 Corbett

Village Homes

Corbett is the developer of the Village Homes development in Davis, California. Village Homes has been lauded as an excellent example of what amounts to a latter-day Garden City project (see Chapter 5). It could be mistaken for a New Urbanist project were it not for the absence of pseudo-traditional architecture. Corbett is not only a developer but a theorist, and he writes of how, after participating in community design as a planner, developer and citizen advocate, he has noted that people rarely make explicit the assumptions that frame their opinion-making and affect the shaping of communities. He presents a set of 12 assumptions (see Appendix XYZ) that he says 'seem to form the basis of a wholistic (sic) approach to community planning.' (Corbett 1981 p.10). His 12 assumptions represent an important instance of where some explicit 'ecological' principles underlie a significant community-oriented development that is recognised as a milestone in environmental design (Village Homes, Davis).

Corbett's expressed concern with ecological relationships and his reference to Bookchin for a critique of power relationships in urban planning betray an underlying radicalism to his approach. This is reinforced by his unequivocal advocacy of participatory democracy – which contrasts with Calthorpe's silence on this subject.

Doyle (2000) is highly, and rightly, critical of 'California-style New Age environmental remedies, where the spiritual self is re-centred and reinvestigated, and where the profound discrepancies between citizens' access to political power are overlooked and denied,' (Doyle 2000 p.148). The American body politic maintains implicit, and often incorrect, assumptions about the rest of the world's politics and social order and New Age obscurantism is endemic on the US West Coast. Nevertheless, exhortations for participatory, grass roots democracy by US citizens should not be confused with the democratic rhetoric of the American Empire, and it is important not to confuse the American directly democratic, individual-oriented politics of radicalism with 'New Ageism'.

4.7 Political People – Energy, Structure and Citizenship

Civic life is what goes on in the public realm. Civic life refers to our relations with our fellow human beings – in short, our roles as citizens. Sometime in the past forty years we ceased to speak of ourselves as citizens and labeled ourselves consumers. (Kunstler 1998 p.38)

Ecopolis requires that cities are developed on the basis of social justice as well as ecological fit. Social justice was never achieved by sitting in armchairs, relaxing on the beach, or manicuring a suburban lawn. Garden Cities and New Urbanism are about extending the comfort zone, making ‘really very nice towns if you were docile and had no plans of your own and did not mind spending your life among others with no plans of their own’ (Jacobs 1962/84) but in the Ecopolis idea, ecocities are really not about nice, comfortable places. They are about making vibrant, creative, civic places because cities *contain* difference. Although there may be differences between cities, the differences within them are greater. It is within the portals of civilisation that we see the creative conflicts of politics and society. At the same time, there is a discernible tradition of libertarian/anarchist political philosophy in the ecocity movement that can be traced back to Geddes, Morris, Callenbach, et al. The author believes that there is no conflict between the fundamentally radical politics of ecocity theory and its eventual adoption as the building block of an ecological civilisation because the politics is realised at the level of community and through local democracy. This is explored to some extent in later chapters but to deal with this proposition fully would require more discussion than this dissertation allows. Nevertheless, there are some key figures and political ideas that remain important to the author’s development of the Ecopolis idea to date.

4.7.1 Invisible Structures

If an eco-city depends on maintaining a non-exploitative relationship with the biosphere then this attitude must be rooted in the culture of that city. The ‘invisible’ economic and social relationships, which characterise such a place, must be founded before the visible foundation stones are laid. If eco-cities are not to be simply constructs of ‘bricks and mortar’ with a few solar collectors and trees on the roof, then the unseen structures which lead to the laying of the bricks must be dealt with from the start. Thus ecological cities must be founded on the basis of ethical behaviour, maximum social responsibility and ‘clean’ capital. Shann Turnbull introduced the author to the ideas of invisible structures and the need to address the proper construction of these structures as the basis for any physical built environment.

4.7.2 Natural Capitalism

A restorative economy is not going to lead to a life of dulling comfort and convenience. We have to recognise that we've reached a watershed in the economy, a point at which 'growth' and profitability will be increasingly derived from the abatement of environmental degradation, the furthering of ecological restoration, and the mimicking of natural systems of production and consumption. (Hawken 1993 p.210)

With the collapse of centralised state economies there has been renewed interest in economic strategies that accept capitalism as a 'given' and attempt to work within its constraints. Paul Hawken's 'ecology of commerce' (Hawken 1993) is a strong pointer to what may be the dominant way of thinking in industry for the foreseeable future¹¹ and, given the small likelihood of change in the fundamental existence of capitalist society in the short-to-medium term, is important as a representation of the economic environment within which ecocity design and development must take place during the next one or two generations.

4.7.3 Energy & Equity

It would be possible to control the patterns of urbanization if the organization of space were constrained by the power man (sic) has to move through it. (Illich 1974 p.74)

Ivan Illich was a radical critic with a great deal of influence in the 1970s. His work on education and technology are still seminal. His most important contribution to ecocity theory was his book 'Energy and Equity' in which he raised questions and provided trenchant analysis about the efficacy of various transport modes which drew attention to the inequitable basis of conventional modern transport and its reliance on 'speed' as a measure of effectiveness. An appropriate relationship between 'energy' and 'equity' is fundamental to the function of an ecological city.

4.7.4 Mutual Aid

...the ethical progress of our race, viewed in its broad lines, appears as a gradual extension of the mutual-aid principles from the tribe to always larger and larger agglomerations, so as to finally embrace one day the whole of mankind, without respect to its divers creeds, languages, and races. (Kropotkin 1914 p.224)

Peter Kropotkin was contemporary with Geddes, as previously noted, and one of the most influential anarchists in history. Kropotkin countered the mainstream political

¹¹ See, for instance, the mission statement of global carpet manufacturer 'Interface' (annual sales US\$1.3 billion): 'We also want to become the world's first sustainable enterprise. That means we are committed to delivering superior value without diminishing the ability of natural, economic and social systems to sustain future generations. It's an ambitious goal. Realising it isn't as simple as making products out of recycled material. Becoming a sustainable enterprise means reengineering not only what we make, but how we make it. It means considering the impact of our every action on clients, shareholders, suppliers, associates, communities and the natural environment. By understanding these connections and by

diminution of Darwin's concept of the 'survival of the fittest' with the idea of mutual aid, and found evidence for mutual assistance being a major factor in successful animal and human societies, including in the Medieval city (Kropotkin 1914). Roszak identified Kropotkin as one of the world's first 'ecopsychologists', as a man who believed that society is 'a biologically deep and intricate system' in which 'the factor of innate conscience makes human community a great deal more than an agglomeration of people held together by a social contract.' (Roszak 1993 p.230)

4.7.5 Street Farming



FIGURE 22: (text) 'Street Farmers till their land... physical transmutation of urban land with radicalisation of lifestyles...' (Source: Crump & Haggart 1971)

The Street Farmers are of interest because they represent an attempt to carry through the construction of an uncompromisingly ecological building on the basis of an anarchist philosophy and a radical vision of urbanism.

Graham Caine, Bruce Haggart and Peter Crump called themselves 'The Street Farmers' and proclaimed a vision for remaking the city that was simultaneously a process of 'greening' and an attack on its very existence. In their provocative collages published in *Street Farmer One* and *Street Farmer 2* in 1972, they showed urban revolutionaries humanising the landscape by ploughing the streets, surreal images of buildings being gradually eaten away and replaced by vegetation, instructions for making a tree house – and a description of an ecological house, a variant of which they built whilst still architecture students at the Architectural Association (Crump &

learning from the efficiency of natural systems, we hope to create a company that exists in harmony with its environment, consuming no more resources than it is able to consume.' (Design Space 2000)

Haggart 1971, 1972)¹². Godfrey Boyle and Peter Harper called them ‘Clever and funny, practical anarchists and guerilla architects.’ (Boyle & Harper 1976 p.272).

The Street Farm House had its parallel in the Southern Hemisphere with a ‘Do-It-Yourself Autonomous House’ built and occupied by architecture students on the University of Sydney campus at Darlington in 1975-76 (Baxter and Grayson 1976). Two years later saw publication of Australia’s first coherent attempt to outline an approach to human settlement (Melbourne) that connected local planning and community development to energy and resource issues in what we would now call a ‘sustainable’ framework (White et al 1978).

The author admits to being strongly influenced by the Street Farmers at the time he was a student of architecture and enjoyed visiting the Street Farm House where he learnt that there were many unresolved and decidedly impractical aspects to the design!

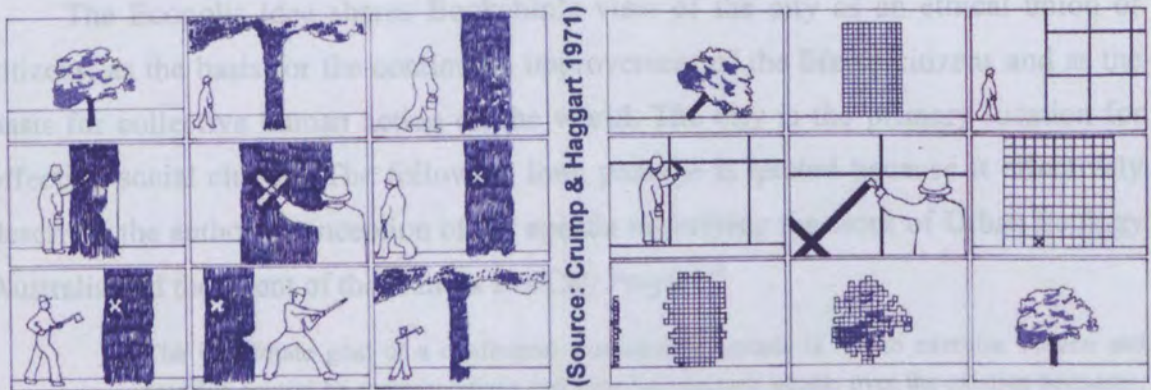


FIGURE 23: More provocative Street Farm imagery (Source: Crump & Haggart 1971)

And you, forgotten, your memories ravaged by all the consternations of two hemispheres, stranded in the Red Cellars of Pali-Kao, without music and without geography, no longer setting out for the hacienda where the roots think of the child and where the wine is finished off with fables from an old almanac. That’s all over. You’ll never see the hacienda. It doesn’t exist.

The hacienda must be built.

(Ivain, Gilles (transl. Knabb, Ken) 1958)¹³

¹² It was, officially, Graham Caine’s fifth-year project. It was erected in a corner of the playing field of the Thames Polytechnic at Eltham on the understanding that it was an ‘experiment’ and was occupied by Caine, his partner and daughter for over two years (Boyle 1976 p.170). It claimed a great deal of media attention at the time and probably contributed to the popular perception that ‘ecological’ buildings were necessarily unusual and confronting. In January 1973 the author organised a visit to Cardiff and a lecture at the Welsh School of Architecture, during which visit he began to understand the essentially *political* nature of the ecohouse project.

¹³ Situationist text on urbanism.

4.7.6 The Limits of the City

...the roots of the urban crisis today lie not merely in poor design, bad logistics, neglected neighbourhoods, and inadequate material support, but in the social system which has created these problems in the first place – and produced the modern metropolis. (Bookchin 1986 p.viii).

Bookchin sees the city as a liberating human invention which deserves careful analysis and passionate support as the essential home of human civilisation. It is more than a mere assemblage of space and in evolving to its present state, wherever its geographical location, it has brought together strands of cultural development from across the globe. City history has been uneven and does not reflect a simple increase in civic virtue by any means but, says Bookchin, the city can only be understood by seeing it in terms of its history, and that history has been a rational and cumulative one in which traditions of rationalism, morality and law have persisted even as the physical frameworks of cities have come and gone.

The Ecopolis idea shares Bookchin's view of the city as an ethical union of citizens, as the basis for the continuing improvement of the life of citizens and as the basis for collective human action on the world. The city is the primary location for effecting social change. The following long passage is quoted because it effectively describes the author's conception of the agenda underlying the work of Urban Ecology Australia and the intent of the Halifax EcoCity Project.¹⁴

The immediate goal of a confederal municipalist agenda is not to exercise sudden and massive control by representatives and their bureaucratic agents over the existing economy; its immediate goal is to reopen a public sphere in flat opposition to statism, one that allows for maximum democracy in the literal sense of the term, and to create in embryonic form the institutions that can give power to a people generally. If this perspective can be initially achieved only by morally empowered assemblies on a limited scale, at least it will be a form of popular power that can, in time, expand locally and grow over wide regions. That its future is unforeseeable does not alter the fact that its development depends upon the growing consciousness of the people, not upon the growing power of the state – and how that consciousness, concretized in highly democratic institutions, will develop may be an open issue but it will surely be a political adventure.' (Bookchin 1995 p.231)

Thus, libertarian municipalism is not merely an effort simply to 'take over' city councils to construct a more 'environmentally friendly' city government. These adherents or opponents of libertarian municipalism, in effect, look at the civic structures that exist before their eyes now and essentially... take them as they exist. Libertarian municipalism, by contrast, is an effort to transform and democratize city governments, to root them in

¹⁴ The philosophy expressed here was not adopted for the HEP nor UEA in any formal way at any time, but it is at least implicit in some texts and was certainly part of most discussions that Hoyle and the author have enjoyed since 1991. This particularly apt Bookchin passage was discovered during formal researches for this thesis and stands well as an illustration of the convergence of ideas that inform the ecocity movement.

popular assemblies, to knit them together along confederal lines, to appropriate a regional economy along confederal and municipal lines. (Bookchin 1991)

To borrow from Bookchin - the Ecopolis philosophy for the design, development and maintenance of ecological cities ‘...lends itself to modification, extension, continuity, and a decent regard for the great variety of needs that distinguish one community from another, not a blueprint that dogmatizes and rigidifies the idea of civic freedom into an inflexible credo.’ (Bookchin 1995 p.241)¹⁵

¹⁵ Noam Chomsky, Theodore Roszak, and the Situationists also added fuel to the flickering flame of political philosophy embedded in the Ecopolis thesis, but their contributions are largely neglected in this text.

TABLE 6: Summary Table of Theorists & Theories Relevant to 'Ecopolis'¹⁶

Classifying the Theorists' Relevance to Evolving Ecopolis Theory: Author's Assessment	
(Not all the following are fully covered in the chapter analysis)	
'Very early' means circa 1970-80, 'Early' means circa 1990. 'Later' generally means since 1995.	
Picture People	
Paolo Soleri	Very early major influence & continuing point of reference
Richard Register	Early inspiration & touchstone
Buckminster Fuller	Very early major influence & continuing inspiration
Ebenezer Howard	Background information to later theorising
William Morris	Very early major influence & continuing point of reference
Ernest Callenbach	Very early important influence
Frank Lloyd Wright	Very early major influence & continuing point of reference
Process People	
Patrick Geddes	Early important influence with later greatly increased importance
Lewis Mumford	Very early major influence & continuing point of reference
Ian McHarg	Very early major influence & continuing point of reference
Michael Hough	Early important influence
Anne Whiston Spirn	Later influence
Jane Jacobs	Important background influence
Chinese & Russian Urban Ecologists	Background information to later theorising
Pliny Fisk & Gail Vittori	Early important influence
Jack & Nancy Todd & the New Alchemists	Very early important influence
Biosphere 2	Early important influence
Peter Berg & Planet Drum	Early important influence
Victor Papanek	Very early important influence
Sim Van der Ryn	Very early important influence & later important influence with Stuart Cowan
Ken Yeang	Later influence
Pattern People	
Christopher Alexander	Early influence with later increasing importance
Bill Mollison et al	Background information to later theorising
Kenneth Frampton	Early important influence
Kevin Lynch	Early important influence
Stewart Brand	Very early major influence, especially via the Whole Earth Catalog & continuing point of reference
Pragmatic People	
Peter Newman & Jeff Kenworthy	Early important influence
David Engwicht	Early background information with increasing relevance to later theorising
Ted Trainer	Background information to later theorising
Herbert Girardet	Early influence
Brenda & Robert Vale	Very early important influence

¹⁶ Gregory Bateson ('Steps to an Ecology of Mind') and the Gaia Hypothesis of Lovelock and Margulis have been seminal influences on the author's thinking regarding the inter-relatedness of person and planet, but the extent and detail of that influence must be taken as not only pervasive but worthy of another thesis and so is not dealt with in this dissertation. A number of others listed here have been mentioned to identify their importance to the author's researches over time but dealing with them here would over-extend the scope of this dissertation.

Principled People	
Community Architecture Movement	Very early important influence
Rod Hackney & Charles	Background information to later theorising
Christopher Day	Later influence
Malcolm Wells	Early important influence
Robert Goodman (see Chapter 3)	Very early major influence
Professional Sustainability initiatives (not dealt with in this chapter)	Background information to later theorising except for the influential 1970s RIBA 'Long life, loose fit, low energy' program.
Village People & New Urbanists	
New Urbanists	Background information to later theorising
Michael Corbett	Background information to later theorising
Political People	
Shann Turnbull	Later important influence in relation to economics & invisible structures
Paul Hawken	Background information to later theorising
Ivan Illich	Very early important influence
Peter Kropotkin	Very early major influence & continuing point of reference
Street Farm	Very early major influence
Murray Bookchin	Very early important influence & continuing point of reference
Theodore Roszak (not dealt with in this chapter)	Very early important influence & continuing point of reference
Situationists (not dealt with in this chapter)	Very early important influence & continuing point of reference
Guy Dauncey (not dealt with in this chapter)	Very early influence on ecocity ideas & background information to later theorising
Aesthetics	
Clough Williams-Ellis	Very early major influence
Antonio Gaudi	Very early important influence
Hundertwasser	Inspiration & background information to later theorising
Ton Alberts & European Organic Architects	Inspiration & background information to early theorising
Kevin Lynch	Early major influence on reading city form
Frank Lloyd Wright (see this chapter) Bruce Goff & American Organic Architects (note in this chapter)	Very early major influence
Ecology	
The following provided the main texts for this author's self-education in ecology since the early 1970s	
Gregory Bateson	Very early major influence
Eugene Odum	Very early important influence
D'Arcy Thompson	Very early major influence
Lyn Margulis & James Lovelock	Very early major influences
Edward O Wilson & the Biophillics	Useful contribution to later refinement of theory



CHAPTER 5

THE AESTHETICS OF ECOCITIES

A city with many different people and many different cultures should have many different houses, and buildings that correspond to people's beliefs. My ideal is a city with buildings as varied as trees in a forest. (Hundertwasser in Verzijl 1998 p.3)

With regard to urban design, there is arguably no particular style that is 'correct' for an ecological city. Given that 'ecological architecture' ranges from very 'low' to 'high tech' (Daniels 1995 p.90-95, Davey 1997b p.26-39) and displays a wide range of aesthetic interpretation it would be unsurprising if ecocity design did not display the same breadth of approach. There are very few published designs for ecocities. There are a small number of examples of plans for parts of cities designed on ecological principles and there are several ecovillage plans. Accepting a broader definition of ecocity than the one proposed for Ecopolis, the following examples illustrate something of the divergence of form and expression in ecocity design.

5.1 Diversity of Form and Expression

Some of the extraordinary potential for aesthetic invention in a city defined by the scale of the pedestrian can be seen in the rigorously fanciful renderings and rationales, based on an obsession with natural geometries, of Roger Ferri's 'Pedestrian City' (Ferri 1980), in the megastructural imaginings of Soleri (Soleri), the cartoon-like organicism of Register or the native organic formations of virtually any old town in Europe.

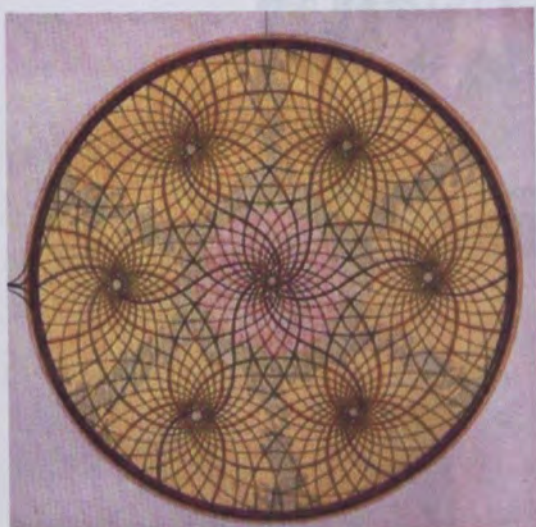


FIGURE 24: Ferri's Pedestrian City – Land Use Diagram: The centre of the city (pink) is surrounded by six neighbourhoods in a spiral pattern. (Source: Ferri 1980 p.274)

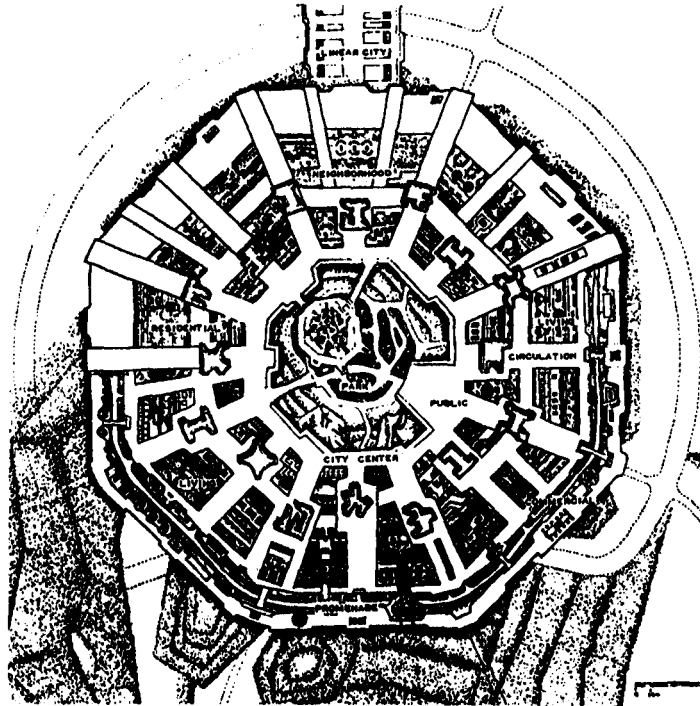


FIGURE 25: Arcology 'Babel IIC', proposed city for 340,000. 850 metres high, 1750 metres in diameter (just over 1 mile). (Source: Soleri 1973a p.63)

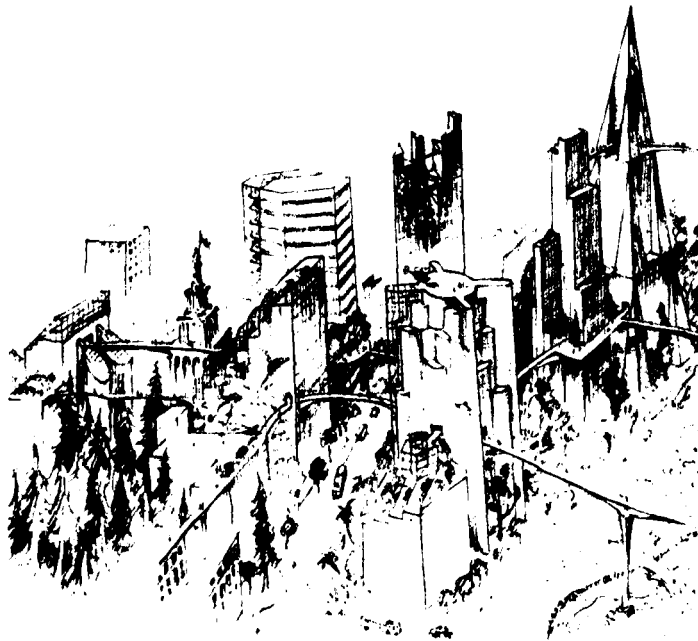


FIGURE 26: A 'take-off' of San Francisco by Register with 'some its buildings modified, some missing, some added.' (Source Register 1987 p.28)



FIGURE 27: This European coastal town clearly demonstrates a built form response to the conditions of the topography and climate it inhabits. (Source: Effie Best)

The pedestrian scale facilitates the creation of spaces that can be experienced as places (Kroll 1987). This inherent design assistance in this approach was employed by the author in the design of the ecocity projects for Adelaide and Whyalla. In addition to an organic aesthetic sensibility, however, the plan for the Whyalla EcoCity Development proposal was developed in response to public engagement in the design process (see Chapter 8).

¹ For a very accessible discussion on general urban theory see the Planning: Ecological approach it deals with as a 'respectable' manner of design, see Paul Thoreau: *The Urban Form Process* (London 1990).



FIGURE 28: Whyalla EcoCity Development site plan and model details. (above) Halifax EcoCity Project perspective detail. (below)



If there is any discernible pattern in these examples it is that a certain degree of visual richness and complexity and a preference for indirect, non-linear circulation patterns. There are no grand avenues and very little in the way of undifferentiated repetition. If anything, notwithstanding Soleri's megastructure or Ferri's insistent spiral geometry the common theme is what urban theorists might call the 'Picturesque' or 'Empirical' approach¹. In contradistinction to Rationalist and Modernist models of simplified, geometric, abstracted urban design the Picturesque generally complies with the kind of aesthetic principles advanced by Sitte (Sitte 1965/1889). It is interesting to compare this with examples of New Urbanist planning, like the many offered by Calthorpe (Calthorpe 1993), with their preponderance of semi-formal avenues and

¹ For a very accessible discussion on general urban theory in which the Picturesque-Empirical approach is dealt with as a 'respectable' manner of design, see Part Three: Theories Into Practice in Broadbent 1990.

tendency to repeat regularised, spatially similar elements. The same patterns can be seen in the South Australian context at West Lakes².

5.1.1 Hard and Soft Geometries

The designs of Soleri and Ferri lack some aesthetic conviction and, despite their organicism, carry a sense of imposition and authoritarianism. Kroll is an acute observer of the aesthetic tension that derives from the mechanical and the subjective approach to designing public space.

An unconscious intellectual dishonesty prompts the design professions and their clients alike to pose militaristic spaces as models and to decide tacitly that no others exist. Yet it is shocking to witness faith in an (albeit prettified) geometric order. It is worrisome to note the overriding conviction that a public space can never be conceived by the public and grow out of its own disorder. It is painful to realize that contemporary public life no longer has the right or even the opportunity to project its own organic image. Rather, it must adapt to historical travesties, private geometries, and mathematical games. By denying the apparent disorder of certain collective actions that mold the landscape and are essential to its final form, the militaristic approach rejects in a heartbreakingly obtuse way the importance of collective action and participation in the birth of urban form. It also denies centuries of slowly evolving collective forms and condemns the power that today's residents could exercise on the urban fabric and its slow colonization by familiarity. And all of this is done for the benefit of a rather exotic intellectualism and a protective artificiality, based on a game of personal power over urban space. It is absurd and nasty. (Kroll 1987 p.331)

The aesthetic message of what Kroll calls 'hard geometries' carries the charge of political meaning – exemplified in Hausmann's imposition of insistent axes and linearity on the fabric of medieval Paris (Watkin 1996 p.388).³ Few organic street layouts exist in America (Moudon and Untermann 1987 p.132) or Australia because there has not been a history of incremental urban planning. Instead, there has been the wholesale imposition of gridiron patterns on a landscape that had no prior history of urbanisation. In discussing the merits, and otherwise, of gridiron street patterns Moudon and Untermann point out that street patterns represent *a principle of development* and that the gridiron 'follows a logic that synthesizes the demands of an orthogonal geometry with ideals of lot and street size' (Moudon and Untermann 1987 p.132). The logic of organic street networks is more to do with following a purpose rather than imposing one.

Thus, while the organic street network is a tribute to the history of urban development, the gridiron defines (at least in part) that history. In other words, organic streets have always

² That diminished suburban fall-out from the failed Multi-Function Polis (MFP) project of the late 1980s and early 1990s in South Australia.

³ Which were justified in technocratic terms by the promise of 'progress' with modern, healthier infrastructure and the elimination of impediments to trade.

had a purpose and responded to a need, while grid streets have defined an intent. (Moudon and Untermann 1987 p.132)

Ecocity intents are about responding to need and thus the organic approach is to be preferred, but at the same time there is a need to set a framework within which that responsiveness can begin to take place – this was the intent of the Whyalla design methodology. ‘Taking place’ is what it is all about.

Real cities are, in a word, ‘messy’. Register’s images of ecocities convey some of that messiness, and consequently do not hold much appeal for most planners. One is inclined to believe that a similar disaffection is held amongst the planning community, at least locally, for the images produced of the Halifax EcoCity Project. This suspicion is at least partly borne out by the Adelaide City Council’s professional urban design staff encouragement of the Halifax site developer to adopt straight, uncomplicated road layouts and minimise irregularities in their final proposal – reducing consideration of the potentially interactive arena of the street to preoccupation with having straight, high kerbs to assist with street cleaning.⁴

Successful examples of designed, rather than historically accreted, picturesque environments do exist, but are typically regarded with suspicion by most architects and other design professionals. Broadbent catalogs some examples in his chapter on Neo-Empiricists (Broadbent 1990). The following have particularly influenced the author.

5.1.2 Williams-Ellis

*Portmeirion*⁵



FIGURE 29: Portmeirion
(Source <http://www.virtualportmeirion.com/airal/airal1.htm> accessed 28 April 2001)

Portmeirion, designed and developed by Clough Williams-Ellis between 1925 and 1978 – a ‘fantasy village’ near Portmadoc in North Wales made up of a number of historical buildings rebuilt in whole or in part, combined with frankly sham facades and a slightly humorous approach to design which, Williams-Ellis recorded, was greatly enjoyed by modernist puritans of

the British architectural establishment even as they proceeded to foist their abstract architecture and prefabricated systems on others (Broadbent 1990 p.214-217);

⁴ Personal communication with John Culshaw, Halifax site developer, ‘off the record’.

One wonders how it is that investment in what might be called 'design for delight' in holiday environments seems to be acceptable, whilst it is not in building for ordinary life. In holiday environments people rejoice in the absence of motor vehicles and those environments that demonstrate this like Portmeirion, attract enormous interest and visitor numbers. Like Alexander's 'quality without a name' there seems to be proof positive of a public predilection for pedestrian places, but 'normal' development practice eschews them. Likewise with the visual vibrancy and delight of such places, represented in Australia to some extent by vacation destinations like Noosa.

5.1.3 Gaudi

*Catalan Gothic*⁶

That the colourful, irregular and sometimes willful aesthetic of the picturesque has popular appeal would seem undeniable, indeed, its 'low brow' appeal would seem to be part of what attracts criticism to it from the architectural establishment. It is closely related to the organic and to the Arts and Crafts movements in architectural design, and both are routinely criticised for their lack of modernist 'rationalism'. Influenced by Ruskin, Wagner and the regionalist theories of Viollet-le-Duc, the Catalan, Antoni Gaudi came as close as anyone to deriving a synthesis from the antithesis, latent in the Arts and Crafts movement, between '...the desire to revive indigenous architecture and the compulsion to create totally new forms of expression.' (Frampton 1996 p.64) There is also little doubt



FIGURE 30: Sagrada Familia, Barcelona
(Source: Calendar-unattributable)

that the popular aesthetic appeal of Gaudi's work is in what are clearly picturesque qualities of changefulness, visual richness, avoidance of monotony and a certain capriciousness in its execution.⁷ He kept closely to the teachings of Viollet-le-Duc, who

⁵ Visited and experienced by the author many years ago.

⁶ Known to the author only from published images.

⁷ John Ruskin introduced the terminology of 'changefulness' as part of his analysis of Gothic architecture in which he saw a rationalism such that 'Whenever it finds occasion for change in its form or purpose, it submits to it without the slightest sense of loss either to its unity or majesty.' (quoted in Davey, 1995 p.19)

warned against the uncritical adoption of old models, and used the inspiration of the past to inform his own brand of creativity⁸ (Zerbst 1991 p. 9).

5.1.4 Hundertwasser



FIGURE 31: The roofgardens of Hundertwasser-Haus, Vienna. (Source: Hundertwasser 1996 p.272)

The Straight Line Is Godless, a Tool of the Devil⁹

...a city full of Hundertwassers would be a catastrophe. What I suggest is not Hundertwasser architecture, but a variety; in the sense of organic architecture. (Hundertwasser in Verzijl 1998 p.9)

Another, similarly ‘exotic’ and individual aesthetic which has proven popular appeal is that of Hundertwasser. The Hundertwasser House in Vienna, constructed by the city council as social housing, has become a major tourist attraction (Hundertwasser 1996).. This building comes closest in its visual actuality to the sketches of roofgarden covered cityscapes of Register and it is frequently referred to in the ecocity milieu as a positive example of what at least part of an ecocity might look like. Despite his international reputation and significant body of work, Hundertwasser is still regarded with suspicion by the architectural establishment around the world and he warrants no reference in Frampton’s critical history of modern architecture.¹⁰

5.1.5 Alberts

European Organic

Whereas in Vienna a building designed to provide housing has become a tourists attraction because of the appeal of its architecture, in Amsterdam, a building designed to provide energy-efficient offices for banking has become so popular because of its architecture that it is now hired out as a venue for wedding receptions! This building, was designed by Ton Alberts, working in the European organic tradition and employing a strongly participatory design process. It has become an icon of the green building movement and is often cited as an example of the kind of architectural approach that might be appropriate in the design of ecocities. Again, it employs irregular form and incorporates evocative ‘natural’ elements of vegetation, water (some running down

⁸ A creativity which was not appreciated by his teachers at the Faculty of Architecture in the university where he began his studies in Barcelona in 1869 and where he received low grades for his exquisitely rendered but unconventional designs.

⁹ Hundertwasser in Verzijl 1998 p.8.

¹⁰ One of the standard texts on architectural history written by one of the more open-minded and progressive architectural academics.

flowform sculptures in the handrails) and shifting patterns of sunlight to make a 'human' building.

One wonders if the propensity for the picturesque might not be a universal characteristic of ecocity advocates. In the grounds of Ted Trainer's house at Pig's Point near Sydney, can be found a fantasy of garden-making and fanciful incidental sculpture that seems to stand in contrast to his analysis of society and advice to 'abandon affluence'.

5.1.6 Lynch

The Image of the City

Kevin Lynch, whose perceptive analyses gave us a city typology now routinely used in one form or another in discussion of city form and sustainability, is also 'One of the first coherent analysers of the urban scene in Empirical terms...' (Broadbent 1990 p.225). Lynch's analysis of 'the image of the city' identified key components in its legibility, namely: Paths, Edges, Districts, Nodes and Landmarks. Lynch's propositions regarding these elements have been influential, including amongst new urbanism advocates, and have been important aspects of design guideline publications like *Responsive Environments* (Bentley et al 1985). His city typology informed the workshop process used in the very successful Whyalla EcoCity Development UEA Urban Design Workshops (see Chapter 7).

According to Lynch, 'An analysis of the mental images that people hold of their life space and life time is the key to understanding the sense of place.' (Lynch 1981 p.28). In considering 'managing the sense of a region' Lynch offered a series of examples of how 'an agency' (which might, one supposes, be a bioregional agency) might develop the sense of place and time. He included: the ability of children to explore their territory, or of the elderly or the handicapped to traverse the region, the perceived safety of being alone at any hour in various areas, the physical definition of social territory, and the preferred nature of the transitions between the public domain and group territory, the degree to which an area should contain visual reminders of its past use and form, and even the degree to which most people should be able to describe the spatial form of the region. (Lynch 1981 p.28-29)

5.2 Appearances *Do* Count

5.2.1 Hideous Mountains

If beauty is in the eye of the beholder, it may be difficult to arrive at consensus on what beauty is. Huntley quotes Sir Francis Younghusband, musing on the beauty of Kashmir scenery 'It is only a century ago that mountains were looked upon as hideous.' (1970 p.89) Notwithstanding the inherent cultural specificity of such a criterion (In his 'Wilderness-Based Checklist' Wells rates Manhattan on the ugly side of the scale when many people see it as beautiful and western culture now sees wilderness as beautiful but used to see it as a chaos to be removed and improved¹¹) it is one that reminds us of one of the primary purposes of architecture and design in human settlement which is to make places that please the human spirit, sensibility and aesthetic sense. Disagreement about what exactly constitutes beauty does not mean its pursuit is worthless and diversity of expression and response is part of the dialogue of culture.

5.2.2 A House is Not a Machine

Living Organism

In trying to establish a relationship between organic metaphor and built form it is important to understand that it is more to do with a philosophic conceptualisation of the building function rather than its aesthetic. If architectural journalism is any measure, the idea of house-as-organism does not prevent it from being a willful, sculptural assemblage of steel and glass. In reviewing a house designed by German architect Thomas Spiegelhalter Frei claimed that the house was 'as close to being a living organism as contemporary technology can provide' (Frei 1996 p.66) whereas a less architecturally inculcated observer might have understood the house quite well as 'a machine for living'.

This is why an argument about aesthetics must be enjoyed in respect of ecology and design. The Ecopolis proposition supports the idea that the appearance of difference from conventional fashion in form is an important part of demonstrating ecology in design. Ideas regarding the aesthetics of ecological design are not generally well expressed except perhaps in the negative. According to Malcolm Wells

If we ever needed great designers it is now. The environmental architecture of America is almost without exception depressingly ugly. Many people on first sight rightly decide they want no part of it. (Wells 1982 p.47)

¹¹ Robert Hughes illustrated this well in his recent history of American art.

More recent criticism comes from James Wines, whose New York City based architectural firm SITE is particularly known for its iconoclastic 1970s designs for Best company showrooms - which features include peeling walls, instant ruins, waterfalls under glass and trees marching through the building.

My take on esthetics is that if it isn't interesting, nobody's going to keep the building around anyway. So what's the point of the sustainable movement?

Wines was reported to be writing a book about the environmental design movement to be called *Architecture in the Age of Ecology* (to be published by Taschen).¹² In an interview, Wines is reported to have claimed that

The point of the book is to get the green movement off this finger-wagging, to get away from that reprimanding tone... I'm challenging those awful buildings done by most of the 'greenies'. It's bad, uninteresting design... While there's brilliant work being done today that qualifies as sustainable, most architects' choices of visual interpretation are still locked into time-warped, 20th century stylistic idioms, which tend to confuse rather than reinforce progressive images of earth-friendly architecture.

Both Wells and Wines are concerned to see public acceptance of environmental building, with a desire for aesthetic delight that provides what one might interpret as a call for an 'authentic' expression for ecologically development.

5.2.3 Nature Is Good for Us¹³

It is this author's proposition that connection with the surrounding environment via an ecologically sensitive and responsive built environment can connect people with changes in light, with the seasons and the living and social environment generally, providing visual amenity and promoting well-being.

This idea that connection with nature is 'good for us' or may be good for us, is also recorded in the work of ecologists, eg. '...nature in the urban landscape is still an underrated resource whose esthetic and educational values have yet to be understood.' (Gill & Bonnett 1973 p.x) thus '...the retention of natural landscapes within the city, together with their use for educational purposes, may enable many people who have lost their 'rural roots' to enjoy and feel in harmony with nature...' and reach some kind of understanding about how features and processes of the ecosystem provide constraints on population (Gill & Bonnett 1973 p.ix).

¹² This appears to have been published in July 2000 as 'Green Architecture; The Art of Architecture in the Age of Ecology'. The author had not been able to obtain, or gain access to a copy at the time of completing this dissertation. The Wines quotes are from a publisher's promotional email circa 1999.

¹³ See Appendix 1 'Nature, Form, Beauty and Biophilia', for further discussion.

Returning to traditional and regional design principles does not have to mean a lack of imagination, as is often maintained. Simple and well-integrated architecture generally possesses greater dignity than fashionable originality. (Kennedy & Kennedy 1997 p.199)

The argument may also be seen this way. Nature abhors straight lines (nowadays we might say she does things in fractals instead). Nature also abhors exact repetition. Nothing is ever the same twice. Symmetry abounds in nature, but even in symmetry things are not identical. In the symmetry of a face, or a leaf, both sides are similar, but different; developed according to the same pattern, but with individual realisation.

If architecture reflected this natural order then it will begin to possess the same kind of depth of difference that is in nature. If simple rules and patterns can be realised with individuality the result will be 'organic' and more likely to be aesthetically satisfying than perfect machine repetition. In many ways craft pieces have exhibited this characteristic and accompanying appeal to our senses since humans became makers of artifice. Hand-made items are never identical in the way that machine produced objects are.

Historically, even the best architects and designers have resorted to simple repetition when confronted with the task of creating a lot of housing or multiple office accommodation. Often, the authoritarian impulse begins to take over, as with Mies Van Der Rohe and his insistence that the blinds on the Seagram office tower could only be open, shut or precisely half-closed! Central authority prefers such certainty and it makes maintenance easier if everything is the same. But as soon as people are able they try to break the tyranny of such monocular vision.

In the Ecopolis proposition for participation in design no two dwellings are ever the same because each one is finally designed in association with its intended occupants. This proposition is based on the same fundamental position of respect for innate human-ness and the value of ordinary life.¹⁴



FIGURE 32: Gaudí apartment façade.
(Source: Calendar—unattributable)

¹⁴ For more discussion on aspects of beauty, nature and form, see Appendix 1 Nature, Form, Beauty and Biophilia



CHAPTER 6

EXTANT ELEMENTS OF THE ECOCITY

An ecocity is an ecologically healthy city. No such city exists. There are bits and pieces of the ecocity scattered about in present-day cities and sprinkled through history, but the concept - and hopefully, the reality - is just beginning to germinate.

(Register 1987 p.3)

As a response to the 1992 Earth Summit and Local Agenda 21 (Quarrie 1992), a number of cities now have 'environment plans' of one kind or another. None of them fully integrate biological and human built environments. None of them are ecocities, although they may possess some ecocity features. This chapter briefly describes some places which display ecological/sustainable characteristics and that have expressed 'ecocity' pretensions. Many of the most 'ecological' places, in the terms favoured by this thesis, are in Europe.

6.1 Agenda 21, Environment Plans & Sustainability

6.1.1 Local Agenda 21

Principle 10 of the Rio Declaration on Environment and Development (Agenda 21) states that 'Environmental issues are best handled with the participation of all concerned citizens...' (UNCED 1992 p11). As the whole purpose of the Rio Earth Summit was to make explicit the links between development and environmental impacts - as did its follow up, the 1996 City Summit in Istanbul, with its focus on urban environments - this principle has potentially enormous implications for planning and other decision making bodies. Principle 10 of Agenda 21, on which planning strategies at the local level (Local Agenda 21 or Local Environment Plans) are based, concludes:

States shall facilitate and encourage public participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided. (UNCED 1992 p11)

Many approaches to ecological development being adopted or promulgated by local governments and agencies through Local Agenda 21 and similar programs possess goals congruent with the ecocity idea, although these goals are rarely stated in terms that presuppose radical action or major change in the status quo. Typical of this kind is the City Environment Plan 1999-2002 for the City of Perth which, under the section on

the built environment, contains only broad platitudes rather than realisable plans, ie. 'The new City Planning Scheme seeks to enhance the natural and cultural heritage of the city by... respecting the natural and built environment.' (City of Perth 1999 p.18). The City of Adelaide Environmental Management Plan published in April 1997 was similar in its scope but stronger on rhetoric and proudly sought 'To make Adelaide a world recognised, environmentally managed city by the year 2005'. It promised to realise that vision with the 'active participation of everyone in the City' (City of Adelaide 1997). As of April 2001 that goal would seem to be a long way off, with little evidence of any physical change in the city, nor in its management of waste streams, resources or energy¹. In particular, there has been no discernible effort on the part of the City to address its stated aim 'To promote ecologically sustainable buildings' ((City of Adelaide 1997 p.69) even though the minor boom in construction in recent years would have provided an opportunity for the Council to show some evidence otherwise. The fate of the Halifax Depot site, discussed in Chapter 6, demonstrates complete disregard for the aims of LA 21. In Australia, there is no reason to believe that other cities have done much better, although there have been small steps towards a better overall environmental performance. These steps include the 1994 Leichhardt City Council Development Control Plan which required all new residential buildings or residences undergoing major renovation to comply with energy efficiency provisions. It included an appendix which listed recommendations for 'sustainable timbers'. The initiative reflected 'Council's concern for... the ecologically sustainable development of the city' (Leichhardt Council 1994)².

Australia has lagged behind other OECD countries in adopting measures to ensure the most basic of environmental performance in buildings and infrastructure provision. At the time of writing in July 2000, there were no requirements for house insulation in the National Building Code, something that has been a feature of European, Canadian and American codes for decades. Although there is a minimum flow rate demanded of domestic water supply there is no upper limit. It is remarkable that there are no statutory requirements for water quality in Australia, only

¹ Urban Ecology Australia was represented on the 'Buildings and Streets Working Group' and Chérie Hoyle and the author both represented the Conservation Council of South Australia on the 'Clean and Healthy City Reference Group' and 'Adelaide Partnership – Focus Group for Sustainability', respectively. Informed by this participation in the process of creating the LA 21 plan, neither Hoyle or the author have been able to discern any substantial realisation of its goals.

² In the absence of any energy performance requirements in the Australian national building code, this was a welcome initiative but as a contribution to creating long-term 'sustainability' it is a very small step indeed. The sustainable timber 'recommendations' are not enforceable.

recommendations, and that the e. coli levels tolerated here greatly exceed those permissible in the old Soviet Union. (Archer 1991)

In England, Local Agenda 21 has been manifest in 'Environment City' initiatives. Typical of these is that of Leeds City Council. Their description of Agenda 21 is that it '...is about local action at community and neighbourhood level. It is also about the services that the Council provides i.e, the way in which it manages and recycles waste - monitors pollution - promotes healthy lifestyles - develops it's (sic) transport policies - sustains the local economy and ensures the equality of opportunity etc.' The Leeds Environment City Unit was established in 1993 as a part of Leeds City Council's Environment Department and '...co-ordinates such issues throughout City Council departments' and '...each year co-ordinates the production of annual Green Strategy Action Plans for all City Council departments.'³

Leeds follows the general pattern which is that rather than setting the agenda for other council policies and actions, which is the real intent of LA 21, local governments adopt environment programs as additional subsets within their existing frameworks. The author has not found any instance where the environmental initiatives have progressed to the point where they become the cohering force for local government policy, and thus little or no evidence of LA 21 or similar programs being used to integrate city functions in an ecological framework. The status quo departmental divisions remain unchanged. A possible exception to this, where the environmental program is determining other programs, is in the Oakland Ecopolis initiative of Mayor Jerry Brown – and that is being driven by a 'visionary' mayor rather than grassroots action.

Nevertheless, many 'sustainable city' programs comply in essence with Local Agenda 21, even in the USA, where suspicion of anything to do with the United Nations limits enthusiasm for its overt adoption (Sustainable Communities Task Force 2000)⁴.

UEA has actively contributed to the LA 21 process in Adelaide as a formal organisation and its members have done so in other cities. Local Agenda 21 is

³ <http://www.leeds.gov.uk/lcc/environ/envinit/envcity.html>, accessed 19 April 2001. 3 years out of date, the website casts some doubt over the currency of Leeds' environment city commitment.

⁴ Case studies listed by the President's Council on Sustainable Development Sustainable Communities task Force report include Brownsville, Texas; Chattanooga, Tennessee; Cleveland, Ohio; Denver, Colorado; New Bedford, Massachusetts; Northampton County/Cape Charles, Virginia; Pattonsburg, Missouri; Piney River, Virginia; Sarasota, Florida; Seattle, Washington.

incorporated in Kannenberg's vision of ecocity planning (Kannenberg 1998 – see also Chapter 12). But Doyle cautions that the 'key gospel' of Local Agenda 21 – sustainable development – tells us that, through increased efficiency and effectiveness in production, biophysical limits can be surpassed (Doyle 1998 p.774). Lovins et al tell us that we can double wealth by halving resource use (Lovins, Lovins and von Weizäcker, 1997). Doyle goes on to describe the kind of cultural imperialism which 'sustainable development' presupposes and promotes in order to advance the cause of creating more and better consumers (Doyle 1998 p.782). In short, it is possible to see 'sustainable city' and LA 21 programs as self-deluding at best, cynical at worst, and ultimately of little or no use for achieving ecological functionality in major urban areas⁵.

6.1.1.1 Sustainability Indicators

Indicators are a way of measuring whether a city is moving towards a better ecological performance. They are 'measuring sticks' - criteria against which the effectiveness of actions, processes, policies, etc, can be assessed, and are necessary components in the making of ecocities. The nature of what makes an effective indicator is debatable. The identification of appropriate sustainability indicators is a major area of endeavour in Australia and internationally. They are rarely objectively measured with agreed units but are developed on the basis of shared perceptions - typically achieved via a community participation process. An example of the best kind of work being done on sustainability indicators is that by the World Conservation Union IUCN International Assessment Team published in its Tools and Training Series, especially 'An Approach to Assessing Progress Toward Sustainability' (IUCN International Assessment Team 1997).

In the USA, Jacksonville Community Council Inc. (JCCI) provides an example of some of the better work being done by local government. JCCI convened a diverse group of residents from all sectors of Jacksonville 'to define progress and to develop a model to measure, monitor, and improve the quality of life for both current and future generations'. The model consisted of nine parts: education, the economy, public safety,

⁵ Doyle's critique of official 'sustainability' draws attention to the inevitable tension in the idea that poor people can 'help themselves' to improve their lives and their environment when the rhetoric of self-help and individual freedom has been captured by capitalist globalism intent on minimising wages and ignoring economic externalities. Part of the promise (or packaging) of sustainable development is the chimera of democracy and it behoves us to remember that Hitler came to power through the ballot box, that there is nothing intrinsically 'free' about democratic systems without a concomitant culture of freedom (Walden 1999 p.72).

health, the natural environment, the social environment, government/politics, recreation/culture, and mobility. The indicators are linked to public participation and information processes. With seventy-five indicators tracked each year the JCCI report that this process has empowered citizens on 'the journey to sustainable development'.

Such projects have the potential to advance the ecocity idea because they affect social interaction and engage citizens in the management of the urban ecosystem. They are engaging for the community because they are about measuring the 'quality of life'. Such programs intrinsically raise the issue of what constitutes 'citizenship' and the role of the individual in the procurement, operation and disposal processes in the lifecycle of the built environment.

The author's exploration of 'indicators' is discussed and presented in later chapters, particularly Chapter 14 'The Seven Steps' in which the indicators are woven into a matrix for an Ecopolis methodology.

6.2 New Urbanism and Sustainable Houses

We must get away from the idea that sustainability is confined to eco-houses or eco-villages in the heart of the countryside. (Rudlin & Dodd 1998 p.2).

To find out what it might be like to live ecologically in the city we have to resort to examples of single dwellings for demonstrations of 'fully featured' environmental building performance – an American and Australian example are discussed below. To get some idea of what urban ecological communities might be like it is necessary to look to Europe, where small and medium scale developments have been undertaken with some cognisance that support of community life was a central requirement of city living. A good example is the 'Biological Building Estate' at Tübingen in Germany where 111 units of high environmental performance are fitted on a 13,000 sq.m. site providing private, semi-private and public open spaces and gardens for the tenants (Kennedy & Kennedy 1997).

There are, across the world, precious few examples of urban developments that have been rethought from ecological principles. In America there have been a number of Pedestrian Pocket developments but... the built examples tend to be pale reflection of the concept as initially conceived. (Rudlin & Dodd 1998 p.1)

The Pedestrian Pocket developments are New Urbanist speculative developments that appear to pay lip service to the core issues identified in The Charter of the New Urbanism (see Appendix 2). These pale reflections of ecocity ideas are of passing interest in terms of their design and aesthetics and but do provide some evidence for a movement against sprawl.

6.2.1 Integral Urban or Sustainable?

The idea of 'ecohouses' is not new, and apart from some improvements in technology little has changed between the time of the Farallones Institute 'Integral Urban House' established in Berkeley in October 1974 and Michael Mobbs' 'Sustainable House' in Sydney, the development application for which was submitted 21 years later, in October 1995 (Mobbs 1998 p.10). Both are inner-city conversions of an existing dwelling. The Integral Urban House was a low budget exercise, the Sustainable House was not.

The Sydney house was ostensibly the result of one individual's determination to demonstrate 'sustainability', it achieved mainstream recognition and was launched by the New South Wales state Premier; the Berkeley house was an outcome of work by a non-profit organisation which had as its president (then and now) Sim van der Ryn, then California state architect under the governorship of Jerry Brown⁶ and still a widely respected and radical ecological architect (see Chapter 4). Members of the board of the Farallones Institute included environmentalist and FoE representative Stephanie Mills, and Peter Calthorpe now lauded for his 'Pedestrian Pocket' and 'TOD'⁷ new urbanist developments. In short, the Integral House was a starting point and catalyst for future achievements whilst the Sustainable House is, in many ways, an end point. Other differences are significant. The Berkeley property was very much about integrated, holistic design in which the house and its grounds were seen as an ecosystem and its occupants integral to that system (Farallones Institute p.16-17) whereas the Sydney house is more of a 'machine for living' filled with product demonstrations.

This distinction is important because it suggests that there has really been no advance in thinking about dwelling in over 20 years. It is about the distinction between houses as organisms or machines, and it reminds us that there has to be a social agenda in any discourse about ecological settlement even at the level of the individual dwelling⁸. This author's concern regarding the concept of 'ecological cities' is that we

⁶ Brown is now Mayor of Oakland and was founder of the non-profit 'We The People'. In 1999-2000 Brown and his office of mayor in the City of Oakland, were promoting 'Oakland Ecopolis' – '...where the promise of a green future holds forth the hope of transforming the crumbling gray concrete of its streets and highways and the deteriorating brown blocks of its downtown into a verdant garden mixing steel towers and tree-filled parks. Oakland Ecopolis calls from the future...' (Yanarella et al 1999).

⁷ 'Transit Oriented Development'.

⁸ Sydney's Sustainable House was undertaken with some moral scruples however. Mobbs included a clause employed in the builder's contract which specified that 'no timber should be purchased from, or supplied by, Boral Pty Limited.' (Mobbs 1998 p.145). Concern about Boral's forestry policies are widespread and, given the published caveat that Mobbs provided, it is all the more surprising that the

do not lose sight of the social agenda and human occupation of the built environment as an absolutely integral part of any definition. There is a need to be wary, in effect, of what Koskiahio calls the 'third approach' in which 'technologisation of the whole ecologisation' of city planning is achieved, or, as Van der Ryn put it nearly 17 years after the opening of the Integral House 'A true 'sustainable community' or 'ecological city' is much more than a dense, efficient land-use pattern.' (Van der Ryn 1992a p.68). It is also much more difficult to achieve. In correspondence from Register to Ede (5 September 2000) forwarded to this author, he mentioned that the next step on from the integral house needed to be the integral neighbourhood and the 'integral whole city', but local politics centred around perceived (but unstated) social justice issues stymied that evolution. With the ecocity projects attempted by UEA et al, there has been a determination to start with the community base, but even then, with the Halifax EcoCity Project, city politics and commercial interests stymied its realisation.

6.2.2 Los Angeles EcoVillage

I was born into the city life
 It's all that I've ever known
 You know it's rough getting around this
 place
 So crowded I can hardly breathe
 You can only see about a
 block or two
 In LA that's the truth
 ('River Song' Dennis Wilson 1977)



FIGURE 33: Postcard from Los Angeles
 (Source – Postcard purchased at LA-X)

There are as many possible cities as there are possible forms of human society, but Los Angeles emphatically suggests that there is no simple correlation between urban form and social form. (Banham 1976, p. 237)

Los Angeles is the heart of the beast that is media America, capital city of the California Dreaming. In April 1992, when Lois Arkin was in Adelaide to speak at the EcoCity 2 conference⁹ there were riots and fires burning in the street less than half a block from her home in downtown LA. Arkin is the unassuming guiding light and guardian angel of the Los Angeles Ecovillage. Although it began as a vision for building an inner-urban ecovillage on reclaimed land in the city, practical limitations on the development of that land prevented it from being built. Nevertheless, the idea

protagonists of the Aldinga Arts Village (a putative 'ecovillage' in southern metropolitan Adelaide) should accept Boral as a sponsor.

⁹ EcoCity 2 – The Second International Ecological City Conference, organised by Urban Ecology Australia Inc and the second in the series of conferences that started in Berkeley, California. EcoCity 3

proceeded to evolve as a pragmatic response to the failure of inner-urban LA to provide a healthy physical or community environment.

Although the LA Ecovillage is neither large nor physically impressive (there are few visible signs of its existence and the casual observer could be forgiven for missing it altogether) it is an important and influential project that demonstrates certain key aspects of ecocity theory in action.¹⁰

6.2.2.1 Healthy Beginnings

Whatever man (sic) has done subsequently to the climate and environment of Southern California, it remains one of the ecological wonders of the habitable world. Given waters to pour on its light and otherwise desert soil, it can be made to produce a reasonable facsimile of Eden....and it was this promise of an ecological miracle that was the area's first really saleable product – the 'land of perpetual spring'. (Banham 1976, p.31)

It was to accommodate a health resort that buildings at the centre of the LA EcoVillage began their existence.

6.2.2.2 LA Eco-Village & LA Housing Department

...the Los Angeles Housing Department, has approved a substantial low-interest loan to LA EcoVillage for the building acquisition. This public partnership with LA EcoVillage puts the mega-city of Los Angeles squarely in the vanguard of the ecovillage movement! (Arkin 1996 p.30-31)

Building ecological communities takes time. Lois Arkin had been organising in Los Angeles and Southern California for over ten years before the LA Eco-Village began to look like a solid possibility – and then it was different in many ways from the original vision. Begun during the summer of 1983, the cooperative advocacy group Cooperative Resources and Service Project (CRSP) brought together a 20-person volunteer group to create a non-profit developer called the Los Angeles Municipal Housing Association. Comprised of activists in housing, urban ecology, economic and social change, the intention was to set up the conditions for ongoing creation of 'sustainable urban communities' (Arkin 1991 p.42-43). They had planned to develop an ecovillage five miles north-east of downtown Los Angeles on an 11 acre (4.6 hectare) landfill site that had been used for dumping street rubble from construction projects (Arkin 1996 p.189). At the time when those plans appeared to be developing well, in a statement of optimism reminiscent of the kind UEA was to issue during the 'Halifax'

was in Senegal in 1996, EcoCity IV was in Curitiba, Brazil, and EcoCity V is scheduled to be held in Midrand, South Africa.

¹⁰ One of the organisations associated with the ecovillage initiative is the 'Eco-Home Network', a fifteen year old organization which 'sponsors a demonstration home and community resource center for ecological living in the city.' (Arkin 1996 p.189).

years, Arkin reported 'We are now well positioned to obtain the site and to enter into a partnership arrangement with the City of Los Angeles and the Department of Water and Power to develop Eco-Village.' (Arkin 1991 p.42).

Ten years later, plans to try and obtain a site had been shelved and the EcoVillage group had shifted their attention to retrofitting and refurbishing existing buildings in their immediate community. They purchased an old courtyard building known as the 'White House' that had originally been one of the resort establishments when the area had enjoyed status and prosperity as a spa and health centre. In order to do this Arkin and the ecovillage group introduced a system of fund raising that offered loans on the basis of minimal interest rates – borrowers nominate their preferred rate and many choose to take loans out at little or no interest in order to assist the ecovillage project whilst maintaining their savings.¹¹ The result is that many low-income people have been able to afford an investment in their local community which provides housing for those in similar demographic groups.¹² Inspired by this model for voluntarily setting interest rates, Hoyle introduced a similar scheme to Wirranendi as part of the borrowing regime for the Christie Walk project (see Chapter 8). The strong sense of community¹³ in the neighborhood of the LA Ecovillage has been developed through such experiences of collective self-help as well as by the establishment of what amounts to a local community centre in the 'White House'.

The Los Angeles experience is relevant to the work of UEA and its attempts to establish ecocity projects in South Australia and vice versa partly because of their bioregional similarity.

The vegetation of the coastal region of Southern California, including that of the Los Angeles Basin, lies within a Mediterranean climate. This kind of climate occurs in only a few areas of the Earth, occupying approximately 1.7% of the Earth's surface area (Lenz and Dourley, 1981). Other areas with Mediterranean climates occur along the coast of central Chile, the Cape region of South Africa, south-western and south Australia, and, of course, in the Mediterranean region. Although they cover only a small area of the Earth, Mediterranean habitats are biologically diverse and support many rare species. (Botkin and Beveridge 1997 p.7)

Precisely because the LA ecovillage is in the heart of one of the world's most ecologically dysfunctional urban sprawls it offers hope for the prospect of remaking the world's cities. As Gilman puts it 'A city could not be an eco-village, but a city *made up*

¹¹ Without the bank charges that eat away at small savings.

¹² Personal communication with the author.

¹³ The author has been a guest of Arkin and the LA Ecovillage community on three occasions.

of *eco-villages* could be a sustainable community.’ (Gilman 1991 p.11) – if not an *ecocity*.

6.2.3 Village Homes

The two-hundred-and-twenty fortunate families of the Village Homes development live in what most folks would call a park. Trees and gardens are everywhere, *redolent* with ripening edibles. All the homes are solar, with energy bills about half those of houses in conventional developments nearby. The small lots are augmented by the mutually owned community garden, expansive village green, swimming pool, and bike paths; these connect all the homes to one another and the nearby town of Davis, CA. Inhabitants pay monthly dues to a strong neighbourhood association that sets policy and sees to the maintenance. Crime is low and neighborliness is rampant. The place is quiet and it smells good. It’s a nice place to live. Even teens like it.

This astonishingly attractive, environmentally wonderful community is so popular that homes change hands, unadvertised, for 20 percent more than others of similar class nearby. Visitors resist leaving. The developer made money. Yet after eighteen years of success, no new project like it has been attempted anywhere.’ (J. Baldwin in Rheingold, 1994, p.120)

Michael Corbett was not only the successful developer of Village Homes, he went on to write a lucid and well-illustrated book to explain the principles of the development and how it might be repeated (See Chapter 1: Review of Theories). In the book ‘A Better Place to Live: New Designs for Tomorrow’s Communities’ he acknowledges many parallels in his approach to that of Howard and his Garden Cities, and berates sprawl proposing:

The pattern I think we should work toward is one of small, relatively moderate-density towns with enough distance between them to give lower density overall. Moderate density within the town would have the advantage of providing stimulating social contact and eliminating most of the need for automobiles. Low regional density would reduce air pollution, allow local agricultural production for each town’s needs, permit easier waste management and recycling, and put the countryside within easy walking distance of every home. This is essential if we are going to live within the limits of renewable energy supplies, maintain a healthy environment and ensure sustainable food production. (Corbett, p.32)

Corbett goes on to discuss appropriate population size for such townships, agreeing with Howard on a figure of about 30,000, and he analyses the density his pattern would generate. The photograph adjacent to the above passage is of a terrace of houses in a small Cotswold village in England. The author’s own early thoughts on what might constitute an ‘appropriate’ or optimum balance between size and density for ecopolitan settlement range over similar territory and he has often considered that the town/village/hamlet/countryside pattern of the English West Country might be somewhere near the optimum for much the same reasons that Corbett identifies above. For this reason, and to reinforce the proposition that the essential patterns of successful long-term human settlement are already proven by their existence, the author has made

a preliminary analysis of West Country settlement patterns, comparing them with the sprawl of Adelaide's metropolitan area (see Appendix 4).

Village Homes is famous for not having been replicated, despite its success as a development even in financial terms. If replicability were to be a condition of ecological development, Village Homes succeeds, at least theoretically; if the fact of replication is a condition, then it is a failure. Corbett himself gave the following reasons for its 'non-replication':

- Most developers don't want to go through the headaches that they have to with local government officials who want preconceived, standard, accepted solutions,
- Lending institutions raise (unspecified) obstacles,
- Builders are discouraged when college-educated civil engineers, public works directors and planners find the concepts 'just too difficult for them to deal with'. (Zelov & Cousineau 1997 p.269)

The residential areas in the core site design for the Whyalla EcoCity Development were inspired by the Village Homes model. Dwelling designs were prepared and a subdivision design worked out in detail, all commissioned by the Whyalla City Council, but as yet, no development has taken place. The planner was totally supportive, the engineers Connell Wagner (who jointly tendered for the design with the architect – this author) found the concept difficult, and no developer has shown an interest perhaps because there is an effective glut of developable land with planning consents for conventional allotments on the urban periphery, already owned by private interests, whereas the EcoCity sites are owned by the city.

6.2.4 Ithaca EcoVillage

In New York State Joan Bokaer¹⁴ and her cohorts set themselves an impressive task, 'The ultimate goal of Eco Village at Ithaca is nothing less that to redesign the human habitat.' (Walker 1997 p.142). With a projected population of 500 people (on the basis that anthropologists consider a village of such a size ideal for good communication) on



FIGURE 34: Ithaca's first 'neighbourhood'.
(Source: <http://www.ecovillage.ithaca.ny.us/>
accessed 19 April 2001)

71 hectares of land two miles from downtown Ithaca, there are already a number of

¹⁴ Convener with Serigne Mbaye Diene of the Third International Ecocity and Ecovillage Conference held in Yoff, Senegal, January 1996.

occupants in the co-housing based project. The developer is EcoVillage at Ithaca, a non-profit organisation with an associated educational arm, EVI/CRESP, a project of Cornell University's Center for Religion, Ethics & Social Policy.

Development has been based on staged construction of five clusters of co-housing neighbourhoods around a village green. The first EcoVillage Cohousing Cooperative formed in 1992, and completed the first neighborhood (aka FROG) in August 1997. About 60 adults, 30 children and sundry pets and produce animals 'have taken up residence in this lively community'. Thirty houses line a meandering pedestrian street. The houses feature a number of innovative energy-efficient features and won an 'Excellence in Innovative Housing' award from the National Association of Homebuilders in 1996.¹⁵ Development continues:

The Second Neighborhood Group (SONG) began meeting in 1996, and is now moving forward with plans to build in the beautiful West Field site at EcoVillage. SONG is working with architects, engineers, and other professionals who have experience in designing and building energy-efficient, affordable, healthy homes, using local materials. The draft site design is based on permaculture principles, working with the natural patterns and systems of the land. A variety of green building technologies are being considered, including super insulation, passiveheating, composting toilets, and solar panels.¹⁶

The overall management and financial structure of EcoVillage Ithaca appears to be similar to the Christie Walk case study (Chapter 9) but it is not a fully urban project in the manner of Christie Walk or the LA EcoVillage.

The work of people in the ecocity/ecovillage movement is often, if not always, done with an eye to the potential for promotion of the ideas embodied in their projects. This is certainly the case with UEA et al and the projects it has been involved with. Volunteers on the EcoCity projects in South Australia would recognise the sentiments in the following passage.

In EcoVillage at Ithaca we have tried from the very beginning to create an educational model – one that will inspire and teach the principles of a saner way to live on the planet. While far from perfect, we have begun to develop a community that, before it is even built, has attracted national and sometimes international attention. We are choosing to build something that is far more than a pretty and satisfying place to live. Instead our goal is to have a small part in influencing patterns of development in this country, and even around the world. (Walker 1996 p.41)

¹⁵ <http://www.ecovillage.ithaca.ny.us/>, accessed 19 April 2001.

¹⁶ <http://www.ecovillage.ithaca.ny.us/>, accessed 19 April 2001.

6.3 EcoUrbanism in Europe

6.3.1 New Ecological Settlement Projects in Europe

Kennedy and Kennedy's review of 'ecological settlements' surveyed seven new developments and five urban renewal projects (Kennedy & Kennedy 1997 p.11-25). The 'retrofit' projects are pertinent to remaking existing urban environments but only the new developments¹ are here set out in table form by the author to provide relevant comparative material for the case studies in Part B of this thesis. The Halifax EcoCity Project and Christie Walk development are treated according to the same criteria used in this table form in Chapter 10.

6.3.1.1 Mixed Development in Nuremberg

The projects reviewed by Kennedy and Kennedy were developed by insurance companies, building societies and housing associations. Innovative urban ecological architecture has also been supported by some local governments in Europe. In Germany, for instance, the local government of Nuremberg decided that a site of just under half a hectare near the medieval city wall should be redeveloped as a catalyst for the revitalisation of the surrounding district (Dawson 1997 p.50). Designed by Joachim Eble 'one of Germany's leading ecologically conscious architects' (p.50) it consists of 61 flats, 32 office units, nine shops, café and kindergarten much of which is linked by a 15,000 square metre greenhouse, the 'Prisma' development was seen as an investment risk by the insurance company developer and some 'ecological' features, such as rainwater flushed toilets, were deleted because of budget constraints. Nevertheless, the project retained fundamental features of ecological design including appropriate material use and a climate-responsive built form. It represents a good example of what can be achieved when local government is supportive and developers are prepared to accept long-term risk as part of their investment strategy.

¹ Six of the seven case studies have been included in the author's tabulation.

TABLE 7: New Ecological Settlement Projects in Europe

Architects, Developer, Number of dwellings, Site Area, Ecological Aspects	Biological Building Estate – Auf dem Schafbrühl, Tübingen, Germany	Ecological Village – Anningerblick, Guntramsdorf, Austria	Multi-family Housing Estate – Stallenmatt, Oberwil, Switzerland	Residential Area – Ecolonia, Aalphen aan den Rijn, Netherlands	Town Extension – Torsted Vest, Horsens, Denmark	Puchenu II Garden City, Linz, Austria
Architects, Planners	Joachim Eble, Buckhard M Sambeth, Wolfgang Häfele	Helmut Deubner, Atelier für naturnahe Bauen	Peter Steiger Urban planner: HR Meier-Knobel	BEAR architects, Alberts & van Huut, JP Moehrein, et al Urban design: Atelier Lucien Kroll	Torben Gade	Roland Rainer
Developer	Karlsruher Lebensversicherung AG (Life insurance company)	S-Wohnbau GmbH and S-Bausparkasse (Building society)	Ciba Geigy Ltd pension fund	Bouwfonds Woningbouw housing association	Municipality of Horsens and a citizen's action group	Neue Heimat, Gemeinnützige Wohnungs- und Siedlungsgesellschaft Oberösterreich
Dwelling Number	111 units	140 units	64 units	101 units	900 units	750 units
Site Area	13,000 sq.m.	Not given	12,410 sq.m.	Not given	55 hectares	Not given
Healthy Building	Use of recyclable materials open to diffusion, natural paints, timber joist floors, cork linoleum flooring, etc	Basic efforts to use healthy and resource-saving materials by consideration of production and life cycle	Careful choice of materials for non-toxic internal environment, double layer brick construction, mineral insulation, natural paints	Yes, supposedly, according to the Dutch environmental protection program and overall minimum ecological requirements	Use of recycled and recyclable materials	Some use of biological building materials, most houses have brick walls, insulation with coconut fibre and mineral wool
Energy	Passive solar energy systems, optimisation of floor plans according to illumination, ventilation and functional requirements of apartments	Use of passive and some active solar energy systems	Use of passive solar energy systems, zoning of floor plans to conserve energy, low primary energy building materials	Use of passive and active solar systems and (unspecified) energy saving strategies	Local district combined heat and power	Use of passive solar systems, some solar collectors for warm-water supply and heating
Heating	Skirting-board heating, connected to district heating network	Low temperature connected to district heating	Low temperature gas central heating, reduced energy for heating (one-third normal)	See above	See above	Central heating of various types
Electrical System & utility lines	Independent sockets, power cable laid in star-shaped pattern	No information	No information	No information	No information	Resource conserving design of infrastructure in common service trenches
Water	Rain water collection in streams and ponds, water used in gardens, landscaping and play areas	Collection of rain water and use for gardens, toilets and washing machines	Biotype with pond for rainwater collection, partly grass-covered roofs to store rainwater, pervious footpaths	Large pond for rain water collection and as landscape feature	Use of rainwater for toilets	Two small streams integrated into landscape design, rain water absorption
Open Spaces	Private, semi-private and public open spaces, gardens for tenants	Private, screened gardens	Vegetation-covered facades in climate and energy strategy	See above	Residents planted 12,000 trees, gardens provided for residents (presumably community gardens)	Intense vegetation in private and public areas, private green spaces in atrium-style houses, direct access to Danube, retention of river bank for recreation

New Ecological Settlement Projects in Europe (cont)

Architects, Developer, Number of dwellings, Site Area, Ecological Aspects	Biological Building Estate – Auf dem Schafbrühl, Tübingen, Germany	Ecological Village – Anningerblick, Guntramsdorf, Austria	Multi-family Housing Estate – Stallenmatt, Oberwil, Switzerland	Residential Area – Ecolonia, Aalphen aan den Rijn, Netherlands	Town Extension – Torsted Vest, Horsens, Denmark	Puchenau II Garden City, Linz, Austria
Traffic	Car free, car parking on periphery – mostly covered	Car parking on periphery, car-free inner open spaces, accessibility by footpath	Reduced traffic on residential roads, underground garages	Reduced traffic on residential roads	Residential streets with 30kph limit, most car parking spaces off the estate	Traffic-free with access only for delivery, waste disposal and emergency vehicles, network of pedestrian and cycle paths, two commuter rail stops
Waste Disposal	Garbage sorted according to type, communal composting	Separation according to type, composting	Separation according to type, composting	Separation according to different types	Some separation, composting	Separation according to type, some clustered collection points, some local composting
Social Concept	High quality of social living, neighbourly contact encouraged by communal open spaces	Communal centre and café planned	Two communal rooms	Fostering a sense of neighbourhood and identification with the living environment through urban spaces	Apartments for single-parent families and socially deprived small families	Tenant and owner dwellings built to public housing guidelines, lay-out of dwelling agreed to by future users, child-friendly, large natural play areas, private and public spaces
Floor Plans	Apartments built on open-plan system around central living room	Lay-out oriented for passive solar	Orientation for passive solar, zoned floor plans, encapsulated areas with conservatory, balcony or verandah secondary structure	Flexible	Flexible floor plans	Several options for lay-out of dwellings
Design	Follows traditional building of nearby hamlet	Pitched solar-oriented roofs with traditional tiles, rendered facades, conservatories of plain wood frames	Basic elements arranged symmetrically, each block with clearly defined central area with secondary structure of trellis and balconies	According to the Dutch environmental protection program and overall minimum ecological requirements including passive solar, reduced water consumption, recyclable and durable materials, sound proofing, healthy materials	See above	Primarily high density and low-rise with 1-3 storey buildings on solar oriented slope, varied architecture in general unified urban structure

New Ecological Settlement Projects in Europe (cont)

Architects, Developer, Number of dwellings, Site Area, Ecological Aspects	Biological Building Estate – Auf dem Schafbrühl, Tübingen, Germany	Ecological Village – Anningerblick, Guntramsdorf, Austria	Multi-family Housing Estate – Stallenmatt, Oberwil, Switzerland	Residential Area – Ecolonia, Aalphen aan den Rijn, Netherlands	Town Extension – Torsted Vest, Horsens, Denmark	Puchenau II Garden City, Linz, Austria
<p>Commentary</p>	<p>Despite high site occupancy of buildings, project offers exceptional qualities to residents and human scale. Architects combine healthy materials and construction techniques with extremely flexible space planning. Ecological design explicitly appreciated by residents.</p>	<p>Demonstrates importance of architect through to completion phase – persistence needed to get building permits and to persuade contractors to adopt new measures. Client scepticism about building costs with some fierce discussion, later costs turned out lower than anticipated</p>	<p>Much compromise, because if client concern with cost, on original design which included clay construction, thermal walls, photovoltaics, solar collectors, composting and biological waste treatment. Decision-making simplified by each partner – developer, contractor and architect – each represented by one individual</p>	<p>Regarded from the outset as research and demonstration project for the Netherlands. Wide range of technology and house designs tested. Emphasis on diversity of issue rather than holistic approach which was regarded as not yet feasible</p>	<p>Emphasis on planning and development processes with involvement of residents as an essential feature. Builders lost interest when restrictive financial constraints affected implementation. Problems compounded by recession in building industry</p>	<p>Demonstrates how a combination of user-friendly principles for high-density and low-rise buildings, good access by different means of transport and use of passive solar correlates with many elements of ecological urban design. Shows a broad social spectrum of housing at reasonable cost and high architectural quality. Holistic approach</p>

All of the above is derived from Kennedy & Kennedy 1997

6.4 Extant Elements in 'Less Developed' Countries

Those of us who work in cities know how difficult it is to change cities. (Ultramari 2000)²

6.4.1 Sustaining the South

In relation to 'sustainability', the developing world is invariably concerned with poverty. Stren, White and Whitney make the point that resource distribution between developed and developing countries is a key issue in the potential for 'sustainable' urban development, referring to remarks made by Stephen Lewis, former Canadian ambassador to the United Nations

To achieve sustainable development in the South, not only will Western countries have to convince developing countries not to raid their own natural environments the way the Northern countries already have done, but they will also have to be prepared to transfer resources generously to prevent this from happening. Lewis concluded rather gloomily that, while there is 'massive international recognition' of the environmental problems of developing countries, the West is 'simply not prepared to come to grips with resource transfer.' This, said Lewis, is about morality as much as it is about what is necessary or even possible. (Stren in Stren et al 1992 p.6)

6.4.2 Colonialism, Compact Cities and the Case of Calcutta

Urban systems evolved from local dependency on regional resources into an international network in which not all cities benefit equally. Cities which industrialised first benefited most from the global reach established by colonial expansion. Stren et al point out that the colonial system assured the prosperity of these cities and allowed them to dictate terms of trade for access to cheap raw materials and that in this way '...they made the whole world potentially part of their hinterland.' This has provided the basis for the wealth these cities enjoy but dependence on a distended, colonised hinterland makes them very dependent on the status quo. 'If they were reduced to their old regional hinterlands, under present operating conditions, they may find it impossible to sustain their present size and level of prosperity.' (Stren et al in Stren 1992 p.45-46)

There is no accepted general theory, but the compact city idea is strongly linked in current literature, at least, to the sustainable city (Welbank 1996). If the compact city is about intensive land use, centralised activity and higher densities, then even a huge developing country metropolis like Calcutta has compact city characteristics. If it is about most people moving around without cars, Calcutta complies. If quality of life is a key criterion, then the city fails. The compact city model is hard to apply to any spreading metropolis, although in cities like London one can identify a polynucleated structure that possesses some compact city characteristics.

² Clovis Ultramari of Unilivre, Curitiba, during the summary session of Ecocity IV.

6.4.2.1 Colonial Cousins

Calcutta is a low-rise city. Buildings rarely rise much above 4 storeys and there are few high-rise blocks in the Central Business District. Although it covers approximately the same physical area as Calcutta, Adelaide could hardly be more different. For most of its metropolitan spread Adelaide rarely rises above one storey. Australians expect complete personal privacy as a basic right, in Calcutta it is a luxury, if it is desired at all. In Calcutta there is real community and vibrancy in daily life, in Adelaide the notion of community is more abstract and remote, and dependent on mechanical or electronic interfaces rather than face-to-face contact. Yet links between Calcutta and Adelaide are not entirely tenuous. Both were founded as intentional colonial interventions for exploiting the resources of their hinterlands. Both successfully extended the reach of the English Empire³.

Compact cities are about concentrating their populations in style, comfort and efficient grace, but the problem with cities in developing countries is that of urban migration. Calcutta exemplifies this problem. Chaudhuri argues that it has absorbed the biggest mass migration in human history 'with incredibly meagre resources, little attention, and less sympathy'. (Chaudhuri 1990b Introduction).

It is encouraging to identify those aspects of compactness and sustainability that show at least a glimmer of what might be possible in developing countries if sufficient resources and planning were to be mobilised. Calcutta may demonstrate how difficult that can be, Curitiba shows something of how that might be done.

City governments in wealthy Western democracies would be unlikely to adopt any policy that did not give high priority to the prevention of poverty and disease, but they would be equally unlikely to press their citizens into work as volunteer garbage collectors or sewage plant workers as part of that policy. In Curitiba and Calcutta that is almost exactly what the city governments have done.

6.4.2.2 Green Calcutta?

Urban agriculture is a valuable contribution to urban sustainability, particularly in developing countries, for although 'Agriculture and urbanization are commonly viewed as conflicting activities... A closer look reveals... that there are considerable land and water areas in the urbanized sphere that are available for agricultural use.' (Smit and Nasr 1992 p.147). Smit and Nasr say that sustainable cities require an economic process

³ See Appendix 5 for a discussion of the attitudes to the price of comfort in Adelaide and Calcutta.

to 'close the loop' of resource use, especially in regard to urban agriculture and water resources (Smit and Nasr 1992 pp.141 and 147). Calcutta demonstrates some of the potential for achieving this in an economically deprived environment, for according to US scientist Harriet Hill 'The sewage fed fisheries of East Calcutta... which have been receiving urban wastewater for over 100 years...' are an example of ecosystem adaptations that have treated human wastewater for millennia (Hill 1997)⁴.

Santosh Ghosh, as the former Chief Architect for Calcutta and West Bengal, has an intimate knowledge of the city and its planning systems. Undeterred by the scale and scope of Calcutta's problems, he has proposed a 'green' vision for Calcutta in which '...scattered green space within the compactly built up area, will act as an oasis and also a continuous wedge of green widening at the edge of the city into the green belt and then into a rural landscape, establishing a coherent relationship between urban and rural areas.' He paints an image focussed on the compact urban area and acknowledges that such a plan is intrinsically regional, but notes also that the making of such an ecologically integrated metropolis '...depends on citizens' awareness and a movement to preserve and protect together with the Government's programme for greenery and wetland projects.' (Ghosh 1992 p.18)⁵

This call for citizen awareness is echoed by ecocity advocates around the world, including in Adelaide through advocacy organisations like Urban Ecology Australia. Curitiba created a 'Free University for the Environment' which offers 'practical short courses at no cost for homemakers, building superintendents, shopkeepers and others to teach the environmental implications of the daily routines of even the most commonplace jobs.' (Rabinovitch and Leitman 1996 p.30)

6.4.2.3 No Room for Eco-burgers

In the 1980s, a middle-class revolution has silently seized Calcutta. There is a new trend towards sporadic beautification, preservation of old monuments, and a certain streamlining, sophistication and even luxury in middle-class homes. With this goes a new concern for the environment. (Bandyopadhyay 1990 p.78).

Turning Calcutta into an 'ecological metropolis' may be a challenging task, but if a city of its population and extent is able to sustain key ecological functions despite the pressures of population growth and development, it may not be perverse to contend that

⁴ According to Aditi Sarkar these ecosystem adaptations have evolved to produce an environment in which the thirty-odd villages east of the city take its solid waste, liquid sewage and polluted air and produce clean air, fresh water, and fresh fish and vegetables. In addition, income and employment is generated in the rural sector (Sarkar 1990).

for compact cities the challenge is correspondingly less, and proportionally more achievable. A similar argument can be advanced for Curitiba, where population and developmental imperatives have also been subsumed within a coherent overall planning framework that accepts the pragmatic realities of its place and time, yet directs both social and economic development towards ecologically sustainable outcomes.

The conditions in less developed countries are generally much worse than in the 'developed' world and the challenge for shifting their cities towards ecological viability is great. At the same time, there are people like Ghosh, who know only too well the scope of Calcutta's ecological challenges, yet sees no room for half measures, telling this author, for instance, that 'Pseudo-environmental approaches are like adding twice the lettuce to a Big Mac and calling it an 'eco-burger'.' (Polo 1999 p.15)

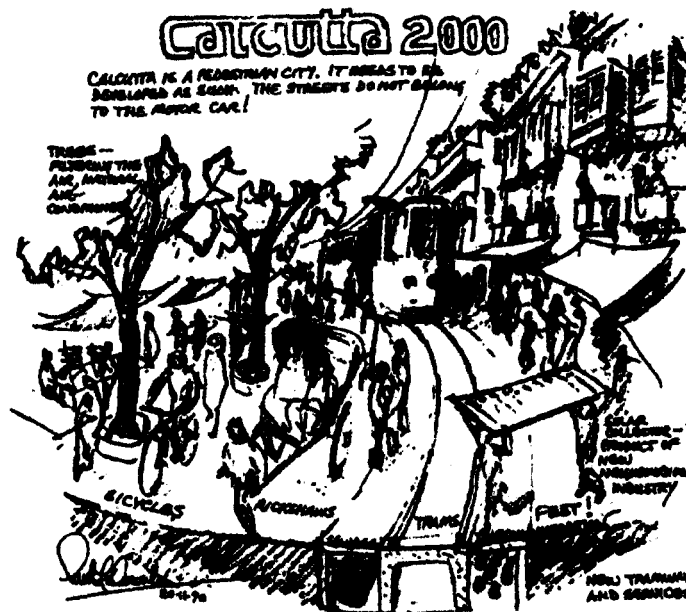


FIGURE 34a: 'Calcutta 2000' An optimistic view of the ecocity potential of Calcutta sketched by the author during his visit to the city for the 'Architecture of Cities' conference convened by Santosh Ghosh in 1990 (source -Author's sketchbooks)

⁵ Ghosh was the organiser of the Conference on Architecture of Cities that adopted 'The Charter of Calcutta' in its final session in 1990.

6.5 Curitiba, the 'Ecocity'⁶

Curitiba⁷ is the primary example of a major city in a developing country that displays some characteristics of ecocity function. Curitiba is receiving international acclaim as a prototypical ecocity but there are a number of aspects of ecocity design, development and maintenance that conflict with its self-described status as a 'true' ecocity.

The problem of what exactly a sustainable city is, is also complicated by the word's market value. Every city administration, every developer, wants to be 'sustainable'. One typical effect of this is 'extensional' sustainability. One additional feature makes a house 'sustainable', ten of these houses make a housing project 'sustainable', and two or three of these projects make a 'sustainable city' - at least for the media. Even without such effects, the concept remains vague. The most concrete aspects of policy are emission norms, water norms - whatever is easily measured. The only other concrete indication in sustainable-planning literature is the repeated use of the same examples, the city of Curitiba in Brazil probably most of all. (Treanor, 1997)



FIGURE 35: Curitiba approached from the East, showing the smog and traffic typical of any substantial urban settlement, North or South. (Photo by author)

Coming down the stairs... were two striking olive-skinned women in lively conversation... one with a T-shirt that said 'Welcome to Curitiba, the Ecological City. (Register 1999)⁸

In 'developing' countries', ecological development is a means of providing infrastructure, improving the basic conditions of life and redressing economic injustice. Because it has tried to do these things, Curitiba lays claim to the 'ecocity' tag, with social and environmental education programs spearheaded by 'Unilivre', an open university for the environment.

⁶ In relation to the 'Seven Steps' proposed in the latter part of this thesis, Curitiba can be understood to be performing very well in terms of 'Shedding', moderately well in terms of 'Proximating' and poorly in terms of 'Architecting'.

⁷ The author was in Calcutta during November 1990 for the 'International Conference on Architecture of Cities' and to undertake a study of architectural and technical education on behalf of the National Office of Overseas Skills Recognition. He was in Curitiba during April 2000 as an invited presenter at the Ecocity IV conference.

⁸ Personal communication.



FIGURE 36: Curitiba's iconic 'tube stations' for the public bus service. (Photos by author)

Curitiba is routinely presented as a model for sustainable urban development even though it is in a developing country environment. It may not be an 'ecological city' but since 1971 progressive city administrations have adopted a development plan that embraces what are often identified as 'ecocity' characteristics '... based on a preference for public transportation over the private automobile, working with the environment rather than against it, appropriate rather than high-technology solutions, and innovation with citizen participation in place of master planning.' (Rabinovith and Leitman 1996 p.27).

Curitiba has successfully pedestrianised many inner-city streets, it has a trend-setting public transport system that makes buses almost as effective as trams, and it has controlled sanitation and drainage problems by creating magnificent parks. At the same time it has instituted recycling programs where the urban poor can trade garbage for food.

6.5.1 Paraná: The Region

Representing the Planning Secretariat of the State of Paraná at the Ecocity IV conference, Antoninho Caron quipped that 'No traveler reached the New World with any maps from the Old World'. This attitude towards planning suggests a cultural disposition towards decision-making that is congruent with participatory planning processes and may tell us more about the underlying ethos of Brazilian planning than any amount of academic analysis! Caron's remarks were of particular interest because they came from a person at the heart of regional planning processes. He also said that 'We have a creative destruction phase...old things must die...' and that Paraná is trying to extend the principle of working 'through human beings for human beings' to the whole state through working with citizens.' If this is true it is, again, an attitude congruent with ecocity principles.

Caron spoke of the inappropriate processes of colonial development and how it was necessary to stimulate the development of smaller cities with the involvement of all cities. A number of initiatives are being put in place by the state of Paraná, including



FIGURE 37: Extensive pedestrian streets and convivial night life. (Source – Photos by author)

extending recycling programs of other cities in addition to Curitiba, developing ecotourism, and adopting environmental auditing. There are five aspects of sustainability that the region of Paraná is beginning to use in a model for developing sustainability in its constituent communities: 1. Social, 2. Economic, 3. Ecology, 4. Spatial, 5. Cultural. According to Caron, ‘the region’ is not a finished product in nature; the city is the architectural response to the region, it is a collective work of art, and a constant participative work that ‘potentialises local initiatives’. (Caron 2001)⁹

Nevertheless, it would seem that ‘ecology’ is still not treated as an overarching conceptual framework for integrating the other issues but, as was noted with LA 21 programs in other cities, is treated as a sub-set of other concerns, as a component rather than as a cohering structure. Despite any failings in absolute terms, Curitiba is relatively successful. Peter Davey suggests

That government action can have a radical effect for good, even in unpromising circumstances is shown by Curitiba, the capital of Paraná in Brazil and that country’s fastest growing city. Under mayor Jaime Lerner, an architect, a land use and transport plan was adopted which promotes dense development while allowing 52m² of open space per person, one of the highest levels of any city in the world. The key is a public transport system... (Davey 1997a p.5)

Curitiba is also justly famous for its adoption of an above-ground transit system using articulated buses that cost much less than an equivalent subway system. Inasmuch as it has been successful, Curitiba planners and government might well echo the views of transport planner Laura de Macedo¹⁰ who, speaking about the experiences of the city of São Paulo, said ‘There are no easy answers, and most of the experience had to be based on co-responsibility, demonstrating that public participation is key to policy making in a strong democratic system.’ (de Macedo 2000).

⁹ Antoninho Caron, Planning Secretariat of State of Paraná, presenting at the EcoCity IV conference in Curitiba, Brazil, 6 April 2000.

¹⁰ In conversation with the author in April 2000, De Macedo proclaimed her knowledge of UEA’s Halifax EcoCity Project and was keenly interested in what she expected to be its progress. The disappointment felt by many in South Australia about the Adelaide City Council’s failure to carry through and embrace the community and ecological principles for that development is felt as keenly overseas by urban professional like Laura as they are here.



FIGURE 38: One of Curitiba's famous articulated buses at a bus stop in the centre of the city departing from a pedestrianised street. (Source – Photo by author)

One of the biggest challenges facing Curitiba is the rising tide of car ownership, pollution, and population growth pushing the city limits. Planning for continued reduction in car use in Curitiba is getting more difficult. As it is in other in Latin American cities like Mexico City and São Paulo, because as newer cars are running cleaner, city governments are being convinced that they can ease up on traffic restrictions, making it even harder for new measures to be introduced in other cities (De Macedo 2000). The status of 'ecocity', already tenuous, is being further eroded as the pressures from global consumerism increase.

Dawson, a former newspaper editor and Mayor of the town and trustee of the Midrand Eco City Trust, described the Midrand initiative as a means of dealing positively with poverty and rapid urbanisation.

Midrand's initiatives include: establishing co-operatives based on food production with bartering systems and development of an eco-bank to provide low to no interest rates for the poor; reduction of water demand growth to zero within 5 years (saving the town US\$10 million even as the population grows at 10% per annum; containing sprawl and planning for a compact city form; appointment of an urban farmer to promote and drive agriculture through the area (a training centre for Permaculture is already operating in Midrand), and planning for municipal waste recycling.

In addition, the city has entered into a covenant with developers for establishing green office buildings and in 2000 was constructing an urban eco-village of 30 'natural brick'¹⁹ homes on 2,500 sq m as a model for sustainable housing integrated with organic agriculture and small business. And they are addressing the ever-present

¹⁹ Alan Dawson, presentation at Ecocity IX conference, Canada, April 2000.

6.6 Midrand



FIGURE 39: Alan Dawson, Councillor, Chairperson of the Executive Committee of Midrand Metropolitan Council, South Africa, presenting the Midrand Eco City Project at Ecocity IV (Photo by author)

At the other end of the scale from Calcutta and Curitiba, but still positioned firmly in the middle of the enormous social and economic pressures of developing country urbanisation and the forces of globalisation is Midrand. Ecocity credentials are claimed by this small city in South Africa which is Africa's fastest growing 'economic investment town'. Its very high annual growth rate has given it 'a brief window of opportunity to adopt sustainable development from the start...' (Dawson 2000).¹¹

Midrand has adopted an 'ecocity' program to address developmental pressures of poverty and population growth (from 20,000 to 200,000 people within 18 months). This program includes community food gardens, 'eco-friendly' construction using local resources, cycling and walking as preferred transport, 'greening' of workplaces, and emphasis on advanced and environmentally responsible technologies as the basis of economic development. In Midrand, like Curitiba, they are trying to address fundamental issues of healthy human settlement.

Dawson, a former newspaper editor and Mayor of the town and trustee of the Midrand Eco City Trust, described the Midrand initiative as a means of dealing positively with poverty and rapid urbanisation.

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In addition, the city has entered into a covenant with developers for establishing green office buildings and in 2000 was constructing an urban eco-village of 30 'natural brick'¹² homes on 2,500 sq m as a model for sustainable housing integrated with organic agriculture and small business. And they are addressing the ever-present

¹¹ Alan Dawson, presentation at Ecocity IV conference, Curitiba, April 2000.

problem of transport by collaborating with South Africa's equivalent to the CSIRO to 'introduce a suite of travel demand management strategies', now being implemented and including electric car, bicycle, park and ride and high-occupancy vehicle programs.¹³

There is a strong link from the developing country environment to that of developed countries and the evolving body of knowledge that is urban ecology. The Midrand Eco City Trust was a body independent of the Midrand Metropolitan Council structure funded primarily by the Royal Danish Government which has a venerable and sophisticated urban ecology program.

However, as of April 2001, the likelihood of Midrand continuing its initiative was fading fast. Writing about the prospect of Midrand continuing to host the forthcoming Ecocity 5 conference, Annie Sugrue¹⁴, one of the organising committee, posted the news that at the time of the presentations at Curitiba, Midrand was 'a fully fledged municipal structure, in charge of its own tax base and allocation of funds.' Since then, however, large changes have taken place in the municipal structure so that Midrand is now a 'part of a huge structure called the Johannesburg Unicity'. The relatively small city of 250,000 is now one of eleven districts of the new Metropolitan city council of some 3-4 million people. 'There is no longer a political structure for Midrand alone. All political decisions for the entire Midrand are taken by a huge council of over 200 councillors.' The city lost key councillors from the previous Midrand administration, including Alan Dawson, Enoch Dlamini and Fienie Van Rensburg.¹⁵ 'This means that effectively after July this year, this organization will have no money!! The Danes have more or less agreed to fund us until the end of the project period for which they are funding, which is the end of November. But I cannot use this money for the conference.' (Sugrue 2001).

Midrand appears to be a victim of the forces of centralisation and gigantism that are inimical to ecological development and the maintenance of community-oriented programs.

¹² Probably cement-stabilised mud bricks.

¹³ Alan Dawson, presentation at Ecocity IV conference, Curitiba, April 2000.

¹⁴ Anne Sugrue posting on ecocity5@lists.gaia.org 2 March 2001.

¹⁵ All delegates to the Ecocity IV conference.

6.7 Rural Urbanism in England

In the search for the 'bits and pieces of the ecocity scattered about in present-day cities and sprinkled through history' it is instructive to look at those parts of 'western' civilisation that have demonstrated some social and environmental resilience.

Urban civilisation depends on complex relationships of resource exchange and management between the urban centres and their regions. In sustaining civilisation over centuries in the same landscape, the natural has become artificial and the remaking of the landscape has resulted in the creation of a 'living fabric' that is susceptible to degradation from poor management, or as it might also be characterised, a collapse of the belief system necessary to sustain that system. Alexander cites the example of southern England '...which is a structure about three hundred miles by about one hundred miles that was built up over an eight hundred year period into one of the most complex structures ever made by man (sic). It is now rapidly being wrecked, because of lack of understanding of its existence and structure as a living fabric.' (Alexander 1997 p.215). The density of population and intensity of development of that region is remarkable¹⁶ and provides an example of at least a partial model for the urban-regional/city-country pattern that is inherent in the Ecopolis prospect¹⁷.

6.7.1 Poundbury

Prince Charles is undertaking an experiment on part of this 'living fabric' of Southern England with an extension to the country town of Dorchester on his estate lands at Poundbury, designed by Leon Krier.

A number of texts deal with shaping streets, squares and the other 'outdoor rooms' of the city. Rob Krier's work has been of particular significance (Krier 1979).¹⁸ Krier's basic premise was that we had lost the 'traditional understanding' of urban space (Krier 1979 p.15). Krier's brother Leon employed the principles that he and his brother had developed together in the planning of 'Poundbury'.

¹⁶ See Appendix 4 for a brief comparative analysis of the relative development densities of rural England and metropolitan Adelaide.

¹⁷ And undoubtedly influenced the author of this thesis, who spent his formative years as a organism in the weave of that 'living fabric'.

¹⁸ The Foreword by Colin Rowe in the first US edition was sarcastically critical ('...if only abstractions could be relaxed, more empirical material allowed to enter and a further generalisation to take place, then how happy one would be.' (p.12)) even as it recognised that what he had done was '...constructive, suggestive and tremendously important.' (p.12).

In the early stages of its construction supporters and detractors of Prince Charles viewed his Poundbury experiment with concern, finding the architectural approach unconvincing and public communication minimal or otherwise inadequate (De Bertodano 1994 p.15). By the end of the 1990s the view appeared to have shifted, so that regardless of opinions about the style of the buildings, there was a growing appreciation of the quality of its streets and public spaces (Worsley 1998 p.24). This appreciation had reportedly extended to the Department of the Environment, Transport and Regions which published a handbook called 'Places, Streets & Movement' supporting the primacy of people over vehicles and variety over monotony (1998 p.24).

Poundbury is categorised as a Type V 'New Urbanism' Development by Barton and Kleiner in their review of 'innovative eco-neighbourhood projects' (Barton 2000). They identify its importance for 'confounding assumptions of house purchaser conservatism, and pointing the way to much more efficient and effective use of greenfield sites.' (Barton 2000 p.78). Despite Krier's attention to walkability and mixed-use they say it fails to stand up to 'the exacting standards of sustainability' and criticise it as 'far from ideal for bike and bus efficiency' (p.78).

It attracted local criticism too 'If the intention was to produce poetry in the Dorset dialect, the result so far is doggerel in theatrical Mummerset.' (Walker 1997 p.70). With what he claims is too little attention given to the use of native materials, Walker, Chairman of Dorchester Civic Society's Conservation Group, says the value of the development as an exercise in 'forging a new model environment' is substantially reduced. He asks 'Where in this 'celebration of the locality' is the cob, the clunch, the flint and the thatch? One suspects these materials were put in the too-difficult file as compared with the ease of utilising insulation blocks and cement render.' A puritanical attitude to materials and carping about pastiche runs through Walker's critique of Poundbury.

His complaints about its urban design seem less sure with some apparent contradictions. Walker recognises that 'The intention was to reduce the impact of the all-pervading culture of the car...' but seems not to allow for the physical limitations of space-packing when he then immediately complains that '... anyone coming to Poundbury to cultivate his (sic) garden will discover more designated parking space than vegetable patches.' He then goes on to say that the Dutchy's own brochure '...reveals the relative spaciousness of the housing plots on the neighbouring council estate compared with the hugger-mugger density of the new buildings.' (p.70). This critic is not an advocate for higher density development, even when it is equivalent to

the historic regional urbanism he so admires. Study of the plans and photographs of Poundbury reveal that it is both inventive and pragmatic in its accommodation of the car. The author's own efforts at designing medium to high density development (and familiarity with the traditional urban form of south west England) lead to a sympathetic acceptance of the need to reconcile 'car courts' with 'urban space' and acknowledge that they often have to be one and the same to achieve a workable solution (see, eg., the parking areas of Christie Walk, Chapter 8). Poundbury has been developed in an environment in which planning regulations and building codes do little to encourage traditional built form and, in the circumstances, achieves surprisingly much of the picturesque quality that is sought in Krier's work. An editorial postscript notes an expectation that Poundbury will offer a richer social mix than most suburbs. A similar design approach can be found in the author's own work done in association with Dave Pickles for redeveloping a part of Beverley in Yorkshire in 1975. This design thesis has many parallels with the much later Poundbury scheme, with the main difference being that it was for redeveloping a brown field rather than a green field site (see below).

6.7.2 Beverley

It is of interest to compare Krier's much later plans for Poundbury in Dorset with those prepared for Beverley in Yorkshire by David Pickles and the author for their final year design project completed at the Welsh School of Architecture in April 1975, later exhibited and published in part (Downton & Pickles 1977). It was a proposal for an industrial site, ripe for redevelopment, in a critical central position in an historic town (Beverley, Yorkshire). Welsh School of Architecture in 1975 (Downton and Pickles 1976). Krier's planning was on the basis of an explicit theory whereas the Pickles-Downton project was entirely empirical. Both are effectively about the reinstatement of a pattern derived from the old urban fabric and both are concerned with what Krier clearly identifies as a 'quarter' (Krier 1989). There is a fairly strong congruence of conceptual forms in the designs including urban blocks, winding streets, visual axes but

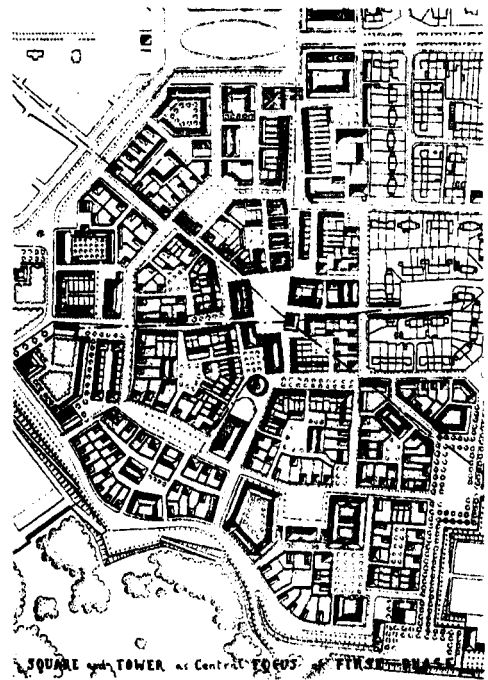


FIGURE 40: Krier's planning for the Poundbury extension of the historic town of Dorchester in England was based on walkable 'polycentric' areas in the town identified by an analysis similar to that used by Register in Ecocity Berkeley. (Source: Krier 1989 p.51)

without rigid linear avenues; there is even some similarity in graphic technique in that both eschew a mechanistic aesthetic in their style of presentation. The architectural forms are likewise traditional or semi-traditional and there is a hierarchical underpinning to the layout, in one case to a central square and in the other to a Minster.

This congruence of approach does not arise from any known conscious relationship of ideas or practice between the authors of the two schemes and thus it may

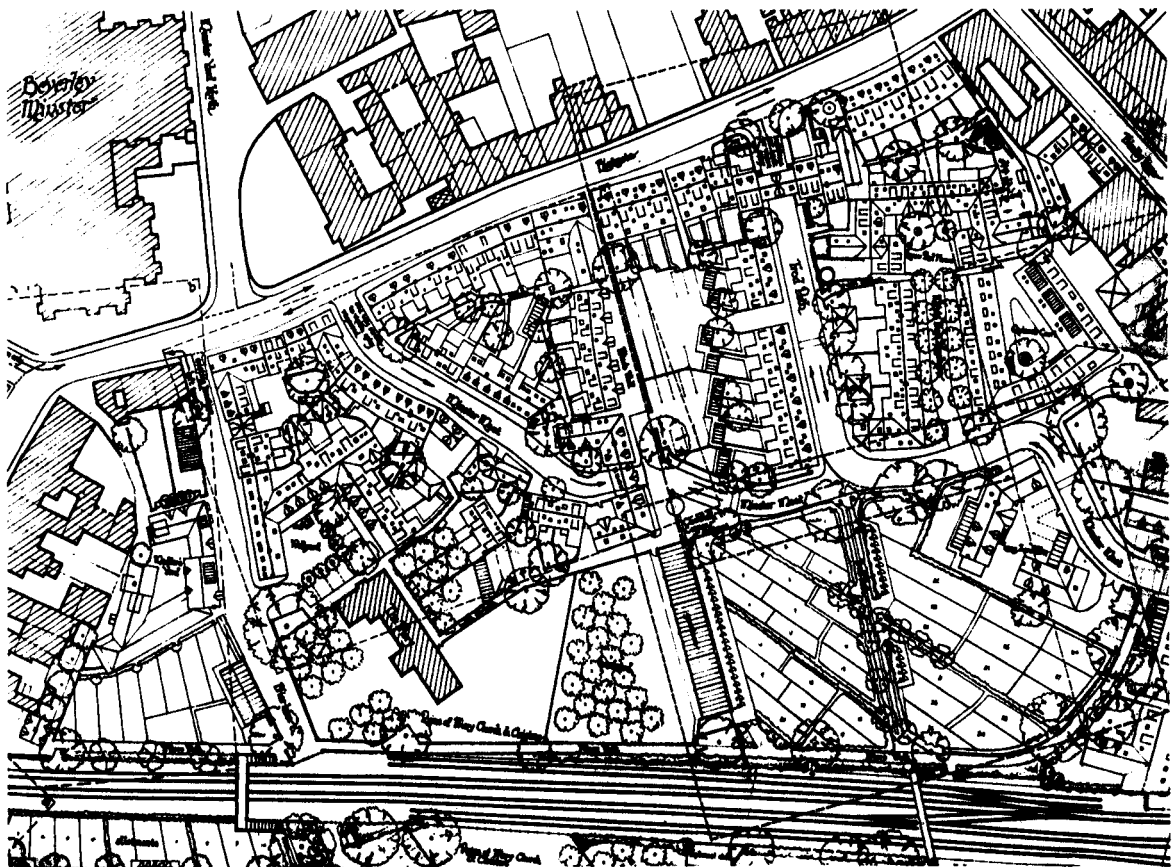


FIGURE 41: The site plan of the Downton & Pickles proposal for redeveloping a 'quarter' of the Minster town of Beverley in Yorkshire (Downton & Pickles 1975).

be taken as another example of the capacity to recognise intrinsic patterns in human settlement that provides coherence to vernacular design and gives rise to what Alexander calls 'the timeless way'.

6.7.2.1 Beverley & the Later Ecocity Projects

Much of the thinking behind the HEP, WED and CW was presaged in the Beverley scheme. The proposal was for small scale, accretive development that engaged local craftspeople and contractors to better serve the local economy and engage local interest. A large developer was eschewed on the basis that, among other things, they would adopt a master plan approach that would not support an adaptive, organic development process. A 'Conservation Trust' was proposed to be the developer

working alongside and in support of the council but autonomous and able to function 'as a self-regulating organism'. Development of the site was proposed over a period of about 20 years with stages *not* planned in advance lest that become 'a strait-jacket on the organic realisation of that development.' (Downton & Pickles 1977 p.3) Each stage was intended to assist the financial viability of the next. The HEP 'School of Urban Ecology' was also there in embryo with a 'school of craftspeople' growing on the site, and 'A job architect would become one of the first residents, living and working on the site with her or his work-place open to all so that public participation stands a chance of becoming a reality rather than merely a phrase.' (Downton & Pickles 1977 p.4) The report reinforces this by insisting that 'There should be no imposed solution at any point. A very real involvement of builder, architect and residents must be the generative force for the entire development.' (Downton & Pickles 1977 p.4) In the plans 'to indicate the general layout of a development in keeping with the above principles' could be found concern for ancient boundary lines, historic street and building patterns, landuse predating then-current urban development, traffic calming, productive landscape, community gardens, and integration of new structures with old.



FIGURE 42: Perspective rendering of the Downton & Pickles proposal for redeveloping a 'quarter' of the Minster town of Beverley in Yorkshire (Downton & Pickles 1975).

Over a quarter of a century after the Beverley schemes was conceived by the authors, one (Downton) is to be found in Australia trying to realise projects based on similar principles of what might be called regenerative urbanism and the other (Pickles), as Chief Architect of Newark & Sherwood District Council in England, is also applying similar principles as part of a strategy for upgrading the environmental performance of the existing urban fabric of Newark in order to reduce health problems caused by cold and damp dwellings (Pickles 1992)¹⁹.

6.7.3 Cornish Domes – The Eden Project

‘The British landscape is semi-natural at best, having been influenced by human activities since the Mesolithic (circa 10,000 – 4,500 BC).’ (Wheater 1999 p.xii)

By 1981 over 10% of land in England was urban. (Wheater 1999). The landscape is artificial. Whilst Charles has looked to the past for inspiration in his addition to the living fabric of England’s landscape, there has been at least one recent experiment in building environments that contain synergies generated by the application of high technology and non-traditional ideas to ecology and place. Bucky’s domes and Biosphere 2 have clearly provided inspiration for the designers and developers of the \$200 million plus ‘Eden Project’, supported by the UK government ‘Millennium Commission’. Situated in Cornwall, south-west England, the Eden Project is under construction and when complete will provide a series of contained ecosystems under a complex of geodesic domes (the largest of which contains 1.5 hectares) set in a worked out China Clay quarry. (Davey 2000 p.76). In this constructed ecology of the English ‘living fabric’ buildings will house ecology, demonstrating an integration between the natural and the artificial, mediated by the architecture of the built environment.



FIGURE 43: Eden Project domes under construction. (Source: *World Architecture* Pawley 2001)

¹⁹ Pickles’ work earned him an OBE in 1996.



PART B

**URBAN ECOLOGY AUSTRALIA & ECOPOLIS:
ECOCITY PROJECTS IN SOUTH AUSTRALIA**



INTRODUCTION

You are certainly on the cutting edge of some of the most critical issues of our times...
Unless we begin to make significant changes soon in the way we organize ourselves as a civilisation,
we face an ecological catastrophe on a global scale unprecedented in history of mankind.
The concerns of the Urban Ecology movement are an integral part of this larger set of issues.
We must begin the restructuring at the most basic level, in our homes and in the
towns and cities where we all live.

(Al Gore 14 April 1992)¹

The ecological benchmark. It is a physical fact: there is on average only 1.7 biologically productive hectares available per person, assuming the fragmented 12 percent of nature suffice to secure biodiversity. Population growth and ecological deterioration are reducing this area even more.

The key question is therefore: how can we squeeze high and attractive quality of life out of these 1.7 hectares. We require experiments and case studies to highlight this question and show how we can best live within these limits. How about an international competition on examples of best living on less than 1.7 hectares?

(Wackernagel et al 1997)

Part B of the thesis presents three case studies of ecocity projects in South Australia, one of which remains unbuilt, two of which have begun construction. In these projects the author was consciously attempting to apply the nascent theory of Ecopolis as described in this dissertation. In these case studies the evolving 'Ecopolis Development Principles' have been used, with varying degrees of application and success, as the basis for the design, development and management of ecocity projects. The projects are the Halifax EcoCity Project, a high-density, inner-city mixed-use development in Adelaide, the Whyalla EcoCity Development, on the EcoCity Core Site, in Whyalla, and the Whitmore Square EcoCity Project/Christie Walk, currently under construction in central Adelaide. The author of this thesis is the architect and urban designer primarily responsible for these projects through his involvement with the architecture and urban design company, Ecopolis Pty Ltd, and the community educational association, Urban Ecology Australia Inc. He is also intimately involved with the developer, Wirranendi Inc and the builder, EcoCity Developments Pty Ltd.

¹ Addressed to the author as Convener of EcoCity 2, from 'Albert Gore, Jr., United States Senator'.

B.1 Taking the Long View

Every week urban growth corresponding to a large city the size of Birmingham, Adelaide, Kitakyushu, or Aleppo occurs on the face of the Earth. (Girardet 1992 p.177)

The temporal and spatial scale of 'the urban problem' is enormous. Brand identified 'six significant levels of pace and size in the working structures of a robust and adaptable civilisation.' From fast to slow his levels are:

- Fashion/art
- Commerce
- Infrastructure
- Governance
- Culture
- Nature

(Brand 1999 p.35-36)

The pace of change in culture and nature are slow and evolutionary rather than rapid and revolutionary. The scale of operation of 'culture' and 'nature' encompasses entire societies and biomes. 'Culture is the work of whole peoples.' (Brand 1999 p.38). An ecocity theory has to be tested against these scales of time and geography of reach rather than those of 'commerce' and 'fashion' (and yet has to accommodate those too). Cities are one of the few constructions that humans create with a long-range timeframe, that work in the realm of Brand's 'Long Now' (see Chapter 4). Yet they have never been purposefully designed to accommodate change and are certainly not, as yet, being designed for climate change. It is intrinsic in the Ecopolis theory itself that it needs time for the processes of participation and engagement in design and development to evolve. Cultural change is difficult to observe in 'real time', it is best understood historically, and ecological adaptation takes place over longer timescales than any civilisation has existed. The case studies introduced here as 'tests' of the theory have to be seen in the context of the 'Long Now'.

Human imagination is capable of planning for the future and in so doing it can either extrapolate (and invariably be wrong) or use 'imaginative scenario planning'. Brand tells us that prediction is more or less pointless. It is always going to be wrong, and rigid planning on the basis of prediction will necessarily go awry. He favours 'imaginative scenario planning' which 'by giving up on any hope of accurately predicting the future, yields strategies made robust by their wide scope of alertness and swift adaptability. You don't plan for a single certain future but rather for multiple possible futures, each based on a different theory of what's really going on' (Brand p.118). Imaginative scenario planning allows for various possible future conditions and

builds resilience and responsiveness into forward planning. In the context of city-making, this supports the idea of constructing a range of built-form and development scenarios in the urban skein as a means of testing in time and context, thus to get a clearer sense of what does and does not work.

One surprising by-product of the scenario-planning process is increased responsibility. Corporations discover the need to take care of their industry as a whole, or to protect the natural environment, or to promote civil liberties. This comes not from virtue but solely from the ability to engage longer periods of time. While twenty-year forecasts are a complete waste of effort, twenty-year scenarios are common and useful. Any organization confidently thinking twenty years ahead is compelled to grapple with long-term needs, such as an educated workforce and a sustainable regional economy. Rigorous long-view thinking makes responsibility taking inevitable because it responds to the slower, deeper feedback loops of the whole society and the natural world. (Brand 1999 p.118)

The case studies in the following chapters are of projects that have taken the longer view based on imaginative scenario planning.



FIGURE 44: The Urban Ecology Australia Inc logo is a revision of one by the author based on a design by Richard Register for the US Urban Ecology. It is intended to represent cities in balance with nature. Register was pleased to see the original idea adapted to a different bioregion and circumstance. *(personal communication with the author)*

B.2 Urban Ecology Australia

B.2.1 A Brief History of the Organisation

Urban Ecology Australia Inc (UEA) was incorporated as a community non-profit educational association in December 1991². It has grown to become a national organisation with formal recognition from the federal government as Australia's 'peak' urban environmental community organisation. Urban Ecology Australia has the following objects and purposes:

- (a) To educate, inform and facilitate the exchange of information about the evolution of ecologically integrated human settlement through conferences, lectures, published papers, newsletters, participation in expositions and fairs, maintaining a library, and through other appropriate means;
- (b) To sponsor, undertake and encourage research to be carried out in relation to the evolution of ecologically integrated human settlement.
- (c) To provide an independent, community-based focus for co-ordinating and advocating action to transform existing human settlements in the direction of ecological integration, health, and social vitality and equity;
- (d) To participate in building new ecologically integrated, healthy, socially vital and equitable new human settlements.
- (e) To do all such other things as are conducive or incidental to the attainment of any or all of the above.

Before there could be interest in *urban* environmental issues, there needed to be a shift in perception within and outside the 'environment movement'. The goal of Urban Ecology Australia has been to inject eco-city ideas into the mainstream and interest 'ordinary people' in ecological development³. To do that, mainstream media had to be involved and both the critique of present day cities and positive images and ideas for future cities needed to gain popular currency.

The history of Urban Ecology Australia can be traced back to Greenhouse '88 (1988), a national, video-networked conference which reached the general public and won the Commission for the Future a United Nations award. After identifying the absence of any reference to the built environment in the conference themes which covered the impact of major industry sectors,⁴ the author was urged by his partner Chérie Hoyle to introduce a focus on the built environment. This led to the convening of people with an interest in urban environmentalism, including Deborah White, a co-

² The author's involvement with this 'grass roots' community organisation has helped maintain his focus on important issues in urban ecology more clearly than would have been the case had he been theorising solely from his position as university academic.

³ Although incorporated in South Australia, its name expressed an intent to lay claim to a national role.

⁴ An oversight repeated in the then-Labor federal government's 'greenhouse' response.

author of an early Australian text on what would now be called 'sustainable cities' (White, et al. 1978). The conference organisers accepted the inclusion of 'built environment' sessions at the Greenhouse '88 conference, which later inspired the formation of the 'Greenhouse Association of South Australia' (GASA). GASA attracted a number of people not previously involved with environmental organisations and obtained sponsorship from the SA Gas Company, largely because of the personal interest of Domestic Marketing Manager, Mike Croshaw. The public launch of GASA was remarkably successful with an inventive program⁵ that involved virtually every major electronic media organisation in the state with coverage on nearly every TV and radio station.

At 'Greenhouse '88' the author presented an illustrated critique of city-making ('Mirror, mirror of our walls') that identified the environmental impacts of cities, using Adelaide as an example (Dendy 1989). It identified the city as the central agency in wreaking local and global ecological destruction, but also proposed a positive future based on ordinary citizens' commitment to reworking the processes and forms of urban fabric. This was researched and developed into the Ecopolis concept presented in Adelaide at the 'Ecopolitics IV' conference in 1989 which, in turn, led to interviews with the author about the idea of Ecopolis being published in two mainstream newspapers (Painter 1990a, 1990b).

Meanwhile, the 'Greenhouse '88' proceedings came to the attention of Richard Register, founder of Urban Ecology Inc in the USA, who invited the author to speak at the First International Ecological City Conference, April 1990, in Berkeley (Canfield 1990). This initiated links between Register and Australian urban ecologists, vital to the development of eco-city activity in SA⁶. Later that year, the author spoke at the 'Architecture of Cities' conference in Calcutta organised by one of the author's former colleagues from Yarmouk University in Jordan, Professor Santosh Ghosh. Ghosh's determination to ensure lasting outcomes resulted in the conference adopting the text of

⁴ An oversight repeated in the then-Labor federal government's 'greenhouse' response.

⁵ Conceived and managed by Chérie Hoyle.

⁶ Register and the organisers claimed that Urban Ecology's 1990 First International Ecocity Conference would be 'the first major event to bring together the innovators and experts from around the world to consider reshaping towns and cities for health and vitality deep into the future...' (The Urban Ecologist 1989 p.14). The subsequent series of international ecocity conferences held thus far in 1992, 1996 and 2000 have been supplemented by national conferences with a similar style, content and ambience, in particular the First Los Angeles Ecological Cities Conference in 1991 and the Catalyst conferences in 1995 and 1997.

'The Charter of Calcutta' (Downton. 1991), which has since underpinned UEA philosophy.

After returning to Adelaide from 'Ecocity 1' as it became known, the author had been invited to mount an exhibition on 'Ecopolis' at Old Parliament House. This prompted creation of 10 panels illustrating the problems and promise of urban development and its environmental impacts (see 13.3 Exhibitionism: Ecopolis Now!). Launched by John Schumman, the exhibition helped spread ecocity ideas in the state, not least amongst politicians, including then shadow Minister for the Environment, David Wotton.

B.2.1.1 Changing the Climate of Opinion

In 1991 GASA held a second national conference, 'Greenhouse '91', at which Register was keynote speaker, with the theme 'Changing the Climate of Opinion'. In December 1991, Urban Ecology Australia Inc (UEA) was formally incorporated, having grown from many of the people and interests that had initially come together through GASA. ACF's Habitat journal featured Ecopolis (Downton 1991 p.22-28) and advertised both the Greenhouse '91 conference and a call for papers for the Second International EcoCity Conference 'EcoCity 2' in Adelaide.

In April 1992 UEA ran the EcoCity 2 conference with over 400 delegates and speakers from 21 countries. The conference was structured to avoid isolating 'environmentalists' from both the broader community and the business sector. It was made affordable for non-wage earners but was held at the Hilton Hotel in Adelaide's CBD, challenging stereotypical expectations of 'environmental' events and enhancing conference 'visibility'.

The aims of UEA moved beyond rhetoric to make practical propositions for ecocity solutions. In support of this goal, UEA announced the Halifax EcoCity Project at EcoCity 2 with a drawing of the project on the conference poster to give the proposal maximum currency. Before reaching this stage, the HEP had undergone a considerable period of gestation involving significant community input (see below).

UEA's evolving theoretical base said that ecocity development should not simply be dependent on economic forces and that there had to be a culture that wanted such development. A precondition for this was the availability of relevant ideas in the socio-cultural milieu. If 'ecocity' and ecological development words and ideas weren't being employed in the media, there could never be enough general interest to sustain even modest proposals for ecocity projects. Between 1988 and 1992 UEA focussed on

changing perceptions in order to set up one of the essential preconditions for acceptance of, and eventual support for, ecological cities.

B.2.1.2 Challenging Negativity

UEA set out to change perceptions in an ‘up-beat’ way. Inspired partly by a workshop at ‘Greenhouse ‘88’ on combating despair in the face of global crises and the vigorous championing of the positive view from Flinders University Philosophy lecturer, Malcolm Slade, it was decided that the best antidote to negativity was presentation of practical alternatives which demonstrated the route from ‘here and now’ to ‘there and then’.

Subsequently, in public meetings and conferences across Australia and overseas, UEA speakers (Downton, Ede, Fisher, Hall, Hoyle, Knottenbelt, Versteegen, et al) repeatedly found that the main source of negativity (‘No, you can’t do that’) does not come from the ‘average suburbanite’ but seasoned ‘alternativists’ or left-wingers who have battled the system for years and dispiritedly believe that they know exactly what cannot be done.

The task of challenging negativity has not been limited to talks and conferences (where UEA’s collective experience in all venues had been, and remains overwhelmingly positive), but also in running the organisation itself, particularly in the management of the Centre for Urban Ecology (CUE). UEA’s policy of not tolerating sexism, racism, or pessimism, has occasionally led to tensions. Just as a steady drip-drip-drip of negative criticism can undermine individual or collective confidence, so sustained effort to see the positive aspects of a situation can build confidence. Positive energy is self-reinforcing and over several intense years, UEA volunteers have generally reported their experiences with the organisation as empowering and liberating.

UEA has only been able to exist at all because of its volunteers. The human capital of energy, enthusiasm and commitment provided by volunteerism has provided UEA with the capacity for promoting ecocity development projects, notably the Halifax EcoCity Project. Since opening the Centre for Urban Ecology in May 1993, UEA has been open to the public and has hosted researchers and work experience students from schools and the tertiary education sector. Setting up a Centre for Urban Ecology has led to provision of an advice and referral service. A substantial reference library has been

established⁷ and UEA routinely receives requests for policy advice from elected representatives at all levels of government.

Since 1994 UEA has hosted interns from other countries including Malaysia, Germany, Denmark, Canada and the USA. They assisted in the day-to-day running of the CUE and also undertook research projects on behalf of the UEA and, often, educational institutions in their home country.

Being non-authoritarian does not mean being a 'soft touch', and neither does it mean a lack of structure and purpose. For a deeper look into the theory of non-authoritarian organisation, anarchist theorists remain relevant, especially Kropotkin from the last century and Bookchin from the present. The connection between these organisational issues and effective eco-city theory is through community participation processes and theories of citizenship (Bookchin 1991, 1995). That citizenship involves active participation and advocacy in the community. On the basis that ecological cities can only begin to exist when there is a citizenship that wants its cities to be 'ecological', UEA has promoted ecocity ideas at the immediate, local level as well as regionally and nationally. Its advocacy has included the promotion of environmental technology and commitment to environmental education⁸ but this has only been a part of the overall goal of promoting ecological cities.

Its commitment to demonstrating practical outcomes has been evidenced through involvement in consultancies for private and public sector clients where the goal is ecological responsibility in urban development. UEA's advocacy of major inner-city, ecological development has been on the basis that the primary means by which developmental and environmental pressures can be reconciled with the restoration of nature is through the massive resource management capacity inherent in the built environment.

B.2.2 Promoting 'Key Developments'

UEA has evolved into a genuinely national organisation since 1991 with over 300 members nationwide (and some overseas members). Its success as a decentralist national educational association can be seen in the autonomous activities of its branches in Victoria and the ACT. It has achieved formal recognition from the federal

⁷ Thanks to UEA Life Member #1 David Munn.

⁸ UEA has run programs for schools, work experience, international internships, professional development courses, public talks, international conferences, and exhibitions. It has maintained a library and published conference papers, journals, newsletters, booklets and a major bibliography, and maintained a website since 1994.

government and contributes to national, state and local governmental panels as well as the life of local communities. But whatever else it has been engaged with, during its history as a formal institution it has maintained the goal of initiating major inner-city redevelopment projects as a key strategy for achieving change. This strategy is derived from the author's proposition that the making of Ecopolis depends on catalytic changes in the urban fabric – a fabric understood to be woven from the threads of social and built form⁹. At the socio-political level, as a cultural intervention, if 'a key building can help to switch a city' (Davey 2000a p.47) then so can key developments. Placing 'the community' at the heart of the development process has been seen by the author and the UEA organisation as a necessary, radical program for determining the type and ownership of any such city 'switches'.

It is being increasingly recognised that the future of sustainable development has to involve practical partnerships between the industrial, commercial, governmental and community sectors. This was, for instance, the theme of the 'Partnerships for Change' conference convened in Manchester in 1993 where the 'Sustainable Urban Communities' workshop noted that 'The history of the city is a history of partnership, of people coming together to create the conditions for social, economic and environmental security' and that 'The city, in partnership with agriculture in rural areas, has been both a vehicle and catalyst for change.'¹⁰ UEA and Ecopolis see eco-city projects in particular, as vehicles and catalysts for change with the community as leading partners in the process of change.

B.2.2.1 Three Fractals

Since 1990 UEA, in association with Ecopolis Pty Ltd, UEA has been advocating and proposing ecocity developments as catalysts for change – 'cultural fractals'. Chapters 7, 8 and 9 present case studies of three of these developments where the evolving 'Ecopolis Development Principles' have been used, with varying degrees of application and success, as the basis for the design, development and management of ecocity projects. They represent, in effect, tests of imaginative scenario planning – adventures in ecocity making – and they range from unbuilt experimentation with ideas (The Halifax EcoCity Project) to active development of community and physical

⁹ RE:1.1.2.4 Proposition 4: *CULTURAL FRACTALS: Demonstration projects provide the means to catalyse cultural change*

¹⁰ p.63, Workshop 3 - Sustainable urban communities (Chair, Jaime Valenzuela; Animator, Paul Downton; Rapporteur, Orapin Sopchokchai; Conference International Advisory Group Member, Michael Ndubiwa), Partnerships in Practice, Department of the Environment, London 1994.

structures at the municipal scale (Whyalla EcoCity Development) and the neighbourhood (Christie Walk). The projects are all in South Australia.

The first project to be publicly announced was the Halifax EcoCity Project in 1992. This was a proposal for a high-density, inner-city mixed-use development on a 2.2 hectare site in Adelaide. It subsequently received enormous community support and gained international acknowledgment as an influential model for advanced, integrated, inner-urban ecological development but conventional developers and the local city council failed to engage with the community in carrying the vision through to reality.

The Whyalla EcoCity Development was proposed in 1996. It not only received community backing but was initiated and supported by the local council. Community developers were erecting innovative, environmentally –friendly buildings within 18 months of the project first emerging as an idea. It continues to proceed, fitfully, on 15 hectares designated the EcoCity Core Site, in Whyalla. A change of council led to reduced support for the project, and recently, private sector corporate interests have begun to undermine the original vision.

A third proposal, the Whitmore Square EcoCity Project, has been pursued as an entirely community-based enterprise embracing democratic processes and ethical investment as well as non-profit structures and uncompromising ecological criteria. This third project is in the heart of the City of Adelaide where site works commenced in early 2000, and the first resident moved in during April 2001.

These three projects are real world attempts to apply knowledge and ideas as they have developed or become available. As case studies they illustrate and test the Ecopolis propositions and many aspects of the theory which are described in Part C of this dissertation.

As the architect and urban designer primarily responsible for these projects through his involvement with the architecture and urban design company, Ecopolis Pty Ltd; and as both an advocate and theorist with the community educational association, Urban Ecology Australia Inc., the author has had the privilege of unrestricted access to documentation and to the people involved with these projects. Since 1991 the author's involvement in these 'cultural fractals' has found him, at one time or another, in the various roles of advocate, client, architect, developer, builder, educator, researcher, theorist and potential resident. Every effort has been made to use those privileges and experiences to inform this thesis in a way that respects the many contributors to these ecocity adventures.



CHAPTER 7

CASE STUDY I

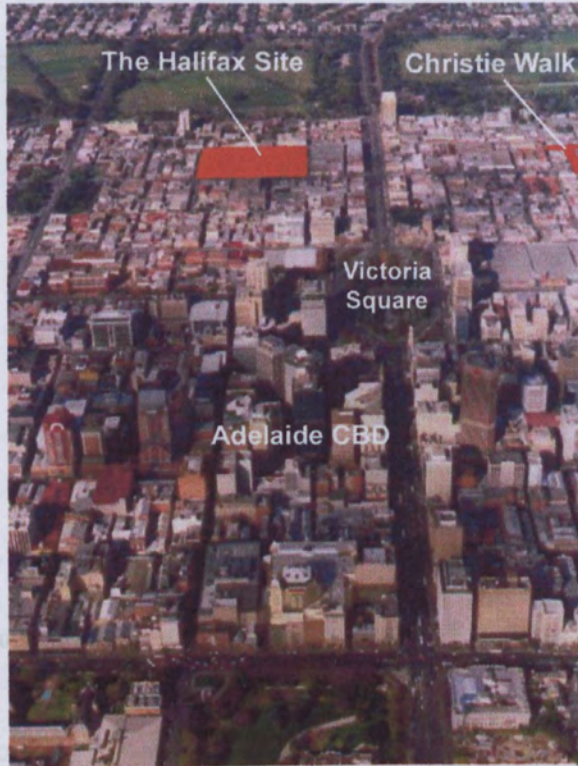


FIGURE 45: The City of Adelaide showing the location of two of the case study sites.
 (Photo by author)

The Halifax EcoCity specific project which is the South

planning for this in the inner city area of 1994 p. 5)

The Halifax Eco

ing the late 1980s and

early 90s. The HEP did... and International EcoCity Conference (Orszanski 1993 p. 3)... activities that the eventual HBP protagonists were already involved in, namely, seeking ways to build a working example of the 'Ecopolis' idea. The Project proposed a 'piece of ecocity' for 800 people including community facilities, cafés, shops, offices, an Ecology Centre and market place. The car-free, mixed-use development of 3-5 streets would have been of a similar density to traditional European cities. It was conceived as a means of catalysing redevelopment in the City of Adelaide and as a device for promulgating the ideas of ecological-development.

Designed by the author from an idea by Roman Orszanski, the Halifax EcoCity Project logo (shown here in its original bit-mapped format) represents humanity learning to juggle the elements in an attempt to place human settlement (represented by the square) in a position of dynamic balance with the biosphere. (The same ancient Air, Earth, Water & Fire symbols are employed in the logo for Ecopolis Pty Ltd.)



CHAPTER 7

CASE STUDY I

THE HALIFAX ECO CITY PROJECT

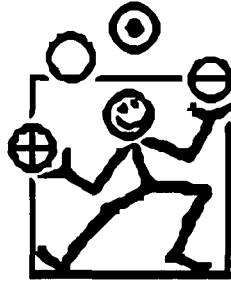


FIGURE 46: The Halifax EcoCity Project logo¹

The Halifax EcoCity Project does exist. Its realism has grown out of the detailed planning for this specific project which is well advanced for a specific site awaiting urban renewal in the inner city area of the South Australian state capital of Adelaide. (Prelgauskas 1994 p.5)

The Halifax EcoCity Project (HEP) and UEA evolved during the late 1980s and early 90s. The HEP did not so much grow out of the 1992 Second International EcoCity Conference (Orszanski 1993 p.3) as develop from activities that the eventual HEP protagonists were already involved in, namely, seeking ways to build a working example of the 'Ecopolis' idea. The Project proposed a 'piece of ecocity' for 800 people including community facilities, cafés, shops, offices, an Ecology Centre and market place. The car-free, mixed-use development of 3-5 storeys would have been of a similar density to traditional European cities. It was conceived as a means of catalysing redevelopment in the City of Adelaide and as a device for promulgating the ideas of ecological development.

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7.1 Beginnings

7.1.1 Placing the Project

Co-protagonists UEA and Ecopolis identified the 2.4 hectare, polluted, ex-industrial wasteland site of an old City Council works depot in South Australia's capital city as an ideal site for

demonstrating ecological development processes. The HEP protagonists believed that the site could have been the location for a world leading precedent on how to take an inner-urban site all the way through from the processes of remediation to occupation as a totally healthy human built environment. The site was heavily contaminated due to a range of past activities, in particular the presence of an asphalt plant and coal tar storage and distillation². Ecological development is about healing and restoring such damaged environments. Public pressure, mobilised by the EcoCity supporters, was instrumental in the Adelaide City Council's decision to clean the site to residential standards.

The goal of the Project was not just to create an 'environmentally-friendly' development but to address numerous issues related to development processes and the impact of the city on its hinterland. These included:

- exploring 'community-driven' development and social equity in development
- challenging status quo power relationships and questioning assumptions about the purpose and cost structures of the development industry
- exploring various forms of tenure and community management structures
- linking urban and rural development and advocating holistic urban planning.

It became an experiment in community development sustained by a nucleus of activists. It moved unevenly from concept to partial realisation by consolidating political momentum at the community level. The Project was always described as a 'piece of eco-city' to reinforce its connection to the existing city but also it complies with 'urban village' definitions³, incorporating principles of social equity, community enterprise and ecological responsibility. It has similarities with other eco-city models but is

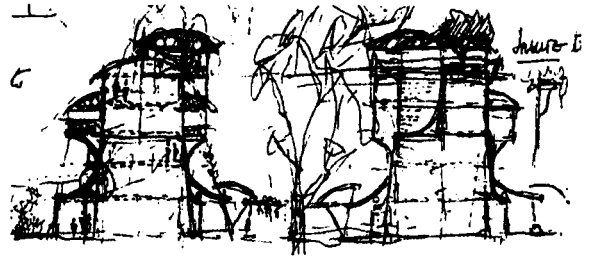


FIGURE 47: An early sketch design by the author, exploring sectional relationships between mixed-use buildings. (Sketch by author)

² The main contaminants were coal tars with elevated Polycyclic Aromatic Hydrocarbons (PAHs) and lead levels with hotspots of arsenic, mercury, and petroleum hydrocarbons.

³ Aldous, Tony (Ed.), *Economics of Urban Villages - A report by the Economics Working Party of the Urban Villages Forum*, Urban Villages Forum, London 1995. This Report appears to confirm the general nature of our independent, Australian-based observations about the problems and prospects of the urban village/eco-city, community-based development model.

notable for its emphasis on the connectivity of city and region – it attempted to address rural degradation by making rural land restoration an integral part of the overall urban development program, creating a model for linking the sustainability of a city's economy and resource base to its bioregional context.

7.1.1.1 Projected Features



FIGURE 48: One of the CUE's socially pivotal vegetarian lunches and some of the volunteers. (Photo by author)

The Project would have featured green technology with climate-responsive architecture, non-toxic construction, solar hot water, solar electricity production and on-site biological treatment of sewage. Initial concepts included massive 400mm thick walls providing thermal mass (cool in summer, warm in winter) and exceptional sound insulation. Privacy was

maintained despite windows facing into courtyards and public spaces to allow passive surveillance of children and the immediate environment. The site was compact, within 10 minutes walk of the CBD. There was to have been no through-traffic for increased safety - and no poisonous fumes. A significant amount of open space was to have been retained at ground level, complemented by rooftop gardens and balconies. All these features were to reappear in the Christie Walk project (see Chapter 9).

Apart from researching and designing the environmentally-friendly physical structures, the project required research, design and construction of the 'invisible' financial and management structures to ensure that its economic and social foundations were equitable and democratic. Without this, in the Ecopolis theory the project could not have been truly 'ecological'. In a 1994 grant application prepared in support of the Project, Adrian Shackely noted that, amongst other things:

Putting in place the legal and financial structures for such a project involves ground breaking innovations. There is no comparable project anywhere in Australia although many of the elements are present in various places. If it is successful, it will provide significant breakthroughs in many areas including legal arrangements, financing, provision of community facilities and environmental enhancement and sustainability.

Funding was planned to come from a number of relevant, ethical, and appropriate sources, the bulk coming from the contracted pre-sale of properties - this pattern of funding was actually adopted for the later Christie Walk development. The Project was sustained by the input of skills donated by hundreds of people over a total period of seven years.

7.1.2 Initiating the Project

Respect for the first people of Tandanya is crucial to making Adelaide an eco-city. Development of the project was only continued after consulting with the Kaurna Heritage Committee to make sure that the project was suitable for the land. (Munn 1995 p.62)



FIGURE 49: The Halifax Depot façade to Halifax Street. The CUE building is to the immediate left of the tree. (Photo by author)

To distinguish the development process from the direct interests of the project initiators, UEA created a 'management team' that included representatives of community and environment groups, educational and tenants' associations, trade unions, and

business⁴. First convened in October 1992, the team was intended to survive just long enough to set up more permanent structures for realising the ecocity vision. It led to the putative formation of a land trust, and the actual creation of a Residents and Users Group and the company EcoCity Developments Pty Ltd. Regular information meetings and workshops were held for interested members of the public and 'potential residents'. In May 1993 sponsorship was obtained for opening shopfront/office premises in Halifax Street, adjacent to the depot site, as a base for the operation of UEA and its advocacy of the HEP. The operation of a Centre for Urban Ecology (CUE) became an important part of the ecocity advocacy process. It meant that information was available in a non-confrontational way every day, all week, and anyone interested enough to walk in the Centre could find someone to talk to about the HEP. Many volunteers were needed to have people continually available for this much community interaction and it is a measure of the Project's success that it attracted and sustained a large and dedicated volunteer group over many years. In the absence of any paid work, it was the quality of the volunteer experience that helped to maintain interest and commitment. For over 3 years, for instance, there were daily vegetarian lunches prepared and shared by every volunteer in the Centre.⁵

⁴ Organisations involved in the development of the project or who supported the proposal include: The SA Gas Company; Building Trade Unions - the Building Trades Federation and Construction, Forestry, Mining and Energy Union; The Conservation Council of SA; the Australian Conservation Foundation; the Kaurna Heritage Committee (representatives of the indigenous people of the Tandanya Bioregion); and Aurora Heritage Action.

⁵ The human ecology of the CUE and the Project has created a wealth of experience for hundreds of people and there are rich human stories to tell about the lives and times of the CUE volunteers which the author has had to resist the temptation of including in this dissertation.

7.1.3 A Working Model

...the life of a community project flourishes in the details. And the Halifax EcoCity Project is stuffed not only with more than 200 subscribing individuals, but features that sing a new ecologically rich way of life: rooftop gardens, bridges between buildings, locally popular verandahs, balconies, decks, terraces that become levels of fertile land hovering in the air. (Register in the Ecocity Prize citation 1994)



FIGURE 50: UEA has run information stalls at various community events since 1993. (Photo by author)

Although the Halifax EcoCity Project has not been built it still has currency as a working conceptual model for urban ecological development. Early in the life of the project Emilis Prelgauskas⁶ wrote of its grounding in the real places and processes and observed that ‘The detail planning of that project incorporates ideas from ‘urban ecologists’ from around the globe; and has involved the work, involvement and commitment of many people in the local community; focussed together through Urban Ecology Australia Inc.’ (Prelgauskas 1994 p.5).

The HEP was always intended to be subversive. Its success as an urban ecological intervention would not have been limited to assessment of the quality of its architecture, or by how much sewage it recycled, but by how much it created a population base in the City of Adelaide capable of redirecting the concerns of the municipality towards ecological responsibility and social justice. Despite being the capital city of the state of South Australia, Adelaide is a remarkably contained political environment capable of being changed by a small number of active citizens. Because it is not only the capital city of the state but almost its only city, its influence on the development of the state and region is exceptional. The ‘Halifax opportunity’ was political as well as didactic.



FIGURE 51: One of the many information events at the CUE. The author’s Ecopolis exhibition lined the walls for the first couple of years.

A number of (non-party) political goals were integral to the setting up of the Halifax EcoCity Project. ‘The immediate goal....(was) to reopen a public sphere in flat opposition to statism, one that allows for maximum democracy in the literal sense of the term, and to create in embryonic form the institutions that can give power to a people generally.’ (Bookchin 1995 p,231). UEA’s primary goal was to establish a major development project configured on principles of direct democracy,

⁶ Prelgauskas was one of the founding board members of UEA and worked closely with the author in the early days of both UEA and the HEP.

with the expectation that this would affect the local politics of the neighbourhood by providing an example of a community-based, democratically-run ecological built environment, and later, to affect the politics of the city and the region. Following Bookchin again 'If this perspective can be initially achieved only by morally empowered assemblies on a limited scale, at least it will be a form of popular power that can, in time, expand locally and grow over wide regions.' (Bookchin 1995)

There was a certain amount of gall in the proposition that a community organisation was capable of undertaking a major urban development with no track record and no conventional financial resources. It was always understood by those at the core of the project (and many others who understood the depth and breadth of the intended agenda) that failure to build the HEP would not mean the project had failed provided it had been influential in the wider community. There was a strong sense of mission regarding the project's potential to raise popular consciousness of what was possible in urban development and community-based politics. Configured as a small piece of ecocity it shared the agenda of confederal municipalism inasmuch 'That its future is unforeseeable does not alter the fact that its development depends upon the growing consciousness of the people, not upon the growing power of the state...' (Bookchin 1995 p.231)

7.1.4 A Cultural Adventure

Achieving a shift of consciousness; affecting the culture of the city and the region; influencing urban development objectives and ideas; affecting popular and planning cultures; all these were hoped for and intended outcomes regardless of whether the project was ever constructed. The goal was focussed but its realisation was subject to evolution according to circumstances. The situation remains such that

'...how that consciousness, concretized in highly democratic institutions, will develop may be an open issue...' (Bookchin 1995 p.231)



FIGURE 52: UEA's 'Make EcoCities Not War' banner in a crowd on Adelaide's Festival Plaza, demonstrating for peace. (Photo by author)

The Ecopolis concept as represented by the Halifax EcoCity Project is constructed on the basis of intuitive design informed by academic research. The HEP was conceived on the basis of extant

knowledge, testing Ecopolis Proposition 2 and the idea that ‘The concepts, principles and techniques already exist that are required to create human settlement that fits within the ecological systems of the biosphere...’ It was intended as a vehicle for the continued evolution of ideas rather than as an hermetically contained, end-point prescription for urban development. There was a spirit of excitement about the idea of trying to build the Halifax EcoCity Project that was not solely to do with ‘bricks and mortar’ - for many people involved with the Project the thought was that ‘...it will surely be a political adventure.’ (Bookchin 1995 p.231).



FIGURE 53: The Tandanya Bioregion drawn by the author for inclusion in the program of EcoCity 2 – The Second International Ecocity Conference, convened by UEA. That the relationship between the city and its region is fundamental to the ecological viability of urban civilisation is the first proposition of the Ecopolis theory.

7.2 Context

7.2.1 Regional Context

Adelaide is on a coastal plain known by its original people as Tandanya (Place of the Red Kangaroos). Criss-crossed by seasonal watercourses, the land occupied by the metropolis used to support a rich ecosystem but now a few degraded hectares of original vegetation remain amidst the hundred thousand hectare suburban sprawl. The climate is Mediterranean/arid irregularly subject to ‘cool changes’ (when the daytime temperature can drop 20°C within an hour). Temperatures rarely reach freezing. Average rainfall for the city centre site is approximately 500mm per year.

South Australia was founded in the same year as Texas (1836). It has a mixed history as both ‘paradise of dissent’ (first state to give women the vote and have an aboriginal governor) and as the intended site for a new aristocracy. Its social structure has been increasingly democratised but evidence of the original patriarchal class structure remains in institutions like the ‘Adelaide Club’. The bell-tower of the Roman Catholic cathedral, adjacent to the central Victoria Square, was only completed in 1996, and the ‘square mile’ defined by Colonel Light’s military grid is, in modern terms, under-developed. Apart from the fairly common car crashes, violence is rarely visible in the streets, but vague undercurrents of unease swirl beneath the social landscape.¹

7.2.2 Economic Context

The civic rose bushes and plane trees deny it, but this is a frontier town, on the edge of desert, facing the Southern Ocean and struggling with an economy based on exploitation of a landscape that is still largely a mystery to the immigrants who have tried to tame it for wheat, steel or coal. Cultural contradictions abound and from the bowels of one of the world’s biggest copper mines in this non-nuclear state comes uranium to feed the global nuclear industry. Car manufacturing, wheat farming and sheep keep the financial wheels turning whilst the thin, ancient topsoil is readily lost to erosion and literally blows away in the wind. Large urban developments have only proceeded with logistical and financial support from State and/or Federal government - a feature of the development landscape for so long that it is now structural. A ‘big is beautiful’ mind-set is entrenched at most levels of government and the ‘community’ is perceived as a disruptive influence in the orderly playground of party politics.²

¹ Salman Rushdie once claimed that the city was like the setting for a Stephen King novel!

² In contrast to the ecocity development model and to the extent that, on the admission of key advocates for the contentious ‘Multi-Function Polis’ in the then State government, the community was deliberately

7.3 Process

This plan and its process to date is poetry in community building, and the voice to read the poem is the public decision making process. (Register in the Ecocity Prize citation 1994)



FIGURE 54: Volunteers learned enough about UEA and the HEP to discuss it with the public. (Photo by author)

To take account of people's real needs and to try and ensure that any added value in the development would be returned to the community, from its inception the Halifax EcoCity Project was designed to proceed on the basis of community participation.

Despite minimal exposure in 'mainstream' media and with no advertising budget, within 2 years the Project had received over 600 registrations of interest from potential residents. The community of the Project began forming as people keen to live in an ecocity began to meet at Potential Residents' Meetings, at events held by UEA and by dropping into the Centre for Urban Ecology 'shop front'. That early participation translated into an ongoing commitment from some individuals who could be found several years later involved in the Christie Walk project (see Chapter 8).

7.3.1 The Barefoot Architecture Program

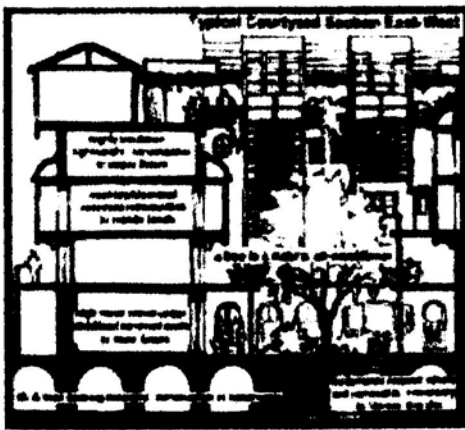


FIGURE 55: An early development of the section proposed for the 'courtyard blocks' that are a feature of the HEP. (Drawing by author)

The HEP was breaking ground in Australia, taking concerns about the quality and purpose of the built environment into broader public arenas, rather than keeping it within the portals of the professions. Whereas in 1992 the non-professional, community-based organisation of UEA was convening the Second International Ecocity Conference, by the mid 1990s the architectural mainstream was so much enmeshed in debates on aesthetics, to the exclusion of much else, that the indifference to other issues was 'striking' (Ghirardo 1996 p.30). 'With some notable exceptions, architects and most of their

publications ignored the consequences of downtown skyscraper development, suburban

excluded from the entire development process for what was intended to be the biggest urban development since the failed Monarto new town project of the 1970s. (Personal communication with John Mayfield from the Premier's Office (John Bannon) 1989).

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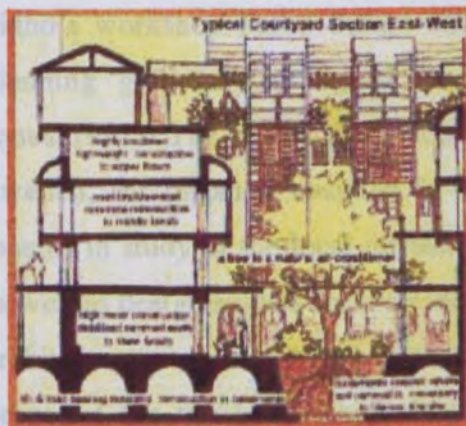


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ecology, toxic materials and environmental degradation that conditioned the transformation of the landscape throughout the world.’ (1996 Ghirardo p.30). Bucking the global trends of the time, the architectural practices that challenged this complacency were typically ‘small, serious and local firms concerned about their communities’ (1996 Ghirardo p.30). Ghirardo cites, as an example, the work of Alberts and van Huut for the NMB (ING) Bank in Amsterdam with its ecological concerns, varied street facades and creation of a ‘pleasant plaza’, and notes that ‘All too often the major protagonists in the architectural debates actively disparaged those who raised concerns about such matters.’ (Ghirardo 1996 p.31).

Attempts to integrate the processes of planning, designing and building have invariably addressed the need for public education. There are many models for this ranging from Workers’ Education Association lecture series to on-site training. Architectural and planning educational programs have traditionally adopted an élitist attitude in which skills have been imparted to professionals only.

The HEP proposal built on the experience of pioneers such as Christopher Alexander, Walter Segal, and architect Ivo Waldhör who successfully involved people directly with the process of planning, designing and building in urban environments (Miles 1992). Participatory design approaches vary from the high profile of Renzo Piano’s workshop based design studio (Buchanan 1992) to Lucien Kroll’s low key planning ‘guided by ecological concerns and the wishes of the local people’ (Blundell Jones 1992). The housing development process adopted by Ivo Waldhör at Malmö, Sweden, for instance, resulted in the creation of a ‘living school’ which involved tenants in study of the local infrastructure, history, nature, planning and administration as well as design studies for their individual apartments (Miles 1992). Such examples of architecture connected to urban ecological processes and lent credence to the processes proposed for the HEP which included the creation of a future ‘School of Urban Ecology’ as an outcome of the development and educational process.

Part of the strategy for engaging people in the design and development process was the Ecopolis ‘Barefoot Architecture Program’ which dealt primarily with the individual needs of households, and ‘Potential Residents Meetings’ organised by UEA and Ecopolis which brought people together for discussing shared concerns about managerial and social issues regarding the Project as well as its physical design. Dozens of households engaged in the Program. It was a two-way process which was intended to

enable people to participate in the design of their dwellings and gain a sense of ownership and understanding of the process that leads to the creation of their living space whilst learning about the demands of construction, planning and ecology.

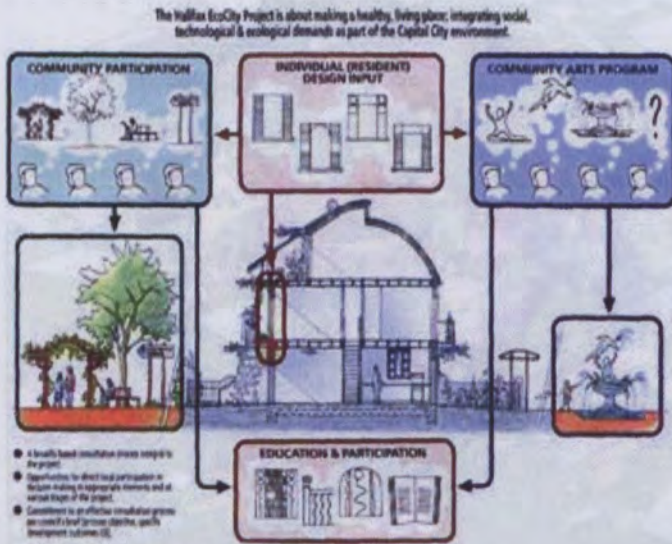


FIGURE 56: This diagram was originally drawn by the author and then reworked by Alpine Construction as part of the tender documentation presented to Adelaide City Council in 1998 (see 'What Happened?'). It illustrates the intended relationship of residents with the design process which was ultimately put into effect through the Christie Walk project (see Chapter 9).

By mid-1994 the people who had registered an interest in living in the HEP had a range of skills and backgrounds that included accountants, architects, artists, child carers, drafters, electricians, engineers, gardeners, herbalists, labourers, landscapers, managers, metalworkers, rammed earth and mud brick builders, nurses, plumbers, students, teachers, woodworkers and yoga teachers (Catalyst 1994 p.4).

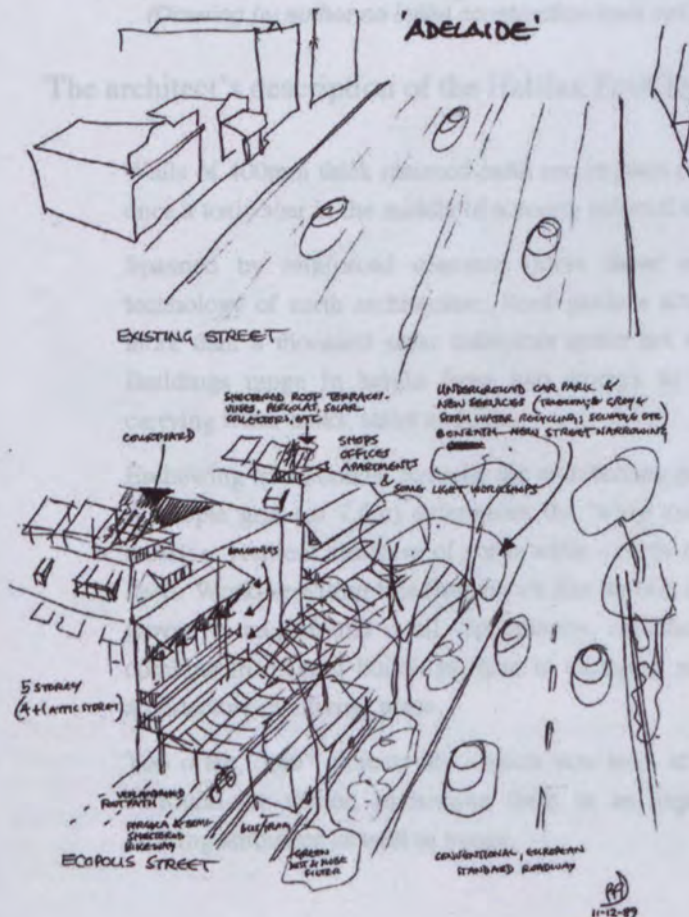


FIGURE 57: The early beginnings of the Ecopolis theory and the design approach later put to the test in the HEP, Whyalla EcoCity Development and Christie Walk, included this sketch (11 December 1989) prepared for Joanne Painter to illustrate the ideas discussed in her interview with the author (Painter 1990a, 1990b). (Drawing by author)

7.4 The Built Form

Paul Downton has covered all sustainability issues with a real feel for creating a ‘sense of place’. (Barton 2000 p.277)



FIGURE 58: Axonometric drawing of the central part of the Halifax EcoCity Project (Drawing by author on initial construction lines set up by Jeremy Hassan)

The architect’s description of the Halifax EcoCity Project in 1994:

Walls of 400mm thick rammed earth run in great parallel lines across the site of what was once a toxic scar in the middle of a young colonial city.

Spanned by reinforced concrete floors these earthquake resilient walls extend the technology of earth architecture. Roof gardens alternate with steel and copper roofs and more than a thousand solar collectors make hot water or export electricity to the grid. Buildings range in height from two storeys to five, with passive-cooling belvederes carrying water tanks, stairs and lifts.

Eschewing traditionalist pastiche the architecture generates the patterns of future tradition. A simple grid (of 7.6m) determines the ‘warp and weft’ of the primary urban form - a massive, resilient structure of earth walls - earth resting on itself, eventually to return to itself. Working within this framework like an old, existing town, the architectural fabric is woven in and around it all. Spontaneity, eclecticism and idiosyncrasies of real people combine in making buildings open to change - not dead objects in space, but evolving architecture in a living place.

Too often, ‘eco’ projects are objects you look at from the outside but this project will surround the visitor, immersing them in an experience of tactile and scented reality, creating ambience as well as image.

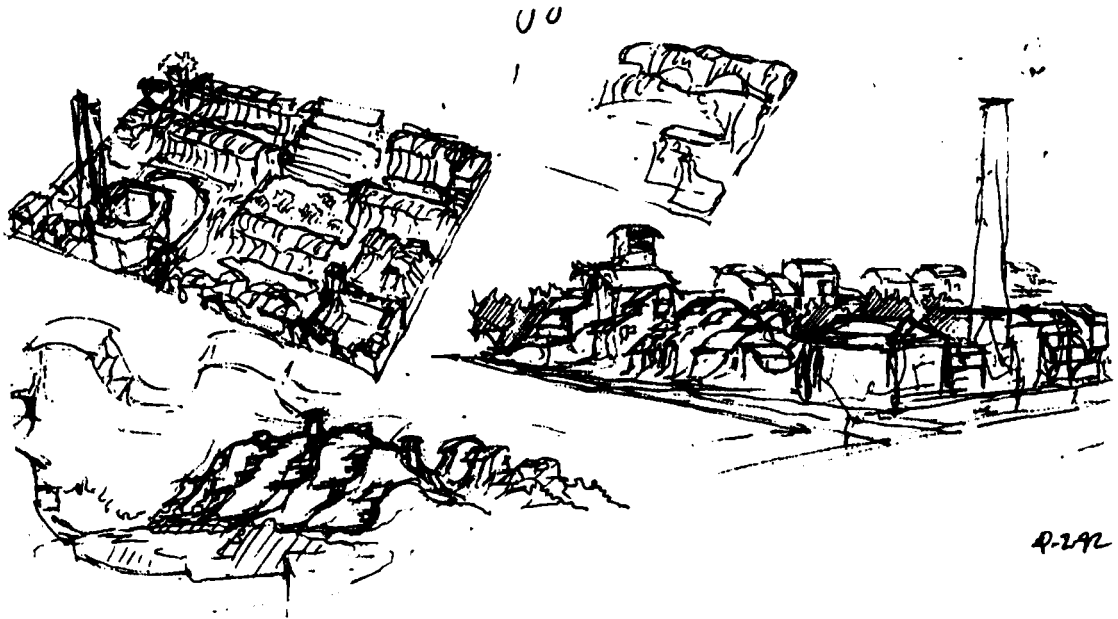


FIGURE 59: Some of the author's earliest exploratory sketches (4 February 1992) for what was to become the Halifax EcoCity Project.

The planning grid is square, apartment blocks enclose square courtyards and the square, with the occasional intervention of a circle, is used as a thematic device throughout. Repetition is avoided. No courtyard is enclosed by the same profiles and every elevation is unique, being designed with input from the households whose home the buildings are. (Downton 1994 & 1996)

The following text and images describe the Project further, drawing on material prepared for various presentations, including the tender process undertaken in 1998.

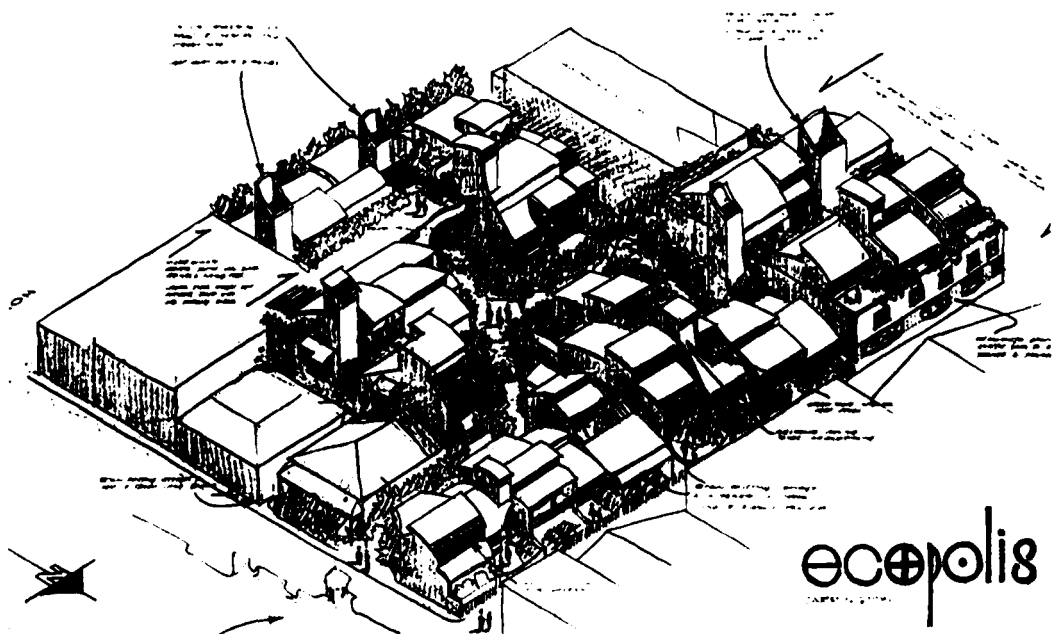


FIGURE 60: Prelgauskas and the author collaborated on some early design explorations for Ecopolis projects in South Australia. This illustration was for an expression of interest submitted in 1993 to the SA Housing Trust for redevelopment of a site in Carrington Street. The bid was unsuccessful but the proposal generated media and local interest that advanced the ecocity cause by promoting the ideas and raising expectations. (Original perspective by Prelgauskas, re-rendered by the author)

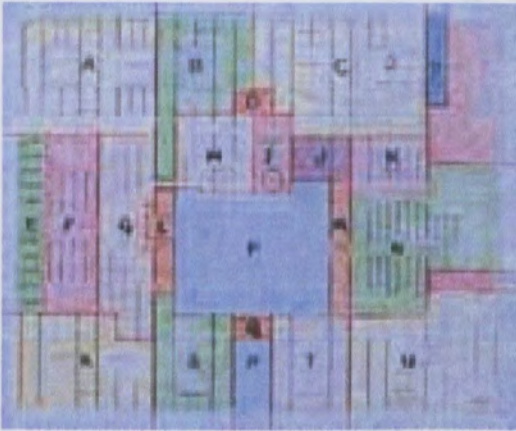


FIGURE 61: The development of the HEP was designed to proceed in stages: 'bite-size chunks' of real estate that would reduce financial risk and allow the idea to be tested bit by bit. The actual redevelopment of the site by Pentroth and the ACC is proceeding on the same basis. *(Drawing by author)*



FIGURE 62: Early sketches in the design exploration stages of the Halifax EcoCity Project. *(Sketches by author)*

opportunity to build on the basis for a more detailed design exploration of the Halifax site, building on Ecopolis ideas (some early sketches are included as incidental illustrations in this chapter).

FIGURE 54: (below) This particular perspective has been reproduced many times, with and without permission, in journals and books around the world, thus contributing to cultural change (Ecopolis Proposition 3) through extending the perception of what is possible in urban development and promoting a 'cultural tactal'. (Source – Perspective drawings by author 1997)



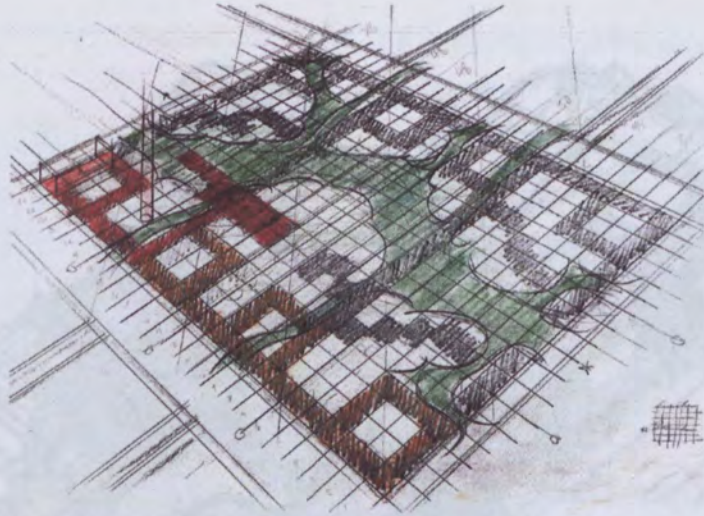
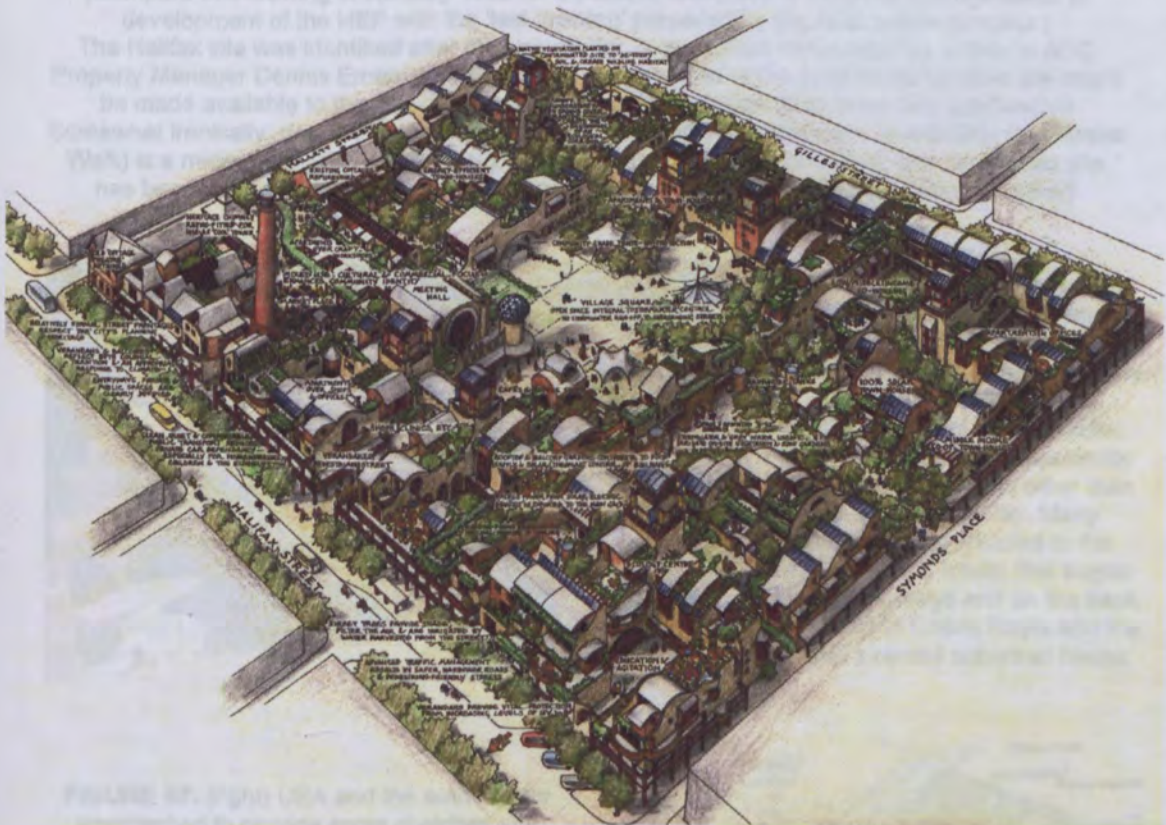


FIGURE 63: (above) is the first stage of the perspective drawing that was to become the quintessential image of the Halifax EcoCity Project (below). It shows the community areas (red), commercial areas (orange) and 'ecological corridor' (green) that underpin the design concept. Initially used for the EcoCity 2 conference poster, the drawing was one of three commissioned by the South Australian Planning Review to illustrate 'sustainability' for an exhibition. The author took the opportunity to use that commission as the basis for a more detailed design exploration of the Halifax site, building on Ecopolis ideas (some early sketches are included as incidental illustrations in this chapter).

FIGURE 64: (below) This particular perspective has been reproduced many times, with and without permission, in journals and books around the world, thus contributing to cultural change (Ecopolis Proposition 3) through extending the perception of what is possible in urban development and promulgating a 'cultural fractal'. (Source – *Perspective drawings by author 1992*)



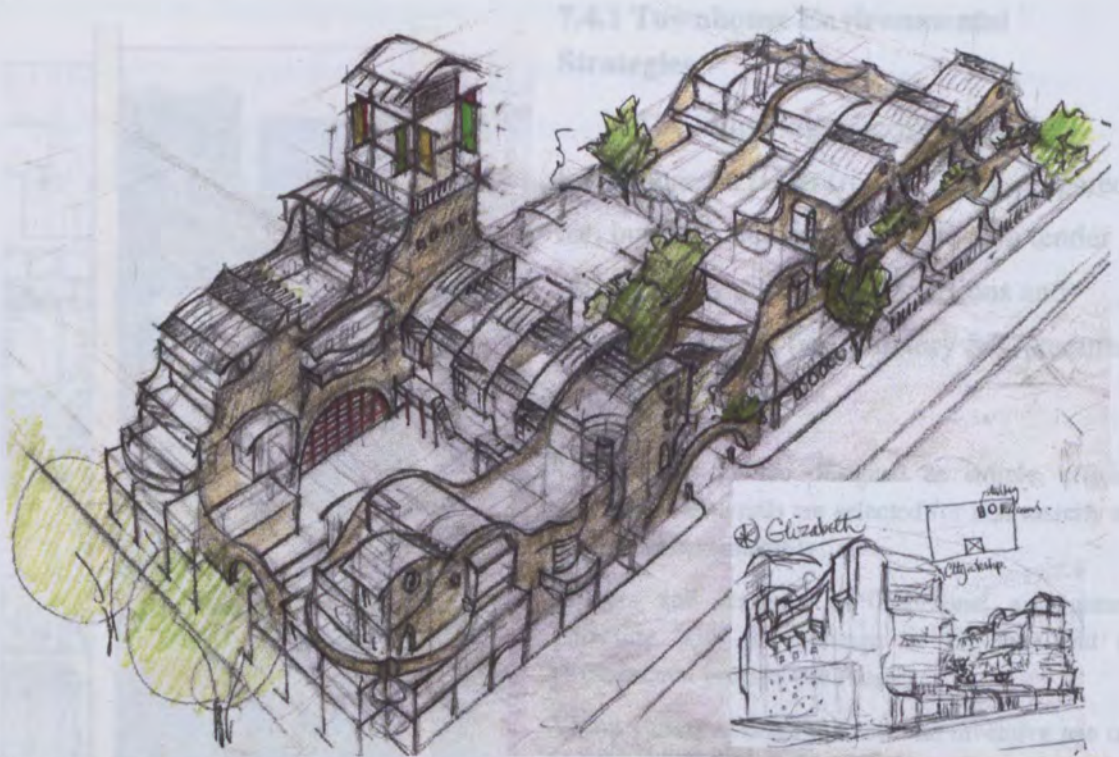


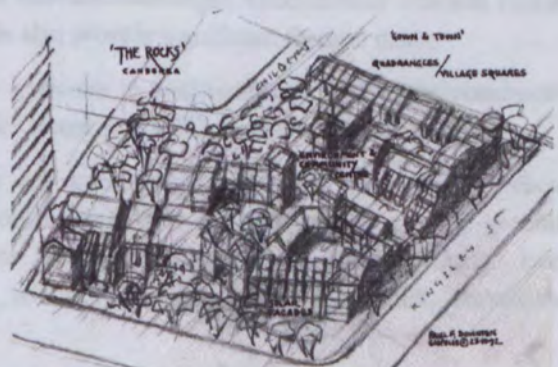
FIGURE 65: (above) The original concept for the building types of the HEP evolved in response to exploration of ideas for making a group of dwellings for a dozen householders who were contemplating the prospect of creating an Ecopolis project of some kind in the inner-city. (Compare this drawing of January 1992 for a putative first piece of Ecopolis and first stage of development of the HEP with the 'last drawing' prepared for the ACC tender process.)

The Halifax site was identified after then-councillor Jacqui Gillen introduced the author to ACC Property Manager Dennis Emery who suggested that a corner of the soon-to-be-vacated site might be made available to the group – surrounded by roads as part of an inner-city subdivision! Somewhat ironically, nearly ten years later, the first Ecopolitan development in Adelaide (at Christie Walk) is a microcosm of the HEP, designed for a dozen or so householders, and the Halifax site has been turned into inner-city subdivisions surrounded by roads. *(Perspectives by author)*



FIGURE 66: (left) Detail from the 1:100 scale model of the whole HEP. Although never finished, this 'work-in-progress' turned out to be a powerful educational and promotional tool. Designed for disassembly, it was occasionally transported to venues other than the CUE for display. Many volunteers contributed to the making of this model that began life in the garage and on the back verandah of Chérie Hoyle and the author's rented suburban house.

FIGURE 67: (right) UEA and the author were approached to provide some sketches and ideas for a group of community organisations trying to direct redevelopment of part of inner Canberra towards the HEP model. They were not successful, but one of the drawings was published in the Canberra Times 29 October 1992. *(Source – author)*



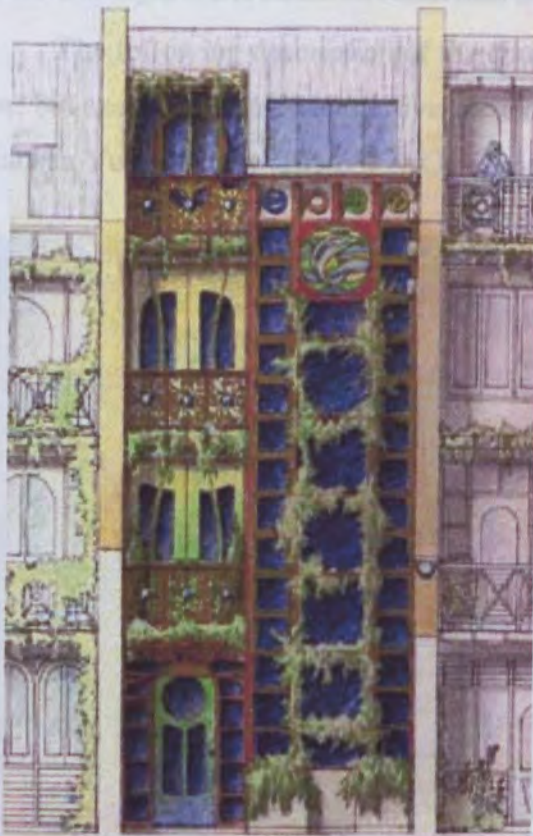


FIGURE 68: (above) Northern façade of a townhouse in the HEP designed for Jacqui and Uris Ezergailis, members of the Adelaide Symphony Orchestra and donors of an Apple computer and programs to UEA. (Source – rendering by author on base by Glenn Versteegen)



FIGURE 69: (above) 1:20 scale model of a townhouse for the HEP, made by volunteer Alison Terry, now working as an interior designer in Melbourne. The deep, solar, multiple-shaded façade, mass walls, and 'thermal flue' configuration was demonstrated in this design which could be taken apart to show the interior spaces. The basic design strategy was used in Christie Walk. (Model by UEA volunteers)

7.4.1 Townhouse Environmental Strategies

The following description of the townhouses is taken from material prepared for, but excluded from, the abortive tender submitted by Alpine Constructions and Hansen Yuncken (see 'History & Outcomes' below).

The townhouses are designed as simple, efficient volumes... Materials are selected for non-toxicity and ecological sustainability.

Colours and textures are traditional and natural, reflecting both the heritage of the city and the environmental goals of the Project.

Visual variety is achieved with the inventive use of a limited number of design elements. This also enables design participation by residents whilst maintaining the economic viability of the construction program.

The preference for verticality reflects the proportions of traditional city streetscapes. Louvres, shutters and very few areas of unrelieved glass or large panes ... assist in maintaining a rich visual texture in keeping with Adelaide's heritage, but also respond to the requirement for the many openable windows necessary for environmental functionality.

Lightweight framed North and South facades easily support the varied architectural palette and allow for excellent control of solar gain and ventilation. Pergolas, balconies and extended eaves are employed to control solar gain and provide a gradation of shade from the interior to the exterior of the dwellings.

Stairwells act as heat chimneys, exhausting warm air during hot weather. Cooler, shaded and vegetated areas provide reservoirs of cool air for drawing into the dwellings by convection.

Thermal mass is provided by the massive 400mm thick ground floor earth wall construction. (This also contributes to sound and fire insulation between dwellings). Ground floor concrete footings and floor slabs also provide significant thermal mass.

Upper storey walls are in well-insulated lightweight construction of either timber frame or AAC (autoclaved aerated concrete).

Upper floors are in sustainable timber and straw fibreboard 'Ecopanel' construction. The well-insulated roofs are generally colourbond or integrated photovoltaic panel decking. Every dwelling has a solar hot water panel. (Downton, unpublished 1998)

7.4.2 Courtyard Block Environmental Strategies: Apartments, Offices and Retail

The following description of the courtyard blocks is taken from material prepared for, but excluded from, the abortive tender submitted by Alpine Constructions and Hansen Yuncken (see ‘History & Outcomes’ below).



FIGURE 70: (above) Part of the massive 1:20 scale model of a courtyard apartment block, made from recycled materials by a number of volunteers, but particularly Tom Leuk and Salvador Salinas – who was responsible for the pots that give it an ‘occupied’ look. (Model – Salinas et al)

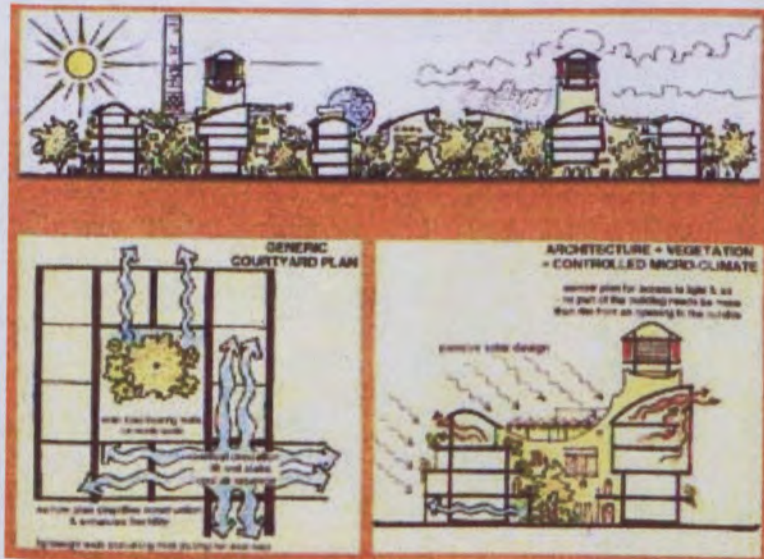
As with the townhouses, lightweight framed North and South facades easily support a varied architectural palette and allow for excellent control of solar gain and ventilation. Pergolas, balconies and extended eaves are employed to control solar gain and provide a gradation of shade from the interior to the exterior of the dwellings.

Thermal mass is provided by the massive 400mm thick ground floor earth wall construction. (This also contributes to sound and fire insulation between units and assists in designing for mixed use). Ground floor concrete footings and floor slabs also provide significant thermal mass.

Upper floors are in reinforced concrete, providing additional thermal mass and good sound and fire insulation. The well-insulated roofs are generally colourbond or integrated photovoltaic panel decking or roof gardens. Every dwelling is connected to a central solar boosted hot water supply.

Upper floor accommodation is designed with roof forms acting as heat chimneys, exhausting warm air during hot weather.

Upper storey walls are in well-insulated lightweight construction of either timber frame or AAC (autoclaved aerated concrete).



Cooler, shaded and vegetated areas provide reservoirs of cool air for drawing into the dwellings by convection.

The sheltered courtyard spaces assist in providing ‘coolth’. Subsidence or ‘cool’ towers drop cool air down vertical circulation towers to ensure cooling air masses are available to accommodation surrounding the courtyard spaces. (Downton, unpublished 1998)

FIGURE 71: (above) Cross-section of the HEP and diagrams of a typical courtyard block. The ‘cool towers’ or subsidence towers, were derived from prototypes designed at the Environmental Research Laboratories in Tucson, Arizona, visited by the author in April 1990.

7.5 Analytical Diagrams of the Halifax EcoCity Project Design

The following diagrams illustrate the layered complexity of design inherent in the HEP. The layered analysis technique is inspired by McHarg’s ‘design with nature’ methodology (see Chapter 4).

FIGURE 72: The Site



Community Facilities

Self-Sustaining

Office

Shops and Workshops

FIGURE 73: Building Types and Configurations



2/3 Storeys



4/5 Storeys



Apartments



Townhouses



Community Facilities



Self Build Housing



Offices



Shopfronts and Workshops



Cafés, Restaurants and Outdoor Eating

FIGURE 74: Climate and Energy



Cool Zones



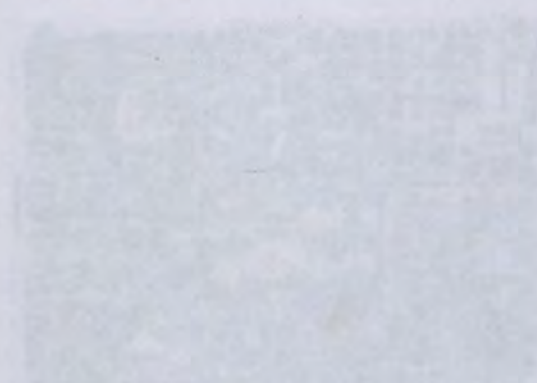
Mass Walls



Photovoltaics



Solar Facades



Balconies

FIGURE 75: External Spaces



Private Areas



Public Areas & Above Ground Parking



Community Areas



Courtyards



Roofgardens and Balconies



Community Arts Project Areas



Ecological Corridor

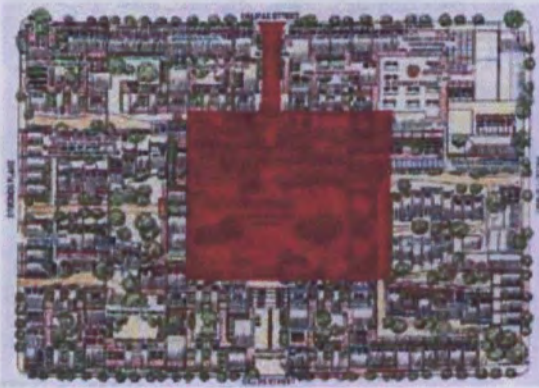
FIGURE 76: Movement



Pedestrian Access



Cycle Access & Above Ground Parking



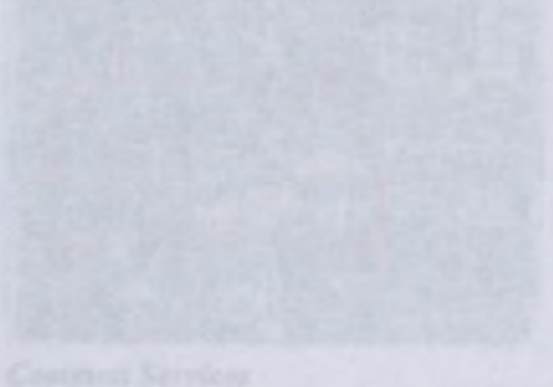
Underground Car Park



Lifts

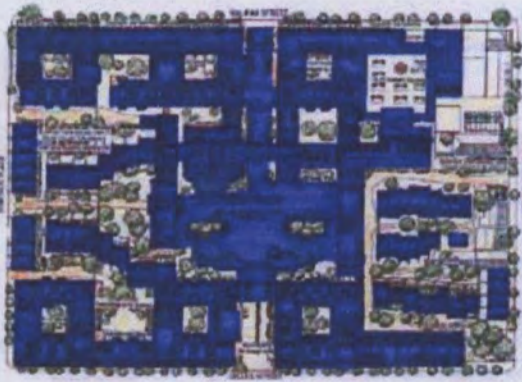


Interpretive Trail



Continuous Service

FIGURE 77: Water and Services



Impermeable Water Harvesting Surfaces



Semi-permeable Harvesting Surfaces



Waste Water



Water Tanks (Underground)



Water Towers

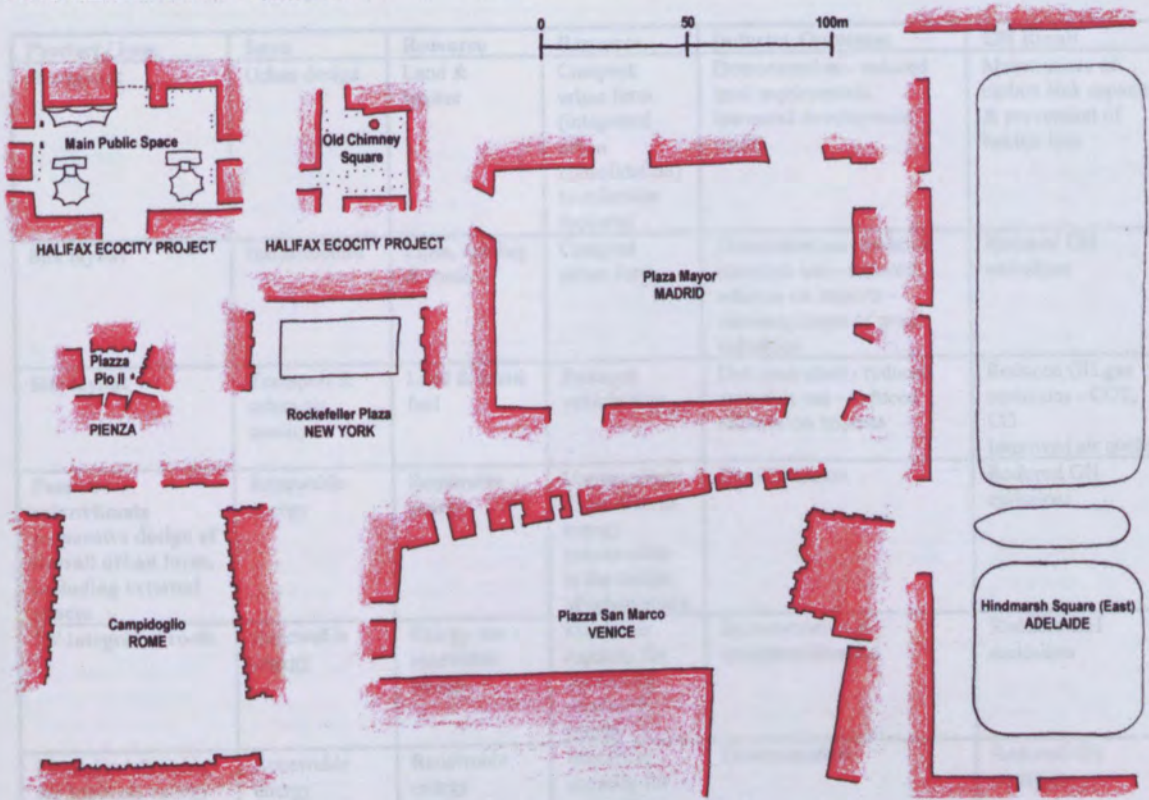


Common Services

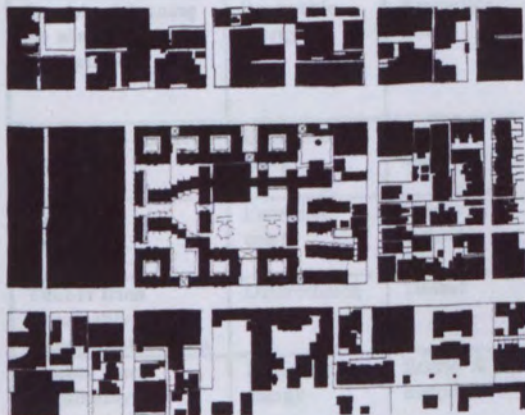


Planning Grid

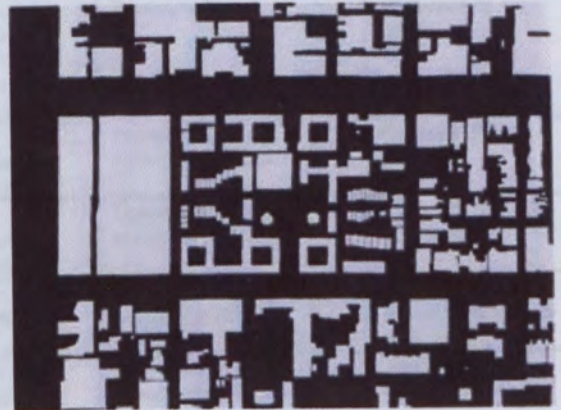
FIGURE 78: Urban Patterns



Comparison of Squares in HEP with Other Examples



Figure



Ground



Planning Grid

TABLE 8: Urban Ecology Australia The Halifax EcoCity Project Greenhouse Showcase

Product / Item	Issue	Resource	Response	Industry Outcomes	GH Result
Site layout	Urban design	Land & habitat	Compact urban form (integrated urban consolidation) to minimise footprint	Demonstration - reduced land requirements, increased development yields	Maintenance of carbon sink capacity & prevention of habitat loss
Site layout	Infrastructure	Pipes, cabling & roads	Compact urban form	Demonstration - reduced materials use - reduced reliance on imports - encouragement of green industries	Reduced GH emissions
Site layout	Transport & urban air quality	Land & fossil fuel	Reduced vehicle trips	Demonstration - reduced materials use - reduced reliance on imports	Reduced GH gas emissions - CO ₂ , CO Improved air quality
Passive solar/climate responsive design of overall urban form, including external spaces	Renewable energy	Renewable energy	Unprecedented attention to energy conservation in the design of urban space	Demonstration	Reduced GH emissions
PV integrated roofs	Renewable energy	Energy use - renewable energy	Maximise capacity for harvesting renewable energy	Demonstration & commercialisation	Reduced GH emissions
Provision/planning for biomass energy harvesting	Renewable energy	Renewable energy	Maximise capacity for harvesting renewable energy	Demonstration	Reduced GH emissions
Provision/planning for wind power generation	Renewable energy	Renewable energy	Maximise capacity for harvesting renewable energy	Demonstration	Reduced GH emissions
Autoclaved aerated concrete	Embodied energy	Energy & materials	Low embodied energy	Demonstration & commercialisation	Reduced GH emissions
Earth wall technology	Embodied energy	Energy & materials	Low embodied energy	Demonstration & commercialisation	Reduced GH emissions
Timber from sustainably managed plantation	Deforestation	Timber	More plantations	Demonstration & more income for farmers	Sustainable CO ₂ sink & reduced GH emissions
Timber from sustainably managed plantation	Embodied energy	Energy & materials	Low embodied energy	Demonstration & commercialisation	Reduced GH emissions
Double glazing	Energy use	Glass	Energy conservation	Commercialisation of window frames	Reduced fossil fuel use
All products	Clean production	All resources used in m'facturing processes	Requirement for clean production strategies from all suppliers	Efficiency in production - development of auditing procedures	Reduced GH emissions
Ecopanel	Agricultural waste	Straw	Waste into resource through adoption of new technology & creation of new industry	Demonstration & commercialisation - farmers benefit as 'waste' is valued	Sustainable CO ₂ sink & reduced GH emissions
Ecopanel	Deforestation	Straw	Adoption of new technology & creation of new industry	Demonstration & commercialisation - new industry	Sustainable CO ₂ sink & reduced GH emissions

Ultra-low emission laminates for doors, worksurfaces etc	Toxicity - Indoor air quality - Landfill	Recycled laminates	Introduction of new product & associated technologies	Demonstration & commercialisation	Sustainable CO2 sink & reduced GH emissions
Marmoleum	Toxicity - indoor air quality	Sustainably sourced & non-toxic materials		Demonstration & market expansion	Sustainable CO2 sink & reduced GH emissions
Omnipol	Landfill	Recycled plastics	Waste management & landfill gas reduction	Demonstration & commercialisation	Reduced methane emissions
Waste minimisation	Efficiency & waste reduction	All resources	Waste management & landfill gas reduction	Demonstration & waste management industry development	Reduced methane emissions
Tontine insulation	Toxicity & landfill	Recycled plastics	Waste management & landfill gas reduction	Demonstration	Reduced GH emissions
Preference for use of local & regional materials, products & services	Excessive fossil fuel dependency	Fossil fuel for transportation		Demonstration & growth of local & regional economies	Reduced GH emissions
Climate-responsive design principles	Energy use	Renewable energy	Reduced energy use	Demonstration	Reduced GH emissions
Solar hot water systems supplying all premises	Energy use	Renewable energy	Reduced energy use	Demonstration & commercialisation	Reduced GH emissions
Passive solar/climate responsive design of buildings - extensive use of solar energy for space heating & cooling	Energy use	Renewable energy	Extensive use of solar energy for space heating & cooling	Demonstration - increased adoption of sustainable design principles - commercialisation of ecological design concepts	Reduced GH emissions
Subsidence 'Cool Towers'	Energy use	Renewable energy	Passive cooling & reduced energy use	Demonstration, product development & commercialisation	Reduced GH emissions
Recycled timber	Deforestation	Timber	Reuse	Demonstration	Sustaining carbon sinks
Roof gardens	Biomass exploitation of solar energy - urban air quality - urban food production - insulation and thermal mass provision	Vegetation	Integrated design of roof gardens with building spaces & functions	Demonstration & commercialisation of relevant technologies (eg. non-PVC impervious linings)	Reduced GH emissions & creation of carbon sinks
Provision/planning for total recycling of waste water	Use of finite resources	Water	Total recycling of all water (storm, grey & black) for on-site use	Demonstration & commercialisation	Reduction of water vapour contributions to GH
Urban/Rural links	City/region interdependency	Urban development financial activity	Revegetation, plantation & land restoration programs	Demonstration & commercialisation - rural industry development	Carbon sinks/sequestering
Construction industry based training programs	Education & training - reskilling - unskilled human resources	People	Education & training for new jobs	Systemic changes in construction industry practice	Long-term reduction in GH emissions

'Green' performance requirements in lease and sale agreements (ensuring 'green address' for marketing purposes etc)	Education	People & intellectual property	Education - 'lifestyle' & marketing development	Systemic changes towards an educated client base favouring ecological developments	Reduced GH emissions
Telecommunication /information technology provision	Infrastructure, communications & community - resource use	Information technology - reduced overall resource use	Advanced telecommunications	Demonstration & commercialisation	Reduced GH emissions
Interpretive facility - National Centre for Urban Ecology	Education	People	Appointment of UEA for community education & participation programs	Systemic changes in consumer behaviour	Long-term GH emissions reduction

TABLE 8: Chart prepared for a 'Greenhouse Showcase' funding application for the Halifax EcoCity Project. (Prepared by author)

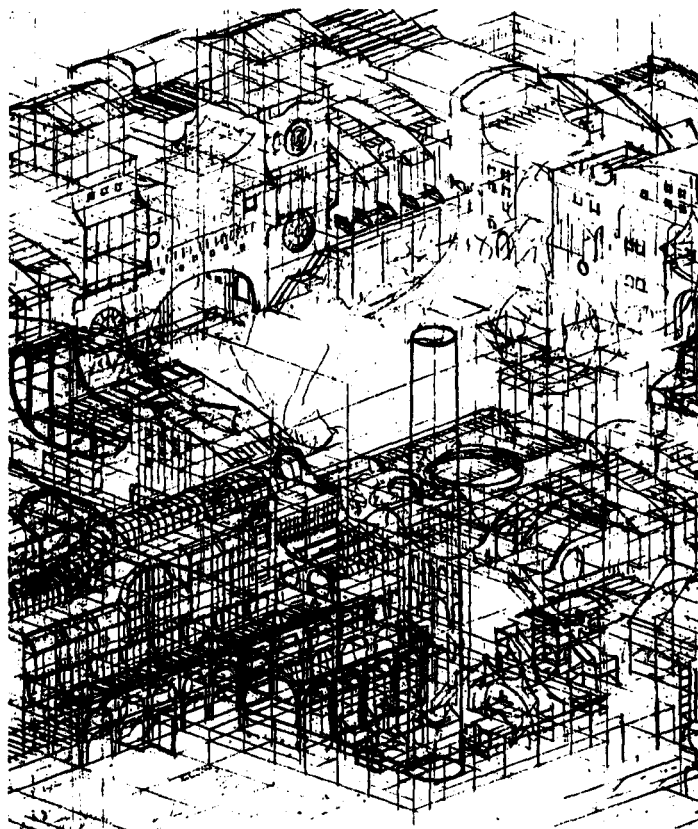


FIGURE 79: Construction lines for an axonometric projection of the HEP. (Source – drawing by author)

7.6 History & Outcomes

7.6.1 History 1992 - 1998

7.6.1.1 Letter of Intent

Setting out the basic proposition and including an initial sketch plan for the Halifax Depot Site, this letter, composed by Ecopolis Pty Ltd as protagonists for the project with the support of Urban Ecology Australia Inc., was sent to Adelaide City Council (ACC) to register an interest in the site. It was accompanied by supporting documentation including a set of the Ecological Development Guidelines¹ generated by Ecopolis Pty Ltd., and was distributed to other interested parties and likely or desirable participants in the development, such as trade unions, tenants' associations, educational associations, industry, environmental and community groups, etc.

7.6.1.2 Management Team

A crucial early step in the 'community-driven' development process was the creation of the Management Team, a group which evolved from the informal 'people network' generated by and around the directors of Ecopolis and the members of UEA. The creation of the Management Team served to distinguish the development process from the direct interest of the project initiators. The Team was formed by inviting people as individuals and/or as representatives of key organisations to join it and was first formally convened in October 1992. The Team had the responsibility of setting up the formal structures for proceeding with the project. Three working groups were set up to research and advise on this process. After serving its original creative purpose the Team passed ongoing administrative responsibilities to a smaller group mostly drawn from the original members.

The responsibility for the project was then transferred to three core structures:

7.6.1.2.1 (1) *The Halifax EcoCity Land Trust*

The Land Trust working group advised the Management Team to set up a Land Trust or Land Bank to own the land, control the finances and set out the caveats and parameters for ecological development on the site.

7.6.1.2.2 (2) *EcoCity Developments Pty Ltd*

The Ecological Development Board working group advised the Management Team to form a primary development body - EcoCity Developments Pty Ltd - to take

¹ An early version of the Ecopolis Development Principles – see Chapter 13.

the place of a conventional developer. Seven years later this company obtained a builder's license and became the construction company for Christie Walk.²

7.6.1.2.3 (3) Residents and Users Group

The Community Board working group advised the creation of a Residents and Users Association to represent tenants, owners and users of the site. This was known as the Residents and Users Group. It dealt with conflict resolution and community demands and helped facilitate the on-going participatory design, maintenance and management processes.

7.6.1.3 Wirranendi Inc.

In late 1995 it was decided that an incorporated cooperative was the best structure for the development of the Halifax EcoCity Project. The name chosen was Wirranendi Inc. – which means 'becoming transformed into bushland', and is a word derived from the Kaurna, the Aboriginal people of the Adelaide plains. Its first General Meeting was held on 3 February, 1996.

7.6.1.4 Registration of Interest

Interest and participation was sought from a wide range of people and organisations who were asked to consider taking up roles as residents, investors or supporters in whatever way was appropriate to their personal goals or institutional missions. This was done with a Registration of Interest form. No legal commitment was taken or implied from this registration but it provided the project with valuable expressions of support and an important database³ to help with detailed development of the project design and preparation of business plans.

7.6.1.5 Information Meetings & Workshops

UEA organised regular public meetings to introduce the project and advertise its existence and purpose to the wider community. These meetings had a local focus but also took place in other cities as part of the process of building support and interest across Australia.

7.6.1.6 Barefoot Architecture Program

Building on the feedback from Registrations of Interest and Potential Residents Meetings, a series of Barefoot Architecture Program consultations and Design Workshops involved participants in the 'hands-on' design development of various

² The license was for projects of up to \$1.5 million and 4 stories high.

³ The database was kept confidential with access controlled by the Coordinator of the CUE.

aspects of the project. Those aspects ranged from the macro level of regional infrastructure, history and ecology to community art and design; from local planning and administration to overall site planning considerations; and from detail design issues and materials procurement to site construction organisation and procedures.

7.6.1.7 Option to Purchase

The original Letter of Intent was not formally accepted by ACC because they advised that a process was being initiated leading to requests for expressions of interest. This did not happen. UEA continued to push for community-based ecological development on the Halifax site and succeeded in convincing the Council that there was sufficient credibility in the proposed ecocity project and its protagonists that on 7 February 1994 the ACC voted 13 to 3 to offer UEA a 12 month option to purchase the site (Munn 1995 p.62)⁴. Two weeks later in response to a recision motion put up by Councillor Jim Crawford, the Council voted 11 to 3 to reaffirm the original decision.

Negotiations were undertaken on the price of the site and the option in April 1994. These were then halted as the ACC admitted liability for the clean-up of the site. A mutual decision was reached that the Contract and Heads of Agreement would no longer be negotiated until ACC evaluated the contamination on the site and agreed to a clean-up plan.

7.6.1.8 Roelof's Report

One of the pivotal meetings in the history of the HEP was reported by an American researcher who happened to be in Adelaide at the time as part of a study tour.

On February 7, 1994, the Halifax Project was the main agenda item at an Adelaide City Council meeting. The gallery was filled (including this author (Roelofs)) and many enthusiasts were sitting or standing in the aisles. There had been extensive community discussion of the project for years, the councillors already had strong opinions about it, and several of them passionately defended it. Some liked the idea of initiating environmentally sustainable development; others hoped that this would bring people back to city living. ...

The opponents of the project believed that any developer should have a chance to bid on the property, and the City Planner supported this protocol. Some questioned the financial competence of the group, to which the supporters countered that commercial developers are not held to such high standards....Finally, the majority of the council agreed that the proposal was different from an ordinary commercial development, and that it deserved special treatment. They voted eleven to three to grant the Halifax Project an option to purchase the site...⁵

⁴ David Munn, first Life Member of UEA, was the 'keeper of the chronicles' for the first year or so of the HEP.

⁵ Roelofs appears to be reporting the figures from the later, recision motion vote.

The Halifax Project is underway and has attracted worldwide interest. (Roelofs 1996 p.34-38)

7.6.1.9 Letter of Exasperation - October 1994

Meetings promised by ACC to discuss the state of the site were not forthcoming. After waiting several weeks for a response, UEA wrote to the new Chief Executive Officer of ACC, Ilan Hershman, expressing several deep concerns regarding the Council's dealing with the site and with UEA.

7.6.1.10 Site Remediation - Dec 1994

ACC agreed to remediation studies, the cost of which were included in the 1995/96 budget. Studies on the site contamination were completed in April 1996. The Council budgeted for a sum of nearly \$4 million for site clean-up and accepted the recommendation that: 'Investigations of remediation methods . . . be completed using the current approach of arriving at a totally clean site'. UEA was in communication with the ACC to select the best method, which was to include bioremediation.

7.6.1.11 Halifax EcoCity Forum - Dec 1994

To celebrate progress to date and to keep the community informed with the Project's development, UEA convened a major public meeting. The day before the Forum, UEA received a letter from Ilan Hershman, signed by Ian Pascoe, responding to the events of October and UEA's letter of 17 October.



FIGURE 80: UEA Youth contingent for Habitat 2 – Sharon Ede, Sam Knottenbelt (van Rood), Rhiannon Downton-Hoyle.
(Source – Photo by author)

UN Best Practices Exhibition - January 1996

'Wirranendi - the Halifax EcoCity Project' was accepted by the UN as an example of Best Practice for Habitat II - The City Summit to be held in June 1996 in Istanbul, Turkey. Young Urban Ecology Australia representatives showcased the EcoCity Project at the Conference.

7.6.1.12 Remediation Approved - 22 April - Earth Day 1995

ACC's Urban Services Committee voted unanimously to pursue a total clean up of the EcoCity site as recommended by consulting engineers AGC Woodward-Clyde and the Council's Halifax site manager, Eugene Kalibatis. The clean up cost was estimated as likely to reach \$3.6 million but would leave Council with no ongoing liabilities.⁶

7.6.1.13 Pilot Project - May 1996

Delays with getting on to the main site prompted the Wirranendi Management Team to purchase a small piece of land in Hobsons Place, near Halifax St, on which to build five townhouses. The project was to prototype two of the main building types of the Halifax Project and trial co-op ownership and management structures (see Chapter 8). Later in the same year South Australia adopted 'community title' as a replacement for 'strata' land tenure.⁷

7.6.1.14 ACC Commissions Halifax Report - Oct 1996

The ACC commissioned Ecopolis Pty Ltd, who worked in association with UEA, to prepare a report, 'The Halifax EcoCity Project and Site Remediation Strategy' which was submitted in February 1997. In this report Adelaide City Council was formally presented with a model for a participatory 'steering committee' proposal which would have set up an EcoCity Trust to oversee and steer the overall process of development.⁸ The report identified opportunities for public-private-community sector cooperation based on successful 'urban village' programs in the UK., but no one in the council ever picked it up (Ecopolis Pty Ltd 1997b).

7.6.1.15 UEA Preferred Developer - Dec 1997

ACC decided to put the development of the Halifax Site out to tender with a closing date for early in 1998. They voted UEA as the preferred developer of the Halifax site and this was reflected in the tender documents.

The Adelaide City Council gave instructions for the development of the former dumpsite that reflected just about everything Urban Ecology said should be done, including ecological responsibility and people-oriented planning and design. All seemed fine. (Arnold 1999 p.29)

⁶ The cost of cleaning up the site was eventually to reach in excess of \$6 million.

⁷ As of November 1996 a new bill was gazetted in the SA parliament to bring in 'Community Title'. Community Title broadly follows the form of similar tenure legislation in New South Wales to provide a basis for managing complex mixed-use developments. The HEP proposal was used as an illustration for the merits of Community Title in a discussion paper circulated during the development of the Bill.

⁸ It can be argued that UEA had actually fulfilled that role since the inception of the project.

7.6.1.16 Shortlist of Developers

ACC shortlisted developers for the Halifax Site and then chose four tenderers, including its preferred developer UEA, whose proposals for developing the Halifax Site were presented to council in May 1998, but it transpired that UEA did not have full control over its consortium ‘partners’ (see below). The other tenderers were Built Environs, Connor Consulting, and Pentroth. The vote on the choice of developer for the Halifax Site took place on Monday 15 June 1998.

7.6.2 The Halifax Site Tender - What happened?

The site is one of the largest and most prominent redevelopment sites to come onto the market for many years and provides an opportunity for the chosen developer to create an innovative (sic) world class environmentally sustainable development consistent with the attached Development Brief.¹

The ACC's brief for the development of the Halifax site addressed all the aspects of creating an ecological development as advocated by the UEA. UEA totally supported the ACC's final tender process because it was open and transparent. The anger reported by many people about the outcomes of that process were not simply to do with the HEP not proceeding as envisaged, but with the fact that the council reneged on its own brief and processes and, in so doing, acted in an undemocratic manner.

7.6.2.1 Dancing With the Wolves

A number of meetings took place in the offices of Barry Phillis and Associates to put together the people and processes necessary to establish the HEP proposal as a development proposition from an industry-NGO group with the capability of undertaking the development. UEA was not required to submit a registration of interest as it was included in the final tender selection process in any case. Nevertheless, the UEA Board felt it necessary to submit a formal document out of concern for being seen to pursue due process. At that time, the understanding was that Alpine Constructions would act on behalf of the interests of all parties in what would be later formally constituted as a consortium. The Registration of Interest submitted by the nascent 'consortium' was primarily put together by Robert Papillion of Alpine Constructions and the author. Papillion was responsible for the final production. The author contributed the text that described, point-by-point, how the proposed development would address each dot point in the Council's demanding brief. This was not the formal 'tender document'.

The Urban Ecology 'consortium' eventually consisted of: UEA (ACC preferred developer and community participation and education), Ecopolis Pty Ltd (architect), Barry Phillis & Associates (project managers), Hansen Yuncken & Alpine Constructions (developers). UEA attempted to formalise a contractual agreement with the developers prior to the tender's submission, but this never transpired. In retrospect, it is clear that UEA relied too much on trust in Alpine's apparent enthusiasm for the Project and Papillion's track record of support.

¹ From the Introduction in the call for 'Registrations of Interest to purchase and develop the former Halifax Street Depot' released by First Pacific Davies acting on behalf of the Corporation of the City of Adelaide.

The tender document that was finally prepared was done as a submission from 'Alpine Constructions and Hansen Yuncken as the Halifax Ecocity Group'² At no time had UEA been consulted regarding the formation of this group. The tender submission was by this group 'in association with Barry Phillis and Associates, UEA, Ecopolis, SA Housing Trust and the Master Builders Association'. Although the final tender document was titled 'Halifax EcoCity Project' it was the least representative of the two documents. Hansen Yuncken and Alpine prepared and submitted the final tender document, without it being sighted by UEA. The tender document omitted material prepared for the tender document by UEA Inc and Ecopolis Pty Ltd relating to community processes, information, UEA's international outreach and reputation, and design.³ The first presentation to the City of Adelaide was done by Hansen Yuncken and Alpine Constructions without them informing UEA that it had taken place. At the insistence of Hoyle and Downton, the second presentation to ACC did involve UEA (and also Ecopolis Pty Ltd), but UEA's role was presented by Alpine and Hansen Yuncken as that of a consultant to their development entity.

What had been conceived and developed in terms of organic, community based processes was disposed of by Hansen Yuncken and Alpine Constructions, as a desperate development bid,⁴ whilst the ACC's professed concern for 'the bottom line' saw a shift away from the dominance of a community zone of influence to that of a corporate zone of influence. The Lord Mayor ceased being supportive, and became critical of UEA for trying to operate outside conventional development parameters – thus undermining attempts to change the dominant paradigm at a crucial time.

7.6.2.2 Pentroth Selected as Developers

At the debriefing by Council staff after the Tender process and after Council had decided they would go with Pentroth, the Council staff said that the only thing the tender had fallen down on was the dollar component, and that not all the information which we had put into our Registration of Interest Document to Council with Alpine Construction had finally turned up in the tender document. The staff said that there was faith that what UEA proposed was intended to be in the Tender Document itself! Pentroth had been told that they had a number of things that they had to develop before they could go ahead! Says it all really! If ours only fell down on dollars, it was obvious that they only cared about dollars. (Hoyle in 'The Community Voice')

² Letter signed by J Bowyer of Hansen Yuncken and R Papilion of Alpine Constructions addressed to the Corporation of the City of Adelaide, dated 19 May 1998 and attached to the tender submission.

³ For instance, as part of the material submitted by UEA, but not included in, the abortive tender document prepared by Hansen Yuncken, examples of the HEP being used in academic and consultancy environments as a case study or benchmarking tool for sustainable urban development were identified.

⁴ It is the hope of this author that the cataloging and analysis of events that led to the failure of the HEP to proceed as planned can assist others attempting to engage in ecological community development.

Pentroth, a medium sized Adelaide development company, ‘won’ the Council’s vote to be selected as developer for the Halifax site. UEA learned of this first via a local journalist, with the ironic twist that when the author rang Pentroth to congratulate them on behalf of UEA, they were slightly nonplused as they had not yet been informed by Council! UEA went public with their support for Pentroth on the basis of their apparent commitment to the council’s brief. The ACC did not accept any of the tenders as fulfilling the brief.

Decision Status

Following the Tender process for the sale and redevelopment of the former Halifax Street Depot Site in June 1998, Council resolved that no tender was acceptable (as all tenders did not achieve the requirements of the Development Brief).

Council resolved to enter into a new process to negotiate an outcome with Pentroth Pty Ltd. Pentroth Pty Ltd were asked to improve their submission to meet the expectations of the Development Brief and accordingly engaged Ecopolis Pty Ltd (and others) to assist in this process.⁵

ACC gave Pentroth two months to finalise terms and conditions so that their proposal fully met the brief. The directors immediately approached UEA and Ecopolis seeking consultancy services in relation to ecological development. Their original tender document was shown to the author and Chérie Hoyle and it did appear to systematically address the key design issues in the brief and, if realised, would have resulted in a remarkable, very environmentally friendly development.

That original proposal was illustrated by a sketch of a slightly incoherent, but promising design (see Figure 81). It was to change completely once the council reneged on the original brief and tender process, in camera, and the administration, under CEO Jude Munro, directed the developers to take a completely different tack from that previously expressed in public.

⁵ From Adelaide City Council’s Operational Committee Meeting 29 March 1999— Item No. 5.10.



FIGURE 81: Pentroth directors Craig Holden (architect) and John Culshaw (engineer) with the first image released of their original proposal for the Halifax site, submitted for the tender process. (Source: *City Messenger Newspaper* 8 July 1998)

Until then, UEA actively worked to assist the Pentroth scheme and in July 1998 Ecopolis Pty Ltd was commissioned to prepare a report for them to help identify the ecological technologies and processes that were most appropriate to detailed realisation on the Halifax site. The submitted report exceeded the brief and dealt with perceived problems in the urban design of the Pentroth proposal. This was studiously disregarded by the directors who made it clear that they did not want any input from UEA or Ecopolis on that aspect of the design. The author's contention was that appropriate urban design was absolutely fundamental to realising any project that had pretensions to being 'ecological'.

The following is taken from the final part of the report prepared by Ecopolis for Pentroth:

Urban Ecology Australia

UEA has already made clear its preparedness to contribute to achieving the best possible, economically realistic, sustainable outcomes for the development of the Halifax Depot site, and we believe that the Pentroth proposal has the capability of being the most advanced development of its kind in Australia, and be a world-leading example of urban ESD.

As part of its commitment to advocating the concept of ecological cities, as a non-profit association UEA is able to act in almost any capacity necessary to achieving its goals. That includes providing services as outlined in our letter to Pentroth Pty Ltd of 6 July 1998, ie:

- UEA would be formally retained as an Adviser to Pentroth Pty Ltd.
- UEA would undertake to bring to bear its considerable skills and success as an eco-city/ecological development advocacy organisation in support of the Halifax Village.

- UEA would work with you to assist in marketing the project on an issue-orientated basis, ie. promoting the ideas and lifestyle opportunities inherent in an ecological development.
- UEA would broker connections between Pentroth, Ministers and their departments at State and Federal level in order to seek assistance and support for the project with grants or other kinds of appropriate facilitation.
- UEA would assist in bringing sponsors into the project.
- UEA would communicate with its substantial network of national and international contacts in order to promote and support the project.

UEA is interested in establishing a International Centre for Urban Ecology on the Halifax Village site. That Centre could include the premises for a management centre for the sustainable systems. UEA could contract to Pentroth in the first instance, then the Community Corporation (and in either case, perhaps with the participation and support of ACC), to assist in setting up the necessary services for ensuring the effective, economic and efficient operation of the various systems in a manner which was integrated with, and in complete support of, the community living on the site.

Recommendations

- Adopt an accreditation program run by UEA to assist in developing and establishing benchmarking for Urban ESD, of which the proposed Village would then be a primary example.
- Adopt internationally accepted principles such as the Hannover Principles.
- Adopt international best practice guidelines for energy and environmental performance such as the German goal of 'low-energy' houses with an energy consumption of 50 kWh/m³ per annum.

Although Pentroth director John Culshaw was very enthusiastic about the report's contents and said so to council, these proposals and recommendations were ignored. Culshaw concentrated on the environmental technologies and did not seem comfortable dealing with social and broader design issues. Later, as the council administration steered the project further and further away from its original concept, and after UEA and Ecopolis formally withdrew from any involvement with the project, Culshaw confided to the author that the council planners had insisted on such things as new roads that had to be straight and of conventional construction to enable the council to adopt them and run their street sweepers along the kerbs. He would love to have been more adventurous, he claimed, but was constrained by the dictates of the urban designers in council.⁶

UEA issued an interim report to Pentroth on 24 July 1998 which was generally supportive of the developer's efforts but was critical of the council's apparent attempts to redirect the thrust of the project (see Appendix 7 UEA Assessment of Pentroth Proposal):

...UEA recognises that the developers are responding to ACC pressure for firm answers on this (vehicle intrusion into the site) and other aspects of site planning and built form and believe that the City Council should make more allowance for a process which enabled the developers to achieve the optimum solution for the site which incorporated active feedback from those community participation processes which were a requirement of the Council's brief.

Planning and urban design

At the time of writing UEA has not seen the current plans for the proposed development and thus is not able to comment on the extent to which the planning and urban design for the project integrates ESD issues.

Community and management:

the overall effort being made by Pentroth is excellent and there is strong evidence for a very real attempt to integrate all aspects of the development including building performance, non-toxicity, embodied energy, use of renewables, energy conservation, water harvesting and treatment and resource recycling;

the community corporation for the site should have 'ecological management' requirements set into its articles and bylaws to ensure on-going application of the principles and processes which promise to be embedded in the physical development;

community participation processes are being pre-empted by the City Council's insistence on firm responses to aspects of the project which may still, quite reasonably, need further refinement if the project is to achieve a genuinely 'world leading' status.

On 21 September 1998, Pentroth Pty Ltd's Progress Report was presented to Council and Council resolved that their Tender, together with the further commitments in the Progress Report, now adequately addressed the requirements of the Brief and endorsed the preparation of a Heads of Agreement. This Council Resolution allowed a process to begin that was effectively 'behind closed doors' and enabled exclusion of community input on a pretext of 'commercial confidentiality'.

Between October 1998 and February 1999 the Corporation undertook a series of workshops with Pentroth, specialist consultants, legal advisers and the industry to derive a re-development of the site which was consistent with Council's endorsed concept.⁷

In doing this there was no community consultation and the 'Process Objectives' of the original Development Brief were effectively ignored.⁸ After that, the Development Brief appears to have been shelved, because it is not possible to find any relationship between most of what the Brief has to say and what was being offered by this Council-directed private development.

⁶ Personal communication with the author.

⁷ From Consultation and Information meetings on Halifax Developer's Concept Plans.

⁸ PROCESS OBJECTIVES 'To undertake the project using a broadly based consultation process which is clearly perceived as integral to the project.' From the Adelaide City Council's brief to potential tenders.

7.6.2.3 Key Objectives Abandoned

UEA undertook a point-by-point analysis of the Council's excellent Development Brief to try and identify where the ACC-Pentroth proposal fitted.¹ The conclusion was that it did not address key objectives, in particular:

- **PROCESS OBJECTIVES** 'To undertake the project using a broadly based consultation process which is clearly perceived as integral to the project.'
- **COMMUNITY OBJECTIVES** 'To create and maintain effective forums and opportunities for the community to take responsibility for itself by participation in decision making and management of the community.'
- **ENVIRONMENTAL OBJECTIVES** 'To ensure that the development promotes the efficient use of energy by the use of appropriate materials, designs and orientation to respond appropriately to the climate.' and 'Creating community spirit'.
- **MOVEMENT OBJECTIVES** 'To ensure that access to and through the site is user friendly, not dominated by cars, and that the negative effects of vehicles are minimised.' and 'To ensure that movement is directed to the site rather than through the site.'
- **URBAN DESIGN OBJECTIVES** 'To create an Adelaide model of dense urban development with a diversity of design outcomes within design guidelines based on performance criteria and where lively pedestrian activity can take place.'
- **PUBLIC RELATIONS OBJECTIVE** 'To maintain an information strategy to ensure the community is informed about the project using state of the art communication media.'

(Quoted passages are from the Council's brief as released by First Pacific Davies with emphases are by the author)

The drawings of the 'Pentroth-ACC' proposal that were finally released seemed to genuinely shock those who had held out any hope that the development of the Halifax site might bear some vestige of similarity to that promised by the council's own brief, and the vision of the Halifax EcoCity Project which had started the process.²

¹ See Appendix 7 for further critique of the Pentroth-ACC design.

² when the revised urban design for the site was revealed Ecopolis wrote a letter canceling its work with Pentroth because their design was so completely car orientated and removed from urban design approaches congruent with ecological and community objectives.

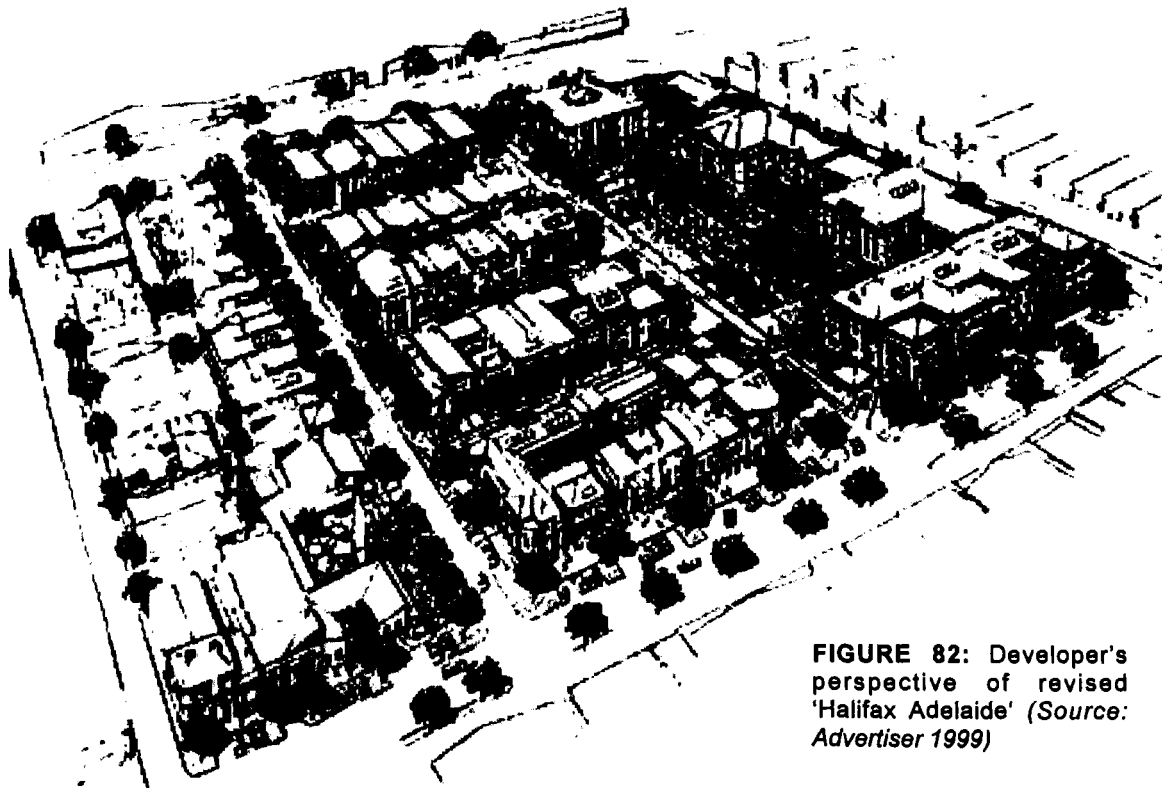


FIGURE 82: Developer's perspective of revised 'Halifax Adelaide' (Source: Advertiser 1999)

'Dear Lord Mayor Lomax-Smith,

August 25, 1999

I am President of Ecocity Builders an NGO operating out of Berkeley California and author of two books on ecological city design and planning. I wrote to you two weeks ago after being alerted by Urban Ecology Australia to a plan for construction on the "Halifax Site" in downtown Adelaide. I mentioned in my e-mail letter that the proposal of Mr. Paul Downton and his colleagues was an inspiration to all of us around the world who are working for ecologically healthy cities and that it was a disappointment to hear Mr. Downton's description of what is presently offered for that site and favored by the City Council of Adelaide.

But only after receiving copies of drawings of the offering did I realize how very great the loss is in dropping the ecological principles as expressed in Urban Ecology Australia's proposal and accepting a proposal that appears to be completely oblivious to those principles. The loss is enormous. Mr. Downton in his critique, probably because he has a certain wry sense of humor, said the project was "boring!"...But given the history of a magnificently well thought-out proposal for that site, to now see the current proposed and apparently officially accepted plan as illustrated is not just "boring!" but tragic.

... there was in Urban Ecology's proposal a sense of the whole community fitting together in a design open to nature's energy flows of wind and sunshine, working with the site, the natural resources and the givens of existing urban infrastructure and the needs of people. The skillful integration of public spaces, sun angles, areas of shade, mixes of uses, relationship of buildings, circulation of people, freedom from automobile intrusion into the pedestrian community... all this was brilliant. The complete lack of consciousness of such things as shown in the drawings for the Halifax Site I have before me now is, again, genuinely tragic.

I know it's the eleventh hour but isn't there anything that you can do to go back and prevent the destruction of this wonderful creation, meaning Urban Ecology's offering for the Halifax Site, before mediocrity locks the city into something in contrast so pathetic?

Sincerely

Richard Register, Ecocity Builders, Berkeley, USA'

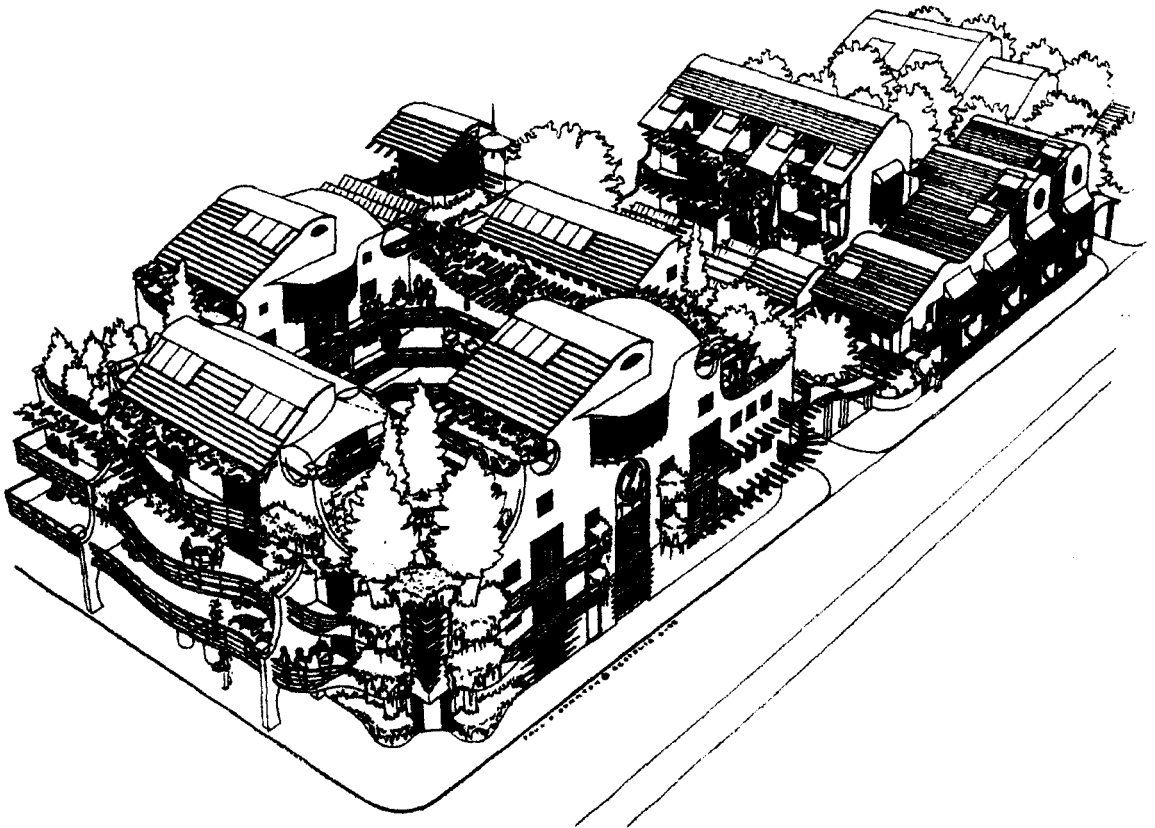


FIGURE 83: Robert Papillon of Alpine Construction was belatedly convinced that another substantial image would provide the evidence for design strategy that had been omitted from the Hansen-Yuncken-Alpine tender document. This perspective was prepared by the author in a last-minute bid to provide that evidence. Ironically it represents the most fully developed design for that part of the site that had originally been identified by UEA for beginning the ecocity adventure in Adelaide back in 1991. It shows a first stage of development – a ‘bite-size chunk’. It is interesting to compare it with the earliest drawing, done in 1992, that set the tone for the entire ecocity project. It is also of interest to compare it with the Christie Walk project both in its scope and style. (Source – *Perspective drawing by author*)

7.6.3 Bite-Size Chunks and the Birth of a Fractal

Development of the Halifax EcoCity Project was designed to occur in a series of small, manageable stages that the author has referred to as ‘bite-size chunks’ (see earlier diagram and illustration above). At one time UEA’s erstwhile development partners joined a meeting convened by UEA and Wirranendi to discuss the viability of such a scenario with the CEO of Adelaide. The meeting was amicable and positive and concluded that it was a viable strategy. Later the city was to abandon the idea of a creative, community-based, negotiated development process and sought a major ‘one-off’ developer for the site and a process that would favour rapid wholesale redevelopment rather than incremental development. That chosen developer is proceeding incrementally with the development of the Halifax Depot site, offering ironic evidence for the viability of UEA’s preferred process.

It is in the nature of urban development that things appear to move slowly, with projects typically taking many years from initiation to completion. The ACC-Pentroth

development on the Halifax site finally began construction sometime in late 2000, 7 years after UEA began promoting the idea of 'a piece of ecocity' on that site. At the time of writing, nearly ten years after the first public presentation of the Halifax EcoCity Project at the EcoCity 2 conference, development has begun on a 'bite-size chunk' – an ecocity fractal - called 'Christie Walk' just a few blocks away from the Halifax site (for location see Figure 45 p.179). The developer, Wirranendi Inc., has sold most of the properties and construction is well under way. The site's first resident moved in on Earth Day, 22 April 2001 (see Chapter 9).



FIGURE 83a: Perspective of HEP proposed 'Northgate' to Halifax Street. (*Perspective drawing by author*)

FIGURE 84: Photograph of the author working in a window of the Buddhist Meditation Centre. (Source – *Whyalla News*)



CHAPTER 8

CASE STUDY II

WHYALLA ECOCITY DEVELOPMENT

The Ecocity project represents Whyalla's best hope for a prosperous future in that it promotes knowledge and information based industry, tourism and sunrise green manufacturing activities, the development of which has become a social imperative as well as a something of fundamental importance to the future of humanity.
(Stewart Payne, City Planner, Whyalla City Council)

The Whyalla project was the first attempt to apply Ecopolis ideas to a major development with the benefit of experience gained in the Halifax EcoCity Project.

8.1 Beginnings



Ecopolis architect Paul Downton works on a window of the Whyalla Buddhist Meditation Group's EcoCity building.

FIGURE 84:
Photograph of the author working on a window of the Buddhist Meditation Centre.
(Source – *Whyalla News*)

The author's relationship with the city and community of Whyalla began some years before the consultancy that involved Ecopolis Pty Ltd and Urban Ecology Australia Inc. On Monday 15 October 1990 he could be found giving the keynote Address to the Western Area Environmental Education Conference on 'Boiling Frogs in the Greenhouse'. At that time Urban Ecology Australia had yet to be formed and the presentation was made as a lecturer in architecture at the South Australian Institute of Technology¹ and Founding President of the Greenhouse Association of South Australia Inc. The reason the author had been invited to give the

keynote went back to 1988 when, with partner Chérie Hoyle, he had visited Whyalla to give a talk to a local environment group and again in 1989 when in researching the potential for setting up a 'Trans-Institutional Centre for the Environment and Sustainable Development' (CESD) as a submission to 'The Inquiry by the Senate Standing Committee on Industry, Science and Technology regarding the contribution that Australian industry, science and technology can make to reducing the impact of the Greenhouse Effect'. The proposal featured Whyalla and the South Australian Institute

¹ SAIT became the University of South Australia in 1991.

of Technology campus there as having the potential to take a key role in the development of a CESD. This research unearthed proposals for establishing a school of arid lands studies (Fox 1986) and detailed proposals for making Whyalla an environmental ‘model city’ (Laing and Rice 1989). Although these did not have a direct influence on later ecocity activities, they contributed to the author’s perception of Whyalla as a place in which substantial commitments to environmental activities were possible. Chérie Hoyle was working as manager of Trees For Life at this time. This amplified the couple’s collective awareness of Whyalla and the environmental interests of its community, and contributed to a fair amount of background knowledge of the city building up many years prior to any formal involvement in the Whyalla EcoCity Development consultancy.

Eco City Project

The various planks of Council’s strategy give a clear picture of Council’s commitment to the principles of Environmental Sustainability. The vision for the city is to be a world leader in an integrated energy and resource strategy, more self sufficient in its energy use. The Eco-city concept is an ecologically sustainable city of ESD in a total urban setting. The Whyalla Eco-city project includes urban design principles, energy conservation and alternative energy. The Council is undertaking this project to provide a new impetus for the region. It is seen that to fully



FIGURE 84a: Model of the proposed development of the Whyalla EcoCity Core Site, made from reclaimed materials and built by volunteers. (Photo by author)

- Prepare an overall strategy
- Communication
- Indicative design
- Liaison with other projects

As development of the Eco-city site is likely to proceed over a number of years, it is vital that the long term goal of the development and the guiding principles which should shape the site and buildings which therein are not lost. Plans and written supporting material should provide clear vision and policy that can easily be carried into the fabric of the city.

Summary

An overall concept plan is required in a graphical format, plus easily legible drafted plans of key components and elements of the development in graphical form (conventional plans, models, computer generated models) to enable communication of the proposal to the broadest possible audience. An involvement in community consultation with the holding of public meetings, or staging of various design workshops is required. The preparation of a document encompassing the key design elements and guiding principles to ensure the long term viability of the project in terms of environmental sustainability is required.

8.1.1 Project Brief

PROJECT BRIEF - SELECTED EXTRACTS

Whyalla City Council has adopted a strategic approach to establish the City as a leader in the utilisation of sustainable technologies in all aspects of the operation of civic services and the built environment.

This strategy comprises several thrusts designed to take advantage of Whyalla's climatically favoured location, the creativity and cohesiveness of the local community and Council's unity in its desire to create a new future for the City by broadening its economic base and increasing employment opportunities for young people and residents generally.

The major thrusts in the strategy are:

- To devise and implement a comprehensive water recycling plan.
- The implementation of mandatory controls in development policy to require the installation of solar hot water heaters and passive design features in enhance energy efficiency in new dwellings or major renovations.
- Financial incentives for the installation of solar hot water heaters.
- Agenda 21 Local Environment Plan Process.
- Public campaigns to disseminate appropriate/sustainable building technologies.
- Integrated cycle network and linear park.
- Alternative energy research centre.

Eco City Project

The various planks of Council's strategy give a clear picture of Council's commitment to the principles of Environmentally Sustainable Development (ESD) with a significant resource allocation being made to date, with more planned for the immediate future. The various strategies will make Whyalla an Australian if not world leader in an integrated and strategic approach to solving the many problems associated with our very energy and resource hungry modern cities. They will prove that urban development in the arid zone can be more self sufficient in its energy and resource needs.

The Eco-city concept could be applied to Whyalla as a whole, as Council's goal is to create a more ecologically sustainable city. However, it is seen that there is further opportunity to demonstrate the principles of ESD in a total urban sense with the creation of a greenfields example of a piece of working city.

The Whyalla Eco-city project will utilise all aspects of appropriate and sustainable technologies including urban design principles, building construction techniques, design factors and materials, conventional energy conservation and alternative energy generation, sustainable water use and reuse of effluent.

The Council is looking to ecologically develop vacant land in the city centre as an early stage in the project to provide a new urban core for the city and act as a catalyst for the new ecological development expected for the region.

It is seen that to fully develop the project, the following need to be done:

- Prepare an overall graphical concept design.
- Communication of the concept to the public.
- Indicative design of a Council meeting hall facility.
- Liaison with major players.

As development of the Eco-city site is likely to proceed over a number of years, it is vital that the long term goal of the development and the guiding principles which should shape the site and building work therein are not lost. Plans and written supporting material should provide clear solutions and policy that can easily be carried into the future of the city.

Summary

An overall concept plan is required in a graphical format, plus easily legible detailed plans of key components and elements of the development in graphical form (conventional plans, models, computer generated models) to enable communication of the proposal to the broadest possible audience.

An involvement in community consultation with the hosting of public meetings, or staging of various design workshops is required.

The preparation of a document encompassing the key design elements and guiding principles to ensure the long term viability of the project in terms of environmental sustainability is required.

8.2 Context

8.2.1 Regional

Whyalla is a small city of 25,000 people situated 400km from Adelaide near the head of the Gulf of St Vincent on the agricultural/rangelands boundary. The climate is broadly similar to that of San Diego with generally bearable heat in summer, excellent spring and autumn weather, and very tolerable winters. There are 301 days cloud-free every year. In the USA it would be regarded as a ‘sunbelt’ city, but its reputation in South Australia is coloured by its industrial history and so it is seen more as a ‘rustbelt’ town. The Outback is very close, with the spectacular scenery of the Flinders Ranges and near-desert within an hour’s drive. The sea frontage is sheltered and excellent for wind-driven craft, although fairly busy with tankers and freight vessels. It has good port facilities and rail connections and generally well developed infrastructure.

8.2.2 Economic

Whyalla was founded as a mining and steel town 100 years ago (its centenary is at the same time as Australia’s centenary of nationhood, in 2001). As is the case all over the world, the steel industry is restructuring and smaller and fewer plants do the same job done previously by larger works. Whyalla has had a population decline from a peak of around 32,000 as the steel works, owned by BHP until very recently, have adjusted their operations. There are still many people in the city with industrial skills in all aspects of metal working and manufacture generally. Whyalla is searching for industries to fill the economic niche(s) being created by these changes, and to find ways to maintain economic vitality despite the underlying trends of the town’s biggest employer². Whyalla also has the major regional campus of South Australia’s largest university - the University of South Australia.

In addition, the city claimed to have developed what the then-Mayor, Keith Wilson, called a ‘can do’ culture³. It may be a result of its industrial ‘backs against the wall’ history, or its multi-cultural make-up but Whyalla has a feisty underlying social dynamic⁴. The city is in a region identified by both state and federal government as a focus for economic regeneration and support but the complex politics of the city have stymied most attempts to pursue innovative development options.

² As this thesis was being formatted for final printing, news media were reporting that Whyalla steelworks would be manufacturing the rails for the new Australian North-South rail link.

³ Personal communication, 31 January 1997.

⁴ According to personal communication with Phil Tyler of the Whyalla Economic Development Board, Whyalla has the most number of different ethnicities of any Australian city, despite its small size.

focus for economic regeneration and support but the complex politics of the city have stymied most attempts to pursue innovative development options.

Whyalla has made some effort to commit to ecologically responsible development and has put in place as number of initiatives with substance such as a wetlands/stormwater management system, extensive bikeways, and financial incentives for people to put solar hot water systems in their homes. The city's Economic Development Authority was ostensibly offering assistance in getting companies established in support of the ecocity development program.

8.2.2.1 The Land Grant

At the commencement of the consultancy title to the land resided with the State Government and was leased to the City Council as a Reserve. Negotiations to transfer ownership of the Core Site to the Council took place with The State Government, through the Minister for Environment and Natural Resources the Honourable David Wotton MP⁵. Change in land ownership came under the provisions of Native Title legislation. There were no difficulties experienced by any parties in regard to Native Title provisions and there was active involvement of the local Aboriginal Barngala community in the project development process, with representation on the Project Management Team and participation in the site 'blessing' ceremony.

To be able to develop what was to become the 'EcoCity Core Site' Whyalla City Council had sought for, and obtained, a land grant from the State Government. In his submission for this grant, the City Planner identified the following potential benefits:

- Developers have security of tenure
- Enables innovative land tenure systems to be used such as community title
- Reduces development cost for community developers who are not able to raise finance readily
- Funds from land sales can be used for ecological site infrastructure development
- Will provide impetus for the Eco City Development and enable building projects to start quickly
- Will demonstrate the Government's commitment to the use of renewable energies and ecologically sustainable development as a whole;
- Will contribute to regional development;

⁵ Chérie Hoyle and the author attended meetings with the Minister to assist in the process as 'honest brokers' for the environmental and community goals of the Whyalla Council's land bid.

- Is the right thing to do for Whyalla, the state and the planet!

He went on to observe that:

The location of the site in the geographical heart of Whyalla close to other retail, recreational and community facilities, makes it ideal for the type of integrated community/residential development intended. The fact that the land close to the centre of Whyalla is vacant, presents a rare opportunity to create a functional relevant city centre. There is no large commercial interest or developer involved in the site, nor is it likely that a large scale developer could undertake a project of this kind and the project is being carried out by a number of small scale, mostly local developers who would not normally have the opportunity to take part in property or building development of this scope and magnitude.

The City Planner provided a site plan for a potential future redevelopment of the site as an exploratory planning exercise. It is of interest to compare his plan with that produced by the consultancy (see below).

8.2.3 The ‘Ecocity’ Consultancy

The City Council of Whyalla sought:

...to establish the City as a leader in the utilisation of sustainable technologies in all aspects of the operation of civic services and the built environment...taking advantage... of Whyalla’s climatically favoured location, the creativity and cohesiveness of the local community and Council’s unity in its desire to create a new future for the City by broadening its economic base and increasing employment opportunities for young people and residents generally. (from the Council’s brief)

In order to further these aims, Whyalla Council advertised for consultants to produce an overall concept plan for a ‘core site’ redevelopment in the city, situated on a 15 hectare cleared, but otherwise undeveloped, site in the approximate geographical centre of the city. Their brief ranged widely, including a requirement for the creation of general design guidelines and extensive public consultation with an underlying, implicit expectation that the core development proposals would be linked to the economic rejuvenation of the city and its long-term goals for achieving leadership in ecological development. Outcomes and activities were to include:

- a number of public workshops
- the preparation of a document encompassing key design elements and guiding principles to ensure the long term environmental viability of the project
- presentation of proposals in a graphical format, with ‘...easily legible detailed plans of key components and elements of the development in graphical form (conventional plans, models, computer generated models) to enable communication of the proposal to the broadest possible audience.’

Whyalla engaged Ecopolis Pty Ltd in association with UEA Inc (with the support of the University of SA) to undertake the Whyalla Eco City Development. This can be interpreted as a commitment to innovation and progress and demonstrated a preparedness to work with young, ‘leading edge’ organisations that more conservative administrations might ignore. In preparing their brief, officers and elected members of the Council had consulted extensively, both formally and informally, with the Ecopolis Pty Ltd and UEA Inc. For the selection of consultants the project was publicly advertised for competitive tender. There was to be a tortuous history to the letting of the consultancy which, for this author, re-emphasised the inherently political nature of all aspects of ‘development’.

The group that made up the Ecopolis-UEA consultancy included a high percentage of young, relatively inexperienced people who learned on the job and brought a high level of energy and commitment to the entire project⁶. Much of the work they did was as volunteers. Without that voluntary work component and youthful energy, the ambitious aims of the consultants could never have been countenanced, much less achieved.

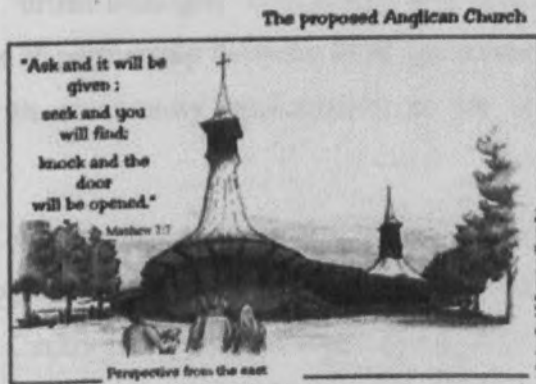


FIGURE 85: Jean Oates of the Anglican community in Whyalla turned drawings of the proposed church into postcards. This demonstrated an embrace by popular culture of ‘ecocity’ ideas and images, providing some evidence that the Whyalla consultancy had some success in addressing Ecopolis Proposition 3 ‘Cultural Change’.
(Source – Jean Oates)

⁶ In particular: Digby Hall, Glenn Versteegen and Sophia van Ruth.

8.3 Process

The Whyalla Eco City Development project set out to re-invigorate the city, not only in environmental terms, but economically and culturally. A clear expectation on the part of the City Council and many concerned and interested citizens was that a focus on, and commitment to, ecological development might lead to new industrial and economic activity linked to the city's re-invention as a 'solar city'.

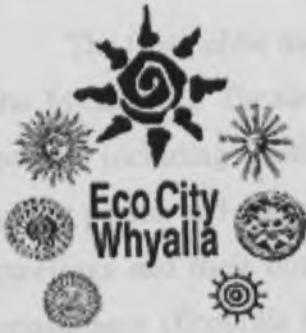


FIGURE 86: Solar symbols from various cultures arrayed under the one created by the author for the Whyalla EcoCity Development.

Whyalla City Council had already undertaken environmental initiatives (see above). The selection of the 'core site' in the geographical centre of the city reflected the shift of the city's residential area towards that central location. The Ecopolis-UEA proposal was that the site become the location for an ecological architecture and urban design exercise incorporating technologies ranging from mud-bricks to 'poured earth' and using both basic and advanced solar technologies. There was seen to be a basis for industrial and economic renewal in the adoption and exhibition of these technologies in a program which set out to provide a model for arid lands human settlement. The exciting thing for the 'urban ecologist' consultants was that this whole program was predicated on the basis of partnership between local government, industry and the non-government sector with community participation at the core of the development process.

The program of community participation in the first stage of the Whyalla Eco City Development program extended over more than 6 months. It included the setting up of an 'Arid Lands Centre for Urban Ecology' (ALCUE) in Whyalla. Modelled on the successful Centre for Urban Ecology which evolved from the creation of the Halifax EcoCity Project, the Centre provided a 'shop-front' for the Whyalla Eco City Development, making information about the project readily available to the community and providing a place for people to put their views, concerns and ideas directly into the development process. ALCUE was the formal responsibility of Urban Ecology Australia Inc., and local members of Urban Ecology and other volunteers were responsible for the day-to-day running of the Centre. Ecopolis-UEA made it a condition of taking on the consultancy that the Council provided premises for such a Centre. This application of knowledge gained in the HEP directly addressed Propositions 2, 3 and 4 in the present thesis.

The consultancy team for EcoCity Whyalla included a number of individuals and organisations that undertook specialised tasks including the production of an ecological analysis of the Whyalla region and preparation of a preliminary bioregional map. The consultancy program began in August 1996. Work was expected to begin on site sometime in early 1997. The first beginnings of development effectively began with ground breaking for the remarkable ‘Terbum’ (Wealth Vase) ceremony in April 1997.

8.3.1 Public Meetings

The first public meeting was held to launch the consultancy on 23 August 1996 in the Middleback Theatre, close to the core site. It was attended by about two dozen people, including media and council representatives with most people over 40, one young person and one baby, and a reasonably even gender ratio. A full report on all the meetings and their outcomes is included in the report submitted to council by the consultants (Ecopolis Pty Ltd 1997a (with UEA)). People were asked to consider: ‘What are the good things about Whyalla? What could be better about Whyalla? And ‘Where are the opportunities for improvement? They were then asked about their perceptions of any obstacles and barriers and how they saw Whyalla in the year 2021. Participants were asked to post in any further responses and the consultants collected a number of contact names and addresses. A series of public ‘workshop’ meetings followed.

8.3.1.1 Whyalla Why Not?

The primary tool used to elicit a response from the community and to send out a message of ‘difference’ about both the consultancy and the consultants, was that of scenario setting by means of a short story. Two thousand copies of the author’s ‘Whyalla, Why Not?’ booklet were produced to serve as an introduction to the project and was made freely available to the citizens of Whyalla thanks to the sponsorship of the SA Gas Company. In addition to the ‘Whyalla Why Not?’ publication (Downton 1996a) a series of booklets was produced in association with the workshops, each dealing with a different aspect of the EcoCity Program. This ‘Mini Library’ provided accessible information for anyone with an interest in EcoCity Whyalla. There were seven titles in the series They were: 1. ‘Urban Design Principles for Arid Regions’; 2. ‘Ecology and Bioregions’; 3. ‘Energy, Architecture and Design’; 4. ‘Earth Construction Technologies’; 5. ‘Core Site Design - Principles in Practice’; 6. ‘Integration and Overview’; 7. ‘Guidelines for the Future’ (Downton 1996b).

8.4 The 'Whyalla Why Not?' booklet presented a short story set 25 years to the day from when the first public meeting was convened as part of the community participation program. In addition to the story there was a section which illustrated some of the ideas that are part of making cities more ecologically and socially responsible. The third part of the publication outlined the brief given by the City of Whyalla setting out the main tasks required of the consultants.

The story is about a journalist covering the 25th birthday celebrations for 'Whyalla - The Solar City' and it offers a view of what might have happened to Whyalla by then 'Whyalla, Why Not?' was written in the future history, utopian tradition of Morris' 'News From Nowhere' and Callenbach's 'Ecotopia' (see Chapter 4) as a way to describe what Brand would call an 'imaginative scenario' of a possible future in which a program for change is implicitly set up but the reader's imagination is left with room to play. One way in which this document was used to engage the community was to run a competition in December 1996 in the local schools to continue the story. The results of this competition were, on the whole, encouraging, with many of the students envisaging quite radical futures for their city ranging from Luddite to 'technofix' imagery and ideas and always with a strong environmental theme.

FIGURE 87: Composite of images from Childrens Workshop.

NOTE:

These figures/tables/images have been removed to comply with copyright regulations. They are included in the print copy of the thesis held by the University of Adelaide Library.

Whyalla Eco City Development
Childrens Workshop
2 00pm - 4 30pm Thursday 3-4 October 1996
Ramsay Street Community Centre
Whyalla Stuart



Workshop by URBAN ECOLOGY SYSTEMS & THE WED LINDSAY PTN LTD
The project is funded in part by the support of the Government of South Australia

8.4 Workshops

A major part of the EcoCity program was a series of workshops held every few weeks, each on a different topic. Their purpose was to inform and educate and to gain input from the community into the design process. They included:

- *'Ecology and Bioregions'* - Participants were introduced to the concept of bioregions, given a Bioregional Quiz, and asked to draw Whyalla's boundary on a large map of the region. They also did some cultural mapping, drawing a boundary around the area they consider their neighbourhood on a map of Whyalla.
- *'Energy, Architecture and Design'* and *'Ecology and Architecture'* - Participants were introduced to the significance of energy issues in ecological architecture, such as climate responsive design, low embodied energy and local energy generation from renewable sources. Groups were formed to explore how to design a low-energy building incorporating these ideas. Earth based construction technologies were introduced and discussed. Particular interest was shown as to how existing houses in Whyalla could be adapted for better environmental performance.
- *'Children, Community and Neighbourhood'* - Adults were asked to recall memories of their own childhood experiences and compare them with what they thought kids wanted today. The younger participants were asked to write and draw about their favourite play spaces, and what they wanted from their urban environment. Participants were introduced to design concepts that helped create safe play spaces and reinforce a sense of community. Both age groups were asked to put forward their ideas as to what should be on the core site with respect to young people. The importance of the input from young people was emphasised by this workshop, reflecting experiences from similar community planning processes worldwide.
- A *'Children's Workshop'* - Whyalla's young citizens participated in the Council of All Beings, with each child making a mask to represent a local bird, plant or animal. Through this 'Council' the children voiced concerns for their character's environment, asking adult humans to take care of non-human habitat. Children then formed groups to express their ideas of ecological cities in play dough, play bricks and through drama. This workshop addressed deeper levels of cultural change (Proposition 3), the need to integrate knowledge (Proposition 2), an understanding of broader context and integration with the biosphere (Proposition 1), and it began the process of engaging the community with the urban ecosystem through an ecocity project.

8.4.1 The Urban Design Workshop



FIGURE 88: Graphics based on Lynch's 'normative city types' prepared as part of the workshop and publication program for the urban design workshop. (Downton & Versteegen)

The results of the Urban Design Workshops were of particular interest. On Thursday 3 October at the Ramsay Street Community Center participants were given a 'crash course' in urban design by the author, illustrated by slides of urban spaces from around the world, showing how squares, fountains, gateways and other urban features contribute to shaping the built environment. Urban design principles for arid regions were introduced. Then the workshop attendees were split into three to look at how each of the fundamental city designs might apply to the core site of Whyalla. A 1:400 scale map of the site was provided along with model materials to represent buildings and trees, and each group worked together to shape an urban space, discussing ideas and options under the guidance of three facilitators and the author¹.

8.4.1.1 Typologies

On the basis of Kevin Lynch's analyses it is possible to discern three 'normative types' of city plan: the 'celestial' or 'Classical', 'Mechanical' and 'Organic' (Lynch 1981). These typologies were used to introduce concepts of urban form to the workshop participants and formed the basis of the workshopping program with three groups being set up under the normative type rubrics. Similarly, workshop participants were presented with the idea, drawn from this author's research, that there are just three basic street or road layouts: radial, grid and hammerhead. From this it follows that all designed movement patterns employ one or more of these layout typologies. The reduction of urban design principles to such simplified typological bases proved to be a resilient means of informing workshop participants and did not seem to stultify their creativity.

¹ 'Classical' Facilitator: Angela Hazebroek, 'Mechanical' Facilitator: Sophia van Ruth, 'Organic' Facilitator: Digby Hall.

In just an hour and a half, the subject was introduced, key concepts were presented and demonstrated, and groups of ordinary citizens became urban designers – with surprising success. By avoiding the extremes of being either patronising ('this is too rarified an idea for you non-experts to understand') or making things simple to the point of being simplistic (better to assume reasonable intelligence on the part of the average citizen) it was possible to get people quickly and effectively engaged in designing their future built environment. The fundamental principle is that everyone knows a lot about architecture and urban design because they are compelled to inhabit a predominantly built environment and they learn by long and deep experience. The role of education is, as the Latin root of the name suggests, to 'draw out' that knowledge in a structured, supportive and interesting way so that that stored experience can be released, employed and enjoyed. The urban design workshops were so much fun for the participants that those running the workshops had trouble getting people to leave!

The workshop participants showed a clear preference for the 'organic' city type and many of their observations and ideas were later incorporated into the core site design. The workshop is documented in the following illustrated section.



FIGURE 89: The first ten minutes of one of the Urban Design Workshops.

Approx time 10 minutes

- Identify existing facilities eg. recreation centre, shopping centre, museum, TAFE
- Focal point – community hall, two main axes through the site.
- Clusters of buildings with good connections to encourage flow from one area to another.
- Relationships & linkages to surrounding areas.
- Residential users.
- Small police presence.
- ‘Are existing buildings staying?’



FIGURE 90: The next ten minutes of one of the Urban Design Workshops.

Approx time 20 minutes

- Use existing paths of desire, with gateways.
- Concentrate higher density closer to existing buildings.
- Mixed use – encourage diversity of people & activities.
- Council meeting place.
- Restaurants – good quality, Thai, alfresco dining, brothel...



FIGURE 91: After the first thirty minutes of the Urban Design Workshop.

Approx time 30 minutes

- Design for proximity eg. elderly between Westlands & Civic Centre.
- Ensure that the EcoCity belongs to the whole of Whyalla – not to feel isolated.
- Green space – native grasses, low water needs.
- Trees, water, wetlands.
- Kids’ adventure playground.



FIGURE 92: 40 minutes into the Urban Design Workshop.

Approx time 40 minutes

- Cycle path in linear park.
- Linear park should link all of Whyalla.
- Two circulation systems interconnecting with each other: walking – driving.
- Open air theatre (TAFE has one).
- Community gardens.



FIGURE 93: 50 minutes into the Urban Design Workshop. Less than an hour and each group has created distinctive layouts.

Approx time 50 minutes

- Tram route & pedestrian mall – linking Whyalla, following linear park.
- Solar orientation – using vegetation for shade on west of buildings.
- Need for private outdoor residential space.
- Food production important – edible landscape.
- Trees which are good for SHADE!
- Internet café.
- Proper paths – pedicabs, trishaws & solar golf buggies.



FIGURE 94: One hour, and the groups have each made plans that include most of the major elements of an effective urban design.

Approx time 60 minutes

- Existing paths provide initial street pattern.
- Identify ‘crossroads’ where paths meet and use as local urban centres.
- Public transport NOT to diminish the quality of pedestrian space.
- Rickshaws – pedal/solar powered, cycle access – on public transport too.
- Recreation – picnic spaces.
- Workshops – maintenance.
- Solar bus.



FIGURE 95: 70 minutes into the Urban Design Workshop.

Approx time 70 minutes

- Linkages – street crossings, safety; closing streets, calming.
- Solar orientation – using vegetation for shade on west of buildings.
- Facilities for elderly people in community areas.
- Good access for people of all abilities.
- Tree lined avenues for walking/cycling.
- Tree lined car parks.



FIGURE 96: The designs continue to be refined.

Approx time 80 minutes

- Civic centre – should be fun, always something happening.
- Kids' playground – adjacent to 'elderly precinct', foster sense of neighbourhood.
- Features: gathering places, courtyards, water features, walkways, limited access for cars.
- Cluster housing for aged.
- Restaurants in town centre.
- Two storey terrace housing.



FIGURE 97: An hour-and-a-half into the Urban Design Workshop.

Approx time 90 minutes

- Pedestrian & green links to civic park over Nicolson Avenue.
- Tramway, museum, library, art gallery/art barn, outdoor amphitheatre.
- Forest, water features.
- Gateways are important.
- ‘Keep the blue – native vegetation is great’.



FIGURE 98: By the end of the Workshop each group had created distinctive designs for the 15 hectare site – but none of them wanted to finish!

Approx time 100 minutes

- Calm streets adjacent to site.
- Playing fields – don’t need more, Civic Park is close enough.
- Church, aged care, aboriginal centre, child-care, school.
- Arid lands botanical garden (education, tourism), beauty, speaker’s corner.
- I prefer things to grow – planning things doesn’t work. The planners should just do it – then we can complain about it!
- ‘Classical doesn’t work – we don’t like it’.

8.5 History & Outcomes

8.5.1 Community Energy

There were a number of initiatives over the period of the consultancy intended to engage public interest in the EcoCity Development. EcoCity Whyalla was represented in the Whyalla Christmas Pageant, with the Anglican Church community generously providing stall space in the Ada Ryan Gardens. High school and primary school visits were undertaken on a number of occasions by the consultants to present the EcoCity Whyalla concept to staff and students. EcoCity Whyalla was promoted via UEA stalls at both the Festival of the Sun and the Sunday Mail Home Show in Adelaide.

In January 1997 the Arid Lands Centre for Urban Ecology relocated to 24-26 Patterson Street and was open six days a week.¹ In March 1997 the Governor of South Australia, Sir Eric Neal, visited ALCUE and the EcoCity site during a tour of Whyalla. By April 1997 the spiritual energies of the community had found memorable expression in an outdoor Inter-faith Ceremony held to bless the EcoCity Core Site, involving the Anglican, Uniting and Catholic churches and initiated by the Buddhists and the first ‘Terbum’ (Wealth Vase) ceremony² held in Australia (see 8.7.2.1 Mixed Blessings). Over 200 people celebrated a future ecocity envisaged as a place of social justice, creativity and environmental responsibility. The event was not part of the council’s brief. It was community spirit released by the vision of Whyalla as an ecocity.

8.5.1.1 Media Coverage

Maintaining the continued interest and enthusiasm of the media has long been an important part of enabling effective community outreach by poorly resourced, non-profit organisations and in Whyalla UEA made an effort to ensure good relations with the print and electronic media. There was coverage of the project in *The Australian*, *Sunday Mail*, *Permaculture International Journal*, *SA Catholic News*, Channel 2, Channel 7, GDS Channel 4, and many other publications, radio stations and other forms of media. The local *Whyalla News* gave good coverage to the EcoCity Whyalla program, helping to both get the word out about Community Workshops and the Arid

¹ Thanks to the dedication of ALCUE coordinator Jo-Anne Waters and other local volunteers.

² Consecrating land for the construction of a new Buddhist Centre on the EcoCity core site.

Lands Centre for Urban Ecology, and providing a venue for the consultants to feed back information to the wider community.³

8.5.1.2 The Project Team and Liaison with Major Players

A Project Team was set up through the auspices of the City Council. Its membership included individuals representing:

- Ecopolis Pty Ltd
- Urban Ecology Australia Inc
- Whyalla City Council (staff and elected members)
- Whyalla Chamber of Commerce
- Australian Central Credit Union
- The Anglican Community
- The Buddhist Community
- Buttingarra Aboriginal Corporation
- Whyalla Senior Citizens Welfare Association
- Whyalla Hospital
- Landcare Australia
- Excel Enterprises
- Whyallina Aboriginal Heritage Committee
- SA Country Arts Trust
- University of South Australia
- The National Trust
- Whyalla Economic Development Board.

The consultants maintained liaison with the following major players, and groups that had expressed an interest in being part of the core ecocity site:

- Anglican Community
- BHP Ltd
- Buddhist Community
- Buttingarra Aboriginal Corporation
- Excel Enterprises
- The Barngarla people
- University of South Australia
- Whyalla Economic Development Board
- Whyalla Hospital
- Whyalla Senior Citizens Welfare Association
- Whyallina Aboriginal Heritage Committee

³ Although the press officer to the Whyalla council failed to realise the Inter-faith Ceremony's significance (and associated media opportunities) his lack of imagination was unusual in UEA's experience.

8.5.1.3 Community Organisations

The consultants also liaised with numerous community organisations throughout the EcoCity Whyalla program, with particular input from the Agenda 21 Committee, the Friends of the Whyalla Conservation Park, Main Street Committee and many of Whyalla's primary and secondary schools, these being in the form of drawings and written visions for the future of Whyalla as an ecological city.

8.5.2 Overseas Volunteer Input

Urban Ecology Australia provided a five month internship to US environmental studies graduate Leslie Chaison from the United States who researched urban agriculture and urban food security in both Adelaide and Whyalla for her thesis. Chaison spent some time in Whyalla working with local volunteer ALCUE coordinator Jo-anne Waters. UEA also hosted German intern Norbert Schulz, an environmental engineering graduate from Germany, who did some research into the embodied energy of various building products and processes but whose main written contribution to the work of UEA was to review the Ecopolis Development Principles (see Chapter 13). Schulz also spent time in Whyalla.

8.5.3 Guidelines and goals

An important outcome of the consultancy was the creation of Urban Design and Architectural Guidelines for the Core Site. Initial plans included the preparation of Goals for the wider city context. Whereas the Guidelines aimed to establish appropriate performance standards for development on the core site, the Goals would have sought to provide the means to ensure that development of the whole city was headed in the direction of long-term ecological viability. The expectations on the part of all parties was recognised as being optimistic with regard to achieving all the original intentions of the program. Thus, the Goals were only included in the consultancy outcomes by implication, as were the mooted Auxilliary Guidelines for retrofitting existing buildings in Whyalla. It was agreed that Guidelines and Goals would be included in any Community Title provisions established for the Community Corporation, or similar, which would be the management vehicle for the Core Site development⁴.

⁴ Community Title was passed by the State Parliament of South Australia in November of 1996 and represented a largely untried means of setting rules and enforcement procedures for multi-occupancy, multi-tenured, multi-use developments such as the Eco City project.

8.6 The Built Form

...a full frontal challenge against Modern architecture's nature of abstraction. It is a radical integrative proposal that is ecological to its core and attempts to showcase architecture as a means of renewal against the usual system of restructuring. (Hajamaideen 1999 p.34)

Faris Hajamaideen was writing about the 'Anglican EcoChurch', but his observations apply to the core philosophy of the entire Whyalla EcoCity Development (WED).



FIGURE 99: The main perspective of the proposed Whyalla EcoCity Development from the North West. (Drawn by the author)

8.6.1 Critically Regional

Building typologies were developed for the project based on ideas of regional specificity generated by climatic and ecological concerns and relationship to the lifestyle of both the suburban and post-suburban Whyalla citizen. Design guidelines were developed to stress functionality rather than style, with a clear intent to engender an appropriate regional style through the application of certain principles, such as requiring a high percentage of shaded external space around every building.

Shade is extremely important in the Australian context. Severe stratospheric ozone depletion has resulted in high UV radiation levels. A 'walkable' city would have to provide shaded pedestrian and bike paths to protect its citizens.



FIGURE 100: Multiple, layered shade elements and non-traditional forms are part of the EcoCity Information Feature design, shown here in its Initial sketch form. (PFD 6 February 1998)

Site zoning was designed to encourage 3 storey dwellings in residential areas and 3 to 5 storey apartments and shophouses adjacent to the public areas - but the current economic reality is that single storey construction is cheapest and the signs are that any move towards medium-density may be difficult to achieve.

8.6.1.1 Building design

Extensive use of verandahs and pergolas characterises an appropriate response to shade requirements, but the guidelines made no requirement that the verandah and pergola forms should be traditional. There was some hope that the guidelines would encourage the use of innovative, non-traditional forms. A 'layered shade' model was the consultants' favoured option which would provide the potential for a strong articulation of the building in the third dimension even when the basic building may be only one storey high (see sketch design below for 'Excel Enterprises').

Both courtyard dwellings and 'pavilion' house forms were addressed in the guidelines - the EcoHouse Types (see below) demonstrate the kind of response intended. Shop-housing, terraced housing and duplexes (semi-detached dwellings) were encouraged although they were generally regarded with suspicion in a place which consultant

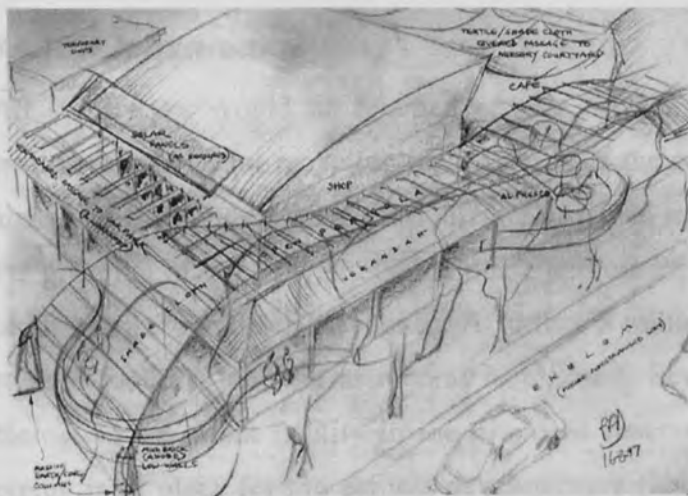
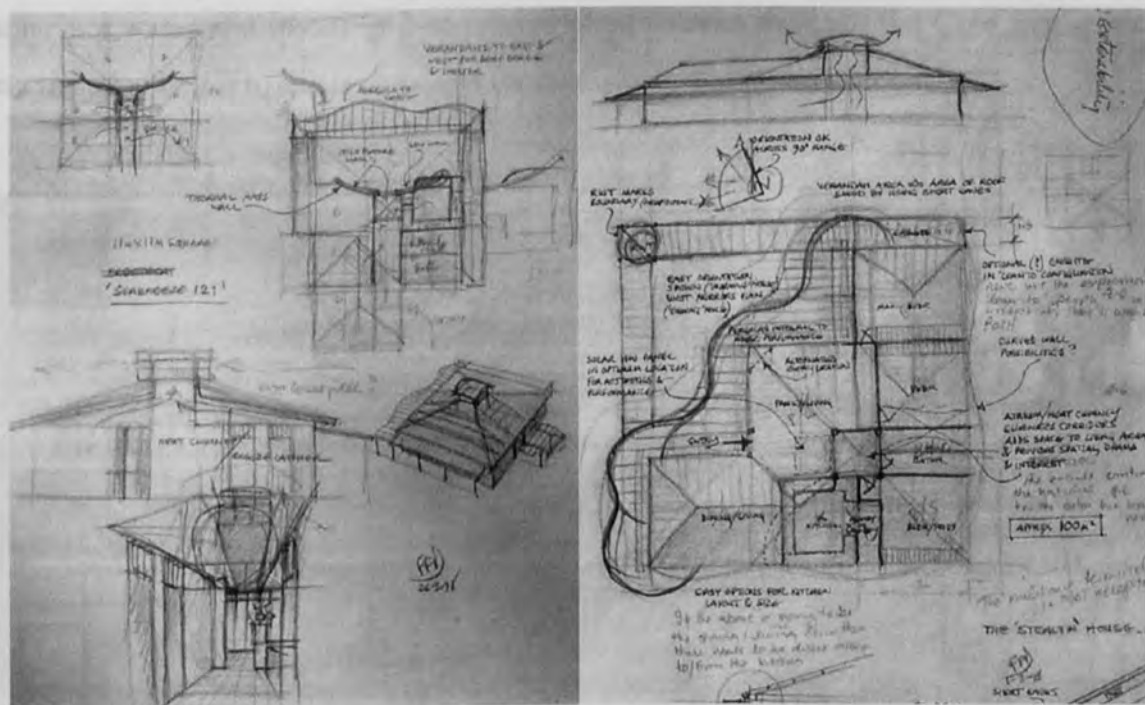


FIGURE 101: (above) Sketch design for the Excel Enterprises building where a single storey volume of shops, offices and workshops is treated with layered shade and thermal venting rising rooflines to add visual bulk to the design. This did not eventuate. (PFD 16 February 1997)

(below) Sketch design drawings of EcoHouse Types B and C. (PFD 26 May 1998 & 1 March 1998)



8.6.1.1.1 Transport

Walking and cycling are encouraged in the core site design. The cycle paths link with the growing network being provided by the present Council. Cars are accepted but their dominance is not. The public areas of the core site would have no through traffic. An existing street to the west of the site would be pedestrianised and links made with the city's biggest shopping mall and its car parking. Other car parking provision to neighbouring community facilities has been generous and the expectation is that these existing car parks would have been sufficient to serve the core site development.

8.6.1.1.2 Infrastructure

All stormwater would be retained on site or taken to the adjacent proposed water treatment reserve for recycling for irrigation of the core site and existing nearby public areas and parklands. Council has already provided major storm water storage to enable the greening of the Whyalla Golf Course and other public open space and the creation of an extensive artificial wetlands. A further 5 millions dollars of investment in water storage facilities and infrastructure is planned. Sewage would be taken to a solar-biological treatment facility in the proposed reserve. In the meantime limited sewer piping is in place for the earliest developments (Excel and the Buddhists) connecting properties to a temporary on-site septic tank with capture of the solids and use of treated grey water for irrigation of the first plantings on the site. Water supply is from the mains in the first instance with water conserving practices reducing use for all purposes, perhaps by as much as 70% overall. In the proposed guidelines, all buildings on the core site would be required to have solar space heating and cooling strategies, provide solar hot water and install grid-connected photovoltaics to make the Core Site a net energy supplier (Whyalla is cloudless for an average of 301 days a year)⁵.

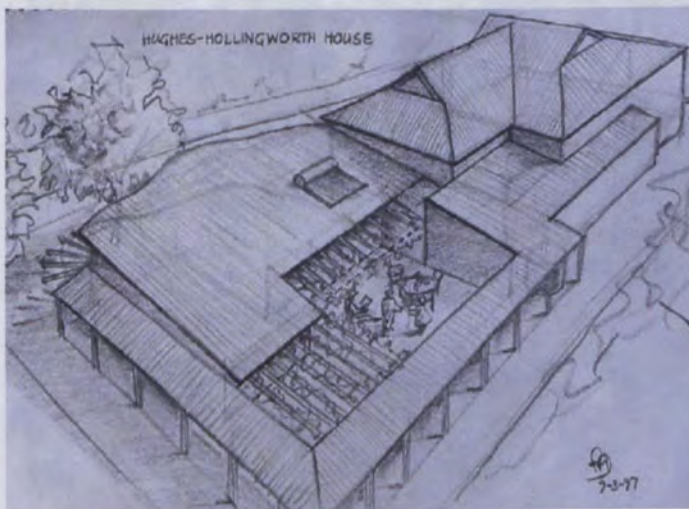


FIGURE 102: One of the councillors most responsible for initiating and maintaining the ecocity program for Whyalla, Eddie Hughes, together with his partner, commissioned a design from Ecopolis to extend their existing house in Whyalla using the same principles and design strategies as those contained in the consultants' report to Council. This non-toxic, solar design has been constructed.
(PFD 9 March 1997)



FIGURE 103: View of the 'Earth' arched gateway on model of the proposed development of the EcoCity Core Site

⁵ Since the consultants prepared their report the Federal government has brought in subsidies for photovoltaic provision. The Plan Amendment Report eventually produced by Whyalla did not sustain the degree of environmental concern demonstrated by the Council's original brief for the EcoCity project.

8.6.2 Comparison and Analysis of Site Planning



FIGURE 104: Site plan prepared by the author for Ecopolis Pty Ltd taking into account the responses of the Urban Design Workshops and general feedback received through the operation of ALCUE and general interaction with the community through the consultancy education and participation program. The site is organised to comply with ecological development principles and in response to the results of the Urban Design Workshops.



FIGURE 105: (Left) Plan of the 'core site' of 15 hectares in the geographic centre of Whyalla with City Planner Stewart Payne's preliminary proposals for environmentally and community oriented projects as the basis for development. (Source: Payne, Whyalla City Council)



FIGURE 106: (Above) Site plan detail of main proposed public areas around the Anglican church. Note church used as organising focus of street layouts.

(Top right) Detail of site model showing same area viewed from the East – Buddhist Meditation Centre in middle foreground.

(Right) Beverley redevelopment by Downton & Pickles. Note Minster used as organising focus of street layouts.



8.6.2.1 Urban Design Guidelines and Analytical Diagrams of the Whyalla EcoCity Development Site

In order to achieve the social, environmental and aesthetic outcomes envisaged in the concept plan, a set of urban design guidelines were proposed. The following pages illustrate the Urban Design Guidelines and are based on diagrams first published in the ‘mini-library’. The diagrams show how the site is organised to comply with ecological development principles and in response to the results of the Urban Design Workshops (summarised above). The concept plan is based on the premise that landscaping is integrated with stormwater management on the core site. This would require more detailed design study but was based on the success achieved with this kind of integrated approach for residential subdivision in Davis, California. A similar strategy is being put into practice in the Christie Walk development.

8.6.2.1.1 Building Morphologies

The built form is most dense in the community, commercial and retail areas forming clearly defined public places. The pattern of residential buildings forms short streets and clusters, each a little different, with their own identity. It was proposed that the architecture would be subject to design guidelines intended to ensure the effective environmental performance of any buildings. The accompanying illustrations in this chapter provide examples of preferred approaches to dwelling design. The consultant’s report also encouraged adoption of shop-housing, terraced housing and duplexes (semi-detached dwellings).

8.6.2.1.2 Colour

The primary informal indicator of pollution in Whyalla is undoubtedly the red iron oxide dust that has accumulated on the buildings and streets, particularly in the older part of town near the ‘pellet plant’ of the steel works. Over the years this particulate has imparted a warm, rosy glow to the townscape. This signals waste and potential health impacts, but it also creates an ironically (what else?) attractive effect. The Consultants proposed that the built forms in Whyalla adopted the oxide colouring as a thematic device. It would connect the urban design to the primary, historically important industry of the region, and also reflect the colour of much of the earth and natural landscape in the region. Thus the building coloration would not be arbitrary but reflect both human cultural history and the natural history of the place, adding another layer of place specific responsiveness to the total urban design program.



FIGURE 107:

1 Relating to the Landscape

Using Mount Laura as the most significant feature in the nearby landscape, an axis is set up to provide a visual link between the existing environment and the new development.

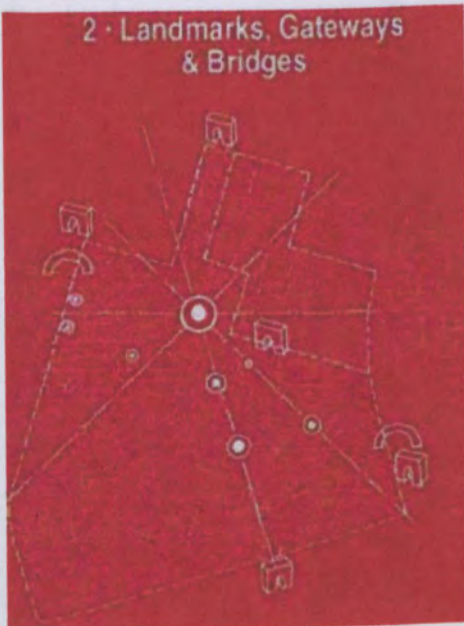


FIGURE 108:

2 Landmarks, Gateways & Bridges

Reinforcing the axis, landmark buildings create a 'readable' environment where important places stand out. Visual 'Gateways' signify entry to the special environment of the core site whilst 'Bridges' (which may also be gateways) link the site to neighbouring areas.



FIGURE 109:

3 Vegetation & Habitat Linkages - Landscaping and Urban agriculture

Significant remnants of indigenous vegetation identified and protected in reserves linked across the site by vegetation corridors. Community gardens to visually link these 'green' (more often blueish and brown!) areas. Use of native and indigenous vegetation and xeriscape promoted. Fruit trees and edible landscape part of overall strategy of creating a biologically productive urban centre. Community Gardens area central to the whole plan linking the various zones of the development with an active, productive, community focus.



FIGURE 110:
4 Courtyards, Public Places and Art works

Sheltered, courtyard areas and places of different scales and sizes suit their function as either intimate or more open spaces. Their ambience varies from the very ‘urban’ courtyards associated with the community, retail and office buildings and the more village-like feel of the residential areas.

Public art would be encouraged, integrating of art and architecture through community arts programs linked to educational projects, reinforcing community ownership of the development.



FIGURE 111:
5 Emergency & Service Vehicle Access

Although the design for the site is based on dominance of the human being, rather than the machine, and there is no through traffic, it is still necessary to ensure that emergency and service vehicles (including delivery vans, etc) can easily travel across the site.



FIGURE 112:
6 Footpaths & Cycleways

Footpaths and cycleways criss-cross the site in a ‘distorted grid’ pattern, ensuring that people can move freely around the site even though the movement of cars and other motorised traffic is strongly controlled.

Walking and cycling are encouraged in the core site. The cycle paths link with the growing network being provided by the Council.



FIGURE 113:
7 Retail & Commercial Frontages

All retail and commercial (and many community orientated buildings) have frontages directly to the main public areas, creating the equivalent to a linear pedestrian street which links the existing community buildings along Nicolson Avenue through to Westlands Shopping Centre.



FIGURE 114:
8 Solar Street Orientations

Streets run predominantly in an east-west direction, ensuring that most buildings can be easily orientated to take maximum advantage of solar energy for heating, cooling and power.



FIGURE 115:
9 Restricted Vehicle Access to Residential Areas

Hammerhead and cul-de-sac road layouts control traffic in the residential areas, making them safer for pedestrians in general, and children and older people in particular. (Traffic calming measures are still considered radical in Australia, which has the world's highest urban speed limits.)



FIGURE 116:
10 Perimeter Car Parking

Car parking for the general public is mostly confined to the perimeter of the core site. The land to the south of the government offices in the north-west corner of the core site would provide an ideal area for extending the car parking if needed. It is anticipated that existing car parking will be sufficient and that very few new parking areas will be necessary as other car parking provision to neighbouring community facilities has been generous.



FIGURE 117:
11 Infrastructure

Easements and site boundaries are designed to accommodate pipes and wires for electricity, water, sewage and telecommunications in 'common trenching' across the site to provide readily accessible services with minimal disruption and no unsightly power poles.



FIGURE 118:
12 Buildings

The built form is most dense in the community, commercial and retail areas forming clearly defined public places. The pattern of residential buildings forms short streets and clusters, each a little different, with their own identity. The architecture will be subject to design guidelines intended to ensure the effective environmental performance of any buildings.



FIGURE 119:

13 Trees

Substantial numbers of native trees are proposed as both physical shapers of the environment, creating definite spaces and places, and as environmental modifiers and filters, working with the building and street layouts to modify the climate - not least with shade!



FIGURE 120:

14 Allotment Boundaries

A number of allotment boundaries have already been proposed to accommodate the early interest in community development on the site, and in order to shape preferred future development patterns. After initial concern about the 'odd' shape of some of the proposed lots, Council officers have been extremely supportive and efficient in getting the survey work under way to accommodate what amounts to 'fast track' development of the core site.

8.7 Community developers

8.7.1 Project Team



FIGURE 121: A Project Team Meeting

The project team had over two dozen members who represented various community organisations and interests in Whyalla, including the Chamber of Commerce and (at the suggestion of the Consultants) financial organisations¹, and Council. Several of those bodies indicated that they were planning, or expected to be planning to be developing premises on the EcoCity Core Site. These bodies, and some of the potential building developments, included:

- Anglican Church, Diocese of Willochra: New church, offices and social services centre
- Sakya Yigah Choeling, Whyalla Buddhist Meditation Centre Inc: Buddhist meditation centre, residence and study rooms
- Excel Enterprises Inc: Plant nursery with disabled access, café, offices and sheltered workshop
- Whyalla Senior Citizens: Residential facilities for the elderly
- Arid Land Centre for Urban Ecology: Offices and interpretive facilities
- Aboriginal Cultural Centre
- Combined Community Services Centre
- Community Hall
- Child and Youth Health Clinic
- Veterinary surgery

The majority of the developers and potential developers on the core site were community or not-for-profit organisations providing services to the community. As such, they could utilise land for the construction of buildings using the present Community Reserve dedication in accordance with procedures under the Local Government Act.

It was assumed by all associated with the project that such things as the creation of allotments and detailed planning of individual blocks and buildings would come some time after the consultant's final report and concept plan was lodged with the

¹ Australian Central Credit Union was suggested because it represents community-based financing (ethical investment) and is the largest financial institution in the city in terms of domestic and local business.

Council. As it happened, the groundswell of support from the Whyalla community was such that building and allotment designs were formally underway by January 1997.

8.7.1.1 Target Team

There were four major participant organisations in the EcoCity Development process during the period of the Ecopolis-UEA consultancy: the Anglican Church, the Buddhists, Whyalla Senior Citizens and Excel Enterprises. Representatives of these organisations formed a ‘Target Team’ in order to review issues, identify conflicts and complementarities and generally progress the project by ensuring that the consultants were well briefed on the Team members’ particular requirements as initial developers on the core site. The stated requirements of these four major players strongly conditioned development of the urban design for the core site which has included allocation of parcels of land to suit both the needs of the various community organisations and the overall goals of the core site program.

8.7.1.2 Property Boundaries

To try and ensure the organic form and ultimate integration of the core site layout with proposed buildings and functions, including the creation of public space in the project, the author felt that the most effective way of controlling any development would be to shape allotment boundaries in a manner which encouraged the creation of appropriate built forms. Although there was an initial very strong commitment to this strategy early on, with the Buddhist site being delineated on the basis of ‘irrational’ geomancy, it has come under attack by commercial interests in the last two years and the outcomes are still unknown.

8.7.2 The Buddhists – Sakya Yigah Choeling

The notion of Eco Dharma is helping us to express our understanding of the Buddhist philosophy in a way that is consistent with the Eco City development. Eco Dharma is about managing various forms of energy in our environments in harmony with spiritual principles. Traditional Buddhist values include respect for all life and the recognition of the interconnection of all living beings. We are being challenged to discover how we can express these values in a manner that is consistent with urban design using ecological development principles. (Muhlhan)²

There are not a great number of Buddhists in Whyalla's 25,000 population, but they are very active and share a strong belief in the need to set in place processes for positive environmental healing. Spokesperson Bruce Muhlhan talks of 'Eco Dharma' and how their Meditation Centre and Temple can demonstrate their beliefs in action.

In the context of the core site design, the Meditation Centre and Temple is being treated as a 'pavilion-in-the-park', with its relationship to surrounding developments mediated by a circular grove of 108³ trees and shrubs. (This circular grove theme is partially reiterated to both the east and west of the Church and is a deliberate reference to a sense of spiritual place which has informed the human relationship to the



FIGURE 122: Plan of the Buddhist Meditation Centre. This design was developed in close consultation with the Sakya Yigah Choeling group. The author's research led to the use of particular colour for each compass orientation in line with Buddhist philosophy. The design was scrutinised and approved by His Holiness Sakya Trizin during a visit by HH and Holiness to UEA's Center for Urban Ecology. (PFD)

² From a media release March 1997.

³ 108 is a sacred number in Buddhist cosmology.

environment since prehistoric times.)



FIGURE 123: His Holiness Sakya Trizin and the Terbum 'Wealth Vase' ceremony. The digging of this hole was the first development activity on the site. (Photo by author)

The active Buddhist group were anxious to take advantage of the moment and proposed a site for their Centre before there was a developed plan for the site. This was accepted by the consultants as a legitimate stratagem for establishing one of the key places on the core site area to be used as a 'springing point' for the design of the whole 15 hectares. The idea of granting the Buddhists an early opportunity to identify and lay claim to a specific site was tested in the Project Team meetings and put to community scrutiny in a public meeting in the Council Chambers at which there was strong endorsement of the proposal, with most of the overflowing public gallery being from the Anglican community. This reflected participation by both the Buddhist and larger community in the building process

The Buddhists' site was established, with its exact centre – destined to be the centre of the Gompa (temple) - identified through the dowsing of a monk and the input of the group. Combined with the use of Mount Laura as the natural topographical reference and landmark for the site design, this produced an important design axis for the site.

The commitment of the group to starting on the site almost certainly helped public perception that the EcoCity project was a live program with palpable outcomes. The infrastructure and servicing requirements of the Centre, along with that of Excel Enterprises, helped to impel commitment of spending to initiate appropriate development on the core site at an early stage.⁴

⁴ Whilst the Buddhists and Anglicans in Whyalla have demonstrated a commitment to ecological thinking and action (and were joined by other religions and dominations at the inter-faith ceremony on the EcoCity Core Site in April 1997) and the major religions have, like other professionals, claimed to be guardians of environmental wisdom, there are those who claim that Paganism differs by being a fundamentally ecological spirituality that 'listens to a speaking Earth' (Harvey 1997). No Pagans identified themselves at the Inter-faith Ceremony however.

NOTE:

These figures/tables/images have been removed to comply with copyright regulations. They are included in the print copy of the thesis held by the University of Adelaide Library.

8.7.2.1 Mixed Blessings

So much interest and commitment was displayed by Whyalla's small Buddhist community that Whyalla hosted a visit by the Tibetan Buddhist meditation master, His Holiness Sakya Trizin. His Holiness is second in protocol to HH the Dalai Lama and is the forty first in an unbroken lineage that stretches back to 1073 AD. On 5 April 1997

FIGURE 124: Representatives of the local Aboriginal community with His Holiness Sakya Trizin and monks. *(Photo by author)*

he consecrated land for the construction of a new Buddhist Centre on the Eco City core site, by performing the traditional Terbum (wealth vase) Building Ceremony, for the first time in Australia.

This ceremony was integrated in a larger event on the core site in which the Aboriginal community and the Christian community took part, with a members of other religious organisations attending. The site blessing began with a song from the



FIGURE 125: Strawbale walls under construction. Note niche carved in bales prior to cement rendering.

Aboriginal representative, and was followed by the Buddhist Terbum ceremony and a service conducted by the leader of the Uniting Church, the Roman Catholic Bishop and the Anglican Bishop (see 'Anglicans' below). The event and its spiritual focus have been consequences of community participation rather than any predetermined program. Somewhat irreverently referred to as 'mixed blessings', this multicultural event suggested a significant resurgence of community activity centred around spiritual and civic values.



FIGURE 126: Straw and steel aesthetic



FIGURE 127: Gompa interior (Terrence Chua)



'FIGURE 128:
Huff'n'Puff' workshops



FIGURE 129: The Buddhist volunteers putting in place windows made by themselves from recycled timbers. (Muhlhan)

8.7.2.2 Summary of Principles Underlying the Architecture

8.7.2.2.1 Building Form and Siting

The shape of the buildings and their siting serve a number of functions.

The buildings are designed as a set of pavilion structure set within a small grove of trees, eventually providing an attractive, publicly accessible area linked to other public space in the Eco City development. The simple geometry of the octagon accommodates both the requirements of the site location and the need for facades and roof surfaces to have good solar orientation. Direct passive solar gain provides most of the heating needs of the Centre whilst the building forms promote the 'heat chimney' effect to exhaust warm air and draw in cool air without mechanical assistance.

Buddhist principles of building orientation help to locate the structure in the landscape.

The curved roofs are intended to reflect both a modern Australian style and an appropriate Oriental flavour. An edible landscape of garden corridors will use permaculture principles to provide food and a cool zone of vegetation around the buildings. Integration of vegetation with the building form supports natural modification of the climate to create conditions of comfort for the building users. The building and site are fully integrated with the planning of the Eco City development

8.7.2.2.2 Construction

The materials and construction methods of the building (primarily timber, earth technologies and steel) address a number of resource, energy and health issues by the specification of: plantation and recycled timbers, non-toxic finishes and construction generally, low energy, non-toxic earth construction, minimum use of machinery and

energy intensive components, recycled materials where appropriate

8.7.2.3 Technology

Environmentally responsible technologies such as solar hot water and electricity are integral to the design concept but have yet to be established on site.

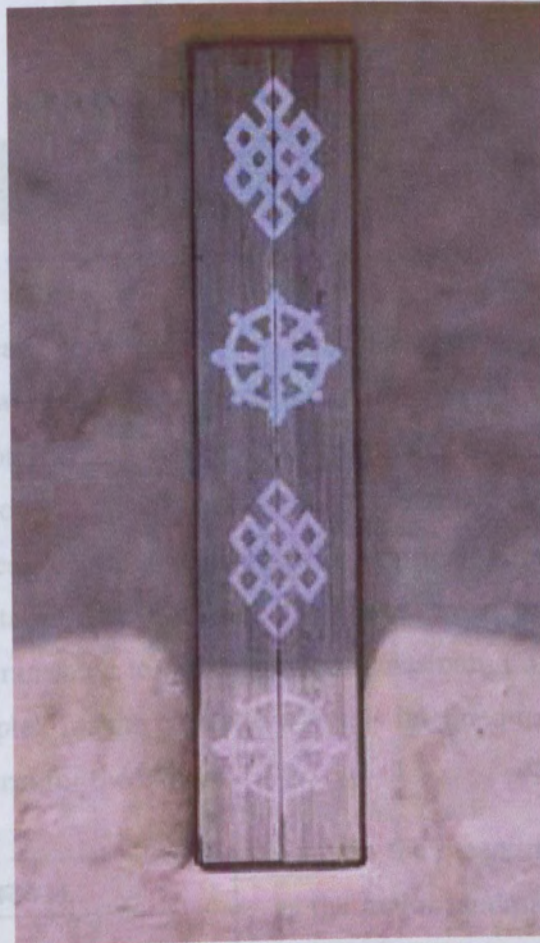


FIGURE 130: Detail of shutters made by the Buddhist community for the long window of the first building of Sakya Yiga Choeling. (Photo by author)

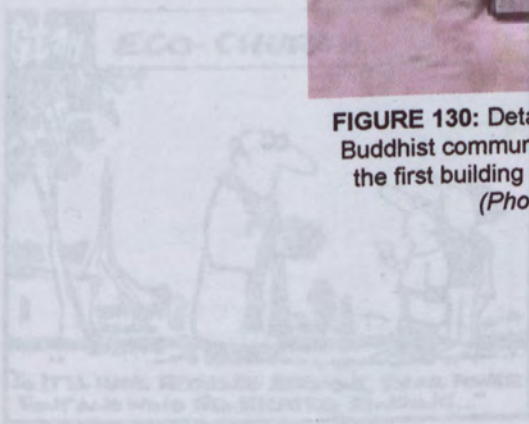


FIGURE 132: Cartoon published in the Whyalla News 22 May 1993

8.7.3 The Anglicans

When Chartres was being built, Robert of Torigni reported glowingly that 1,145 men and women, noble and common people, together dedicated all their physical resources and spiritual strength to the task of transporting in hand-drawn carts material for the building of the towers. Such accounts suggest that raising an edifice was an act of worship in which the feelings and senses of a people were deeply engaged. (Tuan 1979 p.106)



FIGURE 131: Perspective view (hand drawn) of West Front. (PFD)

The two Anglican parishes in the City were considering combining their resources to make a new church and were in discussions with the City Planner as part of exploring the option of locating a new facility on the ‘core site’ before it became identified as the focus of ecological development. When the Eco City concept was put before the local Anglican community through their priest, Father Michael Hillier, via workshops and presentations by Ecopolis, there was broad endorsement of the idea which has since been translated to the formal commissioning of Ecopolis to design an ecological church complex for the core site which is intended to establish a community outreach and services arm for the church.



FIGURE 132: Cartoon published in the Whyalla News 22 May 1998.

In the meantime, the idea of a church as the major landmark for the core site had been translated into initial sketch designs for the building based on the workshop sessions with the parishioners, and it provided the pivot of the urban design schema - a ‘neo-traditional’ concept which the urban design workshops indicated would be a popular proposal. The proposed centre of the church spire has become the setting out point for surveying the axes and allotment locations for the entire site.

In this process, the consultants have taken an advocacy role with respect to the use of the future church building as a key element in the overall urban design for the site, and allotment boundaries have been allocated in the proposed plan which require easements over the future church land to enable public use of vital spaces and thoroughfares. Thus the Church is charged with the responsibility for managing key areas in the development on behalf of the greater public interest in exchange, as it were, for its pivotal location and close integration with the central places proposed in the core site concept plan.

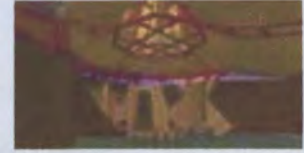


FIGURE 133: Computer generated image of the main worship space.

The links between architecture, ecology and spirituality are not dealt with here, but Cook suggests that ‘Humans build to preserve themselves – at first in the physical sense, but ultimately in a spiritual sense.’ (Cook1989 p.13).



FIGURE 134: Computer generated images of the EcoChurch. (Terrence Chua)

(top) View from the North East.

(middle) View of West front.

(bottom) Entry to Resource and Outreach Centre on the South East wing of the building.

A Greeting

On behalf of the Christian community of Whyalla we welcome you to this ceremony. We acknowledge the original inhabitants of this land and express our thankfulness for their participation in today's celebration. We pray for true reconciliation between black and white in our land and ask for God's grace in our relationships with each other.

(Father Eugene Hurley, Roman Catholic Church)

We acknowledge our brothers and sisters of the Buddhist community. With you we affirm that there is a deeper meaning and purpose to our existence than can be found simply in the physical and

material aspects of life. We seek communion with the divine and with you seek for truth and justice in human affairs.

(Bishop David McCall, Anglican Church)

Thirdly, we greet the citizens of this city of Whyalla and pay tribute to the vision of the city council in adopting the eco-city project. We pray for God's blessing on this site and on this project. We also pray for God's blessing on this city and its citizens.

(Father Frank Measday, Uniting Church)

The Lord be with you.

(From the Interfaith Ceremony)

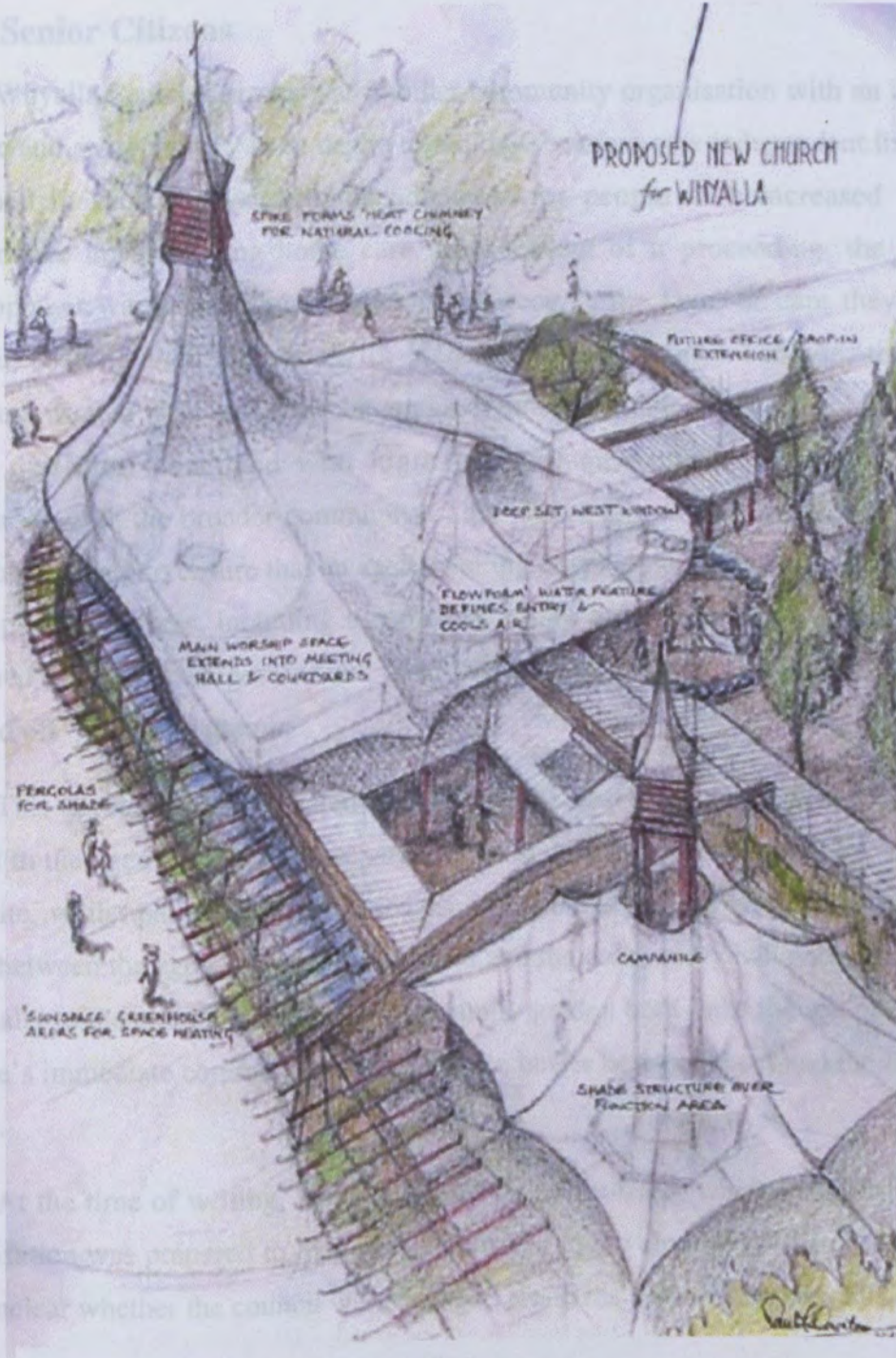


FIGURE 135: Perspective drawing of EcoChurch (PFD 27-29 July 1997)

As of April 2001, the parish had succeeded in raising approximately \$250,000 to build the first stage of a church complex. A revised design was under preparation to fit the available budget and get a physical project under way.

8.7.4 Senior Citizens

Whyalla Senior Citizens was another community organisation with an interest in the site and an apparently keen desire to build 80 or more new independent living units designed in such a way as to be adaptable for people with increased levels of dependence up to nursing home care. In the event of it proceeding, the proposed development would have enabled people to receive the level of care they required without leaving their homes. With leadership from Gunter Scheide, the 'Senior Citizens' wanted high levels of conventional amenity (including automobile access to every dwelling) combined with high levels of environmental performance and integration with the broader community. This 'major player' saw the Eco City project as an opportunity to ensure that an aged dwelling development was designed to be close to shops and services, including a community hall, hairdresser and café, and also be designed for easy management and clear visibility for marketing purposes yet not be 'walled off' from neighbours.

This approach was reflected in the Ecopolis design of the core site where road access to the aged units is quite separate from that to other dwellings proposed for the core site, whilst pathways for pedestrians and cyclists link all areas. A strong link is made between the aged accommodation area and the community hall and public spaces, especially to the church close, and a community garden both links the senior citizens to the site's immediate community and provides a buffer between them and the Buddhist's centre.

At the time of writing, April 2001, it was still unclear whether the Board of the organisation was prepared to make a commitment to developing on the core site and it was unclear whether the council were going to retain the overall structure of site plan.

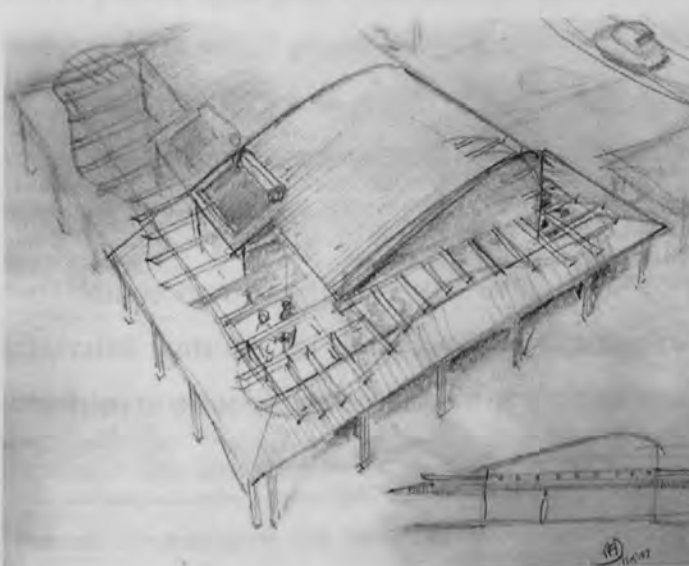


FIGURE 136: Sketch design for possible aged-care units showing two attached dwellings with the separated verandah, pergola shading and thermal flue cooling recommended as the basis of design on the Core Site. (PFD 11 May 1997)

profile, with an associated potential for attracting sponsorship and grant funding on the basis of the innovation and community leadership in the promotion and application of social justice and ecological development principles.



FIGURE 137: (above) In a somewhat desperate attempt to begin development on the site and take advantage of what may have been seen as a moment of opportunity, Excel Enterprises commissioned a toilet block (centre rear of image) and then bought a railway carriage for retrofitting as a café. The author attempted to maintain the Ecocity Core Site principles whilst using these elements. Without surrounding development and the linking pergolas and plantings in place, the exercise was more embarrassing than successful. (PFD)



FIGURE 138: (above) Design studies for low-rise buildings forming a courtyard at the NW corner of the EcoCity site. The 'railway carriage option' was an attempt to retain the essence of this original ideal (PFD 31 January 1997)

There is presently unused temporary accommodation on the site provided by a 'recycled' railway carriage and a permanent toilet block intended to serve the development immediately and in the long-term. The preferred location of the Excel premises offered an opportunity to begin building up the crucial functional linkage with Westlands shopping centre, and posed interesting challenges in terms of creating substantial building frontages with single storey accommodation. The design response to this challenge helped inform the creation of the aesthetic and functional devices of verandah and pergola structures incorporated into the preferred design strategy and guideline documents for the EcoCity core site. The Excel development itself has suffered various management problems and has now effectively been abandoned.

8.7.5 Excel Enterprises

'Excel' are a government funded body providing services to people with intellectual disabilities. They were seeking premises in Whyalla with full disabled access or easy capacity to be remodelled for access without success and were attracted to the Eco City project core site as a potential location for new, purpose designed premises. Excel's CEO Sue Gilbey was inspired by the ecological focus of the development and was in a position to direct investment into a development on the site provided work of some sort could begin in May 1997⁵. The dependency of her project funding on such tight timelines provided a challenge to the council and the consultants which was being met from April onwards. In order to get things happening quickly there were a number of 'impossible' bureaucratic and technical hurdles to overcome, too complex to detail here, which have been successfully addressed through the commitment and professionalism of Council staff, particularly engineer Noel Modystach.

8.7.5.1 Summary of Principles

The principles of the proposed Excel development were essentially the same as those of the Buddhists' complex. The location of the proposed Excel complex and the courtyard layout was intended to provide an attractive, publicly accessible area linked to other public space in the Eco City development - the proposed site would have been a focus for the development and a feature of the 'main street' being created to link the development to the rest of the city, especially Westlands. The simple forms of the basic structures was intended to help to ensure affordability whilst accommodating both the requirements of proposed activities, the site location and the need for facades and roof surfaces to be appropriately orientated for solar gain and use of prevailing breezes. Direct passive solar gain would provide most of the heating needs of the Centre and the building form would promote the 'heat chimney' effect (hot air rises) to exhaust warm air through the tilted roof planes and clerestory vents, and draw in cool air from lower levels (cooled by vegetation and shade, especially in the courtyard) - with minimal mechanical assistance.

Single storey design ensured wheelchair access whilst having the capacity to be integrated with the 2+ storeys of proposed surrounding structures. It was seen as important to demonstrate integration of the disabled community in a project with a high

⁵ Personal communication with the author.

8.7.4 The Whyalla Eco City Information Feature

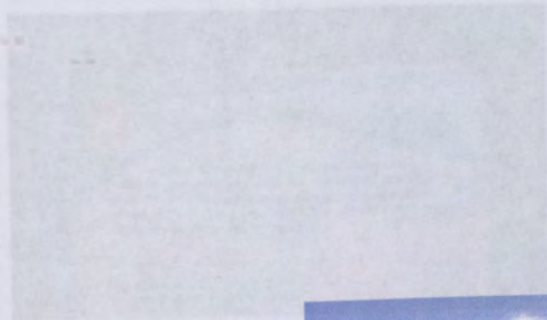


FIGURE 140: Sign info
EcoCity Informa
(Photo by



FIGURE 139: The refurbished, relocated railway carriage stands as a slightly uncomfortable reminder to many of some early miscalculations in planning for the EcoCity core site. (Photo by author)

Early in the history of the project, City Planner Payne spoke with the author about including a sculptural 'interpretive' structure in the development to explain and demonstrate key design and construction elements proposed for the EcoCity site. The Whyalla Eco City was later commissioned to The Whyalla Eco City was eventually a government grant from the Services, Urban Ecology sub-let to Neil Mullard. Students from the Speu (campus) participated in the construction of other elements launched on 3 August 2000 and will provide information to residents of Whyalla about the Eco City Core Site project, as well as environmental projects throughout the City, and other topics of interest.¹

The design for the Information Feature was drawn in plan, section and elevation but for construction purposes a model was provided at 1:20 scale. The design was sufficiently developed to ensure its buildability. Apart from the engineering components (steelwork and footings) the construction of the project was directly informed by the model, constructed by UEA intern Sherry Poon from Canada. The following description is drawn from the architect's original description².

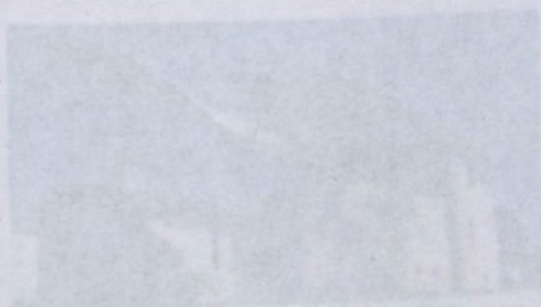


FIGURE 141: Model from North East showing overhangs and proposed vegetation. (Model by Sherry Poon)

8.7.6.1 Design strategy

Sun penetration: The Feature is designed to demonstrate a range of climate responses with appropriate sun control using shade and filtered shade, overhangs and pergolas which can carry additional controllable shade as required, eg. vegetation or shade cloth. Vegetation is a major component of the design, irrigated from the Core Site facility.

¹ Brona Gardiner, Special Projects Officer, letter of invitation.

² On the journey to deliver and present the model of the Information Feature and 'EcoHouse' plans, the author and Poon were accompanied by a guest from Indonesia – an opportunistic part of the Ecopolis wider community outreach and education program!

8.7.6 The Whyalla Eco City Information Feature



FIGURE 140: Sign introducing the Whyalla EcoCity Information Feature.
(Photo by author)

Early in the history of the project, City Planner Payne spoke with the author about including a sculptural ‘interpretive’ structure in the development to explain and demonstrate key design and construction elements proposed for the EcoCity site. Ecopolis Pty Ltd was later commissioned to design such a feature. The Whyalla Eco City Information Feature was eventually

constructed in early 2000 with the assistance of a federal government grant from the Commonwealth Department of Transport and Regional Services. Urban Ecology Australia won the tender to build the adobe walls which it sub-let to Neil Mullard. Students from the Spencer Institute of TAFE (Whyalla Campus) participated in the construction of other elements. The Information Feature was launched on 3 August 2000 and ‘will provide information to both visitors and residents of Whyalla about the Eco City Core Site project, as well as environmental projects throughout the City, and other topics of interest.’¹

The design for the Information Feature was drawn in plan, section and elevation but for construction purposes a model was provided at 1:20 scale. The design was sufficiently developed to ensure its buildability. Apart from the engineering components (steelwork and footings) the construction of the project was directly informed by the model, constructed by UEA intern Sherry Poon from Canada. The following description is drawn from the architect’s original description².



FIGURE 141: Model from North East showing canopies and proposed vegetation.
(Model by Sherry Poon)

8.7.6.1 Design strategy

Sun penetration: The Feature is designed to demonstrate a range of climate responses with appropriate sun control using shade and filtered shade, overhangs and pergolas which can carry additional controllable shade as required, eg. vegetation or shade cloth. Vegetation is a major component of the design, irrigated from the Core Site facility.

¹ Fiona Gardiner, Special Projects Officer, letter of invitation.

² On the journey to deliver and present the model of the Information Feature and ‘EcoHouse’ plans, the author and Poon were accompanied by a guest from Indonesia – an opportunistic part of the Ecopolis wider community outreach and education program!



Orientation: The orientation favours the creation of shaded places and the mass wall is pierced with a variety of openings to create a play of light and demonstrate the potential for reflected light effects through thick walls.

Thermal mass feature walls: The massive walls are designed to demonstrate the form of the thermal mass feature wall proposed for the EcoHousing types with the radius of the curved wall identical to that used for the curved walls in the houses, ie. 7 metres radius (to the outside face) in all the designs in which it occurs. This is standardised so that if the wall construction requires formwork, only one set of formwork is needed.

The intention is to provide people with a sense of what the massive curved wall can ‘feel’ like, and to show the possibilities for using the feature to provide special ambience and character to the dwellings.

Poster pillars: Poster pillars are formed from adobe and are intended to accept general community notices and to alleviate vandalism by providing a point of ‘controlled messiness’.

Cool zones: Cool zones are created with the use of shade, vegetation and water.

Water feature: The ‘flow form’ water feature demonstrates a component of water treatment (‘polishing’) whilst providing the powerful visual, auditory and tactile presence of water in an arid environment. It is recycled around the Feature through a pipe running from the pool to the head of the flow form assembly. The intention is to connect this to a broader strategy of water treatment and reticulation in the Core Site

Wind scoops: The roof forms are intended to form wind scoops to catch the sea breezes, and to lift away from the ‘hot side’ of the feature allowing hot air to rise and creating a microclimate conducive to cooling and the maintenance of comfort conditions.

Photovoltaics: A photovoltaic panel is proposed with an adjacent inverter housing to be connected with Core Site electricity reticulation, and to run the pump for the water feature.

Recycling bins: Recycling bins are given prominence and face the existing cycle track. Three are provided with internal dividers (lift the lid on the model bin!) enabling up to 6 different recycling sectors to be addressed.

Materials: Material choices will ultimately be conditioned by affordability and availability, but the preferred specification are based on considerations of low embodied energy, non-toxicity, regional specificity and maintenance requirements.

The steelwork is intended to celebrate Whyalla’s heritage whilst providing an economic and environmentally appropriate response to local conditions.



FIGURE 142: Model under construction showing adobe wall elements. (Model by Sherry Poon)



FIGURE 143: Flow Forms’ water feature. (Model by Sherry Poon)



FIGURE 144: Model and Feature under construction from the Western end showing 'Flow Forms', pergola and bench seating. (Model by Sherry Poon)



FIGURE 145: Model (left) and Feature under construction viewed from South side, showing poster pillars. (Model by Sherry Poon)

Vegetation: The vegetation would be primarily native and indigenous plants, using the on-site irrigation as needed.

Display panels: The display panels are designed to take A1 coloured and laminated sheets set behind acrylic/perspex (or possibly toughened glass) mounted on a hard plastic base with an 'Omnipol' frame, all set into the adobe wall construction.

The EcoCity Information Feature, like the earlier Buddhist building, has suffered from being a separate, isolated structure on a large site. Its public reception has been lukewarm. Because the 'urban' context of the design is almost completely absent the design makes less sense that it might otherwise. Without vegetation and appropriate context, such projects are not complete. This applies to all the Ecopolis ecocity designs and underscores the challenge of creating architecture and urban design integrated with vegetation and landscaping as part of an ecological whole.



FIGURE 146: The Whyalla EcoCity Information Feature. (Photo by author)

8.7.7 EcoCity Housing

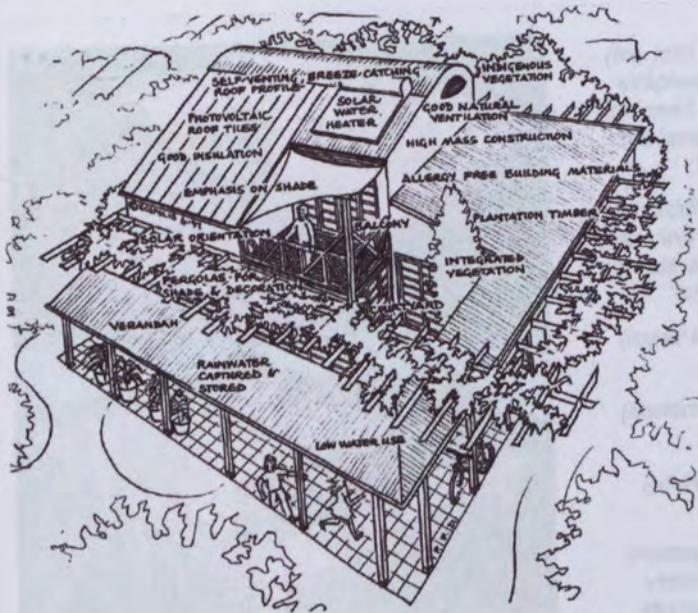


FIGURE 147: Drawing showing many of the intended features of dwellings on the EcoCity core site. The houses eventually designed by Ecopolis Pty Ltd did not include photovoltaics, but did include everything else. (Author)

The City Council commissioned Ecopolis Pty. Ltd. to design three house types for the site. To comply with the design guidelines and principles set out in the EcoCity report. The commission was won in open tender. Three designs were requested; four were submitted, including a two storey dwelling, the three other single storey houses (illustrated below) included footing design by Connell Wagner, engineers.



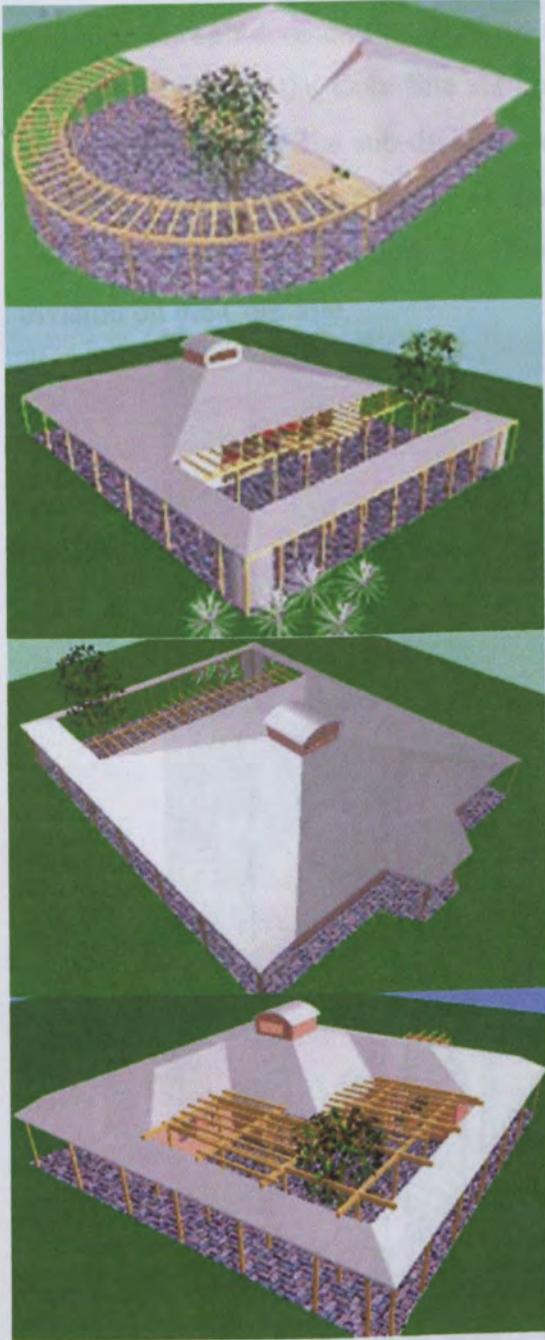
FIGURE 148: Computer-generated perspective by Diana O'Shannessy of House Type A (above). Shadow-casting generated by ArchiCad program for Summer Solstice (top right), Equinox (middle) and Winter Solstice (lower right).



The houses were to be 100% solar, environmentally friendly buildings that could be constructed in Whyalla economically on sub-divisions on the Core Site (see below). The houses were kept simple in plan and section and were designed for construction in a range of materials from strawbale to autoclaved aerated concrete, mud brick, rammed earth and timber-framed with light-weight cladding. The solar strategy was to encase high mass elements (an internal wall made into a feature of the interior design) in a highly insulated skin with high level thermal venting and shading to control solar penetration. This strategy was employed again in the Christie Walk houses (Chapter 8).

8.7.8 EcoCity Sub-Division Design

Ecopolis, in association with Consett Wagner, engineers, was also commissioned



(top left) Type A, the smallest (2 bedroom) and simplest house. The pergola creates a semi-enclosed courtyard area, extends the house into the landscape, and is configured to maintain winter insolation to the house.

(middle left) Type B, a 2-3 bedroom house featuring a verandah set away from the house to create a courtyard space. Thermal flue glazed 'lantern' sits on the apex of the roof.

(lower left) Type B, South West view showing porch to rear entry.

(bottom left) Type C, 2-3 bedrooms and more complex plan than A or B.

(upper right) Type A, showing the pseudo courtyard space.

(middle right) Type A, high ceiling for thermal venting extends sense of space (a design strategy revisited for the Roman Hut – see Chapter 8)

(lower right) Type B, looking south across the 'courtyard' showing lantern/flue and extensive northern glazing.

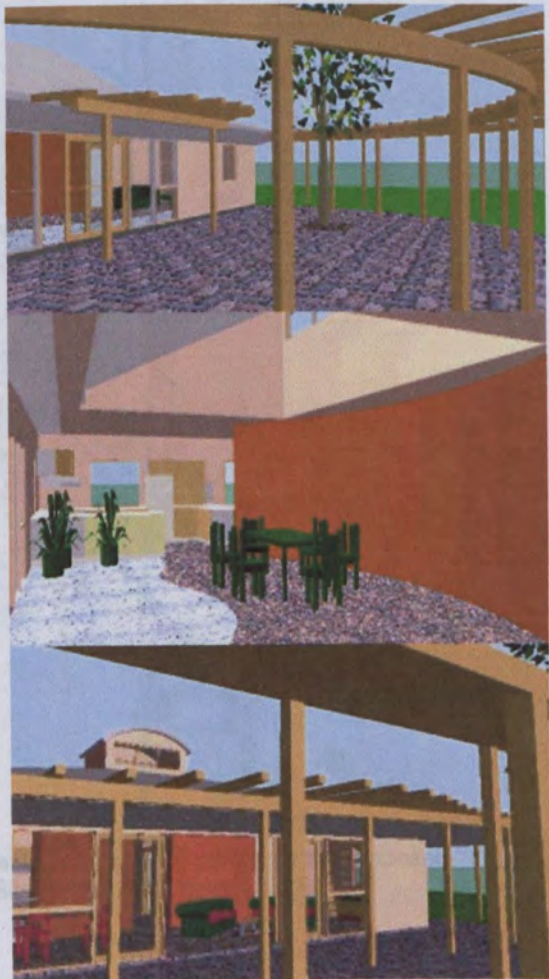


FIGURE 149: Computer-generated Perspectives of EcoHouse Types. (All 'EcoHouse' computer imagery by Diana O'Shanessy. All architectural design by the author)

8.7.8 EcoCity Sub-Division Design

Ecopolis, in association with Connell Wagner, engineers, was also commissioned to design the sub-division of part of the core site according to the principles and overall concept design for the Core Site set out in the Ecopolis report. The commission was won in open tender. The sub-division design was inspired by Corbett’s Village Homes in Davis, California (see Chapter 4). The City Planner’s intention was that the Council encourage developers to adopt the EcoHouse building types to develop this first sub-division on the Core Site.

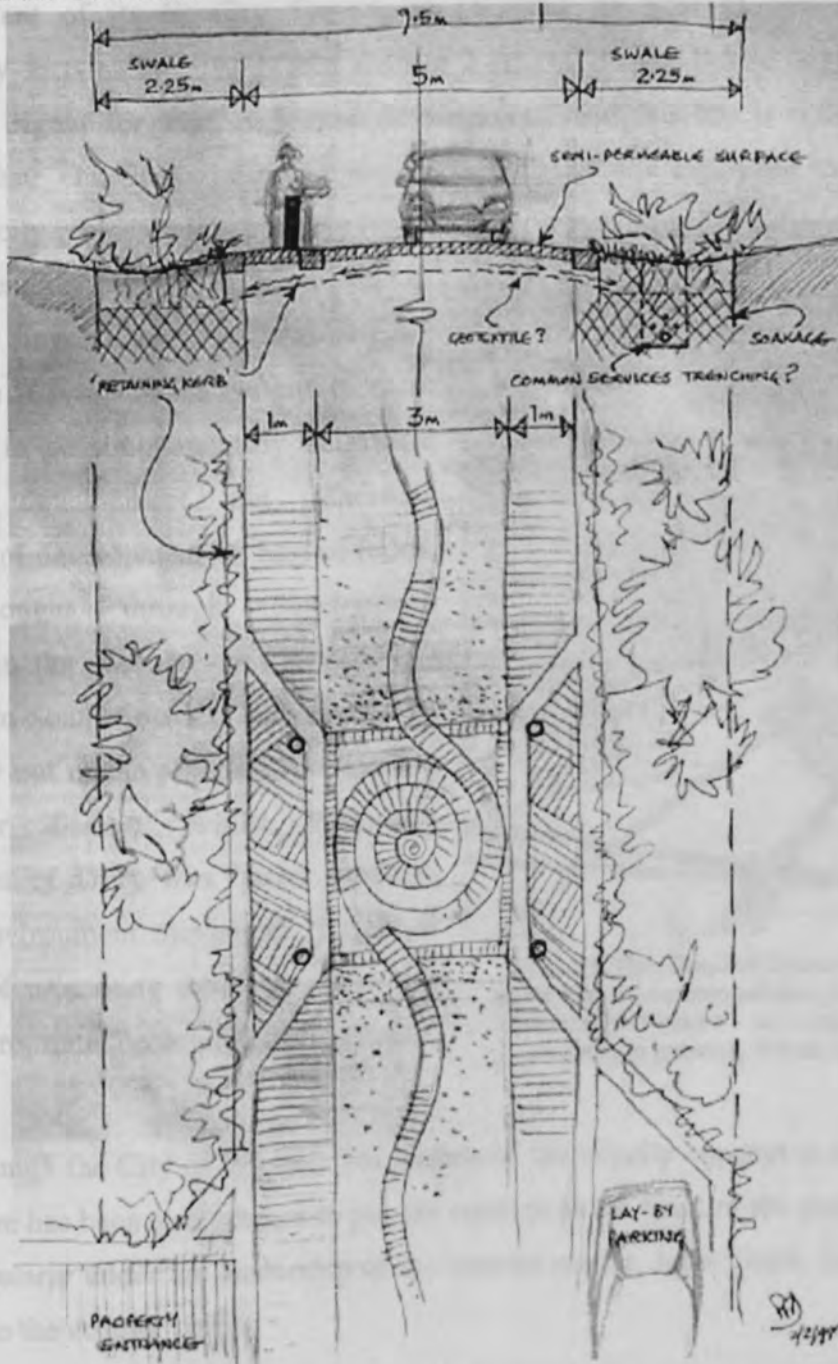


FIGURE 150: Study for environmentally friendly, traffic-calming road design for the proposed residential sub-divisions of the Core Site. (PFD 2 February 1998)

8.8 Future Prospects

8.8.1 Conservational Development

Jack Munday may have 'tried to drag environmental consciousness into the cities in his Sydney-based green bans in the 1970s' (Doyle 2000 p.116) but UEA succeeded in helping change the view that 'conservation' was about simply stopping development so that appropriate development could be recognised and welcomed. 'The Conservation Council of South Australia today expressed its delight at the Whyalla City Council's announcement of its EcoCity Project, in pursuing its goal of creating a more ecologically sustainable city.' (Media Release 3 August 1996). Public engagement has become de rigeur for any 'ecological development' and this too is reflected in the comment that 'The Conservation Council of South Australia expressed its enthusiasm for the Ecocity project today, not only for its green credentials, but its core component of community involvement.' (1996). UEA's work made it possible for the environment movement to be simultaneously be critical of poor development but otherwise supportive of development 'A host of failed, badly thought through development proposals in the past decade has painfully illustrated to South Australia that leaving the community out of the planning process is a recipe for disaster' whilst Whyalla's engagement of UEA was 'proof positive, that the environment movement is right at the heart of promoting development in this state – appropriate, ecological development' (1996).



FIGURE 151: Detail of flowforms, display panel and shade area at West end of EcoCity Information Feature – no water flowing, or vegetation growing. (Photo by author)

Although the City of Whyalla has embraced the ecocity concept to a remarkable extent, there has been a reluctance to put the concept at the heart of the program for the city, particularly under the leadership of the current mayor, John Smith, known for his antipathy to the ecocity vision.

The absence of any mention of the ecocity program is marked. In two fairly recent news features on the city published in the Advertiser newspaper, there was no

mention of 'ecocity', nor was any environmental aspect of the city taken up (Hockley & Kelton 1999 p.51-52, Hackett 1999 p.6-7)

There are parallels with other post-heavy industry dependent environments. Writing about British experience, Colin Ward says 'But possibly the worst result of the economic rationalisation of the inner city is the way it has destroyed the fine grain of the city economy'. (Ward 1989 p.27) The position of the Whyalla Core Site plan in 2001 reflected a similar negative imperative in which the fine grain planning attempted in the original ecocity concept was seriously challenged. A review of the core site by an economic reductionist consultant reportedly proposed³ that the only way for the site development to be 'economic' was to replace a mixed-use, fine grain layout with its short avenue and pedestrian-trafficked public space leading to the West Front of the church, by a monolithic hardware warehouse set in a sea of car parking.

8.8.1.1 Whyalla PAR

Nevertheless, one outcome of the EcoCity Development focus has been a greater commitment overall to 'sustainability' with implications for urban form and future building stock. The draft Plan Amendment to be submitted by the Corporation of the City of Whyalla under the provisions of the South Australia Development Act 1993 summarised its proposed policy changes as follows:

The proposed changes will introduce new controls applying to the layout of roads in new subdivisions to ensure solar orientation and for the utilisation of stormwater on site where possible. In addition building design controls will be introduced to ensure new dwellings will be sited and designed to provide adequate thermal comfort for occupants whilst minimising the need for mechanical heating and cooling.

Although they follow the practice of weak Australian planning, being recommendations rather than requirements, the provisions are quite wide in their scope and include eg: '12. Roof orientation and pitch should facilitate the efficient use of solar collectors and photovoltaic cells; 13. Building materials, appliances and fuel sources should be selected to minimise energy requirements and greenhouse gas emissions; 16. Landscape design should assist microclimate management and conserve energy and water.'

³ Personal communication with persons privy to the consultant's documents.

8.8.2 An ‘ecocity’ outcome

As a result of the work of Ecopolis Pty Ltd and UEA a complex and sometimes obscure process has led to there being a 15 hectare site in the heart of Whyalla zoned ‘Ecocity’ and actual buildings have been constructed there, whereas the Halifax site is being developed quite conventionally. The Whyalla EcoCity Development appears to have had a limited impact on the cultural development of the city, although the city planner and some sectors of the Anglican community in particular seem determined not to let the ecocity vision fade completely.

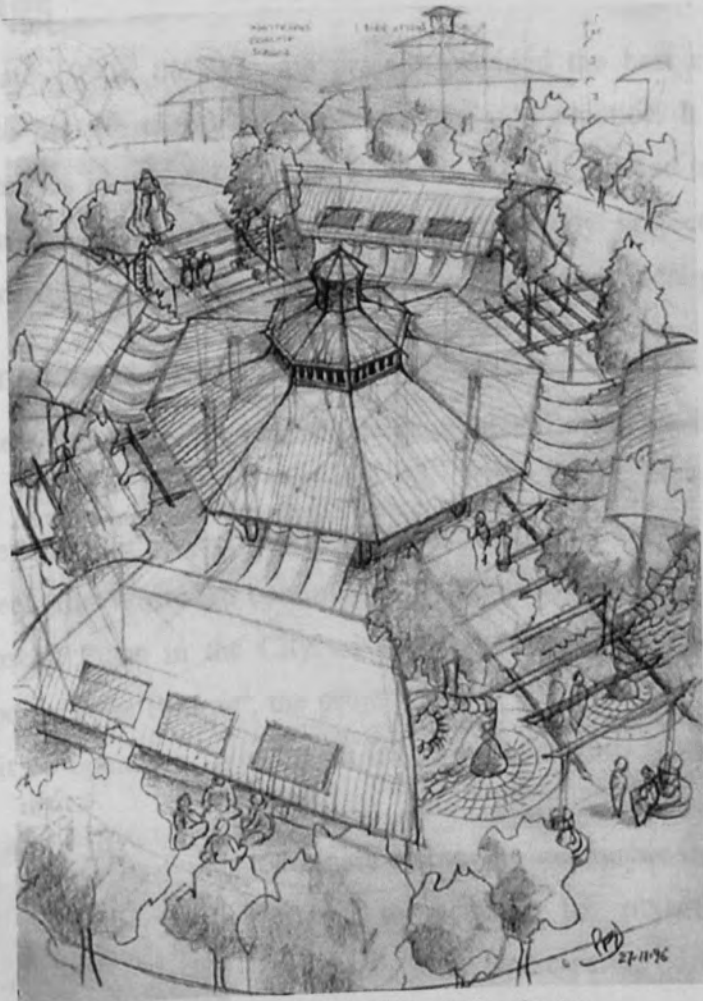


FIGURE 152: Buddhist Meditation Centre (PFD 27 Nov 1996)



CHAPTER 9

CASE STUDY III

CHRISTIE WALK AND THE WHITMORE SQUARE ECOCITY PROJECT¹

9.1 Beginnings

During the late 1990s, the Whyalla project provided the best example of the author's struggle to put the theory of urban ecology into practice. It was one of a number of consultancies in which UEA and Ecopolis Pty Ltd worked together. At the same time there was a constant effort to initiate an ecocity project that was not dependent on the conventional, politically limited environments of local government.

9.1.1 The Bourne Court Pilot Project

In order to test the design approaches, technologies, funding and organisational systems for the Halifax EcoCity Project, the HEP protagonists initiated the development of a small pilot project within 5 minutes walk of the main site, just to the North of Sturt Street (the Westward continuation of Halifax Street on Colonel Light's grid plan) in Hobsons Place in the City. Named Bourne Court after the project's philanthropic supporter Joan Bourne², the project was to be developed by the privately financed non-profit co-operative, Wirranendi Inc. It was designed to test development



FIGURE 153: NW view of model of Bourne Court, made from recycled materials.
(Model by Salvador Salinas)

processes and ecological systems and 'to eliminate unknowns and enable the main EcoCity Project to achieve its objectives with the confidence of all participating partners.'

So that this project could be understood as an 'ecocity' project although it comprised only 5 dwellings and was situated on a site less than

1 Much of the material for this chapter was also used in modified form for two formal case studies, one for the Australian Building Energy Council and the other for the Australian Greenhouse Office for inclusion in their residential design guide 'Your Home', due for publication May 2001.

2 Joan Bourne was an extremely active woman and a regular volunteer at the Centre for Urban Ecology. She died after a long battle with cancer in 1997.

one-thirtieth the size of the Halifax Depot site, it was presented as part of a neighbourhood-oriented project intended to include future similar developments in a process of making a patchwork of projects that, taken together, would eventually knit into a fully featured Ecopolis. Whitmore Square has emerged as the ‘poor cousin’ in Colonel Light’s five square plan for Adelaide over the years and is in the under-developed, low-rent south-west quarter of the city. With the Hobsons Place site being located in the Whitmore Square precinct of Adelaide, it was decided to call this larger program ‘The Whitmore Square EcoCity Project’. Reasons for favouring this nomenclature were that it spelt out the idea that it was a *city* project and not a ‘village’, and it challenged conventional local prejudices by showcasing Whitmore Square in a positive light. A business name was duly registered.

9.1.1.1 Contaminated Land

The Hobsons Place site turned out to be significantly contaminated. UEA and Wirranendi regarded this as just another issue to be dealt with as a means of demonstrating the totality of urban ecological development. It made the small 700 square metre site even more of a microcosm for the Halifax Depot site. In order to establish the extent of the contamination Wirranendi commissioned reports and costings from engineers for a decontamination program for the site. It seemed likely that the cost would be so high as to negate the economic feasibility of the project and so work on preparing the designs was scaled back whilst the issue of economic and responsible decontamination was further researched. It was not until after June 2000 that Wirranendi and UEA were presented with both a realistic assessment of the contamination and a program for dealing with it. In August 2000 Wirranendi sold the site to improve cash flow for the Christie Walk development and so Bourne Court was not built.

9.1.1.2 Research Project

The Bourne Court Project was conceived as a research orientated development and was ambitious in its stated aims. It was designed to trial a number of technologies and design strategies, many of which had been proposed for the Halifax EcoCity Project. It was intended to create an ecological development as an example for builders, architects, designers, developers and clients. Characterised as ‘urban ESD research into dwellings as living systems’, claims made for the project included the following:

1. It brings together examples of all ESD relevant technologies on one small, inner-city, urban site
2. It departs from conventional practice by being designed with a very high thermal mass

3. It is a community-based initiative by a non-profit development co-operative
4. It will be an inner-city grid-connected solar power station
5. It will address all aspects of the Federal government's Greenhouse Challenge strategy

(from UEA leaflet and website)

Bourne Court was intended, amongst other things, to provide an example of an alternative to computer-dependent 'smart house' technologies.³ It was designed as a passive climate response development incorporating the kind of difficult orientations that often arise in dense urban environments. (As was also the case with the later Christie Walk project). It was hoped that the project would enable the testing of location specific, 'dumb technology' systems of automatic ventilation that operated without computer control. This kind of 'dumb but responsive' technology was conceived of in the context of thinking of dwellings as living systems - inspired by Lovelock's definition of what could constitute a living system (which included beehives).⁴ The production process of Bourne Court itself was intended to be an exemplary model for the application of appropriate high and low technologies. It was to have used very low energy technologies where appropriate (eg. mud brick garden walls), innovative low technologies (eg. poured earth walls⁵ and vegetable fibre composite panels⁶), 'middle' technologies (eg. reinforced concrete floor slabs), and high technology (eg. photovoltaic cladding). The design was developed using both pencil drafting techniques, 'low tech' recycled cardboard models and high technology advanced computer-aided design (CAD).⁷

³ The dying embers of the MFP included a 'Smart House' that was built to the north of Adelaide as a demonstration of technological prowess.

⁴ See 'Step 7: Architecting' in Chapter 14: Seven Steps. This approach to building design would appear to make the author, as architect and theorist for the project, a 'biomimic'. (Benyus, 1997).

⁵ See description of construction for Christie Walk townhouses and apartments.

⁶ Some effort had been made to experiment with hemp as a building material. The South Australian government had grown a trial crop of hemp for experimental purposes but enquiries revealed that obtaining some would have involved logistical and cost difficulties associated with providing secure transport and storage. Information on available hemp resources and opportunities came from my erstwhile Masters candidate at the University of South Australia, and 'HEMP Party' (Help End Marijuana Prohibition) political party candidate Jamnes Dannenburg. The intended experimental hemp construction material was isochanvre, which is a hemp composite, and the intent was to experiment with a flax composite for comparison. The idea of using hemp remains current, as does Dannenburg's interest in UEA's ecocity project activity. Hemp twine was specified for use in Christie Walk as an anti-squeak material between the townhouse floor joists and the straw panel and bamboo floor deckings but its lack of availability led to the use of Jute twine instead.

⁷ Exceptional CAD capabilities were available to Ecopolis and UEA thanks to sponsorship from Graphisoft of ArchiCAD computer software and licenses.

9.1.1.3 Community and Optimism

Active resident involvement in design and integration of artwork was part of the program with a participatory development process that engaged the community through the mechanism of a non-profit co-operative and extended participation into the management of the project. The approach of UEA has always been suffused with optimism. Writing about Bourne Court, one can find the project protagonists proclaiming in 1996 that ‘The first development of five ecopolis solar townhouses is likely by the middle of 1996.’ (Downton & Ede 1996 p.95). By September 2000 the project had still not gone ahead and the site was under contract to be sold. It was finally sold in early 2001 after site decontamination costing in excess of \$100,000.

All of the above has been incorporated in the Christie Walk project⁸ which was able to commence quickly once a site had been identified. The design for Christie Walk evolved rapidly based on the architect’s, developer’s and Urban Ecology Australia’s prior experiences in trying to establish similar projects. Most of the initial building purchasers were drawn from people with a demonstrated interest in those projects. There were established stakeholders. In other words, the design strategy, general built form response, and environmental performance requirements had already been established through the experience of working with the Halifax EcoCity Project and Bourne Court.

⁸ The ‘dumb technology’ elements will be late additions.

9.2 Context

9.2.1 Christie Walk

Christie Walk is named in memory of Scott Christie who was a social and environmental activist and a resident of Adelaide⁹. It is an intentional microcosm of the ecocity concept attempted through the Halifax and Whyalla projects. Christie Walk is, for its protagonists, a part of the Whitmore Square EcoCity Project, the idea of which is to provide a conceptual tool for mapping Adelaide's southwest quarter as a future piece of ecocity. Whitmore Square is at the centre of the most mixed-use, the least wealthy, least business-dominated, least academic, least culturally self-conscious, and perhaps the most culturally rich, people-oriented part of the City of Adelaide with the Square itself almost continuously occupied by Aboriginal people. UEA has its working base in this quarter in portable accommodation on the Christie Walk site¹⁰ and a good relationship has been established with people in the neighbourhood, including Neighbourhood Watch and local businesses.



FIGURE 154: Inside the site looking North. Printer's workshop to the left, Old school building to the right. The buildings mark the site boundaries. (Photo by author)

The Christie Walk project is situated on 2000 m² of land at 105 Sturt Street. The site is a former bottle recycling depot¹¹ located near Whitmore Square, the South Parklands, the Central Market and the Gouger Street Restaurant Precinct in the 'Square Mile' of the City of Adelaide, South Australia. The site T-shaped and is generally 'landlocked' but has three frontages – on the north, to Sturt

Street, one of the main east-west thoroughfares in the city; to Russell Street, a one-way north-south street to the east of the site; and to Considine Place, a laneway running

⁹ Scott worked for Community Aid Abroad for 20 years, in Perth and then in Adelaide. He died from cancer in October 1998. His partner, Joan Carlin, is one of the first residents of the development.

¹⁰ Provided by the developer, Wirranendi Inc, to accommodate the interpretive/showroom activities for the project.

¹¹ On the one hand, acquisition of the site meant that a recycling service was leaving the city, on the other hand, it meant that Wirranendi was able to continue an environmentally responsible use of the site.

from Gilbert Street to the south-west corner of the site. The site is almost flat, with a fall of less than a metre across any dimension. Adelaide is at 34° 56' S.

9.2.1.1 Climate

The site is in a warm temperate zone. The City of Adelaide never experiences frost. The natural 'Mediterranean' temperature range provides for warm winters with a diurnal range that rarely goes below 8-10°C and the built environment of the city absorbs solar radiation contributing to a 'heat island' effect further reducing the potential for frosts. The city experiences 500mm of rainfall per annum (Szokolay). Internal design temperatures allow for occupants being warmer in summer than winter with a range of 20°C – 30°C (thermal neutrality range in Szokolay 21.3° - 24.4°C). The proximity of other structures, roads, footpaths and general preponderance of hard surfaces exacerbate the 'heat island' effect of Adelaide's central city area. The air flows are disturbed by trees and building structures and make effective use of prevailing winds difficult.

9.2.1.2 Existing Flora and Fauna

Most of the site had been paved for many decades and there was thus little in the way of existing fauna and flora on the site. Its poor condition and inopportune location meant that the only significant flora, an old grape vine, could not be retained.



FIGURE 155: Grapevine on future site of strawbale cottage, from interior of site looking East towards SA Housing Trust units. (Photo by author)

9.2.1.3 Infrastructure

All main services are readily available so a decision to reduce or eliminate dependency on those services (water, sewage, electricity) was an in-principle decision made to demonstrate the potential for greater levels of autonomy in the urban context. The ready availability of public transportation and ease of

pedestrian access to commercial and cultural facilities was a major factor affecting the design as it meant that reduced vehicle use could be reflected in a lower than usual on-site carparking provision (11 spaces for 14 dwellings).

9.2.1.4 Christie Walk as a Cultural Fractal

As a microcosm of the processes, plans and propositions contained in UEA's vision of ecocity making, Christie Walk probably represents the smallest effective size for a 'cultural fractal' of Ecopolis Proposition 4 with sufficient mix of accommodation, community and commercial facilities to demonstrate social and economic dynamics as well as built form and technological features of ecocity making. It is a co-housing development, meaning that there are extensive common facilities, and it is organised, planned and managed by its residents (McCamant and Durrett 1988 p.16).

It is also planned that the project should address Ecopolis Proposition 1 regarding city-region relationships. The complete demonstration of the idea of an Ecopolis, requires a rural balance to the city centre weight. Areas of degraded rural land would be purchased or brought into the realm of an Ecopolis developer as part of the total development package in order to promote ecological restoration and to provide a food source, recreation destination and additional educational facility for the city site. The original proposition published in the Halifax EcoCity Project 'Blue Book'¹² proposed that at least one hectare of degraded land be restored for every resident in an ecocity development. Once the ecological footprint of an 'average resident' was calculated, the goal would be to restore enough land to balance the full impact of the site population¹³. Seventeen hectares (42 acres) of degraded land (at Monarto) were purchased by members of UEA in 1992 and efforts are being made to incorporate the use, access and possibly ownership of that land in the Christie Walk legal framework which will be 'community titled' and self-managed under a community corporation, with individual titles to all dwellings.



FIGURE 156: View from Russell Street.

(left) The Roman Hut strawbale cottage nearing completion, 'earthcrete mass walls of adjacent townhouses behind. Car park of Childcare Centre in foreground.

(right) Russell Street frontage prior to demolition of decrepit houses. (Photos by author)

¹² 'The Blue Book' was published by UEA through its 'Centre for Urban Ecology' imprint as 'The Halifax EcoCity Project – A Community Driven Development' (Downton 1994 & 1996).

¹³ An Australian's ecological footprint is presently 8.1 hectares/capita (Wackernagel et al 1997).

9.3 Process

With Bourne Court 'on hold' whilst the decontamination issue was under investigation, UEA and Wirranendi had continued to look for effective ways of initiating and undertaking ecocity projects. In October 1998, Chérie Hoyle noticed that a site was for sale in Sturt Street, close to Hobsons Place. The site was that of the bottle recycling depot that was being closed down. The property had frontages to Sturt Street,



FIGURE 157: 105 Sturt Street frontage. (Photo by author)

Russell Street and Considine Place. Hoyle was familiar with the block of land through numerous visits to the depot taking bottles in for recycling and felt that it offered a good opportunity for creating another piece of ecocity in the context of The Whitmore Square EcoCity Project, less than 1km from the GPO. The Wirranendi and UEA boards concurred with this assessment.

There were three particular advantages to the site:

1. It did not appear to be contaminated and would thus not present high development costs at the site preparation stage;
2. Unlike the Hobsons Place site, it was large enough to offer a range of accommodation options and support a co-housing strategy, including a community house and possibly some mixed-use development;
3. It was well-located but unprepossessing with accessible but limited street frontages, highly suitable for combining innovative development with 'good neighbourliness' (ie. its perceived impact on the neighbourhood would not appear so great as to generate concern).

The design brief was based on energy efficiency, the use of renewables and a high overall ecological performance allied to user-participation in the design and development process. It was intended to set the parameters for a project able to demonstrate both the physical and organisational aspects of community and ecological

development. The following table (below) lists the provisions for ‘green’ performance requirements set out in relation to the Christie Walk project. It was developed on the basis of a previous, similar table prepared to inform UEA’s putative partners in the Halifax EcoCity Project and in each case was designed to protect key environmental and community aspects of each project. It is a demanding set of provisions given that they are expected to be acted on in the context of the Australian building industry.

9.3.1 The Builder

Difficulties were encountered in finding a construction company prepared to operate ethically and with environmental responsibility. After initially working with a preferred tenderer to negotiate a price for constructing Christie Walk, Wirranendi found that the builder could not fully or satisfactorily guarantee compliance with their performance requirements as part of their tender price. As a result, UEA and Wirranendi agreed to resume operation of EcoCity Development Pty Ltd as the building company for the WSEP. It was predicated that by using the company structure to engage sub-contractors and community labour for the construction it would be possible to eliminate a significant percentage of costs (approx. 20%) that are generated by arbitrary profit-making or pricing that puts excessive margins in to cover ‘unusual’ design or construction. Construction of dwelling 5, ‘The Roman Hut’ (see below) proceeded by using the builder’s license of project supporter Keith Jupe, and the rest of the development has been proceeding since EcoCity Developments Pty Ltd procured a builder’s license.

9.3.2 Development Approval

A proposal was prepared and submitted to the city council for development approval of a project comprising a co-housing development of 6 townhouses, 6 apartments, 1 cottage and a community house (co-house) as the first two stages of the redevelopment of the site of this former bottle recycling depot. A third stage of development was indicated but not described in any detail as the capacity of that part of the site for redevelopment is constrained by a building of disputed heritage value. During the first two stages of development, the Sturt Street frontage is unaffected except for upgrading of the entry from Sturt Street, providing gated access to four car park spaces and some bicycle parking. Development approval was rapidly expedited by the Adelaide City Council and was trouble free. When an amendment was submitted two years later for an additional dwelling and relocation of the community house ACC officers were helpful and supportive and approval was quickly obtained.

The streetscape to Sturt Street will be the subject of a detailed study and future development application for stage three of the development of the property. The most likely scenario for development of stage three on the remaining 500 square metres of the site fronting Sturt Street, is construction of multi-storey, mixed-use building containing offices, community facilities and apartments.



FIGURE 158: (top) Owner Michael Pilling with townhouse #2 under construction, showing mass walls of earthcrete and Thermalite blockwork (white). (below) EcoCity Development's Ian Rundle applies non-toxic 'Bio Products' paint to small bay of the Roman Hut. The blue was chosen by Roman's 8 year old son, Dylan. (Photos by author)

TABLE 9: Environmental Performance Requirements/'Green Spec'

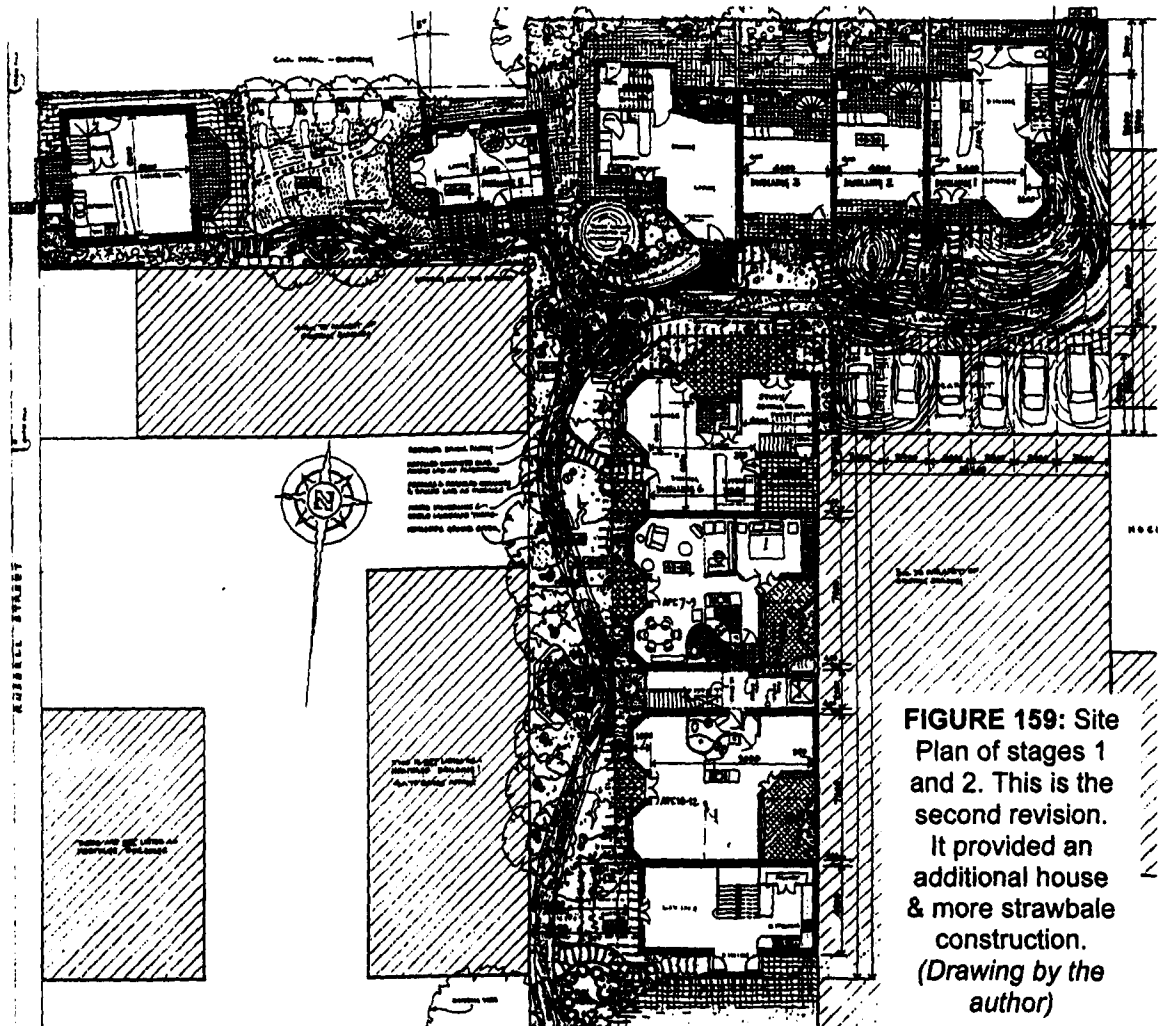
Fundamental	Negotiable
MATERIALS & CONSTRUCTION	
Timber from sustainably managed plantations	
Recycled timber	
No formaldehyde	
No PVC (goal)	
No chlorine	
Non-toxic construction & finishes	
Allergy-neutral construction & finishes	
Design for de-construction (re-use/recycling of materials and products)	
Minimisation of embodied energy over building lifecycle	
Specification of materials based on life-cycle analysis	
Preference for use of local & regional materials, products & services	Construction materials (subject to the 'Required' provisions)
Avoidance of Boral products until they improve their forestry practices	Construction methodology
ECO-TECH	
Provision/planning for photovoltaic power generation	Initial extent of photovoltaic provision
Provision/planning for wind power generation*	Staging of photovoltaic provision
Provision/planning for biomass energy harvesting*	Initial extent of waste water treatment facilities
Provision/planning for total recycling of waste water	Staging of waste water treatment facilities
Solar hot water systems supplying all premises	Extent & type of telecommunication/information technology provision
Capture and use/re-use of rain/stormwater	
Water conserving valves/flow control	
Specification of energy efficient appliances	
DESIGN	
Climate-responsive design principles	Floor plans & areas
Extensive use of solar energy for space heating & cooling	Development mix
Maximisation of pedestrian/people spaces – limitation of vehicle spaces	Extent of vehicle/pedestrian mixing (eg. Woonerfs)
Maximisation of accessibility (espec. Disabled access provision)	Type of vertical access provision
High level of bicycle parking	
Rooftop gardens and balcony spaces wherever practicable/feasible	
Integration of art & craft	Staging of the development
LAND-USE	
Linkage of the urban development with a rural degraded lands restoration program*	Extent & type of rural land restoration program
Prefer indigenous vegetation	Extent of indigenous vegetation
Next preference native vegetation	Extent of native vegetation
Low water use landscaping (xeriscape)	
Create productive landscape	Extent & type of food producing plants
DEVELOPMENT PROCESSES & FUNDING	
Ethical investment funding base	Proportion of ethical investment
Participatory design program	
'Green' performance requirements in lease and sale agreements (ensuring 'green address' for marketing purposes etc)	
EDUCATION & RELATED ISSUES	
Workshops for community education & participation programs (to be provided by UEA)	Type & extent of construction industry based training programs
Appointment of Ecopolis as architect & urban designers	

9.4 The Built Form

The detailed description that follows is included to demonstrate the impact of an ecocity program on building construction issues at both large and small scales, in terms of both technical and socio-cultural aspects of human settlement manufacture.

Stage one of the three stages planned for the development is the terrace of four townhouses (due for completion in March 2002), the cottage at the south end of the property (completed March 2001) and the cottage fronting onto Russell Street (due for completion July 2002). Stage two is due for completion in mid 2002 and consists of an apartment building and two strawbale cottages situated along the western boundary of the property adjacent to the existing printing works. A community house will complete stage 1 and 2 of development as a component of the third stage of works. The scheduling of stage 3 is subject to finalisation of the design for the mixed-use structure and attendant development approvals.

The overall design strategy was, regardless of orientation, to use high internal mass within highly insulated skins with multiple user-controlled ventilation options and



thermal flues. Solar exposure and control was to be varied according to orientation options and overshadowing impacts of adjacent structures. The final design of dwellings for stages one and two is for a block of four linked three-storey townhouses with full solar orientation, a three storey block of six apartments with east-west orientation coupled to three-storey townhouses on the north and south of the building, and two standalone two-storey cottages.



FIGURE 160: (above) The Roman Hut April 2001. Townhouse #4 to the right. (below) The site before redevelopment by Wirranendi Inc. (Photos by author)

A variety of construction methods are employed in the various buildings including load-bearing autoclaved aerated concrete, poured low-strength concrete, steel framing, and timber-framed strawbale. Non-toxic construction and finishes are used throughout with a policy of avoiding formaldehyde and minimising the use of pvc. All timbers are plantation or recycled.

All dwellings will have solar hot water and photovoltaic panels will be mounted on pergolas over the apartment roof garden, sewage will be treated and stormwater captured for use on site. Landscaping is based on low water and favours native and indigenous species with pavings, carports and feature elements constructed from recycled materials including bricks, stone, steel and timber

retrieved from demolition of the few pre-existing structures on the site.

9.4.1 Design response

The buildings were designed to showcase a number of construction systems and to demonstrate climate responsive architecture for north-south and east-west oriented buildings in a compact, medium density urban infill context.

9.4.1.1 Plan and Orientation

The four townhouses on the site are in a staggered 3 storey terrace formation with north/south orientation at the south end of the hammer shaped property. There are three strawbale cottages of 2 storeys and one of 3 storeys facing Russell Street. The six apartments are topped by a roofgarden with pergola structures, solar collectors (both for hot water and electric power generation) and substantial plantings. The apartments have a predominantly east-west orientation and are thus designed with L-shaped plans and bay windows to allow solar penetration from the north, primarily for daylighting and visual comfort. The first cottage is detached, but in close proximity to the townhouse terrace and adjacent to the community garden in the south east leg of the property. The second cottage is a detached structure fronting onto Russell Street on the opposite side of the community garden to the first cottage. A co-house will be a late addition to stage 2 of the project.

A range of dwelling types are represented in the project with differing, configurations, orientations and construction systems to demonstrate the efficacy of environmental design for difficult urban site conditions and diverse lifestyles. All the dwellings have individually designed plans developed in consultation with their intended owners. Each dwelling is also designed to fit with its neighbours in order to create an urban environment of secluded gardens that in addition to providing recreational space and productive landscape, comprise an essential component of the total passive climate response of the dwellings themselves. The provision of shared community space was a major requirement of the brief, as was privacy to each dwelling, and this is addressed by the creation of an internal pedestrian street designed along the theme of a walled garden.

Vehicles have been corralled at the north and south ends of the site with car parking under vegetated carport or decks, making use of the third spatial dimension to maximise non-machine space. The carpark areas are being landscaped and paved through community workshops and are designed as places for people first and cars second. Considine Place will be used for residential access only for six car park spaces situated under a carport designed to support extensive vegetation using vines and planters. The existing gated entry will be upgraded. There is no through traffic in the development, despite its 'gunbarrel' geometry.

Passive climate design considerations have determined much of the built form, moderated by the need to create effective external spaces that worked in terms of urbanism, community and environmental performance. Penetrations and built form articulation are designed in response to daylighting, visual comfort, passive surveillance and external space requirements. Building footprints were kept to a minimum in order to reduce overall site impact at the micro and macro level. At the micro level the

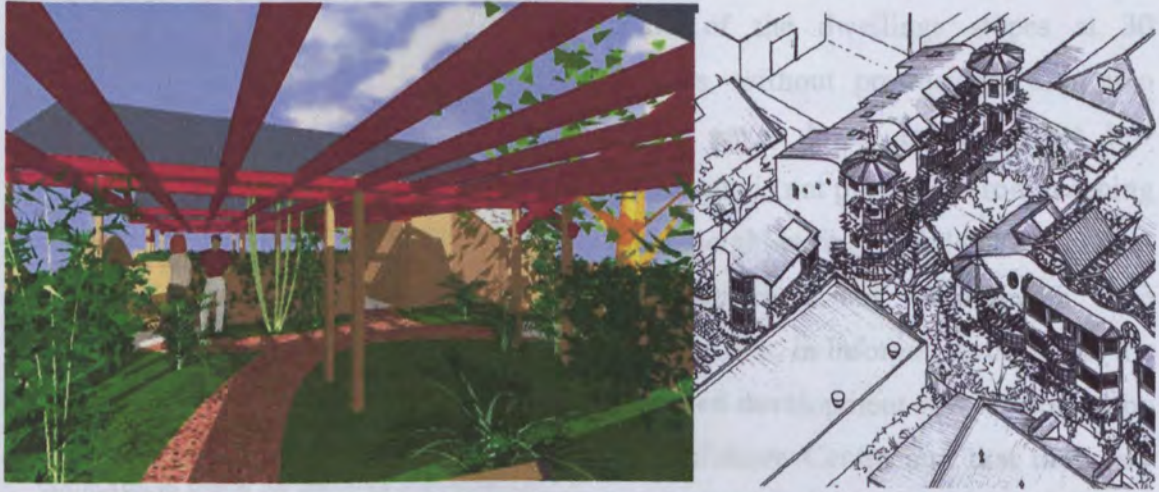


FIGURE 161: (left) Computer generated image by Terrence Chua of roof gardens over the apartments. Pergolas support photovoltaic panels, capturing water and providing shade and amenity to the productive elevated landscape. (right) Perspective of initial proposal with 4 storey Vaughan-Hughes tower and wind turbines on two turrets. The tower and house was later reduced in size and the turbines moved to the roofgarden. (PFD)

outdoor areas are important to the overall passive strategy and need to support vegetation and provide recreation space, at the macro level the project’s development ethos is based on principles that specifically oppose sprawl and support compact city strategies. Balconies and a large roof garden further exploit the multi-level development potential of the urban environment.

9.4.2 Urban Design and Neighbourliness

The development is designed to comply with the City of Adelaide Plan requirements for the Whitmore Square East Precinct, providing ‘an area of transition in activities, scale, intensity, character and built form from the medium-scale and intensity commercial development of the Central Market and King William Street South Precincts, to the lesser scale and intensity residential environment towards Whitmore Square.’ (Adelaide City Council 1999)



FIGURE 162: (above) This large bay window facing East in the Roman Hut will look into an enclosed community garden when the development is finished. The window pattern and balustrades provide a visual buffer which will be enhanced by planting on and around the building. (below) The small bay window lets in winter sun and provides a projecting, secure and comfortable place for passive surveillance. (Photos by author)



The terrace of townhouses along the southern boundary of the property is designed so that the massing of the buildings is directed towards the interior of the site rather than built up to shadow the perimeter. The roof plane on the south of the dwellings slopes at 30 degrees, without protrusions, to a two storey eaves level, ensuring that low winter sun is not prevented from reaching the neighbouring childcare centre. Representatives of Wirranendi Inc reported that, in informal discussions, the proposed development was welcomed by the Childcare Centre and that they saw no problems regarding overlooking or solar access.

Overlooking of neighbouring properties is avoided by orientating the living spaces and balconies of the townhouses towards the interior of the site and through careful consideration of sight-lines. The two storey cottage is designed with an eaves line on its south facade which matches the height of the larger neighbour immediately to the west on the site, thus maintaining a consistently low profile to the south. On the adjacent northerly façade of the childcare centre only one window is put in shadow at any time and that is already shaded by a canopy.

The apartment/ townhouse building along the western boundary of the property (later changed to an apartment flanked by two strawbale cottages) was planned on the basis of it facing the blank stone wall of an excellent, if neglected, property on the

eastern site boundary to form a well defined linear community space. This building was thought, because of its quality and history, to be of heritage value, but turned out not to be heritage listed. Its condition is so poor it had to be demolished by its owners, the Roman Catholic Church. Discussions between Wirranendi and these neighbouring landowners have taken place with a view to coordinating any future development to the mutual benefit of both parties. The outcomes of these discussions are yet to be seen.

To the west, the apartment building abuts a bulky, 4.5 metre high printer's workshop and there are thus no functional overlooking problems for balconies, the roofgarden, or the west facing rooms recessed into the courtyard formations on this side of the building.

Russell Street is used for gated pedestrian entry only. The previous single storey houses on Russell Street were derelict and were demolished. They were due to be replaced by a three storey strawbale cottage by September 2001. The concrete slab foundations for this cottage were laid in December 2001.

The west side of Russell Street has suffered from sporadic, unrelated development which has left gaps in the streetscape including a car park immediately to the south of the co-house and a setback of some 5 metres to form a forecourt to the motor vehicles servicing garage immediately to the north of the co-house. The new Russell Street property is designed to reflect the historical character of the neighbourhood and mediate between the scale of the tall, traditional two storey pub diagonally opposite on the corner of Russell and Gilbert Streets and the four and five storey Housing Trust apartments directly opposite.

Reduction of transport demand and provision of food production capability were part of the strategy for this project. The inner-city context of Christie Walk supplies solutions as well as challenges - transport energy use is expected to be minimised by the site's walkable proximity to all major urban facilities and the closeness of public transport. Despite extreme site limitations it was possible to include a small community garden to demonstrate that even the tightest urban site can produce food.

9.4.3 Artwork

Art and craft are integral to the Project. They are incorporated into the Project as an essential component of the design and integrate ecological themes with artistic expression. They include sculpture with 'Flowforms' and similar devices link water quality management to artistic expression and mosaic from recycled ceramics as an important part of the final aesthetic. The project protagonists hope to involve the

children of the neighbouring childcare centre in the design of mosaics on the buildings adjacent to their Centre. The manner in which both residents and the wider community can be engaged in this kind of creative process was investigated in some detail with Bourne Court.

9.4.3.1 Community Art Program

Such a community art program will require a collaboration between the professional artists and designers, the architect and volunteers to produce artworks for surface treatment of the courtyard paving and various walls of the project. Residents will work with the architects, designers and artists in the completion of the dwellings in an effort to create coherent statements of the holistic philosophy that informs and inspires the development of this pilot project. It is still rare for artists to have the opportunity to contribute to the built environment and part of the program’s intention is to provide an opportunity for artist-designers to be part of a marriage of art, architecture and ecologically sustaining development.



FIGURE 163: Volunteers cleaning bricks for decorative paving and fossicking for ceramics and bottles. (Photo by author)

The proposal is to develop murals and designs using recycled tiles, glass and broken crockery which will be used as surfacing. Designs would be made collaboratively through a series of workshops convened by UEA. Collection of materials has already begun, having started when the Bourne Court artwork program was first mooted. More calls will be going out to appropriate areas for the donation of broken crockery, ceramic tiles

and tumbled glass pieces. Tile manufacturers, restaurants and others have been, and will continue to be, asked to provide materials. Once designs have been workshopped and approved, and the site is available for access by the team, the work of executing the mosaics etc will begin. All materials used will be environmentally friendly.

In the meantime there have been some effective volunteer-based creations of paving and other landscape items including a wall on the north boundary of the site where it reaches Russell Street and paving to the rear (south) of the Roman Hut.

9.4.4 Design strategies

9.4.4.1 Energy and Greenhouse

The overall architectural design strategy was to use high internal mass within highly insulated skins with multiple user-controlled ventilation options and thermal flues. Vegetation and outdoor spaces were designed to be integral with the house designs as part of the passive design approach. Smaller house plan areas were favoured with the quality of space being seen as more important than mere quantity; this is most clearly demonstrated in the first cottage to be built on the site, a two-storey, two bedroom strawbale house of just 55sq metres.

The building shells are formed from 300mm thick load-bearing autoclaved aerated concrete (Thermalite) for all external walls on the apartments and townhouses, with 400mm load-bearing poured low-strength concrete ('earthcrete') for the internal



FIGURE 164: Stage 1, South side under construction. (Photo by author)

mass party walls between townhouses. There is some steel framing in the apartment building construction (which have reinforced concrete slabs on all floors), and timber-framed (load-bearing), rendered 500mm strawbale walls for the cottages. 35% of the cementitious content of the 'earthcrete' walls and concrete slabs is flyash; this replaces cement with a 'waste' product from power stations thus reducing the high levels of greenhouse gas emissions associated with the manufacture of cement.

9.4.4.2 Participation

Participation in the design process was managed on the basis of individual consultation on dwelling layouts within an overall framework set by the architect for the site and approved by semi-formal processes internal to the developer organisation. An interdisciplinary team was set up to co-ordinate services and engineering with the architectural and urban design demands.



FIGURE 165: Recycled materials, non-toxic construction and finishes and natural light to the Roman Hut kitchen. This image was used in the AGO 'Your Home' Technical Manual.
(Photo by author)

This team became less effective as the development time was distended and co-ordination was eventually directly managed by the architect and project manager. Design workshops for landscaping began prior to construction and are scheduled to continue through the development of the entire site and its three eventual stages.

9.4.4.3 Project team

- Client: Wirranendi Inc, Adelaide
- Project Manager: Wirranendi Inc.
- Architect & Urban Designer: Ecopolis Pty Ltd, Project Architect: Paul F Downton.
- Energy Consultants: System Solutions.
- Structural Engineer and Mechanical Engineer: Sagero Consulting, Adelaide.
- Electrical Engineer: Applied Technologies
- Builder: EcoCity Developments Pty Ltd, with sub-contractors.
- Services Contractor: Jones & Sons (plumbing); Berry & LeCornu Pty Ltd (electrical)
- Community processes: Urban Ecology Australia Inc.
- Landscaping: Ecopolis (Chérie Hoyle) and Hunter Gatherers
- Documentation architects (first stage): ADS Architects, Adelaide.

9.4.5 Environmental Strategies

9.4.5.1 Lighting

Considerable effort was made to ensure naturally well-lit rooms and spaces. Light fittings are conventional with a mixture of compact fluorescent and incandescent globes. Building owners are being encouraged to use compact fluorescent lamps (made available at cost price by the builder) wherever possible.

9.4.5.2 Heating and Cooling Systems

The 2 and 3 storey cottages are extremely well insulated detached structures, all the 3 storey townhouses are linked. The overall external area to volume of the buildings tend towards that of a cube whilst shared mass party walls reduce external wall areas to all the linked houses and apartments. Some ceiling fans are included to assist in maintaining air flow on difficult, still days, but there are no heaters or air-conditioners and the expectation is that none will be needed to supplement the passive heating and cooling of the houses. Solar control for the cottages and the apartments with their southern adjoining townhouse is almost entirely to do with morning and afternoon sun. The other dwellings possess ‘classic’ north-south solar orientation. Solar access angles controlled building heights and form within the site and solar access to the neighbouring childcare centre was protected by careful design of roof profiles.

Each house is designed to work as a ‘thermal flue’ allowing controlled release of warm air whilst drawing in filtered, cooled air from the vegetated, landscaped

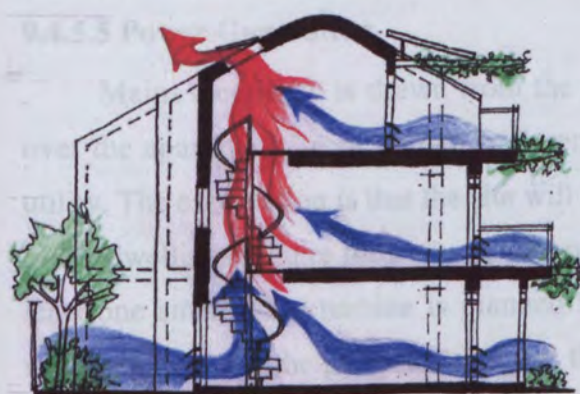


FIGURE 166: Cross section of Townhouse #3 showing air flow cool intake of air across filtering vegetation drawn through by warm air rising, (PFD)

surroundings (in a real sense, the development is not complete until the accompanying landscaping is in place). Good ventilation is critical to the performance of these buildings. Filtered, cooled air provided by surrounding vegetation and landscaping is drawn through the dwellings by convection. Many opening windows are small, top-hung and set low in sets of two or three to draw in the low lying cooler air.

Purpose designed vents, high level louvres, or ventable skylights exhaust warm air at the top of the dwellings, creating outlets for the thermal flues that are formed by the stairwells of each dwelling. The apartments rely on good cross-ventilation and high thermal mass for cooling with the roof garden adding a thermal buffer to the upper floor apartments.

9.4.5.3 Hot Water

All dwellings have solar hot water with electrical backup heating – gas backup was not practical for multi-storey use as it was not being used for any appliances in the apartments. The apartments are designed to have a shared system with banked solar panels and a single pump and external gas backup heater. Low flow shower heads help control water use.

9.4.5.4 Major Appliances

AEG is the preferred supplier for the project and all new appliances have high energy efficiency ratings. Companies with a recycling program were favoured when specifying appliances. All dwellings have high efficiency electric ovens. Gas was used for five cooktops in the first stage of the development as it was initially favoured for its energy efficiency but the improved efficiency of electric cookers and increasing concerns regarding indoor air quality issues have led to the developer specifying electric-only appliances in the latter stages of the project.

9.4.5.5 Power Generation

Mains electricity is drawn from the grid but photovoltaic panels set on pergolas over the apartments' roof garden will generate electricity for sale to the local energy utility. The expectation is that the site will be a net energy exporter for much of the year as the dwellings require little energy for space and water heating, cooling or lighting. At least one small wind turbine is planned for the site to provide a clearly identifiable iconic element for the project and to test the actual performance of a wind generator in Adelaide's inner-city environment.

9.4.5.6 Comfort Issues

There is an expectation that the building occupants will tolerate a temperature range from approximately 20 – 30 degrees Celsius and that appropriate control of air movement and quality will make this an acceptable comfort range. The internal high thermal mass (earthcrete walls and slabs in the townhouses and apartments, the concrete slabs in the strawbale cottages) buffers rapid temperature changes (particularly noticeable in Adelaide on a diurnal basis due to 'cool changes', as well as seasonally) and minimises thermal variation. The high standards of insulation include double glazing making thermal comfort easy to achieve with potential cold bridges avoided. The multiplicity of low level openings are designed to allow the inflow of cooling air in warm months and can be configured by the occupants to avoid drafts.

Traditional splayed reveals are employed to maximise internal light levels whilst minimising glare. The apartments have a predominantly east-west orientation and are thus designed with L-shaped plans and bay windows to allow solar penetration from the north, primarily for daylighting and visual comfort.

9.4.5.7 Ventilation

The likelihood of airborne odour or pollutants being transmitted from one dwelling unit to another is expected to be low to moderate even with windows or doors open simultaneously on adjacent properties. The likelihood of unpleasant odours and pollutants being generated within each dwelling is expected to be very small because of the demographics and lifestyle choices of the residents. Intake of cool air is from low levels from shaded and vegetated spaces. There is some potential for intake of vehicle exhaust pollution from car park/courtyard spaces and this may need to be controlled by community protocols, but car traffic is expected to be very low. Building occupants control ventilation rates and the amount of outdoor air let into spaces through louvred windows and French windows. 100% outdoor air is available to all occupied spaces with all rooms having openable windows and all dwellings are provided with cross ventilation. Through a combination of user-controlled systems and building envelope performance the indoor air temperature within critical spaces is expected to be within accepted comfort ranges for almost all the year. Well ventilated spaces and the thermal flue design of all dwellings should promote the maintenance of an acceptable humidity regime.



FIGURE 167: Computer generated image of original view from Co-House to Community Garden and Roman Hut. (Terrence Chua)

9.4.5.8 Windows and Views

Most windows on facades with significant solar exposure have sunshades or are set back under balconies or pergolas. The exceptional, multi-level provision of pergolas is intended to provide a gradation of shade to building edges to reduce glare and vary shade according to seasonal requirements. In each dwelling a principal daytime living area such as a living room,

dining room or kitchen is designed to have direct sunlight for at least 3 hours either side of noon. Visual access to exterior views has been carefully considered for all dwellings. The minimum unobstructed distance from windows of principal living areas of typical dwelling units is 6 to 7 metres. All principal living areas also have oblique views of at least twice that distance. There is no uncontrolled overlooking from one dwelling to another. Passive visual surveillance of shared space improves security and enhances informal communication and is thus encouraged by the design and placement of openings.

9.4.5.9 Embodied Energy

The high mass, low strength (10MPa) 'earthcrete' party walls are designed to be less labour-intensive construction elements than rammed earth. Their thickness (400mm) requires the use of more total material than a conventional masonry wall but the cementitious content is minimised (10%) and the use of cement is reduced by replacement with flyash (35% of cementitious content). The walls are intended to last for at least a century and constitute a low energy, long-life material that has a low life cycle resource cost. They have only been a qualified success, with cost and logistics providing problems for the construction program. The 'earthcrete' was substituted with AAC half-way through construction of the first townhouses.

9.4.5.10 Thermal Mass and Insulation

The concrete slabs provide substantial internal mass, particularly to the cottages and apartments (With no freezing days perimeter insulation of the slabs has not been regarded as necessary). The 'earthcrete' walls place additional thermal mass between

the townhouses and assist in noise reduction between dwellings. The cost and logistical problems associated with the 'earthcrete' poured concrete technology prompted a change to thick masonry walls in the apartment/townhouse buildings.

Insulation is provided by 300mm Thermalite walls to the townhouses and apartments and 450mm strawbales to the cottages (strawbale walls are 500mm thick overall including the cement render). The basement possessed by one of the townhouses is insulated by earth berming and provides additional 'coolth' to that dwelling. Ceilings of the top floors generally follow the roof lines and are insulated with reflective foil sarking and 200mm polyester batts (Tontine) which contain a high percentage of recycled PEP plastic. The preferred option of cellulose fibre (recycled paper) insulation was not an option because of the sloping ceilings.



FIGURE 168: Ian Rundle posing with freshly painted window assembly made from recycled Oregon with recycled Jarrah sill. Note lower sashes openable for cool air intake. Bio Products non-toxic paints and stains. Panes to be double-glazed. (Photo by author)

All fixed windows of 0.3 square metres or more are double-glazed. Opening windows are single glazed because they are expected to be open most of the year and they create only a small heat sink during heating months. Sealed units are used throughout except for double timber beaded double glazing to the 2 storey cottage.

9.4.5.11 Toxicity and Indoor Air Quality

Formaldehyde and PVC¹ products are avoided almost entirely. Both pollution associated with production processes, installation, and installed product out-gassing issues were considered in the materials specification throughout the project. Care has been

¹ 'PVC... is made of many vinyl chloride molecules all bonded together. Vinyl chloride... has long been classified as a known human carcinogen. Its cancer-causing properties were discovered when high numbers of male vinyl chloride workers began contracting angiosarcoma, a rare cancer that causes tumors to grow inside the liver's blood vessels. The incidence among vinyl chloride workers was found to be three thousand times higher than among the general population... In a 1977 study, women who breathed vinyl chloride vapors on the job had elevated death rates from breast cancer.' (Steingraber 1998 p.66-67)

taken to reduce volatile organic compound (VOC) emissions from materials used in finishing interior areas and the methods used for their installation. Bioproducts are specified for the majority of internal finishes with a zero VOC emission. Laminate use is kept to a minimum with the lowest VOC product on Australian market (Laminati) and elimination of formaldehyde glues. Gas cooktops were included in the first five dwellings, partly at the insistence of the clients. They have been eliminated in all the other dwellings because of rising concern about indoor air quality.

9.4.5.12 Resource Conservation

Although there were no existing structures on the site of sufficient quality to be retained for any of the functions of the new structures, approximately 80% of bricks and 60% of stone from demolished structures has been salvaged for re-use in the development. Lovins et al identify the reuse of materials from demolished buildings as an example of 'revolutionising material productivity' (Lovins et al 1997 p.95) To the maximum practical extent, materials from the derelict buildings on the site (bricks, stone, tiles etc) are being recycled if they are in good condition, or crushed for reuse if in poor condition. Old glass and china from the site is being collected for use in mosaics. (see Community art program) Soil taken out of the ground to make way for foundations is being sieved to provide good quality soil and to collect materials which will provide a history of the site - nineteenth century bottles, china, child's tricycle, buttons etc., have already been unearthed.

There is a high percentage of materials and components used in the building which originate from salvaged sources or materials with high (at least 40%) post-consumer recycled content. Estimated recycled materials content includes:

- 100% of timber for doors and windows.
- 100% of timber for pergolas.
- 100% of insulation (which contains 60% minimum post-consumer recycled PEP plastics).
- 30% of cement content in concrete slabs and 'earthcrete' party walls substituted with flyash waste from power stations.
- 100% of timber curtain rails.
- 50% of consolidated fill.

A high proportion of the building materials, components and systems have been consciously designed for recovery and reuse:

- 100% timber components.
- 100% doors and windows as complete units.
- 100% wiring.

- 90% of the internal plumbing.
- 100% hardware.
- 50% steelwork.
- 50% fittings (sinks etc)
- 90% ceramic tiles.
- 90% Marmoleum.
- 90% bamboo flooring.
- 90% external pavings.

A high percentage of building materials, components or systems have the potential for future recyclability:

- 100% concrete as fill and aggregate
- 100% strawbales and 90% straw ‘ecopanel’ as mulch.
- 100% glazing that is not otherwise re-used.
- 100% wiring plastics and metals not otherwise re-used.
- 90% plumbing components not otherwise re-used.
- 90% polyester insulation not otherwise re-used.
- 100% hardware not otherwise re-used.
- 70% roof sheeting.
- 90% steel not otherwise re-used.
- 90% fittings not otherwise re-used.
- 90% laminates.
- 90% external paving not otherwise re-used.



FIGURE 169: Look no waste! Author transporting straw left over from construction to a needy garden bed for mulch. (Photo by Chérie Hoyle)

9.4.6 Environmental Systems

9.4.6.1 Water and Waste

Stormwater flows to the municipal system have been designed to be virtually zero, with complete on-site capture and use of stormwater for irrigation and spill-over to municipal system only as a last resort. All water shed by the roofs, balconies and other impervious surfaces is collected for use on site in two 20,000 litre underground tanks situated beneath the carports. After filtering, the water will be used for irrigation and toilet flushing thus reducing total water importation to the site. Water use generally will be controlled through maximising re-use and minimising wastage. Underbench filters will provide drinking water at very low flow rates from the imported mains supply.

Extensive measures have been taken to reduce sanitary waste flows to the municipal system. Chlorine-free sewage treatment was planned as a future option. In

December 2001, Urban Ecology Australia Inc, won a federal government 'Coasts and Clean Seas' grant for \$96,000 on behalf of Wirranendi Inc and with the support of Ecopolis Pty Ltd, EcoCity Development Pty Ltd and the New Zealand company Innovative Water Solutions. This grant and support will enable full on-site treatment of sewage. Composted solids will be taken to peri-urban location(s) as fertiliser whilst filtered effluent is returned to the second-class water supply through the on-site stormwater system for toilet flushing and further recycling.

9.4.7 Landscaping

9.4.7.1 Vegetation

The courtyard and community space designs, balconies and roof gardens will maximise the use of vegetation for: biological productivity, climate modification, aesthetic amenity, and food production. Most of the vegetation will be indigenous or native species. There will be a ground level community garden and the roof garden is a community space. The community garden will be developed by the community and incorporate permaculture principles.



FIGURE 170: Computer image of original Stage 1 design. (Terrence Chua)

Pergolas are important as part of the building envelope for climate modification. The roofgarden pergolas will support photovoltaic panels which will also provide water shedding surfaces for stormwater capture. Large balconies add growing space in horizontal layers to compensate for the loss of ground level productive space due to the building footprints. Gardening and landscaping is being undertaken by the resident community using permaculture principles and xeriscape (low-water use

landscaping). Low water use plantings favour native and indigenous species. Some exotics will be used where appropriate to suit passive design considerations. Exotics and productive food plants will be supported by on-site water recycling to maintain minimal overall water consumption.

9.4.7.2 Health

Non-toxic construction and finishes are used throughout with a policy of avoiding formaldehyde and pvc. Timbers are plantation (Pinus Radiata) or recycled (typically, Oregon). The environmental plus cost criteria for materials led to unexpected choices with aesthetic benefits, eg. purpose-built spiral stairs in steel and recycled jarrah. All

finishes are chosen on the basis of environmental and non-toxic criteria. Paints, varnishes and stains are all by BioProducts, produced locally under license from a German company.

Flooring throughout is generally a modern variant of linoleum that was selected on its aesthetic merit and environmental credentials (Forbo Marmoleum) – it consistently tops the list of ‘green’ proprietary flooring materials in studies around the world and allows a rich design palette of colour and pattern. Wet areas are tiled with ceramic tiles with local products preferred. Some clients, including the owner of the first strawbale cottage, chose bamboo flooring in some areas. This attractive and environmentally promising material is currently only available as an imported product.

9.4.7.3 Biodiversity

The site was designed to maximise biological productivity whilst accommodating occupant requirements for habitable space and vehicle use. The roof garden has represented a major commitment to replacing the productive land otherwise occupied by the building footprint. Materials specification specifically excluded non-plantation timbers. *Pinus radiata* proprietary trussed joists are used in the townhouses with plantation pinus or recycled timbers for joists in the cottages. Floor decking is generally Ecopanel, a compressed straw equivalent to particle board that contains no woodchips or formaldehyde. The production of this material contributed to better agricultural and landuse practices, reducing soil loss, carbon dioxide release from stubble burning and the release of carbon particulates. Unfortunately, the Australian company that made the sheets no longer operates and any equivalent product would now have to be imported.

9.4.7.4 Resource Use

During construction every effort was made to eliminate waste on the basis of 1. On-site re-use, 2. Inputting to recycling programs, 3. Responsible disposal. Pavings, carports and feature elements incorporate bricks, stone, steel and timber retrieved from demolition of pre-existing structures on the site. The concrete left in the pump at the end of each pour for the mass walls was directed into formwork made from bricks and salvaged materials for future site landscape elements.

All concrete in slabs and mass walls contains the maximum percentage of flyash that the engineers and suppliers would allow. Flyash is a waste product from power stations and its use reduced the amount of new cement used in the construction.² The flyash was checked for low radiation levels.

² Cement production is one of the largest single global contributors to greenhouse gas emissions.

9.4.7.5 Design for a Long Building Life

All the buildings are set on very stiff reinforced concrete slabs designed to resist the effects of Adelaide's notorious movable clay soils. The high volume of material content of the slabs necessary to carry the townhouses and apartments is justified by the small building footprints and their long design life.

The planned life of the buildings is in excess of 100 years during which time the shells – made from mined materials - are expected to remain much the same whilst internal partitions, doors and windows – made mostly from renewable materials - may be changed and the materials reused or recycled.

9.4.7.6 Security

The challenge was to provide a secure environment, suitable for young families, in an area of the city that has been neglected and where drug damaged individuals seek shelter and solace where they can find it. The site has three frontages - two are vehicle accessible with electrically operated gates and the other access, from Russell Street, is pedestrian only. All entries allow pedestrian access without electronic keying. The site relies on passive surveillance to provide security; this was accorded a high priority and is integral to the planning of the site and buildings with view lines designed to oversee entry points. It avoids the cost of mechanical and electronic security devices and reinforces and fosters a sense of community and shared space.

The highly insulated external skins, double glazed windows and massive party walls make this a much better acoustic environment than might be expected in a dense urban setting. The passive cooling strategy requires windows to be open much of the time but the baffling effect of vegetation and absence of smooth hard road surfaces contribute to relatively good noise control.

9.4.8 Specific Buildings

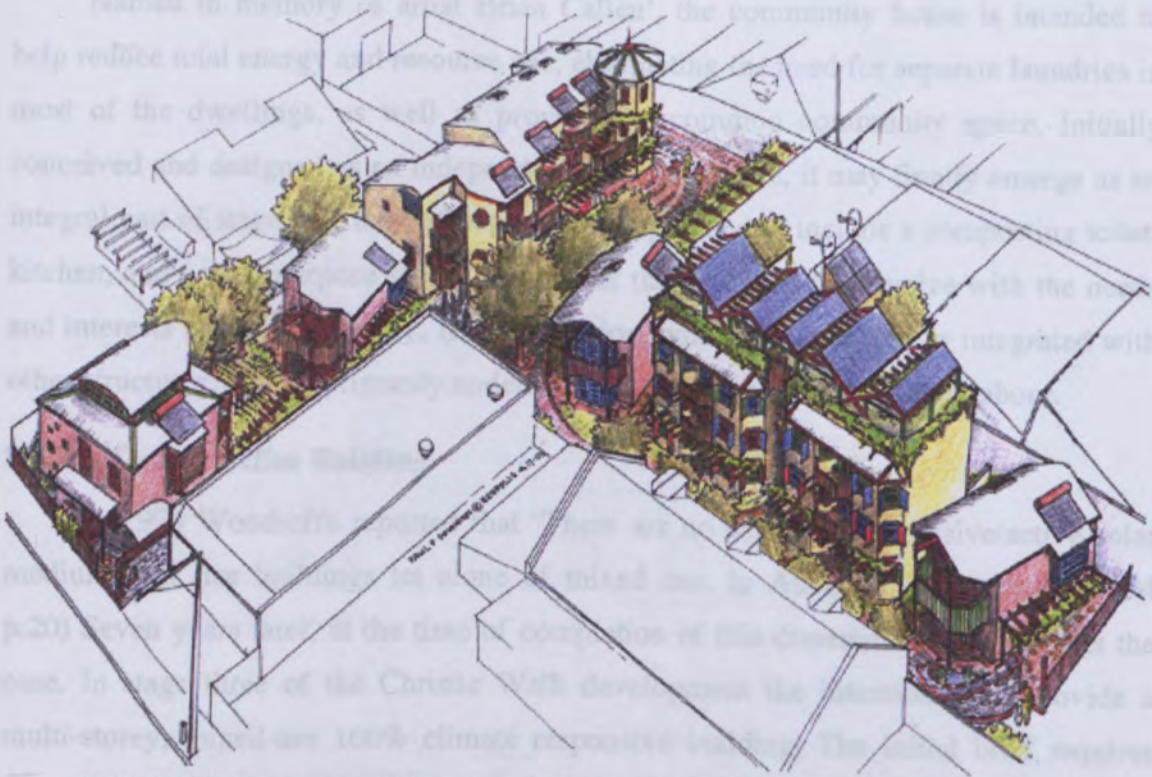


FIGURE 171: The Christie Walk project stages 1 and 2. This is the final configuration for the development of this part of the site. (Drawing by author)

On Saturday 4 December, the Christie Walk site in Sturt Street, Adelaide, was a hive of activity!

Starting at 8am a crew of volunteers began clearing debris and making reinforcement frames for the footings of the first building to be constructed on the Christie Walk site. Within a week or two we expect to see those 'reo' frames set into the concrete of the slab for Roman Orszanski's strawbale cottage (the Roman Hut).

At this time Wirranendi has not engaged any builders. Instead, the workforce was all voluntary and activities were coordinated by Keith Jupe. Keith, who has years of experience working with community and self-build organisations like Habitat for Humanity, has offered his formidable building skills to Wirranendi, initially to build the strawbale cottage. His whole approach fits our community-based ethos really well and we are all looking forward to a long and happy working relationship with Keith as the Whitmore Square EcoCity Project continues to develop and demonstrate the principles and practices that are at the heart of Urban Ecology's mission.

(As reported in the Urban Ecology Newsletter #33 December 1999 p.1)

9.4.8.1 Brian Callen Community House

Named in memory of artist Brian Callen¹, the community house is intended to help reduce total energy and resource use, eliminating the need for separate laundries in most of the dwellings, as well as providing a common community space. Initially conceived and designed as an independent adobe structure, it may finally emerge as an integral part of stage 3 of the development. It is planned to include a composting toilet, kitchen, and a multipurpose space. The use of the co-house will evolve with the needs and interests of the community. Its construction, whether standalone or integrated with other structures, will be primarily undertaken by volunteer and workshop labour.

9.4.8.2 'Green' Office Building

In 1994 Woodroffe reported that 'There are no examples of passive/active solar medium/high rise buildings let alone of mixed use, in Australia.' (Woodroffe 1994 p.20) Seven years later, at the time of completion of this dissertation, this remains the case. In stage three of the Christie Walk development the intention is to provide a multi-storey, mixed-use 100% climate responsive building. The initial brief requires that commercial accommodation be designed to maintain comfort levels without mechanical air conditioning and to create a healthy, stimulating work environment and that all floors of the mixed-use building be wheelchair accessible. Potential occupants of this building include the International Centre for Urban Ecology Australia, Wirranendi Inc., EcoCity Developments Pty Ltd. and Ecopolis Pty Ltd, and others, with several apartments on the upper floors.

9.4.8.3 'The Roman Hut'

The barefoot architecture program. Get involved, they say; what for, I say. Hey, I know what I want. It's easy. What did you say the available floor area is? That can't be right. No one can live in that postage stamp floor area. How much was it again for extra floor space? Boy, the first offer will do just fine thanks. (Prelgauskas 1994 p.21)

The first building to be completed is a 55 square metre 2-storey cottage for Roman Orszanski. The owner moved in on Earth Day, 22 April 2001. Built almost entirely by volunteer labour, the 'Roman Hut' is a timber-framed, strawbale house as high as it is long². At the time of writing, it is the only strawbale residence in any Australian CBD.

¹ Brian Callen was a keen environmentalist, professional artist, writer and early member of Urban Ecology Australia. He died from cancer. He had been a regular volunteer at the Centre for Urban Ecology and bequeathed a number of valuable artworks to UEA.

² At just under 7 metres, it possesses one of the highest strawbale walls in the country.

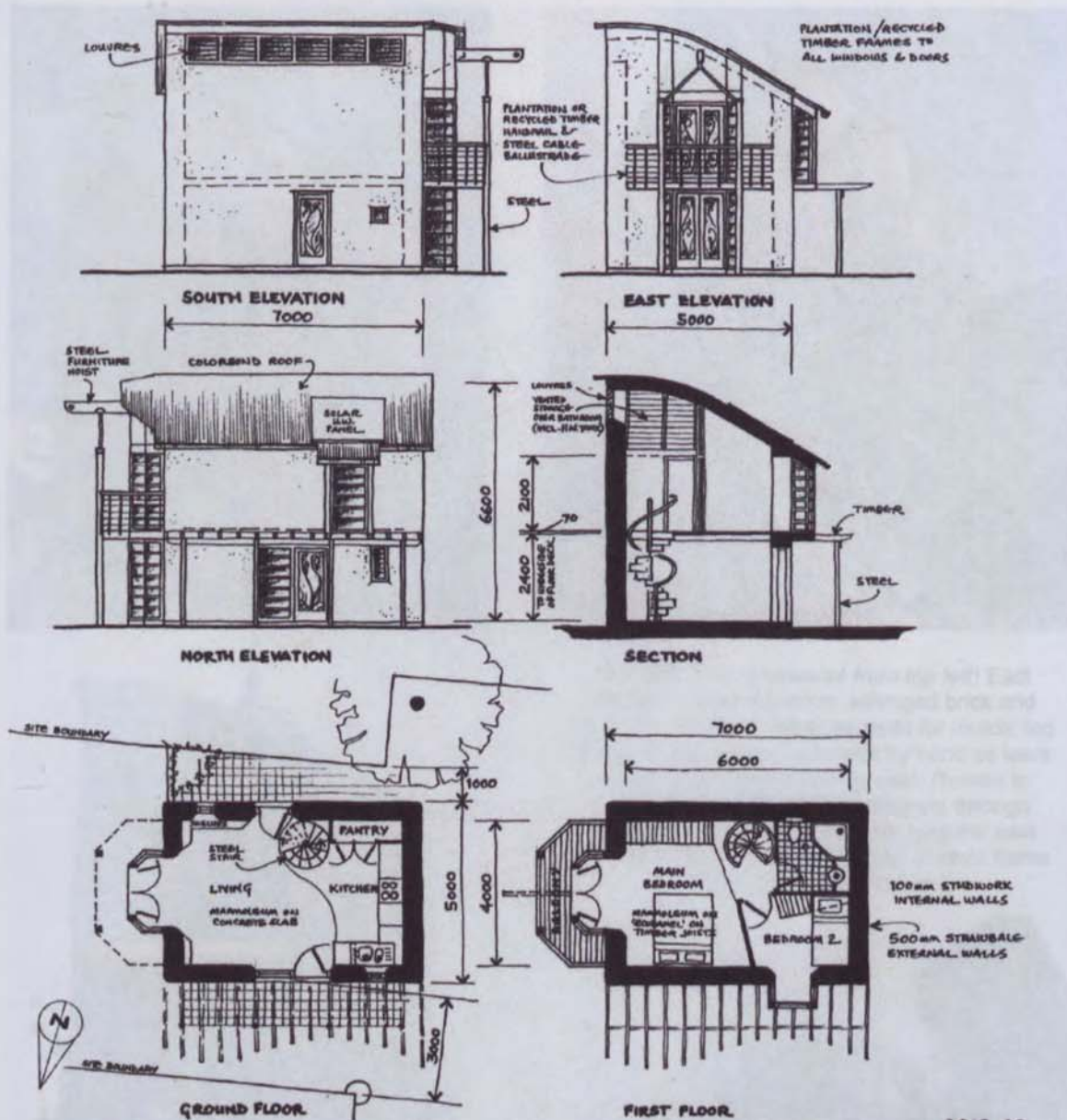
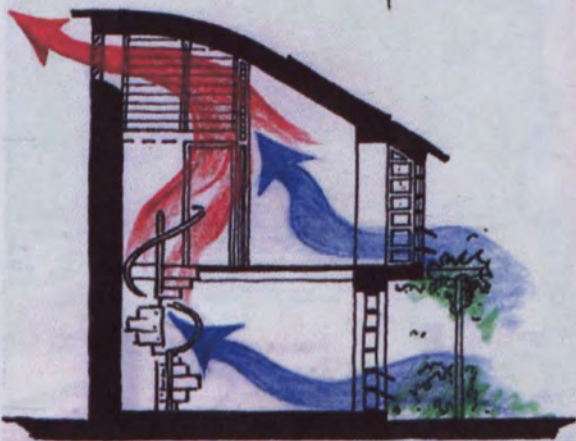


FIGURE 172: (above) Design drawings for Roman Hut as submitted for development approval. (Author) (below) Under construction, with Roman (right) unearthing detritus. (Photos by author)





FIGURE 173: (clockwise from top left) East elevation; east elevation, salvaged brick and stone for paving, straw to be used for mulch; top south frame in position (raised by hand as were trusses, ie. somatic energy use); Roman in future living space; airflow diagram through vegetation supported on future pergola; east elevation shortly after installation of steel frame gantry. (Photos by author)



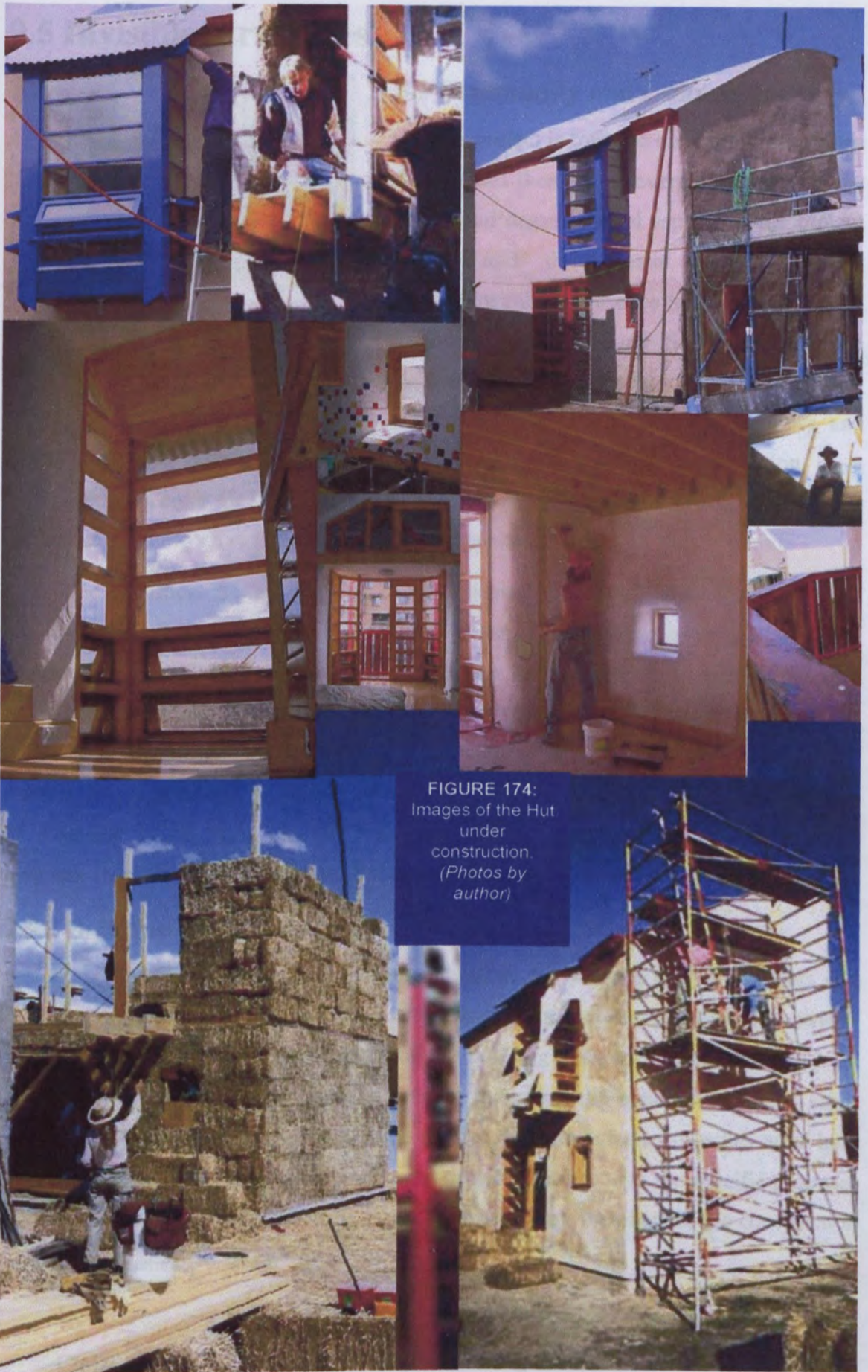


FIGURE 174:
Images of the Hut
under
construction.
(Photos by
author)

represents an exact replication in one of the model 'vill-size clusters' proposed for the HEP in size, scale and design. It is truly a microcosm of the HEP and it has added by

9.5 Invisible Structures



FIGURE 175: On-site consultation and exhibition for the local neighbourhood, held prior to the Development Applications submission.

9.5.1 Community and Cultural Identity

The project is founded on community values and expresses them in its overall approach to the physical and organisational aspects of the project planning and development process. Urban Ecology Australia's presence has been part of the workshopping process and Stage three of the development will most likely incorporate a mixed-use building designed to foster community and

identity through provision of an organic store and café and the creation of a 'International Centre for Urban Ecology' which is expected to attract numerous visitors and act as an interpretive facility for the development.

The Whitmore Square EcoCity Project naming strategy (Bourne Court, Christie Walk, Brian Callen Community Hall) is part of establishing and reinforcing its identity and roots in a particular community sector. Links have already been established with the existing community in the Whitmore Square area. An on-site consultation meeting for local residents took place on 27 March 1999, with a positive response from all parties. Representatives of Wirranendi Inc. and UEA presented the Project to the City of Adelaide South West Quarter Neighbourhood Watch group in May 1999. The response from the local community has been overwhelmingly positive.

9.5.2 Building Culture



FIGURE 176: Slogan typifies project ethos. (Photo by author)

During construction, at the stage of letting contracts and during building works, great efforts were made to deal positively with the culture of the building industry. Project Manager Ed Wilby invested time in inducting sub-contractors to the ethos and purpose of the project. Regular informal lunches were held (are being held, at the time of writing) with the specific proposes of facilitating discourse between all members of the construction team.

9.5.3 Development Processes

Christie Walk makes a particularly interesting comparison with the HEP as it represents an exact equivalent to one of the mooted 'bite-size chunks' proposed for the HEP in size, scale and scope. It is truly a microcosm of the HEP and it has abided by

every principle UEA promulgated for the HEP including community processes and ethical investment. There have already been workshops run in conjunction with construction of the first strawbale house and designing the permaculture gardens. Construction industry based training programs are scheduled for implementation over the life of the project and a number of 'work for the dole' and volunteer workers have been gaining building industry experience and reskilling.

This has been a community based development heavily reliant upon voluntary effort in its early stages. The project contains many elements of experimentation but no government monies or agencies have contributed to the project, testing the proposition that innovation and ecological development can be sustained by the non-government sector. There were initial problems attracting the necessary mix of skills to undertake the tasks involved in developing and building substantial projects but as the project continued and people persisted, those with additional skills did finally arrive.

9.5.3.1 Funding

This is a medium budget project that was designed to provide housing for an equivalent purchase cost to conventional local inner-city development. A substantial degree of innovation and environmental performance, very high levels of insulation and substantial construction (eg. avoidance of toxic materials, thick external walls and high internal mass) contributed to high costs that were ameliorated by the non-profit structure of the developer body. This non-profit structure enabled re-investment in the development in lieu of profit-taking as a means of covering the additional cost of construction associated with building considerably in excess of code requirements and with a full gamut of environmental technologies. The builder was configured on a conventional company structure and all sub-contractors have provided services in line with conventional contractual and financial practice.

9.5.3.2 Financial

There has been a high investment in the building fabric in order to reduce operating costs to a minimum and ensure longevity of the building stock for maximum lifecycle returns. The use of volunteer and workshop labour for some construction activities (especially the strawbale properties), for final internal finishes, ballustrading and landscaping, have contributed to controlling overall costs. Volunteers have gained valuable skills in this essentially educative process. The high labour content of finishing and landscaping (with its very high percentage use of recycled material) and the relative accessibility of these tasks to the residents (after the main construction program) and the creative potential in the tasks, made these areas the logical ones to choose for

engaging relatively unskilled labour and tapping the enthusiasm of the residents and their friends and supporters.

A key financial strategy was to make all borrowings from ethical finance sources. This constrained the borrowings slightly and resulted in the developer educating the institutions involved, but was felt to also be a progressive and liberating move in terms of maintaining an holistic and credible environmentally and socially responsible approach to development. The financial investment by future residents and supporters in the project was part of the ethical financing strategy and also part of engaging the broader community in the program, extending conceptual 'ownership' to actual economic participation in the project. The core of financial support this provided was an essential component of being able to do the development.

Investment in the project was crucial to its success and it was important to all involved that any investment was as 'green' and ethically responsible as possible. To this end, personal loans and investments have formed the core of the financial capacity of Wirranendi as a developer, and the only external loans have been those negotiated with Community Aid Abroad Ethical Investment Trust and the Bendigo Community Bank. Thus the funding for the development is entirely from private and ethical financing sources and does not involve any government monies. Lois Arkin's model of voluntary interest rates (see Chapter 5) has also been used to accommodate private investors to the project.

9.5.3.3 Non-Profit Structures

The entire development program has been initiated and sustained by an active local community of families, businesses and non-government and non-profit organisations. The non-profit structure of the development entity enables the channelling of surplus into provision of appropriate technologies and the construction of shared co-housing facilities whilst a participatory development process engages the community in the operation of the non-profit co-operative. During construction the death of one of the most active people involved with the project meant that for his partner to stay in the project a rapid and substantial redesign was needed to reduce the size of their dwelling¹. This was successfully achieved. The non-profit development structure, ethical investment base and community involvement enabled this experimental project to proceed and to withstand delays and personal tragedies and

¹ Beverley Vaughan played a crucial role in the initial procurement of the site (he provided the deposit for Wirranendi to be able to purchase it) and was a determined advocate for the Christie Walk development.

survive where a conventional development approach would probably have resulted in the project being abandoned or changed beyond recognition.

9.5.3.4 By-Laws

Management of the project once built and sold will be in the hands of a Community Corporation, constituted under the Community Titling provisions of the requisite South Australian Act. This corporation will act in accordance with a set of by-laws that have been drafted by members of Wirranendi and UEA in order to try and ensure appropriate environmentally responsible behaviour on the part of future residents. Prepared in advance of the formation of the community corporation.

The rules for the community corporation have already been drafted, having been developed and reworked from documents composed by working groups since the 'middle period' (1994-96) of the Halifax EcoCity Project. This reworking has left little of the original document as revised by Knottenbelt (1997) which attempted to spell out the essential ecological performance parameters of the project and, instead, provides a mostly standard legal framework for administering a community corporation. The key, 'exceptional' paragraph that addresses the *raison d'être* of the project rather than legalistic niceties is By-Law 7 regarding Administration, Management and Control of Common Property which links and constrains the activities of the corporation to be in accord with the Ecopolis Development Principles.

The Corporation is responsible for the administration, use, maintenance, management and control of the Common Property. All decisions made under this clause shall be in accordance with the Ecopolis Development Principles and the guidelines for the application of those principles as amended from time to time by the Board of Urban Ecology Australia Incorporated. (Wirranendi, Undated)

The By-Laws drafted by Sam Knottenbelt in 1997 had resulted from considerable consultation and comprehensively tried to include a number of issues such as protection of the on-site infrastructure, requirements for residents to recycle garbage, elimination of toxic materials, strict control on pets, bicycle parking provisions and a smoking ban in all common areas (Knottenbelt 1997). They were clearly pre-emptive in terms of their provisions. In order that there would be an organic linkage between future residents and the drafting of the bye-laws, the drafting was done in consultation with people who had already committed to living in the development. This process had already been undertaken with the Bourne Court proposal on the same basis. In each case, the fact that the future residents, the developer, the architect, and the project initiator UEA had a significant overlap of membership made the 'organic-ness' of the process relatively easy to ensure. Larger projects without the same intense early

involvement of interested parties would be harder to manage in this respect. This issue was a continual preoccupation in regard to the Halifax EcoCity Project and remains an area in which participatory democratic process has yet to be tried at any significant scale. As it is, the legal constraints of convention led to a 'softening' of ecological intent even with the 'organic' process in place.

NOTE:

This figure/table/image has been removed to comply with copyright regulations. It is included in the print copy of the thesis held by the University of Adelaide Library.

FIGURE 177: Administration and financial management are the foundations of any construction project. With the projects initiated by UEA, these 'invisible' issues are further extended to include the codification and implementation of social and environmental principles through the entire program and a strong volunteer workforce has been essential to their realisation. *(Photo by author)*



FIGURE 178: Pouring the first 'earthcrete' wall. *(Photo by author)*

Paul F Downton

9.6 History & Outcomes

There was a short initial design period that set all the main parameters for detail design. As the project progressed some redesign was required to accommodate changes in personal circumstance among the investors and future residents. Construction was initially very quick for the first property, a strawbale house. This slowed as managerial and cash-flow challenges confronted the relatively inexperienced developer. Construction work on the first block of townhouses initially proceeded slowly as the logistics of building the poured ‘earthcrete’ walls were confronted. The latter stages of the development have been running on schedule and it is clear that, given the experience of this project, there is no reason why an equally innovative development could not proceed on a building schedule equivalent to that for a more conventional project.

There have been no major problems obtaining development and building approvals and the development process has been very resilient. As an indication of that resilience, it has already been noted that personal tragedies have been successfully dealt with by architectural and developmental responses in support of community sentiment and goals. There are various instances of where the non-profit structure and community base have assisted in enabling the project to proceed and withstand delays where a conventional development approach would almost certainly have resulted in the project being abandoned.

The use of recycled material and the requirement for residents to lay the external paving may result in creative, attractive environments but would add costs to any project not able to tap the same level of commitment and goodwill from its clients.

The ‘earthcrete’ wall created difficulties in construction programming and cost more than anticipated. As an attempt to provide affordable high mass construction and as an alternative to rammed earth it is a qualified, moderate success. This is an instance where a more cooperative and interested sub-contractor might have assisted in achieving a better result.

The buildings are yet to be proven through occupation and use over more than a few months but the signs are that they will be successful. There is a tremendous sense of ownership and understanding about the designs that both reflects and reinforces the community basis of the development approach. People have been able to purchase much more than just a house in the city.

The community house will be an important part of the project as both a physical facility (including the laundry essential for building approval of the apartments, cottages and townhouses planned with no internal laundry) and as a community meeting place. Its construction remains contingent on a voluntary self-build co-operative approach that cannot necessarily be readily replicated in all situations. This would be reflected in overall purchase prices for any comparable development elsewhere.

Rigorous cost planning requires good information which was not available the first time around but details and costs associated with the innovative approaches to construction and design have now been tested and refined making it much easier to predict programming and costings for future developments. More financial resources would make it possible to accelerate the development process so that it was competitive with conventional development, and would assist in maintaining the active engagement of a wider community with the design and development program. More time would make community engagement more effective and easier to maintain.

A building operation and maintenance manual is being prepared for all residents. The client is keen to see structured post-occupancy evaluations undertaken but lacks the financial resources to achieve this as yet. Informal feedback is coming from residents, owners of property under construction, and from the numerous visitors attracted by the project. The expectations of all parties are extremely high and the preponderance of positive comments to date has maintained a sense that the project is achieving its goals.

Christie Walk has already been cited internationally as an example of UEA's work as 'eco-activists' (Baird 1999 p.10).

9.6.1 Occupation

Whereas it is not always easy to appreciate the significance of the built environment in terms of its impact on human existence and the natural environment, it may be instructive to consider the difference to both that this one development is likely to make. The completed project is expected to accommodate a resident population of 25-30 people with the buildings occupied on average for 50 weeks of each year. At an average occupancy of 15 hours/day per person in that time there would be between 130,000 and 157,000 person-hours a year of human occupation. With a design life of 100 years, the development has the potential to house over 15 million hours of human existence – excluding visitors and non-residential activities. There will also be a net change in the ecological value of the site. As the site is transformed from a predominantly unproductive light industrial wasteland to productive, managed land and

roofscapes there should be a dramatic improvement in terms of vegetative cover, biodiversity, and ecosystem function.

9.6.2 Optimism Again

In the description of Bourne Court the optimism of UEA ecocity protagonists was noted. This optimism has been both a powerful source of energy for ‘maintaining the rage’ which has enabled projects to be conceived and promoted, and in the case of Whyalla and Christie Walk, developed. It has also lead to unrealistic expectations and disappointment for many people. Looked at as a community project, this combination of high hopes and let downs is obviously fraught with danger. Looked at as a development project, this pattern is fairly normal. It is not unusual for conventional developers to have to raise interest and confidence in their proposed developments long before they have the wherewithal to undertake them, and with no guarantee they can be undertaken at all. This kind of ‘calculated risk’ is unusual territory for community organisations and is compounded, in a sense, because the unusual nature of the ecological development itself makes outcomes even less predictable. Much of the effort expended by UEA and its supporters has been in attracting and maintaining confidence in the overall goals of ecological development. Any success that has been enjoyed through this process could not have been achieved without the commitment of a large number of people in a general supportive role and a smaller group of people who have been able to invest significant quantities of money and time into enabling projects to have an opportunity to happen. This pattern can be seen quite vividly in each of the three case studies.

9.8 Future Prospects

Christie Walk is proceeding more slowly than intended, but little or nothing of the original intent of the project is being lost along the way. It promises to represent a significant microcosm of ecopolis development. All the processes adopted in its realisation to date are congruent with the theories and principles set out at the commencement of the project. The challenge will be to maintain this integrity and consistency as the project continues to develop.

The future form of development of neighbouring site to the east, owned by the Catholic Church, threatens to have a high degree of significance for Christie Walk. Appropriate development will assist maintaining the community and environmental values of CW, inappropriate development may even undermine it. It is for this reason that Wirranendi have been in discussion with the church about the future of their site and how development can be of mutual benefit to the goals of both parties. If the outcome of these negotiations results in a development on the church site that respects the CW initiatives and adopts similar principles, then the project will be able to claim success as a catalyst for ecocity development. A number of articles have been published about the project in popular journals², two major professional case studies of the project are being published, and it seems reasonable to conclude that, as a contribution to education and raising awareness CW is already moderately successful. Perhaps the last word on the project for the case study in this dissertation should rest with one of Wirranendi's most committed volunteers, Julia Winefield:

When this project is completed,
and Christie Walk resounds with music, conversation, and breezes in the trees,
we will remember the moments
we felt worried or stressed and see that
in those times we evolved as a real team,
supporting each other, and that in getting through the harder times,
we gained the faith
that everything we want to do will be done.³

² Including 'From Greenhouse to Green Houses' and 'A Strawbale in the CBD' in *Greenhouse Living* (Downton 1999, 2000).

³ Julia Winefield joined UEA early in its history and, after returning to Australia from a sojourn overseas, began working with UEA and Wirranendi, initially as a volunteer, later as paid staff. At a time when there were many challenges for Wirranendi and in response to a plaintive request from project manager Ed Wilby for something inspirational, she composed this 'creed'.



CHAPTER 10

UEA AND THE CASE STUDIES: REVIEW & OUTCOMES

Adelaide's Ecopolis development, pioneered by Paul Downton, Chérie Hoyle and Urban Ecology Australia Inc., has revealed an important element of this new environmental radicalism: its emphasis on the Dreaming. Inspirational architectural and decision-making models for society are being concocted without the self-censorship of the reformists.

(Doyle 2000 p.216)

Chapter 10 reviews outcomes and aspects of the case studies.

10.1 Social Experiments

Models and strategies are required for eco-neighbourhoods in urban areas in order to practically demonstrate innovative and appropriate solutions which could be readily applied by other neighbourhoods. (Rudlin & Dodd 1998 p.2)

The HEP and Christie Walk can be seen as self-directed social experiments, undertaken without coercion by people freely choosing to be part of an innovative, non-government initiative. In Denmark, projects with similar overall goals have been undertaken by local government. Torsted West (a new 'green' town) and the Green Municipality Slagelse (an environmentally responsive retrofit of an existing urban area) are both projects which have been approached from the three angles of:

- The city as an ecosystem, that is matter and energy flows in the city,
- The functioning of the nature in and around the city, that is plants and animal life,
- Democracy, participation and everyday life. (Marling 1992 p.11)

According to Marling, 'Danish experiences with social experiments and urban ecology/green municipality planning create an effort towards a democratic sustainable development.' Even with government support, 'the experiments have been rather small and limited.' And 'It has taken a long time to mobilize both the grassroots and the authorities.' (Marling 1992 p.14). All efforts to undertake 'ecologically sustainable development' in Adelaide¹ have had to proceed in a context where there has been no

¹ In South Australia, although the goal of Adelaide City Council's Local Agenda 21 Environmental Management Plan (to which UEA members were significant contributors) was 'To prepare and implement a strategic and management plan for the protection of the environment and the promotion of ecologically sustainable development in the City of Adelaide.' (City of Adelaide 1997 p.22) there has been no sign to date of any significant move towards this goal.

support from the level of government most pertinent to providing it whereas in Whyalla there has been some support.

The case studies reinforce the centrality of social dynamics in any kind of 'ecocity' program. By pursuing the 'Ecopolis Development Principles' which underscore the Ecopolis theory, the Halifax EcoCity Project, Whyalla EcoCity Development and the Whitmore Square EcoCity Project have attained some degree of success, either as conceptual models (with the HEP), or as actual developments. They have helped to integrate knowledge (Ecopolis Proposition 2) through experiential means, bringing together dispersed information on technical, economic and social matters through the focusing processes of creative, collective action with the goal of making 'pieces of ecological city'. These 'pieces', no matter how incomplete, have possessed sufficient characteristics, in process (particularly) and form (partly) to represent ecocities in microcosm (Ecopolis Proposition 4). With a high level of participation from the wider community (the measure of which is that, without that participation, there would have been no projects at all) the projects have been self-conscious demonstrations of the potential for systemic cultural change (Ecopolis Proposition 3). As such, they have been influential; for instance, the idea of 'future residents' as an active community that could interact and contribute to ecological development was raised and developed in the HEP and has grown local roots with its adoption by the Aldinga Arts Eco-Village (Aldinga Arts Eco-Village Newsletter 2000). The HEP proposal included restoring degraded rural land as an integral part of the urban development program. This animation of Ecopolis Proposition 1 regarding the city-region could not be tested in real terms. The idea that cities have an ecological responsibility to their regions was rarely, if ever, stated at the time the HEP was first proposed but is now part of the lexicon of sustainability².

Through following the precepts of the developing idea of Ecopolis, working with the author, UEA and Ecopolis Pty Ltd. opened channels of communication and stimulated the aspirations of the Whyalla community that had unpredictable, outcomes,

² A note on urban centres in SA. South Australia's urban system belongs to a group that is rare in wealthier and more developed countries in that it lacks a well-balanced hierarchy of cities and is dominated by one very large agglomeration. This lack of balance is characteristic of many of the poorer, smaller and more populous countries of the 'South' (Stren, White and Whitney 1992 p.2) It reinforces the idea that Adelaide, despite its nominal 'first world' context, is functionally similar to many third world cities. As a 'developed country' city in the southern hemisphere and with its anomalous hierarchic positioning as a regional centre in a state with a larger territory than many countries, Adelaide manages to straddle circumstances that make innovations here potentially useful (and certainly intriguing) models for application in the 'North' and the 'South'

ie., unplanned and unexpected outcomes that did not fit any presumptions about urban planning and renewal. Seen from an historical perspective, although conceived as a radical 'eco-city' departure from conventional city making, the Whyalla EcoCity Development project may be most interesting for having 'spontaneously' established, as central to the remaking of its urban heart, a focus which may predate that of trade or political management - that of spiritual endeavour and the collective need to have more than just a political economy as the focus of human social activity.

10.1.1 The Halifax EcoCity Cultural Fractal

10.1.1.1 Sustainable Urban Neighbourhoods

Examples of best practice tend to be confined to individual buildings, occasionally urban blocks – such as the car free development in Edinburgh – and to ecovillages in the countryside – such as Findhorn in Scotland. There are however very few projects which address sustainability at the neighbourhood scale, Kolding in Denmark and Halifax Ecocity in Australia being notable exceptions. (Rudlin & Dodd 1998 p.1)

The original presentation of the Halifax EcoCity Project concept was an attempt to make visible a buildable vision of an urban environment that integrated social justice and community control with strong ecological goals. It consolidated and gave form to a number of ideas about architecture, urbanism, environment and community politics that can be recognised collectively as 'ecocity' concepts. With the support of people and organisations around Australia, the challenging task of creating a piece of ecocity began with the Halifax EcoCity Project. It provided the impetus for the EcoCity Projects in Whyalla and at Christie Walk. Though the HEP has not been built as a physical edifice, it exists as a cultural construct and as an historical experiment in participatory, community development processes. It has been referred to as the 'Holy Grail' of urban environmentalism³.

Rudlin and Dodd identified the HEP as a case study example of neighbourhood scale ecological development when they spelt out 'a brief for a sustainable urban neighbourhood' to be used as the basis for a design exercise (Rudlin & Dodd 1998 p.2). Acknowledging that it would be difficult to achieve the targets involved in creating such a neighbourhood, they claim that the scheme would not have failed if it did not meet all the targets and that it would nevertheless 'push the limits of urban development to show just what is and is not possible at present and how they could be tackled in the future... and hopefully demonstrate that the truly sustainable urban neighbourhood is a practical goal.' (Rudlin & Dodd 1998 p.3). The environmental targets to which they

³ Comment in the 'Ecopolis Now' video documentary by Sam Stegman screened in Adelaide at the 'Wild Spaces - 5th Environmental Film Festival' Friday 3 November 2000.

refer include reducing the eco-footprint of the neighbourhood to an ecologically sustaining level, looking at lifecycle costs and impacts, using ecological design principles and environmental purchasing criteria, eliminating fossil fuels for power and heat, creating a closed water system, exploring food production possibilities, reducing car use, and developing a community planning approach.

It is difficult to measure the success of a project that has not been built, lived in and independently assessed by users and critics, nevertheless, an important goal of the HEP was that it be influential in the wider community and raise popular consciousness of what was possible in urban development and community-based politics. Some evidence of the project's success in this regard can be seen in the (incomplete) listings of academic citations and courses that have incorporated the project as a case study, publications that refer to the project, media reports, exhibitions, and awards received for, or because of, the project (see Appendix 12).

Its value as a vehicle for 'imaginative scenario planning' is demonstrated to some extent in relation to later UEA-Ecopolis projects. The 'Halifax Hypotheticals' (Prelgauskas 1994) offer a partial illustration of this.

The Halifax EcoCity Project set out to provide a model of ecocity development *processes* as well as a developed concept of what that process might lead to. It was, above all else, an exercise in citizen participation for ecological development. The HEP was featured as an exemplar of participation in the book of 60 international case studies published in Barcelona in 1999 (Ruano 1999). UEA received awards and recognition for that from KESAB, the Civic Trust and the South Australian State Government, it received the 1994 inaugural 'World's Best Ecocity Project' award from US-based Ecocity Builders Inc., and the HEP was featured as an example of Good Practice on the UNCED/Habitat 2 database. All such publications and awards helped to substantiate the value of participatory processes which were understood, at least initially, by Whyalla City Council with whom UEA and the author had a productive working relationship for some years.

The HEP certainly raised expectations, one of its primary goals and an essential part of cultural change. According to Wendy Sarkissian, internationally respected Australian planner specialising in community participation, 'All over the world planners, designers and ecologists are waiting to see what happens on this site. - There

is enormous professional discourse about the concepts embodied in the earlier plans prepared by Urban Ecology.’⁴

Even the most sympathetic people working in the Council administration were stymied by having to operate within the Council’s bureaucratic framework. That framework simply did not have the necessary capacity to respond to community initiatives. UEA succeeded in harnessing a great deal of community commitment that provided substantial resources able to support an office and campaign for over 6 years to advocate a new approach to development in the city, but at no time did the Adelaide City Council try to form a formal working relationship with UEA as a community organisation. There was always concern on the part of the HEP protagonists that there may have been a failure on UEA’s part to communicate the issues and ideas more effectively. This concern was, at the same time, constantly ameliorated by the evidence that thousands of people in South Australia, and even overseas, seemed to recognise what the project was trying to achieve.

The HEP proposal left evidence of its residue in the reporting on the Pentroth-Council ‘Halifax Adelaide’ scheme. In the Adelaide Advertiser report on planning approval being given for the ‘Halifax Adelaide’ (‘the most difficult planning application we have looked at’ according to Lomax-Smith), the ‘problems’ associated with the site included a cost blow-out, claims the site was sold too cheaply, and ‘disappointment that original plans for an ‘ecological city’ were abandoned, with many environmental features scrapped.’ (Haran 2000 p.13).⁵ This is more evidence for the project having succeeded in changing perceptions of what is possible in the city setting, as it were, a ‘perceptual benchmark’.

Through agitating for ecocity development on the Halifax site, UEA has:

- played a pivotal role in raising debate in the public domain about environmentally sustainable development;
- directly influenced the City of Whyalla in adopting a comprehensive eco-city strategy relating to both showcasing ecological development on a core site and for Whyalla as a whole;

⁴ Email communication from Sarkissian to UEA, August 1999.

⁵ The Haran report was accompanied by the developer’s image of the proposed development which is startling for its entirely inaccurate rendering of a dense row of trees on the North side of Halifax Streets instead of buildings – inadvertently demonstrating complete neglect of the *actual* urban context of the design.

- brought urban environmental issues onto local and national agendas, including the Adelaide City Council's Local Agenda 21 Environment Management Plan and Environmental Advisory Committee, including initiating Adelaide's Green Map⁶, and being recognised as the peak national urban environmental organisation with formal input to Federal government departments and programs;
- had direct input to dozens of architecture and environment university courses throughout the world as students studied the Halifax EcoCity Project (see 'Educational Outcomes' below);
- established an international profile for Adelaide among people and organisations pursuing ecologically responsible urban futures.

By 1995 it was possible to list a number of outcomes from the Halifax EcoCity Project. It had:

1. Created a credible \$60 million project from a capital base of zero

The Adelaide City Council has de facto accepted the Project as a credible development by voting to grant Urban Ecology Australia Inc., an option on the site.

2. Attracted worldwide attention as a model of ecologically sustaining urban development

*Invitations have been received to talk about the Project from around the world and Adelaide City Council was one of just 50 cities worldwide invited to send a delegation to the UK government sponsored follow-up to UNCED called Global Forum 94 because of the EcoCity Project. The Project won the inaugural 'World's Best Ecocity Award' and the Centre for Urban Ecology has hosted a number of overseas visitors including Charles Nqakula of the ANC National Executive Council, and a delegation from the Vietnamese government. UEA was listed in the resource section of *La Città Sostenibile* and cited in the bibliography (Alberti, Solera & Tsetsi 1994 p.393, 354).*

3. Attracted national and statewide attention as a model of ecologically sustaining urban development

In South Australia the Project has been adopted as a model for Integrated Resource Management by the State Government and nationally Australia's peak environment organisations adopted the Project as the example of how to tackle urban environmental issues.

4. Served to educate school and university students about urban environmental issues

Dozens of schools and a number of TAFE colleges have either sent students to the Centre for Urban Ecology or had speakers visit them to talk about the Project. The University of South Australia subjects 'Urban Ecology' and 'Ecological Architecture' are substantially informed by the CUE and HEP.

⁶ Championed and developed by Chérie Hoyle with the assistance of Sharon Ede, the Green Map of Adelaide City was launched on World Environment Day, 5 June, 1998, by which time thousands of maps had been distributed 'around South Australia and as a model to other green map cities.' (City of Adelaide Agenda 21 Newsletter August 1998).

5. Served as an example for educational purposes worldwide

A number of university and government departments from around the world have requested information on the Project.

6. Created a grassroots movement for change in architectural, planning and development practices

Adelaide has become recognised as a leader in urban environmental issues and the feedback to the community through the Centre for Urban Ecology ranges from influencing local politics to advocacy for healthy building practices.

7. Generated interest in the building and related industries in ecologically responsible processes and products

Caroma, and the SA Gas Company are investigating product development options through the Project and additional product development work is taking place with researchers at the University of South Australia.

8. Upset conventional development practices and prised open the 'behind closed doors' policy of urban development decision making typically associated with the City Council.

After a recision motion against the 'option' being granted to UEA failed, an Adelaide developer called in the Ombudsman. The outcome was favourable to UEA and lead to the public admission that whereas there had been a number of options granted to developers without public tender, the EcoCity option was the first to be offered openly in a public session!

(Downton, from abstract prepared for the Catalyst Conference 1995)

10.1.1.2 The Shopfront

UEA's experience with each of the case study projects strongly indicates that a shopfront should be at or near the intended site of any project. Conventional developments are planned in an abstract, alienated way with community involvement confined to 'participation' through short-life exhibitions and meetings in one-off or institutional venues. Shopfronts open to the public on a daily basis are different in effect and intent and people react accordingly.

Conventional community expectations about major developments are based on distrust and suspicion and there is no quick and easy way to allay such fears. In a public environment where people are cynical about media there is really no fast sell, only honest and open interaction with a community over time can establish trust and the basis for understanding⁷.

10.1.1.3 Under-Valuing the Community Sector

In Whyalla, UEA set up a Centre for Urban Ecology as a deliberate early stage in promoting an eco-city development, whereas in Adelaide the Centre evolved from the

⁷ A favourite tale told by Urban Ecology volunteers is about a neighbour whose initial reaction to the Project was hostile but who now brings flowers to decorate the Centre. Because the Centre was open to casual visits, the neighbour was able to satisfy her curiosity and learn about the Project in her own time.

need to house activities of urban ecologists promoting the HEP concept. Whyalla reinforced the relevance of a Centre for providing information on a current eco-city proposal, but also underscored the need for information, advice and referral on urban environmental issues generally. In both cases, thoroughly committed volunteers were essential to the operation of a Centre, and to achieving an eco-city project. Getting people involved has been essential to getting ecocity ideas into the public domain. During the six years of the Halifax EcoCity Project UEA learnt a great deal about difficulties of protecting the interests of the non-profit sector.

From its inception in 1992 to 1998, hundreds of volunteers contributed a conservative estimate of \$AUD 3,000,000 to evolving the HEP, this kind of valuable community investment is not recognised in conventional economic terms and thus lacks importance in the conventional accounting approaches of the corporate sector. At all times, over the years of evolving the Halifax EcoCity Project, UEA has been vigilant and acutely aware of the problematic dynamics of the development industry. In approaching UEA and becoming involved in the tender process, the developers in the UEA 'consortium' recognised the commercial potential of the Halifax EcoCity Project proposal and were determined to utilise their financial resources to realise it⁸. However, it could be argued that in omitting information concerning community processes and education from the tender document, they did not fully understand the importance of the community component. Much work needs to be done to achieve real partnerships between the private, public, and non-profit sectors.

10.1.1.4 Inside Views from Overseas

Some of the interns hosted by UEA have had to produce reports to satisfy their university research requirements. Two of these are of particular relevance to any attempt to assess the Halifax EcoCity Project. They are by Neils Lautsen and Thomas Jensen, both from Aalborg University in Denmark. The original connection with Aalborg University came about from Gitte Marling's participation in the 1992 EcoCity 2 conference.

10.1.1.4.1 Laustsen

Part of Laustsen's analysis of the HEP was done on the basis of a method called SCOT (Social Carriers of Technology) from his host department of International

⁸ At the same time, the Adelaide City Council would seem to have failed to maximise the site value of the Halifax Depot by accepting a purchasing option that gave quicker, but less, return when they selected Pentroth proposal rather than that of the consortium built around UEA's proposal (personal communication with Chérie Hoyle after analysis of confidential tender bids).

Technology Planning at Aalborg University. He observes that the HEP was being proposed in a context such that the overall situation of development in Adelaide was not advancing towards 'sustainable development' (Laustsen 1998 p.17) and quotes Susie Herzberg at the time a planner with Adelaide City Council, saying that there was a lack of knowledge and understanding of environmental problems in Adelaide and that lack of action was 'because we actually are in ignorance of our impact on the environment.' (Laustsen 1998 p.22). Laustsen reports that Adelaide City Council sees disadvantages in urban concentration because it limits opportunities for water retention, food production and composting of waste, and requires increased need for cooling (due to less opportunity for cross-ventilation and limited tree cover) (Laustsen 1998 p.42). He points out that where so many people have the opportunity to capture water, grow food and compost green waste, they do not, and furthermore 'Few take the orientation into account when planning a house and few houses are insulated, so heating in winter and cooling in summer are a necessity.' (Laustsen 1998 p.42). He concludes that 'The slogan from the Agenda 21 plan 'To make Adelaide a world recognised, environmentally managed city by the year 2005' will not be reached.' (Laustsen 1998 p.44).

Noting that the proposed density of the HEP was between 33 and 417 persons per hectare compared with the Adelaide average of 11.8, Laustsen observes that 'The very important 'trick' for the Ecocity is to make the housing look less dense than it really is.' (Laustsen 1998 p.45). Despite the challenging density, he decided that it would be possible to attract sufficient people from the 1.2 million population of South Australia to fill the project. Accepting that high car use is a certainty in the Australian environment, he also wryly observed that some would 'have a problem with seeing the world's first ecocity, with a carpark underneath.' (Laustsen 1998 p.45)!

Laustsen's correct impression of UEA's organisation was that it depends on very few people, and suggests that 'Without the two originators no urban ecology projects.' (Laustsen 1998 p.50). He also notes that even in Denmark, which has an established, state-supported history of urban ecology projects, there have been problems with low levels of community participation in projects. The problem is certainly not local to Adelaide. In her interview with Laustsen, project co-originator Chérie Hoyle made the observation that UEA members 'don't seem to realise how much work it takes to create a development like this....(but) we're living in a culture where, it's not just the young people that require instant gratification but it's all levels of this society.'

Laustsen concludes that the HEP would contribute to sustainable urban development in the City of Adelaide, reducing water and energy consumption relative to conventional development and improving the air quality for residents. He denies that it would be the 'world's first piece of ecocity', and does 'not think it is possible to build an ecocity in the present Australian context.' (Laustsen 1998 p.60). He suggests that UEA might have been guilty of 'biting off more than one can chew' and recommended starting on a small scale and letting it grow from there. He neglected to mention UEA's work with Whyalla City Council, but he would surely approve of the Christie Walk development.

10.1.1.4.2 Jensen

Another intern from Aalborg University, Thomas Jensen, observed that 'Whereas Agenda 21 policies will provide the basis for sustainable urban development, urban ecology projects must work as demonstration projects to reveal the practical barriers of the implementation process.' (Jensen 1994 p.39). He went on to explain that it is only the practical implementation process that could uncover barriers in the area of technical problems, lack of political cooperation or resources, or lack of public interest and citizen participation. Without being aware of the Danish experience, UEA had inaugurated a project that completely fitted the Danish interpretation of 'urban or city ecology', which Jensen quoted from Miljøministeriet, 1994, as:

...a special environmental program which, with the environmental conditions in a specified urban area and the participation of its citizens as the origins of action, seeks to promote holistic solutions to problems concerning the usage of resources, environmental effect and natural environment within the specific urban area.'

The difference between American and European perceptions of what urban ecology and ecocities are all about is demonstrated in part by comparing Laustsen's view that the HEP, even if realised, would not be a real 'piece of ecocity', with Register's statement on behalf of Ecocity Builders Inc., that 'The Halifax Project is by far the most thorough-going ecologically informed project anywhere. It meets more of our Ecocity Prize criteria for ecological building design, community layout and planning process than any other project known to us.'⁹

A 'cultural fractal' has to have integrity that survives analysis and process from conception through to financing and development, and later, occupation. If this 'living process' is absent, or is severely damaged as it was in Whyalla, then the 'fractal' is incomplete and incapable of full effectiveness. The HEP has been able to maintain its

⁹ From the Ecocity Builders' citation when presenting UEA with the 'World's Best Ecocity Award' in 1994.

role as a cultural fractal because it was never compromised. Although the tendering process saw UEA lose control at the very end, it also meant that UEA were not seen as responsible for what Hansen Yuncken did and, if anything, the process reinforced the proposition that success in making ecocity programs is dependent on adopting inclusive development programs that do not allow conventional development approaches to control the process.

10.1.2 Whyalla EcoCity Development

Unlike the Halifax EcoCity Project the Whyalla EcoCity Development has proceeded with some development on-site, although it has undergone some modifications. That it would be hard to get things started and that 'key' structures would be needed to catalyse appropriate results was always understood by the City Planner and the consultants but a 'critical mass' of development



FIGURE 179: The EcoCity core site in Whyalla with the EcoCity Information Feature in the foreground and the first of an intended five buildings for Sakya Yigah Choeling in the middle background. (Photo by author)

would be difficult to achieve in any city on a 15 hectare site. In Whyalla a high level of optimism and commitment was essential to achieving anything at all. Again, an important goal was to raise popular consciousness of ecological development and encourage community-based politics.

10.1.2.1 Community Engagement

The improvement of environmental quality, in the long term, depends on the community's understanding of, and commitment to, environmental issues. Thus there must be a well articulated and properly exploited linkage established between community. Whyalla Council already had a history of environmental endeavour, and its consultants-to-be had a history of interaction with the Whyalla community. Whyalla provided an opportunity to put into effect lessons about community education and participation learnt from the HEP experience. As a result, this small city of 27,000 people has a significant group of citizens (many closely associated with local religious and cultural organisations) who understand and are committed to the ecocity vision. This is just as well, for their knowledge and advocacy skills are now being tested in

response to pressure from economic reductionists seeking to replace community areas with commercial interests.

One test of the effectiveness of the ecocity project was to be whether the councillors and mayor responsible for committing the city to this line of development retained their seats in the first round of local government elections that followed the initiation of the Ecocity program. The mayor lost his seat but two elections later in May 2000, two of the new councillors¹⁰ were members of Urban Ecology Australia who had joined the organisation and become involved in community politics as a result of the workshopping, participation and educational programs run by Ecopolis-UEA during the Whyalla EcoCity Development consultancy in 1996-97. One of those councillors is an active member of the Anglican community in Whyalla and the other is an avowed atheist. One is elderly and the other middle-aged and both are women. The ecocity concept has empowered and inspired both to engage more fully in the public realm.

The small but active local Buddhist community also became advocates for the ecocity idea and became the first community developers, initiating the first ecological building on site as part of a future meditation centre. This unexpected release of spiritual energies in Whyalla can be attributed to the involvement of particular members of the community in the series of workshops run by Ecopolis and UEA as part of the consultancy to Whyalla City Council.

10.1.2.2 Cultural Impact

In Whyalla a 15 hectare site in the heart of the town has been zoned 'Ecocity' and actual buildings have been constructed there. The Halifax site is being developed quite conventionally. In terms of cultural impact, however, the Whyalla EcoCity Development example has had negligible impact whilst the Halifax EcoCity Project continues to exert influence. This suggests that the 'cultural fractals' in the Ecopolis proposition can be as effective in a 'virtual' sense. That the unbuilt HEP is more effective than the Whyalla project at conveying the ecocity message beyond the city limits is a challenge to the idea that examples need to be built and experienced to be effective.

The difference in impact may be attributed to the relative success in promulgating the HEP compared with the WED. Even with buildings and zoning in place the example of WED has not been widely published or acknowledged. Where there has been any national or international interest or publication of the WED it has been through the

¹⁰ Jean Oates and Jo-anne Waters.

direct promotional activities of the author. In Whyalla itself, the impact of the ecocity idea has been so weak that by the early part of 1999, when the future of the town was receiving media attention, the ecocity concept was not mentioned at all (Hackett 1999, Hockley and Kelton 1999). This is certainly attributable to local politics, with the current Mayor known as an opponent of the ecocity idea, but the failure of the idea to reach beyond the town's portals has to be seen, at least in part, as a failure of the local supporters, and the council's media officer, to promote the concept with sufficient alacrity and conviction. It has also been damaged as an advocacy base by the unfortunately ill-advised development by Excel. The determination of all concerned to support this (partly) community-based developer over-rode deeper concerns about the appropriateness of their development strategy and the result was a toilet block and railway carriage set in a showcase position with no other development happening in close proximity. Without a strong sense of the whole picture for the site, and without being able to see further development rapidly taking place adjacent to it, the causal observer could be forgiven for being uninspired. Later placement of the EcoCity Information Feature was done pragmatically rather than in the context of the wider planning intentions for the site, adding to the sense of piecemeal and uncoordinated development.

10.1.3 The Christie Walk Cultural Fractal

The following quotes are taken from UEA's 'Blue Book', describing the Halifax EcoCity Project. It can be seen that these verbal descriptions work just as well for the architecture of the Christie Walk project and provide some evidence in support of the assertion that the later Christie Walk development is a physical microcosm of the HEP.

No two plans are quite the same.... the individual character of every household finds expression through both the skin and guts of the buildings. Non-toxic materials ensure a healthy environment.

.... solar-facing north and shaded southern facades change over the days and years as shutters, stained glass panels, fly-screens, paint and stains come and go with the flux of life in the dwellings they light, shade, warm and cool.

The buildings work better the more they are lived in, improving with age. The combination of mass with insulation, lightness and ventilation means the buildings will function well even as the climate changes.

As water falls on the myriad roofs, solar panels, paths, balconies and verandahs, it is collected and piped to underground tanks.... All of it is stored on-site... to irrigate the roof gardens and balconies and sustain the edible landscape, permaculture plantings and 'ecological corridor' threading across the site.

There is no through traffic and the pedestrian is in control. The paths and trafficable areas all capture stormwater run-off through impermeable or semi-permeable surfaces. Surface carparks are designed as courtyards for people rather than machines with sheltering pergolas carrying vines and solar panels like the ones on the roof gardens.

The walls are designed to last for centuries, holding up floors and roofs, storing heat and absorbing acoustic energy in a very dense urban form - making good neighbourliness possible by damping the passage of sound - and one day, perhaps, making a marvelous ruin ... (Downton 1994 & 1996)

The Christie Walk component of the Whitmore Square EcoCity Project demonstrates more than just a similar built form response to the HEP, it contains and expresses important aspects of how the Ecopolis theory translates into practice, including:

- Community processes and social structure based on mutual aid and direct democracy;
- At-a-distance impacts related to financial decision making (Community Aid Abroad Ethical Investment Trust and Bendigo Community Bank);
- Technologies – showing how various aspects of design address key issues: water capture and re-use, solar power, etc;
- Urban form – showing reduced transport demands and higher density facilitating notions of community and conviviality (thus returning to the social agenda of point 1, above).
- Built form¹¹ manifestations of technology and funding as the means to reinforce community processes – thus (in the case of achieved ecocity practice) achieving the scenario of sustainable human ecological development.



FIGURE 180: The organic nature of Christie Walk is reflected in both building process and built form.
(Photo by author)

¹¹ Putative, but beginning to be evidenced as the built environment of the site gets progressively established, and also in the effects of how on-site physical arrangements facilitate community interaction.

Whereas the HEP provided grist to academic and professional mills as a partly realised, but unbuilt project, Christie Walk is already being cited as an example of good practice in building and development. The Australian Building Energy Council has commissioned a case study of the project for dissemination on its website and is using images of the Roman Hut in promotional material¹². The Commonwealth Government's extremely comprehensive new residential design guide 'Your Home', being published in printed and website formats in May 2001, includes the project as a case study for 'villa', ie. urban, ecologically sustainable development¹³.

There was no structured research done *about* the HEP and its processes apart from occasional studies by students, interns and volunteers. It is therefore difficult to cite formal studies that can prove or disprove claims about its participatory nature. The author's consistent contention has been that as the HEP was completely reliant on community volunteerism to provide the resources, people and skills for its realisation, the fact that it existed in any form at all for so many years and nearly became a built development is proof that community participation was core to its existence. Some documentary support is available for the contention that participatory processes were fundamentally important to the project (Ruano 1999).

Collectively, members of Wirranendi have learned, and are continuing to learn, a great deal from managing the Christie Walk development. Any weakness in the performance of the organisation has been attributable to a lack of developed skills in key areas rather than the cooperative structure of the organisation itself.

¹² Owen Saddler, personal communication by email 27 April 2001.

¹³ The author is a Technical Adviser to the Australian Greenhouse Office program that has resulted in the production of the design guide and was asked to provide a case study of the project for inclusion in it.

10.1.4 Communication

10.1.4.1 Media and Outreach

Achieving such close adherence to principles that are antithetical to much of the way the construction and development industries operate has required a lot of internal education for those involved in the project, and as has been noted, the work and time investments of committed individuals has been the only means to get ecocity projects happening without any significant financial resources. Broad support from the community has also been a prerequisite for anything to have a chance of being built and the support and understanding of professionals such as planners and local government officers is also necessary. To get any of this there has to be education.



FIGURE 181: Reporter and cameraman from ADS Channel 10 filming for a news item 18 April 2001.
(Photo by author)

'The media' are crucial to effective community outreach for educational purposes in a democratic, pluralist society. Given that the media are mostly owned by corporate interests that may not perceive any self-interest in ecocity projects, it has been at the level of individual journalists that ideas have to be initially presented. In the process of promoting the three case study ecocity projects the author and others in UEA have found the media generally to be supportive.

Public talks and conference presentations are the tried and tested route to community communication and education. UEA has had the good fortune to attract a number of competent speakers over the years. Nevertheless, UEA has also had to turn down more opportunities than it has been able to partake of. Workshops are a vital tool for really engaging people in the kind of dialogue that leads to deeper learning. By working on issues in a positive, intense environment, people learn quicker and better. This was borne out particularly well in Whyalla when UEA ran its ambitious sessions on 'urban design'.

10.1.5 Community Action

Barton observes that whilst Local Agenda 21 (LA21) 'calls for participation of local communities in the process of development. It does not see such involvement going as far as *citizen control*...but rather a process of devolution taking place within a

framework set by the local authority.’ (Barton 2000 p.7). Although the New Urbanism is primarily an American phenomenon and there is antipathy to LA 21 in the USA, its commitment to the ‘charette’ process suggests that it embraces a similar ideal of participation. The process brings together ‘stakeholders’¹⁴ in structured discussion forums and design exercises which provide a means of informing decision-makers but are not in themselves decision-making. Most certainly ‘There are issues here about the degree to which such processes – however sincerely undertaken – raise public expectations of action without establishing effective means of implementation.’ (Barton 2000 p.7).

A charette-like process was employed in the Whyalla EcoCity Development program by Ecopolis and UEA in which an effort was made to reflect consequent design decisions back to the community for further commentary and approval (or otherwise) (see Chapter 8). The Halifax EcoCity Project employed a much more extended (deeper and longer) process of design development allied to community participation (see Chapter 7). The Whitmore Square EcoCity Project has limited participatory design processes embedded within it but has been wholly developed by a community organisation.

With the HEP, community engagement was vital to the project’s mere existence, and over a period of 7 years hundreds of people became actively involved with one or another aspect of the project, whether it was helping to keep the Centre for Urban Ecology open and operating as an information centre for ecocity development, or sticking bits of recycled foam and cardboard together to make the numerous large scale models employed to communicate the project’s architectural and urban design concepts.

In Whyalla, a small group of people worked to maintain an Arid Lands Centre for Urban Ecology. With only a small population base (27,000 in Whyalla and no nearby towns) it was hard to find sufficient volunteers for something as untried as ‘ALCUE’ as it became known, and it ended up being run virtually single-handed by Jo-anne Waters, who was one of the new councillors elected this year. When the Buddhists, led by Bruce Muhlhan and Rae, decided to become the site’s first developers they researched ecological construction techniques themselves and chose to experiment with strawbale construction. Construction of their first building was through participatory workshops that further engaged some of the community in ecocity processes.

¹⁴ Who are self-selected or, more usually, nominated by interest groups - see Doyle 2000.

In Adelaide, the Whitmore Square EcoCity Project has depended on community engagement. In this case it has been more directly to do with setting up the legal and financial structures, managing the co-operative, and working on the site. Fewer people have been involved but this reflects both the smaller scale of the project and the need to be more focused and conventionally 'professional' in order to negotiate the legal, fiscal and temporal constraints of a commercial property market. Even so this, UEA and Wirranendi have relied on volunteerism to get the project up and running with most of the initial work including construction of the Roman Hut to roof level undertaken by unpaid workers. It seems certain that similar levels of personal commitment would be necessary to ensure the functionality of ecocity organisational structures in most conceivable circumstances.

10.1.5.1 Leadership

Hundreds, if not thousands, of people have actively contributed to the birth and sustenance of these ecocity projects, but through all that has happened there has been a very small core group of extremely dedicated people without whom the broader community energies would not have been focussed or have found an 'ecocity' purpose. In other words, these kinds of community enterprises are probably not possible without the leadership of people capable of simultaneously matching vision with pragmatism and a preparedness not to compromise on the core values of social justice and ecological performance.

In Christie Walk all the experience gathered with the Halifax and Whyalla projects has been brought together and whereas the Halifax EcoCity Project and Whyalla EcoCity Development ultimately depended on city councils for their realisation, Christie Walk does not. It is a 'mini-Halifax' the size of one of the 'bite-size chunks' of development that were proposed as the means to incrementally develop the Halifax site. It is being developed without compromise on ecological performance, ethical funding considerations, or social values and educational and workshop programs are integral to its creation.¹⁵

¹⁵ UEA's proposed process for evolving 'Ecopolis Adelaide' and developing the Halifax site incorporated the creation of a School of Urban Ecology. There are a number of aspects of the original School proposal in the educational and workshopping activities at Christie Walk. In the original proposal for the school, as project site works commenced, design workshops were to have involved craft and building construction tuition as the basis of a practically-orientated and site-based School of Urban Ecology. Workshopping and building construction tuition has been integral to the Christie Walk development process and the final stage of Christie Walk is now planned to include an international Centre for Urban Ecology which would continue maintain and develop this kind of educational approach *after* the site development was complete.

A measure of the success of UEA's leadership can be found in its awards which include a Certificate of Commendation from the 1995 Volunteer Program Awards (SA) and Chérie Hoyle as outright winner in the Community Category of the 1999 KESAB Metropolitan Environment Awards.

UEA has members in all states and territories (and overseas) and active regional branches in Victoria and the ACT, maintaining and leading the momentum for change:

Canberra is a young city but still has fallen foul to the common evils of a dominant car culture, sprawling urban form and the proliferation of mock federation brick veneer homes. The new branch in the ACT is keen to educate, demonstrate and motivate the community to help make Canberra a beautiful and sustainable place to live.'

'...projects we have discussed include running public workshops and of course building something inspirational (Halifax II??). (Overton in UEA 1998 p5)

10.1.5.2 Community vs. Systematic Indifference

The most disappointing aspect of the Halifax site saga has been Adelaide City Council's failure to sustain environmental and community values once their excellent development brief (which owed much to the work of UEA) was abandoned. It seems that the hardest thing to do is get these values embedded systematically in development processes because it is so easy for bureaucrats and elected members to disregard even the most extensive and successful community input once they are in the position of managing its implementation.

This pattern of initially accepting, then ignoring community inputs, is being repeated in a similar form in Whyalla.

With the Whitmore Square EcoCity Project, however, the de facto client role taken up by the councils as the landholders has been taken up by a non-profit community organisation. Although this group has to operate within the bounds of pragmatic commercial realities (and receives no grants from any level of government) it has a vested interest in maintaining the original vision – no-one benefits if the program is diluted or goals diminished in the name of pragmatism.

This then, seems to be one of the keys to success, to have strongly entrenched stakeholders who are able to directly influence, and be influenced by, the core community and ecological goals of ecocity making. In Halifax the stakeholders were denied influence by the city council, in Whyalla, the stakeholders have a strong enough grasp on the process (some have actually begun building on the site) that the city's current prevarication has a good chance of being halted. With the Christie Walk development everyone is a stakeholder in the original visions and the resulting energy and commitment is free of any encumbrances from too-flexible political processes.

10.1.5.3 Human Resources

Even where there is a poverty of financial resources there are still people. Mobilising the human power of the community through volunteerism can provide a wealth of resources not available through monetary exchange¹⁶. Volunteerism is a major part of all economies but, like environmental externalities, does not show up in conventional accounting. In Australia, even though the dollar value of volunteerism is not factored into economic analyses, it is openly acknowledged that the formal economy could not function without it.

It may be significant that efforts to initiate and sustain ecocity programs have had to address the issue and use of resources that are either taken for granted or are invisible in the formal economy. The natural capital and natural infrastructure provided by the environment are exploited with no financial costs attached in conventional development. Trees are there to cut down, gravel is there to mine and the air and the seas are treated as free sinks for waste. In the ecocity context, volunteerism can also be seen as using somatic energy in the production of the built environment in a way that, because it uses human energy that is already, in effect, 'latent', doesn't add energy costs to that production process.

Most 'green' buildings do cost a bit more in terms of materials, design effort, or labour, if only because conventional building standards are so low (in Australia, the environmentally basic provision of good insulation is an 'extra'). Land costs more in the city and multi-storey construction is the rule. A lot of green dwellings get built because their owners are prepared to invest tremendous amounts of 'sweat equity' but owner-building has rarely been seen as fitted to the pace of the city. The conventional expectations of industry and local government favour business-as-usual approaches to domestic urban building. For the householder, whether renting or buying, choice is diminished by convention. An opportunity to invest sweat equity in city property is thus rare, and it extends the range of choice.

10.1.6 Maintaining the momentum

Even researchers who have closely studied UEA and its projects can end up mystified by how an underfunded, unwaged, understaffed group of disparate individuals can hope to make any difference to the development of urban form in the prevailing social, economic and political environment:

¹⁶ In addition, this human resource is powered by somatic energy rather than fossil fuels.

You could say that Urban Ecology Australia are 'biting off more than they can chew', they want too much and are not comparing the project with the context they are living in, concerning the political context. (Laustsen 1998 pp60-61)

But whereas careful study can demonstrate that UEA's agenda for Adelaide is not immediately achievable, the reality is that 6 months after Laustsen's report, the City of Adelaide made a decision about the development of the Halifax Depot site on the basis of UEA having been identified as 'preferred developer'. Until the process was derailed, Adelaide City Council had publicly committed to community participation and environmental performance as core requirements for a development on the city's largest available site. Even the ACC's own brief challenged conventional expectations for Australian urban projects and this would not have been the case without UEA's constructive eco-city campaigning. In Whyalla, UEA's strategy of community participation has resulted in a local power base for planning and decision making which continues to reap results.

10.1.6.1 Barriers

The Halifax EcoCity Project may have been influential but it has not been built. There are a number of reasons for this, but they are not unique to the project. The 'pattern of problems' associated with trying to physically develop the project are similar to those enjoyed by participatory, low-income groups and those in what Turner calls the 'third sector' which is neither commercial nor governmental and does not fit conventional patterns of development. The common ground is in the search for the means by which people can plan, build and manage their own homes and neighbourhoods 'at costs both they and society can afford.' (Turner 1990 p.182). Turner identifies a series of seven basic tasks that have to be carried out to overcome actual or potential barriers to any given program (Turner 1990 p.185):

- Organising, by those on whom implementation of the programme depends, and in ways that ensure the required degree of co-operation;
- Financing, to obtain the necessary services and material resources;
- Land and acquisition, or obtaining an appropriate form of tenure providing the necessary rights to the use of the property;
- Planning and the specification of practicable works that can be easily followed or adapted;
- Acquiring techniques and the necessary tools and materials for the works;
- Building, by contracted and/or voluntary management and/or labour;
- Maintenance of the works, if they are not to be lost prematurely.

Turner shows the tasks diagrammatically as vertical barriers that have to be sequentially traversed. Each of these tasks have been barriers that have needed to be overcome by UEA and its associated organisations. With the HEP these were all addressed in theory but none were finally overcome. With the Christie Walk development the experience of the HEP informed the process so that it is now successfully entering the 'sixth phase' of building. Maintenance will be provided by management structures set up through the community corporation after the ownership of the development has been transferred to its inhabitants.

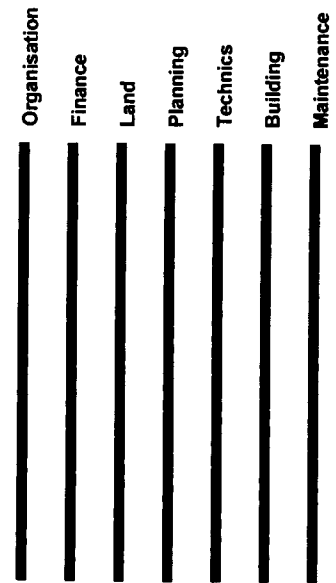


TABLE 10:
Turner's Barriers.

10.1.6.2 Habits of Competition

The nexus between social, physical and governmental environments is critical in the realisation of ecocity-type projects. Experiments in ecological housing have taken place in Denmark for many years on a wide scale of operations, arguably it is the world's leader 'in terms of implementing ecological aspects to urban planning' (Scheurer 1998 p.v). After reviewing projects in a variety of locations, some initiated by government, some by communities at the grass roots, and some in between, Scheurer found that 'Urban ecology... is a functional concept when local communities show initiative and are granted responsibility over the process' (p.146) but that regardless of the 'geographical, social or physical setup', the ecological performance of a settlement is co-dependant on the level of cooperation of the inhabitants, governments and private industry (p.vi-vii). With the Halifax EcoCity Project and Whyalla EcoCity Development this has proven to be the case. Scheurer calls for replacement of the 'habits of competition' between government, industry and civil society by 'complete cooperation' (p.146). The experiences with the HEP and WED reflected the veracity of Scheurer's critique in an Australian context. Knowing that the level of cooperation between the sectors was likely to be very small led the project initiators and protagonists of the Christie Walk development to make a point of avoiding any significant government or industry dependency in order to progress that project.

The Halifax EcoCity Project was always intended to be subversive. Its success would not have been measured by the quality of its architecture, or by how much sewage it recycled, but by how much it created a population base in the City of Adelaide capable of redirecting the concerns of the municipality towards ecological

responsibility and social justice. Despite being the capital city of the state of South Australia, Adelaide is a remarkably contained political environment capable of being changed by a small number of active citizens.

In his study of the HEP, Orszanski asks how an ecocity might be built and concludes that it might be done 'By replacing existing structures with ones more appropriate to the task, and by uniting people with similar concerns...' (Orszanski 1993 p.48). His analysis of strategy adopted by UEA for the Halifax Ecocity Project encapsulates the core concept of creating systemic change very well:

The Halifax Project, an attempt to build sections of ecocity in Adelaide, has explicitly identified the barriers to the creation of such as city, and has suggested three structures to tackle those barriers. By a process of "*applied structuration*", the Halifax Project has created appropriate structures to connect their Project with the "outside world". Because the Halifax Project will not exist in isolation, it must depend on the surrounding city, by involving a wide range of communities in the creation of the Halifax Project, there are a large number of connections to outside concerns. The aim of the project is to act as a seed for the continuing transformation of the city of Adelaide, as an example of what can be done with denser city developments. By analysing the existing structures relating to land, money and power which underpin modern society, the Project has identified those rules which need to be altered or replaced to encourage ecocity building. The structures the Project has created are intended to function as replacements for existing structures, as a conscious attempt to *restructure* society. The structures make use of familiar (surface) forms (a company, non-profit trust, and a community association) to embody deeper concepts of community ownership, social equity and ecological responsibility. A process of structuration has changed the *structures* within the Halifax Project in an attempt to modify the *systems* which underlie existing urban society.

They have substituted their structures for the usual ones in society in an effort to provide the conditions which will encourage the *production* and *re-production* of ecocities. (Orszanski 1993 pp45-46)

That replacement of structures, as can be seen from the experience with the ecopolis case studies, has to be achieved through a gradual remaking of existing structures rather than their immediate, wholesale substitution by new forms. Thus: the creation of a Land Trust was not readily achievable but it was possible to create a co-operative developer that effectively holds the land in trust during the development process; a highly participatory 'barefoot architecture' program required too much in the way of people and resources to operate effectively but a scaled down version has enabled people to engage quite intensely in the designing of Christie Walk; a formally constituted non-profit building company does not exist but the company that has been formed is able to operate as a non-profit company so as to help make construction affordable; and the community title system is able to provide a legal organisational form for continued engagement by residents in the management of their collective ecopolitan home.

10.1.6.3 Make Ecocities Not War!













UEA has campaigned for ecocities in a broadly pluralist way, deliberately seeking ways to reach as many people in the community as possible, without limiting the outreach by buffering the reception of the ecocity 'message' with ideological barriers. Notwithstanding this, UEA has maintained two positions which are 'ideological', but not 'party political'. These are opposition to nuclear power¹⁷, and militarism. Neither of these positions is exclusively the province of the political left or right. In using the slogan 'Make EcoCities Not War!' for instance, there was cognisance of a burgeoning movement towards retooling military industrial capacity for environmental purposes. The argument was that in the kind of balanced system advocated by the ecological city approach, the need for environmentally appropriate shelter would require technological innovation to supplement and extend the best use of traditional technologies. The impetus for technological innovation could, in theory, be at least equivalent to that generated by the military technology production underpinning much of the world's economic activity. In this argument, the city could provide the focus for activity along the lines of Al Gore's global environmental 'Marshall Plan' (Gore 1992). Ecocity technologies could be construed as constructive, peaceful but challenging technological imperatives capable of generating industry and employment and enhancing economic activity for social benefit.



FIGURE 182: The deadly nature of conventional current townhouse development in the City of Adelaide. (Photo by the author)

¹⁷ In addition, Ecopolis Pty Ltd sponsored the production of new anti-nuclear stickers in 1999 'Nuclear Target? No Way!'

TABLE 11: Ecological Settlement Projects – Halifax EcoCity Project & Christie Walk
(Compare with 'Kennedy's' table in Chapter 5) Icons show Ecopolis Development Principles

Architects, Developer, Number of dwellings, Site Area, Ecological Aspects	Halifax EcoCity Project	Whitmore Square EcoCity Project - Christie Walk (Stages 1 & 2)
Architects, Planners	Paul F Downton, Ecopolis Design Team	Paul F Downton, Ecopolis Pty Ltd
Developer 	Community/local government/builder partnership – unresolved	Wirranendi Inc, non-profit private co-operative
Dwelling Number 	350 units	13 units
Site Area	22,000 sq.m.	1,500 sq.m.
Healthy Building 	Use of materials open to diffusion, natural paints, timber joist floors, cork linoleum flooring, etc. Careful choice of materials for non-toxic internal environment. Use of recycled and recyclable materials	Use of materials open to diffusion, natural paints, timber joist floors, cork linoleum flooring, etc. Careful choice of materials for non-toxic internal environment. Use of recycled and recyclable materials
Energy 	Use of passive solar energy, optimisation of floor plans according to illumination, ventilation and functional requirements of apartments. Solar water heaters. Low primary energy building materials. Photovoltaics, power to grid	Passive solar energy, optimisation of floor plans according to illumination, ventilation and functional requirements of apartments. Solar hot water. Low energy building materials. Photovoltaics, some wind power, power to grid
Heating/Cooling 	Solar heating primarily, some incidental unspecified heating. Solar cooling via passive climate responsive design. High mass/high insulation design strategy	Solar and body heat only. Solar cooling via passive climate responsive design. High mass/high insulation design strategy
Electrical System & utility lines	Independent sockets, power cable laid in star-shaped pattern	
Water 	Rain water collection. Sewage water collected and treated on-site for re-use	Collection of rain water and use for irrigation, especially roofgarden. Sewage water collected and treated on-site for toilet flushing
Open Spaces 	Private, semi-private and public open spaces, intense vegetation, roofgardens. Vegetation-covered facades in climate and energy strategy. Link to rural revegetation project	Private, semi-private open spaces, intense vegetation, roofgardens, community garden area. Vegetation-covered facades in climate and energy strategy. Link to rural revegetation project
Traffic	Car free, car parking on periphery and underground	Car parking on periphery, car-free inner open spaces, accessibility by footpath
Waste Disposal 	Garbage sorted according to type, communal composting	Garbage sorted according to type, communal composting
Social Concept 	High quality of social living, neighbourly contact encouraged by communal open spaces, various community buildings. Centre for Urban Ecology, cafés, etc	High quality of social living, neighbourly contact encouraged by communal open spaces. Community house and community gardens. Centre for Urban Ecology and possible café planned for stage 3
Floor Plans 	Variety of design approaches in plans. Apartments built on open-plan system. Detail design developed with future residents through 'barefoot architecture' program	Variety of design approaches in plans. Lay-out oriented for passive solar. Apartments built on open-plan system with adaptable floor plans. Detail design developed with future residents through 'barefoot architecture' program
Design 	Primarily high density and medium-rise with 2-5 storey buildings, varied architecture in general unified urban structure. Rammed earth and rendered facades, timber windows. Murals. Street facades in tradition of city with balconies and verandahs. Multi-layered, three-dimensional design	Low -medium-rise with 2-4 storey buildings, varied architecture in general unified urban structure. Diverse construction unified by rendered facades, timber windows. Murals. Street facades in tradition of city with balconies and verandahs.
Commentary 	Project offered exceptional car-free environment and human scale. Architects combine healthy materials and construction techniques with flexible space planning. Ecological design explicitly supported by residents. Demonstrated potential that was not realised when 'mainstream' developer/builder erstwhile partner prepared incomplete/misrepresentative documentation for final stage of procuring project site	Exceptional car-free environment and human scale. Architecture combines healthy materials and construction techniques with flexible space planning. Ecological design explicitly supported by residents. Demonstrates importance of committed developer, architect and builder – all based in the community. Building permits easily obtained. Building company formed because no contractor could deliver required outcomes. Strong community base, enjoyed momentum developed through HEP proposal. Cost control challenging.



Ecopolis

**Towards an Integrated Theory for the Design,
Development and Maintenance of
Ecological Cities**

VOLUME 2

Including:

Synthesis – SHED – Conclusion

Part C



PART C

TOWARDS A THEORETICAL SYNTHESIS OF ECOPOLIS



INTRODUCTION

I swear the earth shall surely be complete to him or her who shall be complete,
The earth remains jagged and broken only to him or her who remains jagged and broken.
(Whitman (1856/1881) 1991 p.68)

Architecture is in the process of becoming the physical definition of a multilevel, human ecology.
(Soleri 1969/1973 p.31)

Since there are now few places left on earth which man (sic) has not altered in some way we could say
that much of the earth is really designed.
(Rapoport 1972 p.4)

We are as gods and might as well get good at it.
(Brand 1968)

C.1 Rebuilding the Foundations

In her keynote address at the First International Ecocity Conference, Berkeley, 1990, Jean Gardner told us 'In 1925, the French architect Le Corbusier proudly praised the fact that cities were an assault on nature.' That 'The history of man (sic) is the history of increasing mastery over nature' (Clark in Rapoport 1972 p.38) is a truism typical of preambles in many a tract on design, planning and the environment. Like Corbusier's proud boast, it is an enormous conceit and is, fundamentally, untrue. All that humans have done is extend their domain within the biosphere, we have pushed the limits of our niche just as any other species might. The difference is that we have evolved organisational skills and extra-somatically powered, extra-corporeal means to act on the environment at a scale over which the consequences are so displaced in distance and time that we cannot know whether we have yet to demonstrate any mastery whatsoever. What we do know is that, intentionally or otherwise, we are designing our fate. In the absence of evidence for the contrary it would seem wise to design in a manner that defends, rather than attacks the foundations of our existence.

C.1.1 Design Synthesis

The synthesis presented in the following chapters is about design in the sense that it is the totality of human decisions and choices made in order to provide and maintain conditions for human habitation within the biosphere. Linkages rather than barriers, commonality rather than difference, integration rather than separation and mutual aid rather than competition describe this totality. The following chapters bring together

allied understandings of buildings, cities and living systems in a framework intended as the basis for creating urban systems consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes.

C.1.1.1 Pattern Pieces

In a sense, this thesis may be seen as an attempt to find a pattern language for making ecological cities. Because no such city has yet been made, the language for it does not yet exist in a clearly visible form. The projects described in chapters 7 to 9 are each attempts to create 'pieces of ecocity'. To do that, they have been designed through the author's understanding of the language that fits the making of an ecocity. As pieces of ecocity get built so the understanding of what patterns do and do not fit will improve. The Seven Steps (Chapter 14), in particular, can be seen in the light of Alexander's theories (Alexander 1977, 1987) as a means of setting out some ecocity patterns so that they can be shared and tested.

At the same time as the Seven Steps can be seen as a partial manifestation of Alexander's theory of the timeless way, they can also be seen to contain that theory, setting it together with a panoply of other theories and techniques. It is probably both.

The four chapters that make up this part of the dissertation bring together key elements of the Ecopolis proposition to outline the main aspects of the 'integrated theory'. Community processes are seen as vital to achieving 'real' ecocities and much of the theory is to do with how the community can be engaged in the entire gamut of processes and activities that create and maintain ecologically viable human settlement. Identifying what constitutes 'community' is seen as integral to the application of community processes.

The urban eco-system is the most elaborate geographical control-system or integrated resource-management system in human experience. (Douglas 1983 p.206)

Two approaches to defining ecological cities can be identified: the 'performance' model and the 'ideological' model. The performance model stresses measurable outcomes, eg. Air quality, levels of pollution, percentage of wastewater recycled, percentage of renewable energy captured, etc. It is essentially to do with urban biophysical environments and is typically dealt with in phenomenological texts that lay stress on description, classification and quantification¹. The ideological model lays stress on conceptual and less measurable aspects, eg. provision of roof gardens and

¹ Characteristic of this approach to elucidating the relationship between human settlement and the biosphere is the textbook 'Urban Biophysical Environments' (Bridgman, Dodson and Warner 1995).

community amenity, commitment to social justice in management structures, health and security, etc. This approach is more clearly focussed on the human ecology of the city.² This characterisation, or thematic identification of definitions based on ‘performance’ or ‘ideological’ approaches can also be interpreted in terms of ‘biophysical’ and ‘social’ themes. Human settlement is a consequence of the interweaving of these themes that are reflected in the Ecopolis Development Principles³ (Chapter 14). These ‘Principles’ have been developed and tested in the public domain through the case studies described in Part B of this dissertation and have been central to the synthesis of the Ecopolis theory.

There is a lot of good information available and a number of well-constructed texts that deal with ecological architecture, urbanism and design, but curiously, none of them seem to provide a framework for using and integrating the wealth of knowledge each provides, or the set of principles each encompasses. The Seven Steps described in Chapter 14 provide a framework for dealing with these myriad ideas and bits of information. The Seven Steps do nothing to reduce the complexity or richness inherent in any of the theories, principles, procedures or practices they relate to, but do provide a means of systematically accessing that knowledge and experience within the framework of a clearly expressed set of values and goals.

C.1.2 An Urbanism of Resistance

And it is with this belief and this knowledge
that I say,
You are not enclosed within your bodies, nor
confined to houses or fields.
That which is you dwells above the mountain
and roves with the wind.
It is not a thing that crawls into the sun for warmth
or digs holes into darkness for safety,
But a thing free, a spirit that envelops the earth
and moves in the ether.
(Gibran 1979/1926)

An important idea at the centre of the evolving theory is that community expectations are not, and cannot, be entirely conditioned by the current state of global

² It is interesting to compare this distinction with the different types of environmentalism identified by Doyle, in particular the Australian and North American ‘preservationist’ and the European ‘human ecologist’ (Doyle 2000). The one is ‘at a distance’ from social concerns whilst the other is focussed on them. Apart from this apparent similarity, however, it is difficult to find any consistent relationship between the parallel analyses because the two general approaches to ecocity thinking are just as likely to occur in Europe, Australia or North America.

³ Initially drafted as a set of 12 precepts for ecological development in 1991-92 by Emilis Prelgauskas, Chérie Hoyle and Paul Downton – see Appendix 11.

capitalism and that what Kenneth Frampton calls 'an architecture of resistance' can be conceptually and practically extended into an 'urbanism of resistance' against the monocultural, monopolistic, life-threatening practices inherent in conventional city design, development and maintenance.

C.1.2.2 Technology Is the Key

The time for real unification of art and technology is really long overdue. (Pirsig 1974 p.294)

Our global impact on the environment is a result of technology. Our survival as a species depends upon technology. There is nothing 'unecological' about this proposition. Technology is the key. But what is technology? Humans are tool-using creatures. Other species have evolved some tool use, but we have developed more tools and have learned to use them in more ways. Technology, that word which inspires dread or delight in so many of us, and sometimes both together, is what we get when we use tools.

C.1.2.3 Essentials

Cities must become socially, economically, and ecologically sustainable, fulfilling basic human needs for shelter, subsistence, and social cohesion. For this to work the active participation of people in shaping their urban environment is crucial. (Girardet 1992 p.117)

For ordinary citizens to participate in city-making as an ecologically responsible activity in the context of conscious evolutionary endeavour, complex processes and concepts must be made as accessible as possible. In the following synthesis the author presents a set of icons and what Geddes might have called 'thinking machines' as a contribution to the community-oriented design program that must be at the heart of ecocity making. The challenge has been to make the complex processes of creating human settlement appear simple, to keep the goals of ecological development visible and understandable, and to reduce things to their essence. A conscious effort has been made to arrive at a set of what might be called 'intellectual sound-bites' by way of trying to fit otherwise complex ideas into the communication framework of popular culture.⁴

⁴ This approach is lent some credence by ecologist Eugene Odum's Ecological Vignettes in which he was clearly of a similar mind, saying 'I have tried to show with 'sound bite' vignettes, cartoons, and charts how ecological thinking and human common sense can help us understand and deal not only with environmental problems but with other human predicaments as well.' (Odum 1998 p.55)

The following four chapters deal with key areas that broadly correspond to the four Ecopolis Propositions:

- **Chapter 11 'City Ecology'** describes biogeophysical aspects of urban ecology and their relationship with human culture and society – this relates strongly to **Proposition 1** that 'City-regions determine the ecological parameters of civilisation';
- **Chapter 12 'ABC of Ecodevelopment'** describes the development processes that may bring ecological cities into existence – these processes are the means by which knowledge can be effectively integrated, ie. by *doing* rather than merely thinking, this addresses the imperative of **Proposition 2** 'to integrate extant knowledge';
- **Chapter 13 'Education'** explores cultural 'change agents', those many ways of communicating ideas that inform and affect the cultural, social and individual realms of human life – **Proposition 3** states that 'an ecological civilisation requires conscious, systemic cultural change';
- **Chapter 14 'The SHED'** provides a step-by-step program for acting on all the above and a framework for cohering the many facets of design, development and maintenance into the 'cultural fractals' of ecocity demonstration projects – **Proposition 4**.

Chapter 14 presents the four central elements that constitute the framework of the theory – *a mission statement*: the Charter of Calcutta; *a performance measure*: the Frogstick; *a set of principles*: the Ecopolis Development Principles; and *a process*: the Seven Steps. Together, these elements constitute, in effect, the Ecopolis synthesis.

This synthesis relates the organic, city-as-organism typology to the science of ecology and what Geddes referred to as 'civics'. It draws on ideas and attitudes immanent in the minds of a generation that grew up with the permanent threat of nuclear annihilation, the fact of continual media bombardment, and the promise of personal liberation. The expected shape of civilisation for post-war babies has never matched that of their fore-parents. Nurtured on the certain belief that our species has the power to destroy the world, we might be forgiven the conceit of believing that we might somehow make it better. As Stewart Brand wrote in the first Whole Earth Catalog of 1968, 'We are as gods and might as well get good at it'. During the period of the personal-computer revolution and its related information revolution the balance of

knowledge has shifted in favour of citizens and away from central authority. And as Brand argues 'The discovery was made simultaneously, in a whole array of sciences and arts, that truly adaptive systems grow from the bottom up, not the top down.' (Rheingold, 1994, p.5)

In these chapters are described some tools that can be used to facilitate the processes of sustainable human ecological development. Although these tools have been employed in the making of the case study projects described in Part B of this thesis, the crafting of these tools cannot be completed within the limited scope of a doctoral study. Therefore, an attempt has been made to set out the parameters of their material, shape and use as the basis for further study and development and as a contribution to sustaining the 'truly adaptive systems' in which such tools might find their appropriate use.



SYNTHESIS I

CHAPTER 11

CITY ECOLOGY

Cities are both social and physical structures. While they may be analysed from many viewpoints, life in the city is an amalgam of social encounters and physical experiences.

(Douglas 1983 p.1)

An animal is an organism of one mind. The city is an organism of one thousand minds.

(Soleri 1969/1973 p.31)

Cities are fragile creations balanced on the earth's crust....

(Sprin 1984 p.91)

This Chapter describes biogeophysical aspects of urban ecology and their relationship with human culture and society through the built environment. It relates to **Proposition 1** that 'City-regions determine the ecological parameters of civilisation'.

11.1 Structures of Life

A town is a thing like a colonial animal. A town has a nervous system and a head and shoulders and feet. A town is a thing separate from all other towns, so that there are no two towns alike. And a town has a whole emotion. How news travels through a town is a mystery not easily to be solved. News seems to move faster than small boys can scramble and dart to tell it, faster than women can call it over the fences. (Steinbeck, 1980, p.27)

All living organisms have a lifecycle. The assertion that cities behave as living organisms is substantiated by reference to definitions of life being adopted in current life sciences, and particularly by the 'Gaian' hypotheses of James Lovelock and Lynn Margulis (Lovelock and Margulis 1975, Lovelock 1991). Cities possess discernible boundaries in both space and time and have a lifecycle. Cities are not just simulacrums of life, they exhibit enough of the characteristics of living organism to be considered 'alive'. An inhabited city is a living system which may be considered to possess the characteristics of living organisms (Girardet 1992, Downton 1999c) and can certainly be regarded as ecosystems (Douglas 1974, Sprin 1984, Hough 1995)¹. If a city is

¹ Notwithstanding Gilpin's definition of an ecosystem as a 'natural complex of plant and animal populations and the particular sets of physical conditions under which they exist...' (1976 p49) (This author's emphasis).

considered as an organism it may be healthy or sick (see Holurbanism, Malurbanism and Vital Signs). Whereas most of our cities currently display the characteristics of cancer, they should be healthy organisms². If organisms are purposeful, as Kevin Lynch suggests, then the purpose of an ecological city organism must be to heal the landscape. This idea is at the core of the thinking behind the ecocity projects described in Chapters 6 – 8. The idea of an ecocity is not merely about minimising environmental damage; it is about restoration - maximising reconstruction of the biosphere. Ecopolis Proposition 1 links the city to its region and makes the whole a vehicle for restorative action in support of the processes of the biosphere for human purposes.

Continued development of the built environment along its present lines will not address the requirement given by William Rees' analysis that says we need to reduce the impact of the built environment 10 fold by 2040 (p.11, Rees, 1998). Architecture and urban planning must adopt a paradigm that embraces and is embraced by a profound understanding of ecological processes. 'No species in nature has increased permanently beyond the capacity of the environment to support it, nor has it persisted if its effects were destructive of the ecosystem.' (p.184, Sears, 1970).

11.1.1 Little cities, big impacts

A city of 1 million, it has been calculated, takes in 9,500 tons of fossil fuels, 2,000 tons of food, 625,000 tons of water, and 31,500 tons of oxygen every day – and puts out 500,000 tons of sewage, 28,500 tons of carbon dioxide, and great quantities of other solid, liquid, and gaseous wastes. (Sale 1991 p.56)

Precipitated by the end of the last Ice Age, the innovation of city-making co-evolved with agriculture during the change from predator/scavenger societies about 10,000 years ago (Brown 1971). Past urban settlements have been very small by modern standards (city populations rarely exceeded a few tens of thousands until the advent of industrialism) and although this, by default, made the resource consumption and overall ecological footprint of such cities much smaller than urban entities in the modern era, no city has ever been 'ecological' in the sense of being consciously integrated into the processes of the biosphere with the intent of maintaining the optimum functioning of the biosphere from a human perspective. Even the impressively climate-responsive, compact urban constructs of the Anasazi's Pueblo Bonito in Arizona ultimately outstripped the carrying capacity of its environment '...destroying the ecology of its supporting hinterland.' (Cook, 1989 p.15).

² Cancers are, strictly speaking, not organisms.

Urban impacts are pervasive 'Processes of urbanisation have strong impacts on the elements of the atmosphere, the geosphere, the hydrosphere and the biosphere.' (Bridgman et al 1995 p.1). Rees maintains that our highly consumptive cities now represent 'a new ecological reality' (Rees 1998 p.3) in the context of an environmental crisis which results from deeply-rooted cultural values (Rees 1998 p.6). Nevertheless, those cultural values have allowed for some responsiveness to the global environmental context (eg. at the conservative end of things, the 1992 UN 'Earth Summit'). In relation to the built environment manifestations of responsiveness can be seen in recent years as climate responsive, energy efficient design has become more sophisticated (Szokolay 1987) and the need for architects and urban professionals to look beyond the impact of individual buildings has become imperative (Szokolay 1989 p.90). A renewed sense of citizenship is a fundamental requirement for the ecological re-making of cities and '...we need to explore the possibilities of grassroots electoral politics.' (Bookchin in Aberley 1994 p.48) (see Chapter 12.3).

11.1.2 Architecting³ and Nature

Some architectural theorists have regarded the development of 'green' architecture and design as an extension of aesthetic concerns, with emphasis on stylistic developments and with a sense of the environment as a backdrop to architectural concerns rather than a driving force in design and social endeavour. '(Architecture)...is the art we can inhabit; because it also caters for our brute needs, it can show more comprehensively than any other how fast or fragile are the connections of mind to body, or the relationship of human society to the natural world.' (Farmer et al 1997 p.6). Architects and architectural theorists have often turned to the natural world to inform their designs and commentaries. 'Organic' architects like Gaudi looked to nature for guidance and inspiration, evolving structural forms and aesthetics as expressions of natural forces. '...Gaudi believed architecture was a living organism, with a life of its own. It possessed a structural skeleton, a flesh inspired form, and a colored skin. What could come closer to Nature without being a living being?' (Gupte 1999p.49). And, yet, fairly typically, the creation of 'ecological building' is simply regarded as a technological challenge (Daniels 1996).

At the more pragmatic level there have been increasingly sophisticated efforts in recent years to measure energy and environmental impacts inherent in the processes of manufacturing the built environment. Whereas Boyden et al provide ecological analyses

³ Architecture as a verb – see Seven Steps #7 (Chapter 13).

of human settlements which differentiate between somatic and extrasomatic energy (Boyden et al 1981), embodied energy analyses of built environments typically do not make this distinction (eg. Lawson 1996), perhaps because the measurement of energy input into manufacture is so difficult. Ideally, analysis of energy use in the construction of the built environment should be divided into somatic and extrasomatic categories to correspond better with ecological analyses. This distinction might contribute to a more complete description of the profound inter-relationship between the biotic and non-biotic components of building and city-making.

11.1.2.1 Skins and Layers

As environmentally responsive building has developed in recent years there has been a rediscovery and reworking of pre-industrial design elements and techniques. Framed views, articulated openings, layers of screening, thickened walls, filtered edges and the modelling of light have begun to replace the flat, sealed glazed box of undifferentiated plate glass as an architectural paradigm (Stonehouse 1999 p.17). In seeking to reduce energy consumption and pollution by 'a return to selective modes of environmental control' (Stonehouse p.17) there has been 'an increase in the sophistication of the layering between the inside and outside.' (Stonehouse p.18). Such buildings possess external envelopes that act as environmental filters, more akin to the skin of organisms than the hard surfaces of the architectural machines of modernism.

This re-placement of architectural technique has also seen 'the reintroduction of degrees of enclosure at different scales at the edge of the building, eg. porches, arcades and conservatories, and often deep into the building, eg. atria, galleria and courtyards, so that the building is formed of zones of differing degrees of enclosure which interact environmentally and may be inhabited and used differently in response to changes in the external environment.' (Stonehouse p.19). There is a return to living in and with the diverse, constantly changing conditions of the environment instead of fighting against it. This edge condition of permeability and responsiveness brings architectural thinking much closer to the concept of building as organism or ecosystem, and not only in respect to physical function. As Stonehouse notes, 'this layering of enclosure not only works environmentally, psychologically and phenomenologically, it also underlies the way we structure our lives socially, for instance in sequences of spaces of increasing enclosure and privacy and in such situations as the porch, which is the place of transaction between public and private worlds.' (Stonehouse p.18). This layering is reflected in the concern with social ecology demonstrated by the new urbanist codes which insist on providing porches and verandahs on new dwellings to facilitate social

interaction between the private realm of the house and the public realm of the street. Critics of modernism identify courtyards as ways to make more humane space for living (Charles 1989 p.124). There is an increasing preparedness to recognise that these traditional, and even archetypal, means of shaping human space represent a pattern of expression that is simultaneously functionally appropriate and culturally sustaining (Stonehouse 1999 p.19).

The manufacture of the built environment is a response to extant conditions but the extant conditions are never entirely 'natural' by the time a human civilisation has been in place long enough to settle and build - the extant conditions are ultimately provided by a system of economic relations and a power structure. These 'invisible' structures are integral to the function of the urban ecosystem.

11.1.2.2 Constantly Renewing Skins

Brand proposes a view of buildings that sees them consisting of a number of layers, each changing at a different rate in time. 'Because of the different rates of change of its components, a building is always tearing itself apart.' (Brand 1994 p.13). Conversely, a building is held together through time by constant maintenance, and so it is with organisms and ecosystems (and is thus an intrinsic requirement of ecocity systems). Brand's 'layer' analysis can be applied to ecosystems and organisms generally. This may provide a way of linking understanding of the various components of organisms and ecosystems with construction systems. A tentative comparison is given in tabular form below. ('STUFF' could include what might be called 'tenant organisms' - which may or may not be conscious.)

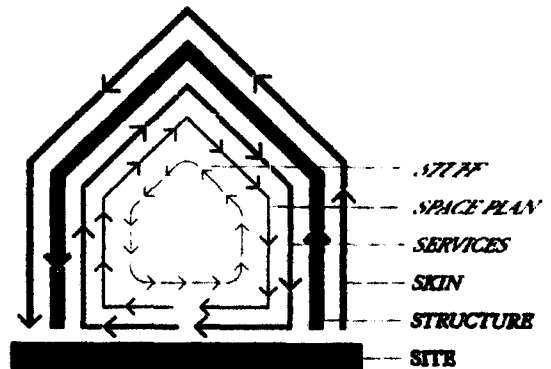


FIGURE 183: Stewart Brand's 'Shearing Layers of Change'
 Because of the different rates of change of its components, a building is always tearing itself apart.

TABLE 12: Layers in ecosystem function

GENERIC CONDITION	BUILDING LAYERS	ECOSYSTEM/ORGANISM
CONTEXT	SITE (biotic & abiotic)	ABIOTIC ENVIRONMENT/SITE
SUPPORTING SYSTEM	STRUCTURE	STRUCTURE/SKELETON
BOUNDARY CONDITION	SKIN (constantly renewed)	ECOTONE/SKIN (constantly renewed)
MATERIALS TRANSPORTATION	SERVICES (fluids)	SERVICES (circulatory)
INFORMATION TRANSFER	SERVICES (electromagnetic)	SERVICES (neurological)
SYSTEM ORGANISATION	SPACE PLAN	SYSTEM LAYOUT/BODY PLAN
SUPPORTED ACTIVITIES	STUFF	STUFF

11.1.3 Buildings as Ecosystems

Eugene Odum identifies four basic components to an ecology (Odum 1974). The following diagram shows these as part of a simple ecological building. Living organisms - human and plant - are integral to the function of this constructed ecosystem

1. **Abiotic Substances** – Basic elements and compounds of the environment
2. **Producers** – Autotrophic (food making) organisms, largely the green plants
3. **Consumers/Macroconsumers** – heterotrophic (food eating) organisms, chiefly animals that ingest other organisms or particulate matter
4. **Decomposers/Microconsumers** – heterotrophic organisms, chiefly bacteria and fungi that break down the complex compounds of dead protoplasm, absorb some decomposition products and release simple substances useable by producers

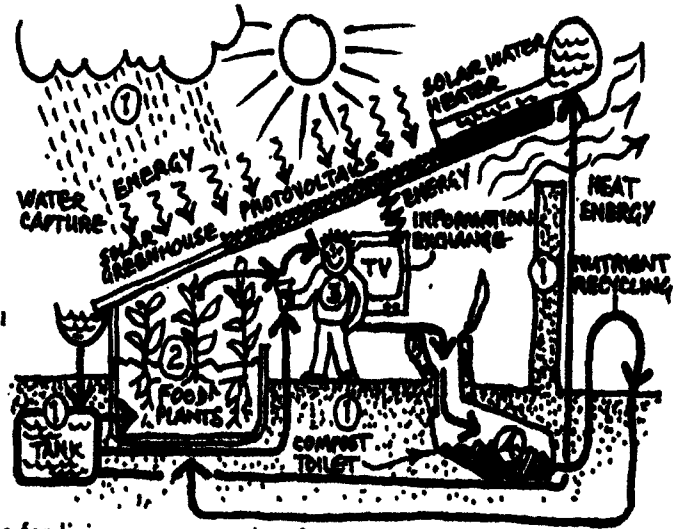


FIGURE 184: Ecological building: Not a machine for living – an ecosystem for thinking
(Diagram by the author)

Any ecosystem requires functional, unthinking engagement from its constituent organisms⁴. In an ecosystem containing conscious organisms, that engagement must also be conscious. In an ecosystem constructed by conscious organisms in order to support themselves, that engagement is critical, and conscious information exchange becomes central to ecosystem function. Thus an ecological building or city is dependent for its function on engaged, intelligent information exchange. Rather than being a reductionist, Corbusian 'machine for living', an eco-house is an ecosystem for supporting consciousness.⁵

11.1.4 The Living City

Paraphrasing Sears, one might define a perfectly conceived ecocity as 'a living community operating on the current supply of energy from the sun, using the materials of the environment and returning them in forms suitable for continuing re-use, keeping

⁴ An organism is 'a living individual consisting of...a group of interdependent parts sharing the life processes' (Concise Oxford). An ecosystem is not necessarily an organism.

⁵ Arguably, a house is as much alive as any ecosystem. Humans are themselves both containers and supporting environments for life. At the microscopic level there is a fascinating variety of fauna swarming over our bodies in a close, warm, symbiotic relationship with each and every one of us - a part of the human ecology of which we are normally blissfully ignorant (Andrews 1984).

the air pure, regulating the movement of water and protecting the earth's surface from violent and destructive change.' (Sears 1970 p.184). But this neglects the socio-cultural dimensions of an urban ecology. The growing global ecocity movement tends to support the contention that 'Ecological cities are about balance within human society as much as they are about balance between humans & nature.' (Downton 1994). It is to clearly position the human presence in ecological processes, to establish the value base of decision making, and to remind us that cities are artificial ecosystems, that ecological cities have to be defined as urban systems consciously integrated into the processes of the biosphere with the intent of maintaining the optimum functioning of the biosphere for human purposes.

11.1.4.1 What Is This Life?

Douglas summarises some organic analogies for the city in history, citing, amongst others, Cobbett in 1830), Elisee Réclus in 1885⁶, Rolt in 1974, and Geier in 1972 who saw the city in the terms of a life-support system. (1983 p.9-10).

It should be emphasised that ecosystems may be conceived and studied in various sizes. A small pond, a large lake, a tract of forest, or even a small aquarium can provide a convenient unit of study. As long as the major components are present and operate to achieve some sort of functional stability, even if only for a short time, the entity may be considered an ecosystem. (Odum 1971 p.10)

Ecosystems can be thought of and studied in many sizes...one could study an aquarium, a greenhouse or conservatory, or a formicary or ants' nest. As far as human activities are concerned, the town, suburb or farming village are all good subjects for ecological enquiry. The important point to bear in mind is that whatever unit you select as your ecosystem, it should contain major components of existence, which are operating together in some sort of stability, even for a short time, and functioning in a coherent manner. (p.41-42, Sholto Douglas, 1974)

Perceptions about the aggregate qualities of life exhibited by complex systems as championed by Margulis et al are gaining acceptance but there is, as yet, no agreed scientific definition of what constitutes life (Lovelock 1991 p.29). Natural patterns we associate with living things may also be found in patterns generated by chemical reactions and other non-biotic processes. The capacity for self-organisation permeates the natural world but its significance in relation to living systems remains unclear (Ball 1999). In addition, recent developments in genetics, medicine and computer engineering '...exist in a netherland between the technological and organic and fall outside our traditional systems of classification.' (Channell 1991 p.4)

⁶ See also 'The Towering Outlook of Patrick Geddes' in Chapter 1

In the absence of agreed definitions, the choice of parameters becomes critical to any consideration of what is biotic rather than abiotic. To a Lovelockian geophysicologist, '...a living organism is a bounded system open to a flux of matter and energy, which is able to keep its internal medium constant in composition, and its physical state intact in a changing environment...' and it certainly includes ecosystems (Lovelock 1991 p.29). Ecosystems contain both biotic and abiotic material (Odum 1974) but if an ecosystem is not alive, what is it? A dead ecosystem is not an ecosystem. Cities and buildings may be regarded as ecosystems, and when they operate as such they are as alive as any ecosystem is alive with their biotic and abiotic components functionally interlinked by necessity. Thus people and other organisms are integral to the ecological description of any architecture or urban construct.

11.1.4.2 Dead or Alive

...an ecosystem is a stable self-perpetuating system, composed of living organisms and their non-living environment... a Gaian ecosystem sees the two components of the system, the living and the non-living, as two tightly coupled interactive forces, each one shaping and affecting the other. (Lovelock 1991 p.50)

The author contends that there is a clear distinction between the inhabited and uninhabited states of buildings and cities. The uninhabited state represents the abiotic components 'at rest' in the form of art, whilst the inhabited, active state represents the full flowering, or coming into being, of the thing we call a 'building', or a 'city'. This distinction helps clarify differences between conventional architecture, urban design and planning and their ecological counterparts that contain the emergent properties of living systems. Thus ecological architecture is not simply solar panels, low energy construction, etc., but only comes into existence when the architecture is occupied and 'alive'; and, likewise, ecological cities are not made solely by the provision of stormwater recycling, renewable energy systems, and so forth. Cities, more than architecture or buildings, depend on people to inhabit them to have a coherent existence – buildings can be quite empty of people (as they often are in architectural magazine and promotional images) and still attract interest as art objects, but the 'dead' cities studied by archaeologists lack meaning without some knowledge of who lived in them and how they worked. With this added meaning, human values are added to matters of artefact.

⁷ Strictly speaking, not only will the vegetation around the Roman Hut be part of the air conditioning system (cooling and filtering outdoor air) but so will be Roman. The inhabitant of an ecological building is part of its total ecosystem, integral to its operation.

The best writing about urbanism reflects this distinction with evocative articulation of active urban space. With its focus ‘...on ordinary days and the multitude of spaces that surround us.’ Jan Gehl’s influential ‘Life Between Buildings’ is a good example (Gehl, 1987) and Lewis Mumford’s works are seminal in this regard. Organic architecture in its various manifestations has always emphasised the making of buildings as a living process of human interaction with matter - with some acknowledgment of continuing change and adaptability as buildings are used over time.

The idea that an occupied urban environment is consequentially, qualitatively different from an unoccupied urban environment follows historical precedent inasmuch as it reflects the difference between the *civitas* - the functional, cultural entity, and the *urbs* - the physical entity⁸. Douglas suggests that ‘No biophysical study of the city can... be divorced from the ancient view of the city (*polis*) as a political conception.’ (Douglas 1983 p.2). Any attempt to reduce the view of urban life to the single dimension of consumerism is a denial of its political reality, yet this is exactly what can be seen happening in cities like Adelaide when new townhouses are seen only as isolated product and city planning processes effectively eliminate consideration of the realm of the *civitas*. Environmental concerns and urban management have long been inseparable. Douglas shows that ‘...political change or reorganisation in cities is often prompted by the need for better management of such apparently mundane matters as water or transport.’ (Douglas 1983 p.2). Given the close relationship between socio-cultural and built environments and the insistence of theorists like Bookchin that social change can best be initiated and articulated through direct action in citizenship, rather than through centralised state or industry institutions, the reshaping of the *urbs* required by ecological concerns may yet be the catalyst for social change.

11.1.4.3 Life Form?

Engwicht fondly hopes that the ‘ecological revolution’ is under way and sees ‘the Eco-City’ as one of the new life forms that will help usher in change (Engwicht 1992 p.159). Having it both ways, he describes the city ‘as an organism, an eco-system, with its own internal life, creative energy and interdependence.’ (Engwicht 1992 p.116), But

⁸ In his introduction ‘The Urban Environment’ (1983) Ian Douglas notes the value of the *civitas/urbs* distinction as a means of analysing and understanding urban systems. In the body of his book, Douglas explains key aspects of cities and their function in terms of both physical and social eco-systems. He regards the city as an economic system and as an ecosystem; considers food supply, raw materials and their environmental impact; energy and water balance in the city; geomorphology, biogeography, and urban health and disease. His final chapter is a prescient look at people, government and the ecological future of cities.

an ecosystem is not an organism, and although his book is replete with ideas and techniques for making cities work better it is unclear how Engwicht intends to connect his organism insights into an holistic program for creating these organism-ecosystems.

Recent commentators, such as Spiro Kostof, have dismissed the biological metaphor as have Kevin Lynch ('Cities are not organisms') but their comments betray a preoccupation with urban morphology rather than function, and a limited understanding of the functional relationships of biological organisms. Sennett is another who does not make a strong case for seeing the city as an organism. Instead, he relates the form and functions of the city in history to perceptions of the human body and to the human corporeal experiences of the city. If there is a connecting theme it is that society is the organism and the city happens to be where it lives. According to Sennett, the medieval period in Europe saw 'scientific humanism' create an image of 'the body politic' (Sennett 1996 p.155-156). By the mid 17th century William Harvey's discoveries about the circulation of blood set off a revolution in the understanding of the body that led to 'a new master image of the body' that coincided with the birth of modern capitalism and helped bring about the social transformation to individualism (Sennett 1996 p.255). 'The modern individual is, above all else, a mobile human being.' (Sennett 1996 p255-256). The idea of free movement allied to growing comprehension of economic forces was integral to Adam Smith's conceptualisation of a free market of labour and goods 'operating much like freely circulating blood within the body and with similar life-giving consequences.' (Sennett 1996 p.256). According to Sennett 'Harvey's revolution helped change the expectations and plans people made for the urban environment.' It changed conceptions of what constituted health and led to a much greater emphasis on ease of movement within cities so that 'Planners sought to make...a city of flowing arteries and veins through which people streamed like healthy blood corpuscles.' (Sennett 1996 p.256). Sennett argues that by the nineteenth century this approach led to '...urban spaces made for individuals in motion, rather than for crowds in motion.' (Sennett 1996 p.257) In the analogous design language of Enlightenment planning lungs became as important as the heart and circulation so that urban 'gardens' and forests were conceived as organs in the civic corpus as a means of ensuring the health of cities.

Kostof says 'A study of true organic form proves that the atomized behavior of the elementary particles is forcibly restrained by an overarching discipline.' (Kostof 1991). But the biological metaphor may have a lot more potential than has traditionally been recognised for this view of how organic systems organise themselves is not

reflected in the kind of holistic thinking currently represented by James Lovelock's work on the Gaia hypothesis, for instance.

The Gaia hypothesis is that the Earth, taken as a whole system, displays the self-regulating characteristics of a living organism. It does not attribute supernatural qualities to the planet, nor does it suppose any element of consciousness on the part of the planet, it simply observes that the sum of the activity of the planet's organisms results in the overall performance of a superorganism. Lovelock's work with Lyn Margulis develops a definition of life that supercedes that used by Lynch in his dismissal of the view of cities as organisms. According to Lovelock's definition of what makes a living organism, a city may very well be alive:

An organism can be said to be alive if it:

- has defined outer limits or boundaries
- takes in free energy, either as sunlight or chemical potential energy stored in food
- excretes waste products, high in entropy
- maintains a high level of internal disequilibrium
- maintains a constant internal medium, regardless of changing external conditions.

(Lovelock 1991 p.30)

Lovelock argues that bacteria, mammals and trees are organisms, and are indisputably 'life forms', but unless one considers an ecosystem to be dead, small ecosystems like beehives are alive too. The author has extended this line of reasoning to include the ecosystems we build. The following table extends Lovelock's comparison of the characteristics of life forms – which include beehives - (Lovelock 1991 p.30) to include human built environments.

TABLE 13: Characteristic Life Forms (After Lovelock)

	Bacteria	Mammal	Tree	Gaia	Beehive	House	City
Reproduction	+	+	+	-	-	-	-
Metabolism	+	+	+	+	+	+	+
Evolution	+	+	+	+	+	+	+
Thermostasis	-	+	-	+	+	+	+
Chemostasis	+	+	+	+	-	-	-
Self-healing	+	+	+	+	+	+	+

Ecosystems have boundaries within which they maintain the conditions for continued existence of the living matter of which they are partly comprised. They have measurable metabolisms, taking in free energy, excreting waste, maintaining a high level of internal disequilibrium and repairing damage when it occurs. They evolve. Ecosystems may not reproduce, but they sustain themselves into the future, adapting to changing conditions through processes of colonisation and succession. Cities do all these things. City boundaries are not defined by walls but merge into the landscape where agriculture and mining capture the materials and free energy needed to sustain their existence - particularly the chemical potential energy of old, and ancient, sunlight stored in food and fossil fuels. And just as the cells of which we are now comprised are not the ones that made us years ago, so it is with cities. Very little of the original fabric of ancient London, Edinburgh or Rome is still there, but the cities undeniably remain.

11.1.4.4 City Skins

If a city is a living system, then its outer layer might be likened to a skin. A complex organ, skin is a multi-layered permeable membrane which conveys gaseous and aqueous fluids, supports receptors for sensory information, and forms a protective layer which provides insulation, helps buffer mechanical injury and prevents desiccation. Skin can be studied as an ecosystem (Andrews 1984) and is also a habitat in its own right. *Pityrosporum ovale* yeast, for instance, lives on the skin of most humans where it can reach populations of half a million per square centimetre (Andrews p.60).

Traditionally, many cities had very clearly marked defensive boundaries within which were contained most of the city's functions. Their city walls were more carapace than skin.

Fully enclosing urban environments have been the stuff of science fiction for many decades.⁹ The geodesic domes within which they are typically enclosed were invented by Buckminster Fuller in 1947 (Meller 1972 p.33). Fuller proposed domes over Manhattan as a means of improving the efficiency of the city as a climate modifier for human comfort (Baldwin 1996 p.189). The Biosphere 2 experiment in Oracle, Arizona demonstrated the enormous difficulties involved with making truly contained environments (see Chapter 4). To build a city completely enclosed by a semi-permeable membrane with the sophistication of living skin we would need to fully understand that

⁹ See, for instance, Scott Sanders' 'Terrarium'.

skin's function as an environmental filter and its relationship to the city organism. We would need, in effect, to re-invent the 'city wall'.

The Ecopolis 'city wall' is such a semi-permeable boundary. This boundary is a zone of transition rather than a hard edge. It is the place which defines the extent of the city organism, its biophysical limits and bioregional fit. Historically, the green belt is the most apposite equivalent of such an ecopolitan 'city skin'. To be considered in an ecological framework, and as an ecosystem, the city needs to be seen as integral to its context. The city-region is an entity that includes the entire landscape that supports it. It is a manifestation of culture in the landscape identified by Alexander in southern England (see Chapter 5). City-regions form whole spatial and temporal patterns of settlement which are manifestations of culture in the landscape (Dickinson 1970 p.82).

Ecosystems maintain life but being entities of biotic and abiotic material they are, in a sense, 'half dead'. The life they do maintain, with us, achieves consciousness. Ecosystems thus provide cradles, or crucibles, for the gestation and development of consciousness, turning matter into thought (and, as Paolo Soleri would have it, into spirit) (Soleri 1973). That thought provides the self-regulation necessary for the function of urban ecosystems. Regulation of urban systems is about the management of resource and energy flows in the urban metabolism and is expressed in social, political and economic terms. Socio-political-economic activity is mediated by culture - science and art. An ecological culture must integrate the life sciences that seek to understand living processes, with architecture and urban design - which may or may not make art from them.

11.1.4.5 Time, and the Art of City Maintenance

Brand (see Chapter 4) writes of the 'long now' and how we have lost a meaningful perspective on time, and he points to the problem of living too much in the present, without a sense of history (Brand 1999). The 'long now' is, in a sense, a device for re-establishing a context for the present, connecting when we are to when we were and when we might be. Architects, more than most, need a sense of time that embraces past and future. Because buildings exist in time as much as in space, they are intrinsically about process, although much architectural theory (such as it is) and nearly all architectural criticism treats buildings as if they were objects frozen in time. Goethe memorably and poetically referred to architecture as 'frozen music'. Real buildings degrade and decay. Without constant attention and maintenance they weather, rot and eventually fall into ruin. Brand's framework for understanding the rates of change that

permeate buildings was a revelation to most architects and it was only published just before the end of the last century. Earlier in that century Wells observed:

We live in the all-too-familiar *now*, which never seems to change, unmoved by any event more than 48 hours in the past. We have no anchors in our drift through time.

Seeing the world from other points of view – historical, physical, biological, social, geological – sometimes helps us to see the present moment, and ourselves, in perspective. (Wells 1982 p.3)

And, he says about his book *Gentle Architecture* ‘This is an architectural point of view.’ (Wells 1982 p.3). Wells speculates on the fate of cities if they were divested of their human population. Using the Empire State Building as a case in point, Wells charts the future of a wilderness come to ‘reclaim’ the city. He says ‘The timetables, of course, are unknown to us, but surely, long before the Great Collapse of the Empire State Building, trees and flowers would have begun to grow from hundreds of its windows, there above the new forests of Thirty-Fourth Street.’ (Wells 1982 p.20).

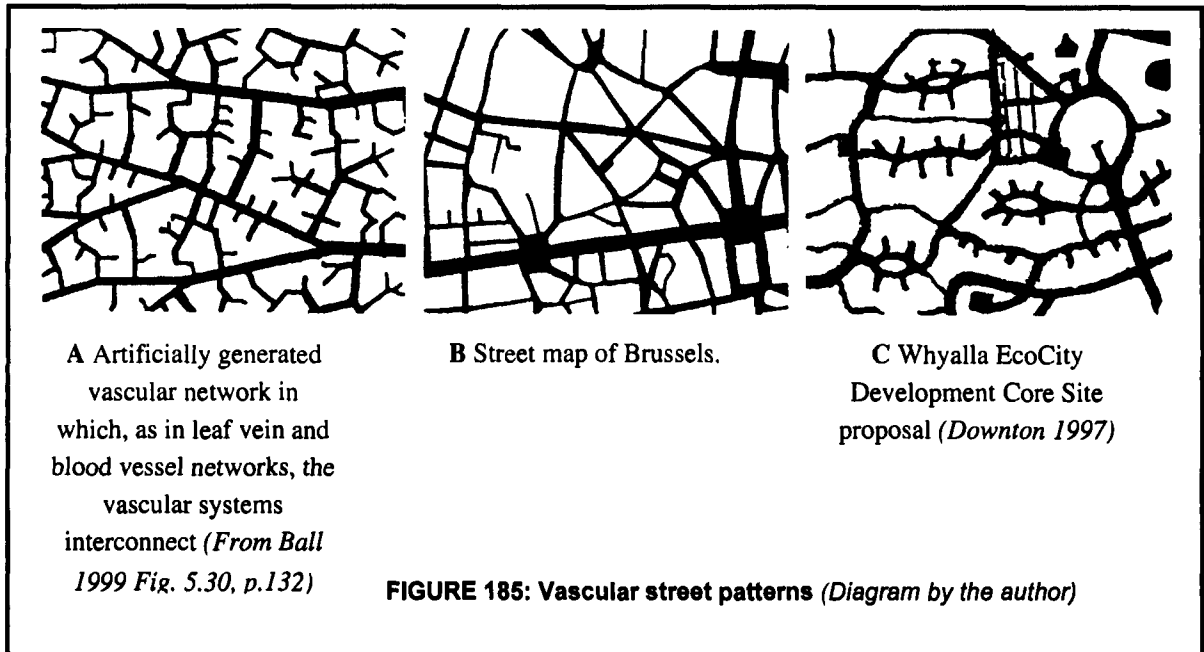
That timetable gives us a good measure of how important maintenance is to the existence of cities as human habitat. Left alone, they not only lack any human purpose, they quickly revert to a condition that gives urban humans as little comfort and succour as wilderness.

11.1.4.6 Modelling the Nature of Cities

Ecological analysis and modeling of city functions include the exchange space/movement space issue identified by Engwicht (Engwicht 1992) and the more formal, overtly scientific analyses of urban ecological function found in the work of Rusong Wang et al in China (Wang 1992, Wang et al 1990, 1991a, 1991b) and the ‘landscape ecological approach to urban management’ such as that posited by Keith Smith in Adelaide (Smith 1993). The life sciences are increasingly sophisticated in their analysis of non-biological processes in living systems. Thus, for instance, the branching structures of many natural organisms are now seen to be following the ‘fractal dimension’ rules that govern such things as the branching of crystals. ‘However crude the present models, they promise that a marriage of physics with biology will surely have much to tell us about the ramifications of growth and form.’ (p. 139, Ball, 1999).

In a ‘life sciences-integrated’ model of city development it should be possible to analyse urban systems behaviour to assist in conceptualising, constructing and managing cities. Michael Batty and Paul Longley have identified in the fractal characteristics of cities the same ‘diffusion-limited aggregation’ patterning process that

appears to create many natural branching structures. According to Ball, Batty and Longley have developed credible models for describing how cities grow, enabling them to predict the pattern and extent of urban sprawl and potentially assist in long range urban planning. This work is important for its focus on actual cities' behaviour as opposed to their theoretical performance as planned entities. Ball acknowledges the



nature of cities as 'organisms' and quotes Batty as saying 'The time is now ripe for the new approach to cities and urban form for which we have been waiting for more than a generation.' (Ball 1999 p.251).

Alexander has long advocated acceptance of 'natural' growth patterns in the making of urban form and proposed patterns of development that accept the inconsistencies and apparent randomness in the 'organic' nature of our built environments (Alexander 1977). Batty and Longley's work, along with that of Makse and others (Ball 1999) promise a macro-level modeling and planning tool that is congruent with Alexander's smaller scale processes. Convergence of these techniques promises the possibility of modeling and planning for ecosystems within the daunting complexity and scale of city organisms where realistic planning has historically proved extremely difficult.

11.1.4.7 Evolving Solutions

It is because so many of man's (sic) activities result in poorly devised ecosystems, fabricated to suit human purposes only, that these malfunctioning units, often termed civilisations, carry in themselves the seeds of their own destruction and will not last. (Douglas 1974 p.43).

In his case study of the urban landscape ecology of Salisbury, South Australia, Smith observes that 'Human dominated landscapes are characterised by land phases where the ecological processes are dominated by human influences.' and that in such environments the disturbed native biological communities are rarely able to regenerate naturally because of those influences (Smith 1993 p.23).

An approach to urban development in which outcomes are uncertain and are attained by extrapolation is a kind of 'undirected evolution'. The goal directed approach is purposeful and expects certain outcomes. An 'undirected' model for urban development¹⁰ might use sophisticated modeling to predict urban sprawl patterns but it would accept the imperatives of sprawl. Subsequent planning would mitigate the consequences of that sprawl but would not seek to stop it. Conversely, the purposeful approach sets out to create ecological cities consciously integrated into the processes of the biosphere with the intent of maintaining the optimum functioning of the biosphere for human purposes. This approach may still employ the same urban sprawl models, but include the goal of halting sprawl to create more efficient and sociable urban form. In either case the techniques of prediction and analysis may be much the same, but the difference in their use derives from the existence or otherwise of an overriding goal.

¹⁰ 'Extrapolatory planning' – see remarks in Chapter 3 at the end of the section on Shadow Plans

11.2 Habitats for Non-Human Species

...changes in rural life, especially in agriculture, have resulted in the paradox that... wild creatures can often best be studied in the cities. (Ward 1989 p.98)

The fundamental roles of cities as commercial exchange systems and life-support systems are interlinked as the supplies of food and resources to city people and industries are part of the overall mass-budget or nutrient circulation of the city. These supply networks link the city, through commercial exchanges, with other ecosystems. (Douglas 1983 p.4-5).

Pollution, the spread of noxious species, dereliction and the need for reclamation, restoration, habitat protection and species conservation are all important in urban environments. However, there area also many opportunities for wildlife in novel artificial habitats or by the creation of new habitats. (Wheater 1999 p.80)



FIGURE 186: Nest constructed by Paper Wasps in an Adelaide inner-city garden. Sophisticated, elegant, functional. An example of what Turner (2000) would claim is a physiological extension of its creators and home to what the neighbours might claim was a hazard to humans. (Photo by author)

Having recognised the imperative to incorporate nature in our human designs, we are obliged to recognise that the optimum functioning of the biosphere sets an imperative for designing to explicitly accommodate non-human species. This is a neglected aspect of eco-city theory that requires much greater study. It is not simply about creating more parklands in and around urban areas but is about understanding the city as an ecosystem in which humans are but one of the species. Clearly 'The city has innate opportunities for complex wildlife habitats.' (Hough 1995 p.184) Some species (other than obvious candidates like rats and cockroaches) find benefits in urbanisation, peregrines, for instance 'have always been attracted to urban environments' and have a long history of attempts to nest on tall buildings which provide cliff-like environments that peregrines favour. (Bell 1994 p.22)

Humans are not the only builders of habitat either,

Many animals, like human beings, live in environments of their own construction rather than simply in nature. An evolutionarily advanced animals such as birds and mammals are not the only species that can build. Even single-celled organisms construct shells for themselves out of things like sand grains....If humans nonetheless claim a certain superiority, the claim must rest on grounds other than architectural achievement. It must rest on awareness. (Tuan 1979 p.101-102)

Architecture and urban design rarely takes account of non-human species except as pests, with nesting boxes and dovecotes being obvious, and rare, exceptions. But

human edifices can be dangerous to wildlife. Buildings and other aerial structures are hazardous to birds with over half a million birds a day killed by collision with artificial structures in the USA alone (Wheater 1999 p.56). Wheater makes the point that the attachment of warning objects to high-risk lines such as those in flight paths can reduce the danger to avians. This kind of non-anthropocentric design response should be integral to the design of ecological cities.

Moving to ecological design of cities means reassessing historical approaches. Marshes and wetlands used to be areas to avoid or places to fill-in and develop. The habitat value of wetlands is being increasingly recognised, reversing to some extent, the trend to eliminate wetland areas that has been historically associated with city-making. Reedbeds are important edge environments, providing habitats for both aquatic and terrestrial organisms and they also have properties that can help clean urban run-off (Wheater 1999 p.65) Full management of such cleansing systems requires consideration of what to do with silt and vegetation that has accumulated toxins over time.

Wheater notes that habitat enhancement and creation has received significant attention in recent years, citing Gilbert and Anderson 1998, Baines 1995, Baines and Smart 1991, and Emery 1986 (Wheater 1999 p.99). In the UK 'community forest' programs are creating new habitats with recreation and conservation uses (Wheater 1999 p.99). In Australia the idea of urban forests is gaining currency with cities like Adelaide planting significant areas of urban woodlands with species selected on the basis of ecological pertinence rather than aesthetic preference, reflecting the understanding that 'Habitat diversity is an important focus, especially when establishing new areas.' (Wheater 1999 p.99) In discussing urban habitats Wheater makes recommendations about management of such areas noting the need for guidelines, continuity, diversity, use of suitable species, and the need for monitoring.

Education is essential to maintaining urban wildlife and the role of wildlife in cities is fundamental in regard to educating the human population about how cities themselves exist within the context of non-human living systems. Bharne writes of different 'natures', one made without human assistance and a 'second nature' of sterile urban environments. This second nature is precipitating a fight back from the first nature: 'The contemporary city, born and created by inorganic forces of processed consumerism and capitalism, engenders a third nature.' (Bharne 2000-2001 p.25).

Cities are not wilderness. Wildlife corridors are not 'natural'; but non-human species already live in our urban constructs, mostly without special consideration for

their requirements. In an ecological city program there needs to be an interactive relationship with nature derived from a perception of humans as part of the ecosystem in which for any organism to survive, all organisms must thrive. Humans need the birds and the bees for practical purposes. The bottom line is survival, not sentiment.

Ecological systems employ a range of transport methods to carry seed, biological material, information and other resources. Animals are like 'vehicles' plying the ecological highways. Water is carried through the plumbing of living organisms, trees, roots and soil. Information is transferred through DNA and other sophisticated mechanisms which require a degree of proximity. And in both country and city the demands of ecological systems remain the same.

Urban wild habitat is a place for untamed animals to live within and around the metropolis. It includes parks, marshes, lagoons, estuaries and creeks...it can also include less obvious homes, such as peregrine falcon nests on the ledges of high-rise buildings. It requires not only physical room for animals to live and roam but also freedom from harassment and enough territory to support the rest of the food chain that the animals depend on. (Berg et al 1989 p.46-47)

11.2.1 Ecological Corridors

The importance of wildlife in cities has become more widely recognised in recent years perhaps as a consequence of the increasing ubiquity of urban environments.¹ The pressures on 'wild' habitat clearly contribute to awareness of the diminishing space for wild things and their increasing need to invade human occupied space.

Urban habitats sometimes conjure up images of disused canals filled with old prams and shopping trolleys, or derelict building plots...However, an amazing range of habitats with their associated plants and animals are found in towns, cities and areas of urbanisation on the urban fringe. (Wheater 1999 p.1)

According to Wheater 'Some habitat patches behave like islands surrounded by a sea of unsuitable or less suitable habitats' where, in accordance with MacArthur and Wilson's theory of island biogeography 'larger islands ...recruit more species and have lower extinction rates than smaller islands.' (Wheater 1999 p.10) Increasing fragmentation of 'island' habitats by urban developments increases the isolation of populations and hinders movement between patches. Thus larger islands, or patches, are to be preferred in the creation of viable non-human habitats in urban contexts. Nevertheless 'Small areas should not be dismissed as lacking wildlife values, especially if they add to the overall habitat diversity of the area. They can even override the

¹ One might speculate that this is also because of an increasing awareness of environmental issues generally.

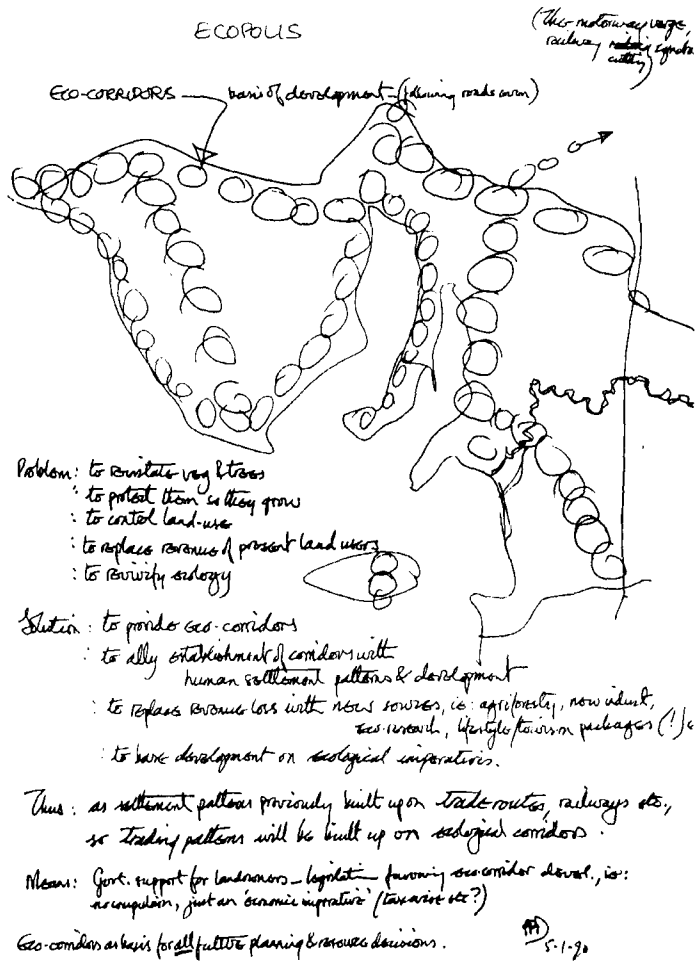


FIGURE 187: Early sketch of Ecopolis concept of regional planning integrated by development along armatures of 'ecological corridors' (PFD 5 January 1990)

species/area effect if several small sites contain more species than one large site of equivalent area' (Wheater 1999 p.11).

This supports the 'ecological corridor' basis of planning that has been part of the Ecopolis theoretical position since 1989. It was integral to the conceptual design of the HEP and the planning of the Whyalla core site (see Site Planning Analyses in Chapters 7 and 8). It was used by the author in Ecopolis design studies for other projects including a proposed development in Queensland (see Figure 188). It is a theme picked up in the WSEP where

the overall vision is one of developments that each contain islands of green – deliberate habitat creation. In the Ecopolis strategy, each island or patch would be enhanced in its effectiveness as habitat whenever another patch, or patches, were established close by, leading in time to a patchwork quilt of urban habitats that effectively linked into ecological corridors through the urban fabric. This is not simply a reiteration of the idea of creating linear parks as wildlife corridors (Lewis suggests parks and parkways, street corridors, boulevards, parkways, bicycle trails and walking trails as urban corridors (Lewis 1996 p.85) and Hough points to canals and railway rights of way as 'potential biological links through the city to the surrounding countryside (Hough 1995 p.145) This is proposing that every urban development can contribute to the piece-by-piece creation of increasing biodiversity. In effect, the whole of the habitats would be greater than their sum.



FIGURE 188: Part of a concept plan for a 10,000 population 'new town' for Hall Construction Pty Ltd by the author that was based on ecological corridor planning and walkable city principles. (PFD 1995)

Ecological webs or networks should form the basis of all land-use planning, with urbanisation subsumed in that web, if only because, as Michael E. Soule notes:

Wildlife corridors can be viewed as a kind of landscape health insurance policy - they maximize the chances that biological connectivity will persist, despite changing political and economic conditions. (Soule 1991)

Wildlife corridors may fully incorporate built form and artificial structures.

Some of the harshest urban habitats are constructions of brick, concrete and stone which, at best, provide analogues of cliffs and bare rock. They are inhospitable, often deficient in moisture, nutrients and shelter, and yet may be rich in both plants and animals. (Wheater 1999 p.51)

Citing Darlington, Wheater tells us that there is an estimated one hectare of vertical wall surface for every 10 hectares of urban habitat (Wheater 1999 p.51) It is possible to imagine an approach to architecture and urban design that encouraged vegetation to gain a foothold on buildings and accrete organic material over time,

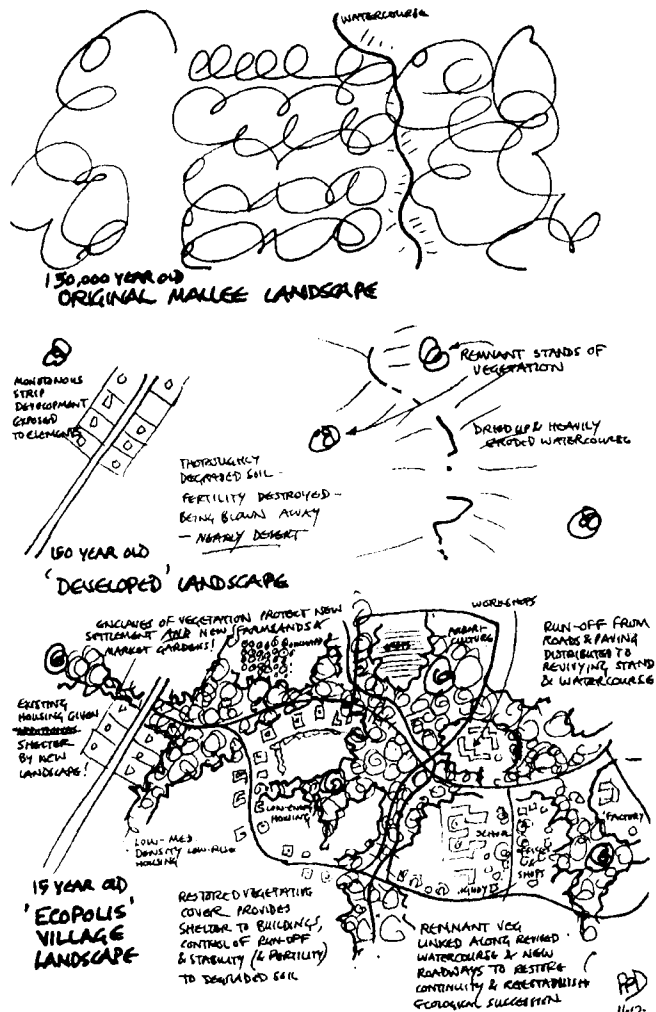


FIGURE 189: An early Ecopolis concept drawing, prepared for Joanne Painter to help her understand what an 'Ecopolis' might look like in non-metropolitan locations such as Callington in South Australia. (by the author 11 January 1990)

designed to erode in such a way as to increasingly support plant life and allow a progressively more diverse natural community to develop. Derelict structures are quickly colonised and the lifespan of a city as a human habitat is surprisingly short without constant maintenance of conditions favourable to human use. There is a design challenge in the idea that cities could be made in such a way as to facilitate the accreting, evolving creation of non-human habitat whilst sustaining human comfort conditions and simultaneously reducing maintenance demands and costs.

Citing Laurie, Hough notes that 'While urbanization reduces the amount of vegetation, it has been shown that in European cities

there is a comparatively high number of species present compared to the surrounding agricultural countryside' (Hough 1995 p.105)

Urban forestry, an increasingly well understood concept in Britain, Europe and North America, involves the transfer of ecologically sound forest management practice from the rural to the urban setting. Its objectives are based on the premise that forests, existing or introduced into cities, function to create low-cost and self-sustaining landscapes. (Hough 1995 p.114)

Cities may support forests that not only provide recreation amenity but are productive. 2,200 hectares, nearly a quarter of the urban area of Zurich, population 500,000, is mixed forest and common land park space that has been maintained for many years 'on an integrated management basis, providing timber, recreation and athletic facilities, wildlife, agriculture, visual amenity and education.' (Hough 1995 p.126). The initial plantings of the urban forest in 'Park 23' of the Western Parklands in Adelaide were a result of collaboration between councillor Jane Lomax-Smith, and

Chérie Hoyle of UEA, thus demonstrating UEA's active role in promoting urban non-human species habitat initiatives in association with local government.

11.2.2 Urban Wildlife

Whiston Spirn sees mutual benefit arising from paying attention to wildlife in city design. Purposefully designed wildlife habitat has the potential to increase the abundance and diversity of species that humans find desirable for aesthetic reasons and may also contribute to controlling pest species. Spirn notes that this need not mean great economic expense and points out that:

The design and use of an area for wildlife habitat is compatible with many other urban function like flood control and sewage treatment, climate modification and air quality management, erosion prevention, forestry, and recreation.' (Spirn 1984 p.226)

And she insists that the opportunities for developing wildlife habitat in cities is much greater than commonly recognised (Spirn 1984).

Animals cannot tell whether or not they have just crossed the line between a national park and the 'no-animals' land called suburbia. What they can know, however, is whether or not an area can provide them with the three ingredients for local survival – food (and water), shelter and a nesting site. (Pastorelli 1990 p.15).

The suburban nature of Australia makes accommodation of wildlife easier to some extent, or at least it makes it relatively easy to provide for some selected species with concepts like 'Animalscaping' (Pastorelli 1990 p.11-16). A number of authors and organisations have identified the value of urban wildlife including Taronga Zoo who published a practical and inspiring guide to the care of Australian urban wildlife which includes advice on creating appropriate habitats (Walraven 1990).² Gill and Bonnett's 'Nature in the Urban Landscape' includes chapters on 'Planning for Wildlife in the City' and 'Management of Wildlife Habitat' (1973).

11.2.3 Barriers to Wildlife in the City

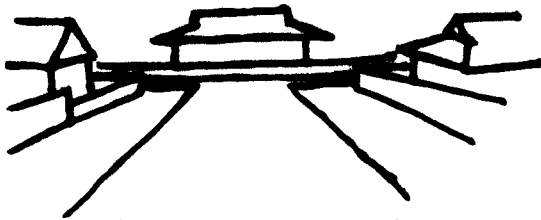
Where people have made sustained efforts to introduce wildlife into existing cities and integrate nature conservation with city living they have found a number of impediments to implementation. 'Some of the most difficult obstacles to overcome include problems with funding; competition for land; how nature is perceived by different groups in society; confusion about terminology or in explaining what urban

² And a poem about a galah being splatted by a bus!

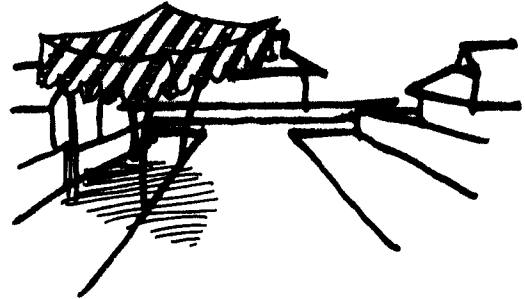
ecology is; and other priorities which take precedence over access to wildlife³ (Johnston 1990 p.239). Historically, such 'barriers' have been the basis of development.

One of the lesser-known statutes of the French Revolution was the formal abolition of all marshes...*two centuries later*...these habitats were still being polluted and destroyed. (Purseglove 1991)

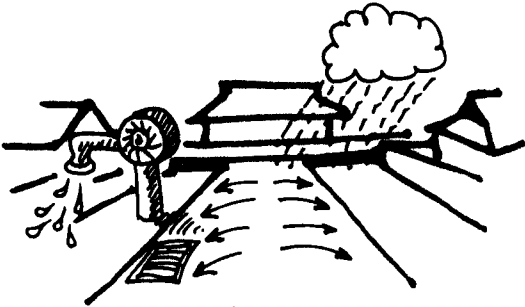
³ 'An application to develop much-needed public housing on an area valuable to wildlife illustrates how difficult it may be to decide political priorities: which is the more important land use?' (Johnston 1990 p.241)



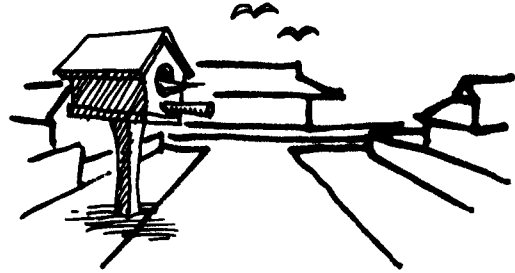
This street needs...



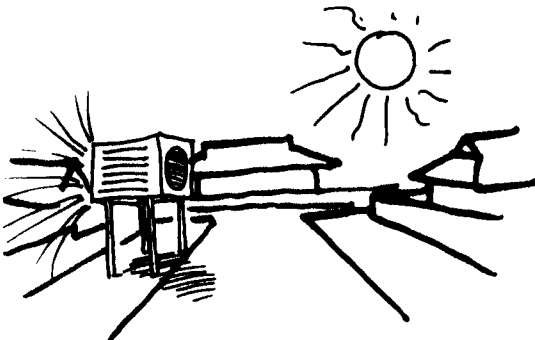
Shade from ultraviolet radiation



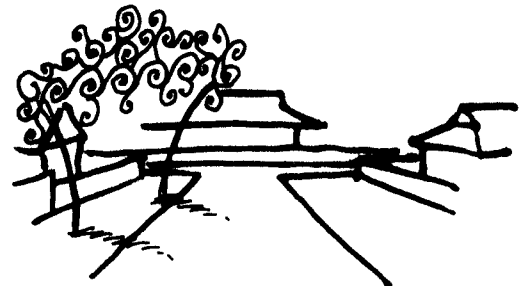
A pump to take up stormwater



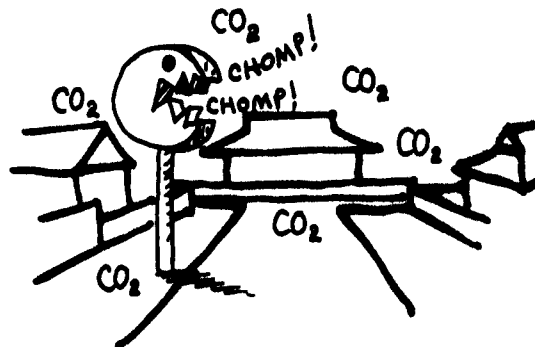
Wildlife habitat



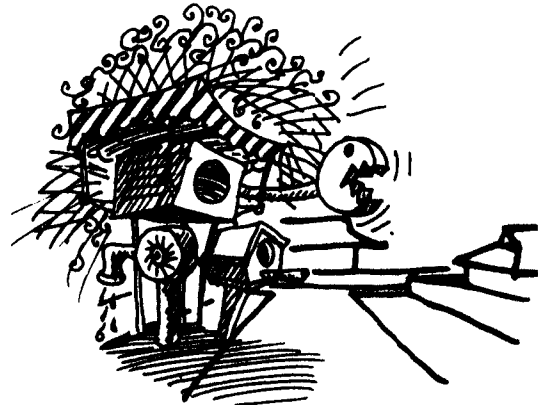
An airconditioner to improve the climate



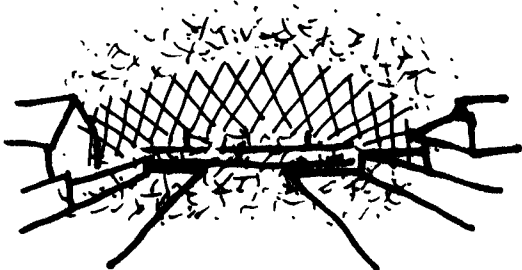
Something decorative?



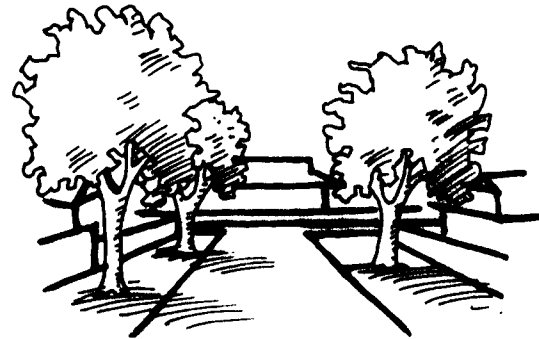
A device to capture carbon dioxide



And low maintenance!



A dust catcher and air filter



This street needs trees!

FIGURE 190: The many contributions made by trees. (PFD)

The challenge is to redefine and re-understand potential barriers from being problems to being potential opportunities for integrating human and non-human habitat requirements. Wetlands were once seen as impediments to human progress and city-making. Now they are being constructed as part of urban water management systems and are understood to be important habitats for non-human species that can co-exist with humans. Forests, for instance, can act as 'living filters' for urban sewage (Sopper 1990). The Netherlands existed as a largely unpopulated area of tidal land until its reclamation and transformation that began in the Middle Ages (Deelstra 1990 p.83-84). Its entire modern landscape can be attributed to human intervention in natural processes. Even in this highly artificial context urban environments can be reconfigured to create productive landscapes and 'urban forests are now... viewed as a means to reinforce the ecological infrastructure of the country.' (Deelstra 1990 p.88) In designing for the sustenance of non-human species, it seems that biogeographical studies indicate that ecological webs or networks should form the basis of all land-use planning, with urbanisation subsumed in that web, if only because, as Soule notes:

Wildlife corridors can be viewed as a kind of landscape health insurance policy - they maximize the chances that biological connectivity will persist, despite changing political and economic conditions. (Soule 1991)

The implications of this approach for design strategies are profound. The shape of city it implies is quite different from the 'pancake city' of urban sprawl. Instead of islands of parkland and greenery scattered in a sea of urbanism, the consequence of combining biogeographical precepts with an understanding of the nature of the city as a place of human exchange results in a plan of clustered, dense centres set in a living landscape. This design approach is explored in the 'Shadow Plans' for Adelaide metro area developed under the author's direction, described and illustrated in Chapter 12. The case studies in Chapters 7, 8 and 9 are conceived in this context.

An essential ingredient in the rehabilitation of degraded landscapes, and a sign that the project is successful, is the return of native fauna to a new and viable habitat. (Buchanan 1989)

The pursuit of complementarity between ecological (wild) and human (civilised) land-use suggests that existing transport corridors should also be ecological corridors to create a network which services the needs of both human artifice and natural order. Rehabilitation of degraded land has to be a primary goal of ecological city making and the success of an ecocity depends on much more than the energy efficiency of its built form. Ways are needed to measure this. Indicators have been developed by a number of cities and institutions to address this idea. Frogs have been identified as particularly sensitive environmental indicators, not least because they live in, and are

exposed to the vicissitudes of fortune of the realms of land, water and air. If the frogs return to a place after its restoration, it may be regarded as a fair measure of the success of a project. The 'Frogstick' in Chapter 14 offers a yardstick to assess human settlements with an emphasis on their ecological performance.

A healthy habitat means a healthy ecosystem - the primary goal of any ecocity. As a general rule healthy water and healthy ecologies depend on healthy vegetation, which is powered by the sun through photosynthesis. Whilst direct measurement of the extent of photosynthesis in an urban environment may be an intriguing option for assessing ecosystem health it does not adequately relate plant-captured energy to broader ecological activities; a relatively sterile hydroponic supported vegetative mass could read well on a photosynthetic scale, for instance, but fail to support any life form other than its gardeners and incidental, generally unwanted microfauna.



FIGURE 191: Urban ducklings rescued and recuperating in an Adelaide inner-city garden. (Photo by author)

11.3 Design Guidelines for Non-Human Species

11.3.1 Edge Effect

Where two communities or land uses meet, they form an edge that can appear abrupt. However, the effects of adjacent communities can penetrate into each other, often deeply. (Russo & Young 1997 p.171)

Just as conventional urbanism is informed by design guidelines derived from an understanding of socio-cultural requirements to accommodate the various aesthetic, economic and legal issues that are part of the human ecology, so, as part of a framework for making ecological cities, there is a need for design guidelines for non-human species. How such guidelines might be developed and the consequences of their application may be explored by using the ecological corridor/edge effect precepts drawn from biogeographical analysis. Consideration of the 'edge effect' can influence the resulting form of habitat-sensitive urban development in surprising ways.

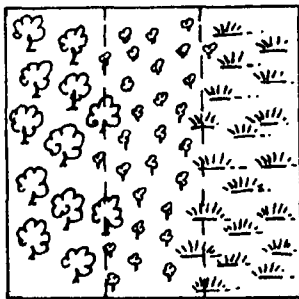


FIGURE 192: Ecotones & Edge Effects

Living system boundaries are not simple lines through the landscape, they constitute significant zones in themselves. The 'edge' is a place of transition which varies in extent according to the type of ecosystem it is associated with. These edge zones may be ecotones, where two vegetation associations join. There is an 'edge effect' when, instead of mutually evolved associations there is a boundary created by intrusion, eg. when a housing development is set in cleared woodland. (PFD)

Conventional design thinking is almost entirely based on aesthetic concerns. Many architects, planners and designers might happily support the notion that development should respect the environment. Given a relatively untouched landscape and asked to design 'sensitively' in response to that landscape, the most predictable, aesthetically-driven approach would be to scatter the proposed development across the landscape in order to diminish its visual impact. At the scale of small to medium sized developments, however, this results in a 'chopped up' landscape with reduced ecological connectivity. A design that respects ecosystem function through minimisation of the 'edge effect' looks less obviously 'organic' but works better ecologically. Interestingly, it also turns out to be more efficient in terms of infrastructure deployment. When natural habitat is also recognised for its value as 'natural infrastructure', the difference between the two development forms in terms of ecological performance is pronounced.

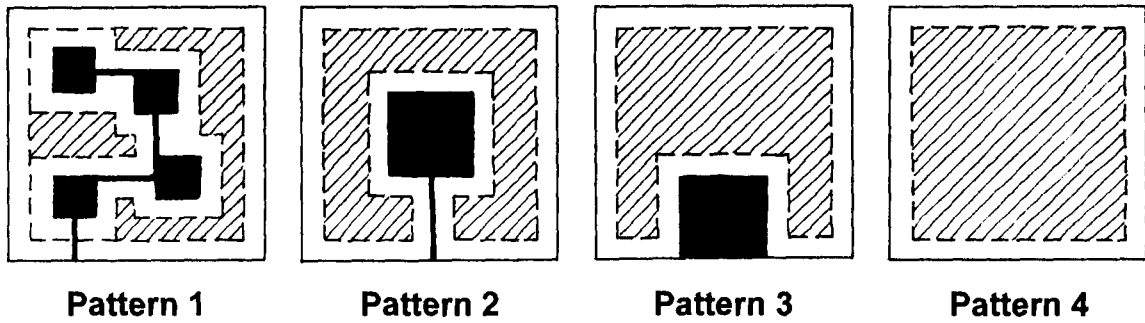


FIGURE 193: Diagrammatic comparison of development patterns in relation to environmental impact measured by ecosystem edge effects and maintenance of core natural areas.
(Original work and diagram by the author)

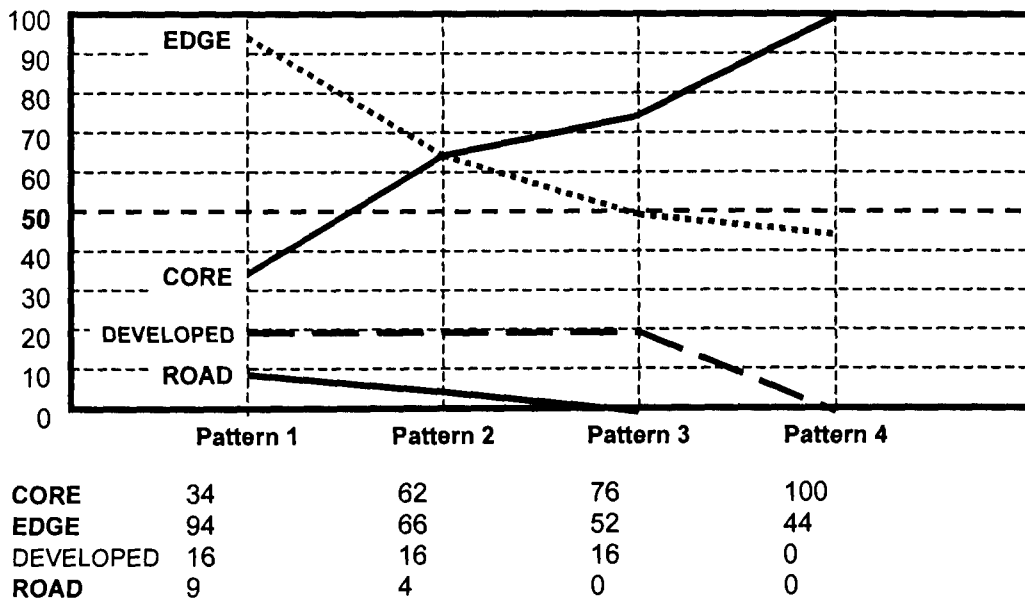


FIGURE 194: Graphical and tabular comparison of development options.
(Original work and diagram by the author)

Pattern 1 shows a visually beguiling configuration in which developed areas are distributed and visually buffered by the natural landscape. This has a much greater functional ecological impact than the less visually ‘imaginative’ Patterns 2 and 3.

Based on this kind of analysis, so-called ‘eco-villages’ such as Crystal Waters Permaculture Village - which adopt similar distributed/buffered site planning configurations - do not necessarily demonstrate landuse patterns most compatible with the preservation of ecosystem integrity and biodiversity. The above graph quantifies the difference.

11.4 Adaptive Urbanism

11.4.1 Food Security

It is more appropriate to think in terms of ‘adaptive’ rather than ‘sustainable’ cities. Adaptation implies the capacity to achieve fitness for purpose, a capacity to evolve. For a city to be ecologically viable it must by necessity be adaptive. Adaptation can only arise if the conscious ecology of the city is sufficiently informed to know when adaptive action is necessary, and it requires that the population have effective means of initiating and maintaining that action. Typical adaptive responses would be to do with food production, maintenance of water supply, protection of sources for materials, energy conservation and capture, and macro-environmental adaptation to changing physical conditions, eg climate change.¹ The IPCC Third Assessment Report released for comment in early 2000² could be seen to support the idea that human settlements will be effected by climate change, set against a very dynamic background of other environmental and socioeconomic factors, and also that human settlements might be expected to be among the sectors most easily adapted to climate change given appropriate planning and foresight. There would seem to be a growing consensus that efforts made to reduce the impact of human settlements on the environment by pursuing ideas of ‘sustainable communities’ hold the potential to reduce the vulnerability of settlements to global warming.

On the one hand, we seek to increase biodiversity or wildness, on the other hand, we aim to increase social interaction or civilisation. This apparent contradiction is resolved by the dynamic action of ecosystem function in which the human presence is integral to the whole environment and is understood to be contained within the same parameters as all other species (see adjacent diagram).

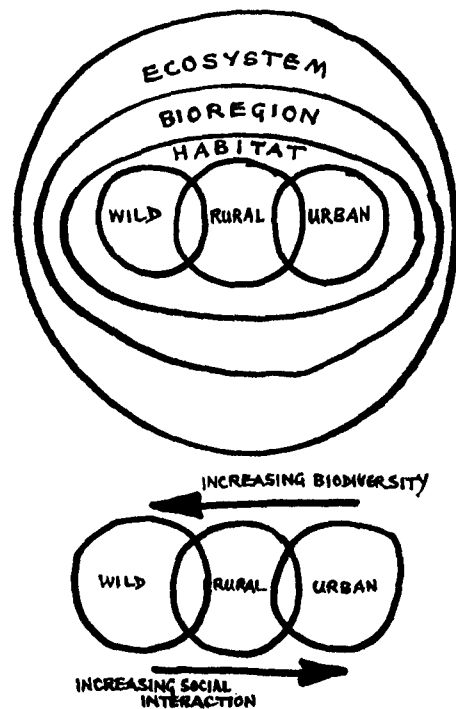


FIGURE 195: (right) Human society is integral to the whole environment and exists within the same bio-geo-chemical physical parameters as all other species. (PFD)

¹ Climate change may itself bring on other changes in the physical environment, eg. The loss of stability in certain slopes as sub-surface hydrological regimes are affected by increased rainfall or patterns of rainfall. Extreme examples of this kind of hazard are already evident with such ‘natural’ disasters as the catastrophic flooding in Central America in 1999.

² Which cannot be formally cited or quoted, but to which this author contributed minor comments.

11.4.1.1 Equity Corridors

If ecological corridors are a prerequisite as the basis for all land use planning, then the imperative for increasing social interaction may demand 'equity corridors' also as a basis for city design³.

There are issues of equity and biophilia in the idea that cities should be designed for people *and* nature. In Britain, 'The greening of the cities, in thousands of little local projects, is a genuinely popular movement.' (Ward 1989 p.101) Yet the love of greenery and natural landscapes and related experiences tends to be seen as a white middle class preoccupation by professional and politicians, whereas there is strong evidence that it is anything but (Ward 1989). Surveys by geographers at the University College of London showed that residents in inner-city areas of different classes and racial backgrounds all 'gained pleasure from the natural world' (Harrison and Burgess quoted by Ward 1989). The researchers found that green areas, even small, scrubby bits, and especially 'wild' bits, were highly valued as places that gave pleasure and provided places for children to have adventures, experience the beginnings of independence and discover the natural world. All in all, despite problems of management associated with open space in the inner-city (to do with racial abuse, sexual and physical harassment, vandalism and drug abuse) green spaces were seen in an overwhelmingly positive light, leading the researchers to refer to them as 'gateways to a better world' (Ward 1989).

Human impact on the natural environment is profound whether or not it is conscious. Whitleock showed that although South Australia still has only a million and a half people, it took less than 200 years of European occupation for a massive area of land to be reshaped. 'Where the grain grows over the grave of the mallee' an ecosystem larger than England has been obliterated to make room for unsustainable agriculture. (Whitleock 1985) Over the rest of the state pastoralism has unleashed hooved creatures in an environment in which their alien hoofs are destroying the soil. Until the release of the Calicivirus rabbits killed a billion seedlings every year preventing natural regeneration of the land. Numerous animals and plant species have become extinct. Conservation has come along too late to save them. The story of urbanising civilisation worldwide is encapsulated in the story of South Australia.

³ Equity corridors were first mooted by the author in a keynote presentation to the First International Ecological City Conference in Berkeley, 1990 (Canfield 1990 p.19)

Wheater's earlier observations typify and underscore the growing understanding of a need to integrate 'nature' into urban systems. Parks and greenbelts are as old as urban history and their functions have been seen in organic or biological terms at least since the French Revolution. The concept of biophilia is now extending that understanding so that the deeper levels of functionality in the human organism are being seen as so inter-related to evolutionary experience of nature that continued connectivity is regarded as essential to our long-term health. Any requirement for maintaining urban space for purposes other than building needs to be fully ensconced in the framework of civic understanding and management. Property values are generally higher near 'green' areas in cities (this is one of the arguments advanced in favour of the biophilia hypothesis) and so there is an intrinsic imperative to maintain the areas in order to maintain those values. At the same time the lure of 'greenfield' development sites is so strong that there are always putative 'developers' ready to build on green belts and parklands. It also seems that without an informed awareness of the larger context, it seems that perceived pressures on urban space are exacerbated when open space resides adjacent to densely built-up areas.

These imperatives, lures and pressures are strong in Adelaide where the existence of a largely intact green belt stands as a testament to both the relative weakness of the economy and the strength of the civic community. Both the Halifax EcoCity Project and the Whitmore Square EcoCity Project have been planned with the value of the nearby parkland green belt firmly in mind. The southern parklands are within just two city blocks of both sites, and both are within a short distance of one or another of the city's inner squares of parkland, all well inside a distance that enables urban dwellers to access the green areas with relative ease. Wheater reports that even large areas of urban parkland, at least in the UK experience, 'rarely recruit visitors from more than 1km away' and that Harrison et al recommend that there be at least 2 hectares of greenspace within half a kilometre of any home. (Harrison 1999 p.108)

11.4.2 Productive Landscapes

The idea of including productive landscapes within the framework of urbanism has been popularised in recent years through the growing Permaculture movement which stresses that successful food production is best achieved by creating a mixed environment of both animal and plant species. There was a surge of interest in localised (and therefore of necessity, urban, or peri-urban) food production in 'western' democracies when environmentalism was boosted by the 'oil crisis' in the early 1970s evidenced by publications like 'Agriculture in the City' (El Mirasol 1976). Sir Albert Howard wrote about 'Nature's agriculture' in which 'Mixed farming is the rule: plants are always found with animals; many species of plants and animals all live together... mixed crops and mixed farming are the rule.' (quoted in El Mirasol 1976) Ted Trainer's vision (Trainer 1996 p.149) for transforming Australian cities sees them evolving from suburban street and lawn monocultures to places filled with vegetable gardens, and productive landscapes. In many ways these visions recreate the environment of small-scale, localised food production that has been part of pre-industrial cultures.

11.4.2.1 City Farms

Ward tells us the city farm movement has spread 'not through any official body but from local enthusiasm, to every city in Britain.' There has also been a parallel surge of interest in community gardens (an example of which is included in the Christie Walk development and a community garden occupies a central space in the Whyalla EcoCity Core Site proposal). Community gardens, historically known as 'allotments' in Britain, have been part of the urban scene for two centuries and Ward reports that the waiting list for obtaining an allotment in England and Wales went up by 1,600 per cent in 1979. (Ward 1989 p.100). Allotments embody ancient beliefs that every family has a right of access to land for food production and in Britain community action has resulted in the creation of new community gardens of various sizes and descriptions. (Ward 1989 p.100)

11.4.2.2 Roofgardens: Architecture, Habitat and Food

Roof gardens and vegetated roofs are an increasingly evident part of the ecocity oeuvre of design devices. Register's images of ecocities are distinguished by their depiction of riotous rooftop plantings. There are obvious aesthetic reasons for favouring abundant greenery as an iconic component of green building, but there are also a

number of pragmatic and functional purposes to the substantial inclusion of rooftop greening in ecocity design. The reported benefits of rooftop greening⁴ include:

1. improvements in human comfort levels and general air quality
2. reduction in greenhouse emissions
3. energy savings in heating and cooling through roof insulation
4. rooftop capture and productive use of stormwater
5. increased habitat for native plants and birds
6. job opportunities in plant production, design and construction
7. opportunities for urban food production, and
8. access to private outdoor open space at home or at work

According to Monica Kuhn, rooftops are a city's 'greatest untapped resource' with limitless possibilities for urban greening, air cleaning, community building, and food production. She (rather breathlessly!) lists the following advantages of rooftop greening:

Increase Oxygen, Decrease CO₂

By increasing the city's biomass, you have increased oxygen levels in the air - and decreased the amount of CO₂, produced by cars and other fuel burning "technologies";

Filter particulates

Cut down on dust and air-borne particulates, since plants act as natural filters;

Alter the local climate

Because plants absorb rather than reflect heat.

Retain stormwater

Because roots hold and absorb water, every time it rains, your roof garden is retaining storm water runoff thereby decreasing the load on the city's already overflowing storm sewage systems.

Insulate the building

Layers of soil and foliage have wonderful insulating qualities,

Reduce your energy bills

An insulated building is warmer in the winter and cooler in the summer

Increase the life of your roof

Because the extreme temperature swings which cause expansion and contraction of roofing materials will be moderated by your roof garden.

Grow vegetables

Increase urban food production. Feed your family. Barter or sell your surplus. Start a small business.

Make your city beautiful

Grow flowers, attract butterflies! Give the people next door a better view

Increase public and private open space

Create a safe, private, outdoor space in the heart of the city - without having to buy extra land. Meet your neighbors 10 storeys above the street!

There already exists the knowledge and experience for making roofgardens in the USA and Canada although the seminal work on the history, design and construction

⁴ Research into these reported benefits was being undertaken by student researchers from the RMIT and Monash, Melbourne and Deakin Universities from mid 1998 onwards.

of roofgardens was only recently published (Osmundson 1999). Whereas most existing gardens were given structural consideration during the initial design phase, most roofgardens that people are now interested in installing would have to be retrofitted to existing buildings. Meanwhile

In some parts of Germany, new industrial buildings must have green roofs by law; in Swiss cities, regulations now require new construction to relocate the area of greenspace covered up by the building's footprint to the rooftop and even existing buildings, some hundreds of years old, must convert 20% of their roofspace to pasture!⁵

⁵ It seems that this has created a whole new industry specialising in light-weight growing mediums, filter cloths, roofing membranes, plant stock, and how-to books and kits with nurseries, designers, consultants, and contractors learning to operate in an expanded and more diverse market

11.5 Create Compact Cities

11.5.1 Density and Disorder

This is the first generation that has lived with both the achievement of affluence as a constant force in life, and the problem of what to do with it.... And it has no model from the generation that brought it into being, since the willful innocence of the suburbs does not seem to be a satisfying way to sustain a social life, seems in fact to be a voluntary servitude to unruffled ease. (Sennett 1974 p.8)

The ecological city must contain and support internal diversity to maintain social health and, perhaps, to sustain the evolution of civilisation. Tielhardt de Chardin's ideas on evolution profoundly influenced Soleri, one of the most radical ecocity theorists. Soleri supposes a high density of population as almost a precondition of human evolution towards a spiritual end point. 'Developed' countries have experienced huge levels of wealth creation and phenomenal production of goods; although their distribution has been less than equitable, the reality is that millions of people have lived in, and continue to live in, an environment without scarcity. On a more material, social and political level than Soleri, Sennett sees human diversity as a prerequisite for successful urbanism in a post-scarcity world. Just as Bookchin sees post-scarcity as a positive condition, liberating humanity from drudgery, so Sennett's 'Uses of Disorder' starts with the premise that 'communities of abundance open up new possibilities in men (sic) for self-imposed tyranny as well as for freedom.' and he suggest that 'To understand the community of people freed from scarcity requires a sounding of the darker desires of men, desires for safe and secure slavery that people bring into their social relations...which most men (sic) would be loathe to admit to themselves...' (Sennett 1974 p.11). His thesis is that only by probing and confronting these feelings can people break through the historical patterns of self imposed slavery to achieve '...an adulthood whose freedom lies in its acceptance of disorder and painful dislocation' - the realisation of which '...depends on a structure of experience that can only take place in a dense, uncontrollable human settlement - in other words, in a city.' (Sennett 1974 p. 11).

He concludes his introduction with the proposition that '...it is in the building of purposely diverse cities that society can provide men (sic) the experience of breaking from self-slavery to freedom as adults.' (Sennett 1974 p. 12)

Sennett's call for dense cities as the means to encourage socially creative and responsible behaviour evokes Paolo Soleri's pleas for extreme urban densities as a virtual prerequisite for less violence. In his brief chapter 'Violence and the Urban Effect' (in a book of extremely brief chapters), Soleri maintains that

...any eventful environ (a village for instance) is accompanied by some violence. An environ 10 times more eventful (a city for instance) should reasonably carry 10 times more violence. **The astonishing thing is that this is not so.** The fact is that, on average, the urban effect is **benevolent.** (Soleri's emphases) (Soleri 1987 p. 93)

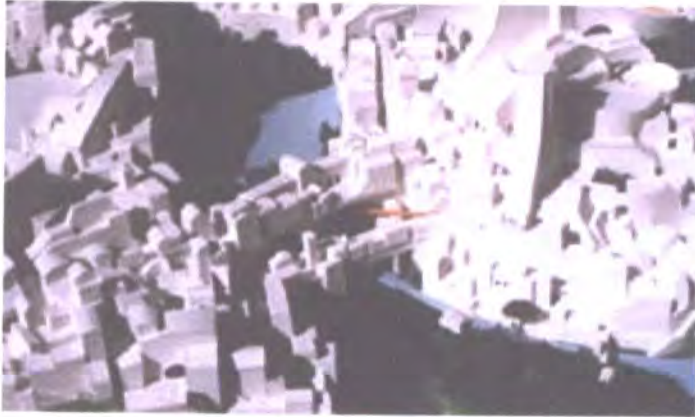


FIGURE 196: DenseCity project for 10,000 people in Stoneyfell Quarry above Adelaide. Site 500metre x 500 metres. Studio program by Paul F Downton. Design by Daryl Talbot. (Photo by author)

The city has long had its champions, and from diverse places and times. Apart from reducing violence (Soleri 1987), providing the creative chaos of diversity to encourage adult responsibility (Sennett 1974), and making safer places for children through the provision of 'passive' surveillance (Jacobs 1962), cities have liberated

women (Uitz 1994). Harley Sherlock states his case very completely in 'Cities Are Good For Us – The case for close-knit communities, local shops and public transport' and quotes approvingly from Aristotle's 'Politics' – 'Men came together in cities in order to live. They remain together in order to live the good life.' (Sherlock 1991 p.13).

There appears to be convergence on the view that the most energy and resource efficient building form is 2-4 storey terrace housing and that: 'safe and largely traffic-free streets, parks, formal and informal education facilities for all ages, arts and cultural venues and healthcare facilities...can only be provided efficiently in the compact city form.' (McLaren et al p.127)¹

11.5.2 Compact, Ecological or Green?

Compact city theory draws from the same well of ideas as the burgeoning theoretical constructs of the 'green', 'sustainable' and 'eco' city. Related ideas range from the 'arcological' visions of Soleri and American 'design outlaws' like Fisk, to Europeans (especially in Denmark) and the Australian transport researchers Newman and Kenworthy (Soleri 1987; Zelov and Cousineau 1997; Newman, Kenworthy and Lyons 1990). Some models of the ecological city stress energy, some traffic, and some the development of healthy communities (Koskiaho 1994). The nesting of ideas varies

¹ 'Dissidents' include Patrick Troy, who has employed the debate on sustainability to present ingenuous arguments for maintaining low-rise suburban development as the norm for Australia, see for instance 'Rethinking Our Cities' in which he suggests that increased urban density is achievable only at the expense of 'sustainability objectives' (Troy 2001 p.8).

so that 'green cities' may or may not include being compact and compact cities may or may not be 'green'. Superficial theorists like UK architect Richard Rogers typically bring together a selection of characteristics to illustrate their preferred model of what a compact city is supposed to encompass. Rogers, for instance, employs 'ecological city' and 'compact city' as subsets of an overall definition of a 'sustainable city' (Rogers 1997)².

The compact city is emphatically not about squashing existing cities to make them fit preconceived notions of a proper size. There is no intrinsic value in merely being 'small'. 'For if 'small is beautiful', the whale is ugly and the mouse is beautiful.... Gigantism is the problem, not size as such.' (Soleri 1987 p.29). In Australia 'urban consolidation' is used to scare suburbanites away from what could be more space-conserving, efficient and convivial built form. In cities grown dysfunctionally large, their problems and prospects are a consequence of a number of inter-related factors. As Knowles points out in respect of architecture 'The right size, and notably the right size of building, is relative.' (Knowles 1996 p.135). His studies in Los Angeles conclude that the best density of building is in a size range that is neither too great nor too small and one might conclude that the same applies to cities. Although we lack the evidence to discern that 'correct' size, and the scale of response has to be specific to place and circumstance to allow for a range of scale of responses from the neighbourhood to the region, there is little or no evidence that sprawling, low density urban morphologies can be justified in terms of energy, resource use or social functionality.

² The politically consummate Rogers is undoubtedly alert to the preferred terminology in the mainstream of political discourse where, particularly through UN usage, 'sustainable' has an established currency.

11.6 Provide Health and Security

11.6.1 The Health of Cities: Holurbanism, Malurbanism & Vital Signs

It is now clear that the fate of human settlements is inextricably bound up with the environmental crisis. (White and Whitney in Stren 1992 p.48)

The dangers of persisting in a fragmented view of the city and its environment are more evident every day: the increasing frequency of miscarriages, birth defects, and neurological damage caused by environmental contamination; the increased mortality of the elderly, the sick, and the very young; permanent brain damage among children; overall degraded health of city residents and workers; increasing magnitude of natural hazards; increasing energy demands; depletion of high-grade mineral resources; dwindling water supplies; and the inefficient use of space and resources. The fact that environmental thresholds are poorly understood, that every action produces a complex response in the environment, with many unforeseen consequences, and the fact that severe effects are already manifest would recommend caution and immediate attention. Yet we proceed with heedless abandon to squander ever larger quantities of energy and to carelessly dispose of wastes. (Spirn 1984 p.239)

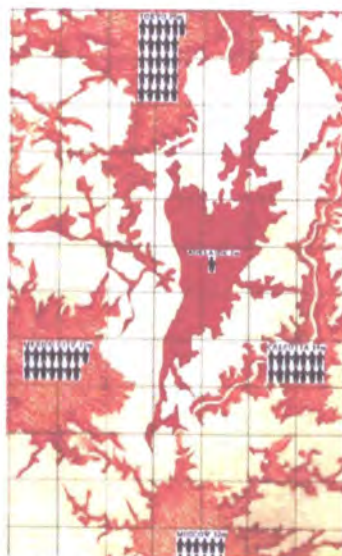


FIGURE 197: Detail from 'City Cancer' panel of the 'Ecopolis Now!' exhibition (see Chapter 13.3). The cities surrounding Adelaide are Tokyo, Calcutta, Moscow and Mexico City. (by the Author)

As we have seen, there is a long, rich and varied history of writing, commentary and mythology that clearly identifies the city as 'bad' and the rural/wilderness/non-city as 'good'. But it would be as unrealistic to imagine that our species can leave cities behind us and escape to some utopia over the hill, as it would be to believe that we can forsake this planet in favour of a better one. This entire thesis is founded on the proposition that cities are the habitat of most of humanity and that we are bound to urban ecosystems as much as we are contained by the circumstances of our existence in this biosphere. From this position, therefore, the challenge is to establish what is 'good' about cities, what is 'bad', and how to fix it.

In the spirit of Lovelock's 'practical science of planetary medicine' and his efforts to establish the science of geophysiology (1991 Lovelock p.24) and accepting that human settlements may legitimately be regarded as organisms or living systems, the author proposes that it is possible to identify 'healthy' and 'sick' cities and that their relative health can be determined from reading 'vital signs'. There is some precedent for these precepts. Healthy Cities is an international organisation that has been

operating with some considerable success since the phrase was first used in 1985³. Especially since the advent of Local Agenda 21, city governments around the world have adopted the idea of identifying 'indicators' to help measure their progress on the road to sustainability. Indicators are similar, in effect, to vital signs. They constitute performance assessment criteria. The author introduced 'The Frogstick' (see Chapter 13) for this purpose in 1990, prompted by the need to demonstrate the difference in approach between the Ecopolis idea and the 'techno-fix' proposal for an MFP⁴ which was then current in South Australia (Downton 1991a p.54).

The following table sets out some basic characteristics of healthy cities (Holurbanism) and unhealthy, cancerous cities (Malurbanism) in the sense intended by this thesis.

	Holurbanism	Malurbanism
	<i>Healthy Urb/Healthy City</i>	<i>Cancerous Urb/City Cancer</i>
1. Vital Signs	See FROGSTICK	See FROGSTICK
2. Boundary	<i>Well defined boundary – generally fixed</i>	<i>Ill defined boundary – mobile/mutable</i>
3. Size	<i>Limited</i>	<i>Indeterminate</i>
4. Energy & Information	Open to energy & information	Open to energy & information
5. Nutrient & Resource Systems	<i>Closed systems (closed loops)</i>	<i>Open, damaged systems (loose ends)</i>
6. Environmental Relationships	<i>Symbiotic</i>	<i>Parasitic</i>
7. Status	<i>Resilient – able to sustain all vital functions in stressful environments</i>	<i>Fragile – subject to collapse in response to very short-term events (mental experiment: turn off water and power...)</i>
8. Metabolism	<i>Constrained</i>	<i>Unconstrained</i>
9. Organisational Coherence	<i>Self-organising - Higher orders of organisation with increasing coherence – integrative</i>	<i>Self-destructive - Reducing orders of organisation with decreasing coherence - reductionist</i>
10. Bio-Trajectory	<i>Lifewish – sustains (nurtures, creates, maintains) conditions for its own existence and replication</i>	<i>Deathwish – destroys conditions for its own existence and undermines basis for replication</i>
11. Public Realm	<i>Civic – active citizens</i>	<i>Consumerist – passive consumers</i>
12. Environmental & Social Limits	<i>Acceptance of limits enables society to be sustained, thus to evolve – free citizens in an environment they can understand & manage</i>	<i>Failure to accept limits disables social frameworks – tyranny of state/bureaucracy (impersonal organisation) consumers in an environment they have difficulty understanding or affecting.</i>

TABLE 14: Some basic characteristics of healthy cities (Holurbanism) and unhealthy, cancerous cities (Malurbanism) in the sense intended by this thesis. (*Concept and table by the author*)

³ International Healthy Cities Foundation website

<http://www.healthycommunities.org/facts/overview.htm> accessed 5 May 2001.

⁴ Multi-Function Polis.

11.6.2 The Reproduction of Cities

Well-accepted definitions of life usually include the ability to reproduce as an essential attribute (Lovelock 1991 p.31). Lovelock maintains that this is a 'category error' and that what should define whether something is 'alive' or not is whether it metabolizes and self-regulates (Lovelock 1991 p.31).

The capacity to reproduce does not appear to be an accepted attribute of ecosystems of any scale; nevertheless, ecosystems are about maintaining the conditions for their own existence. In the majority of living organisms the information required for the organism to replicate the conditions for its existence is communicated via DNA. Organisms like mammals also communicate vital 'survivalist' information via a teaching/learning process, particularly during the nurturing stages of a young organism's life.

In the present 'Phase 4' of human existence (Boyden 1981) humans spend much of their lives in social, culturally constructed environments, engaged either formally or informally in processes that teach them about appropriate behaviour for staying alive. Through culture, we transmit knowledge across generations that is vital to our continued existence and that is not encoded in our DNA. The built environment is the most complete expression of human culture. Without a functioning built environment, most individuals in our species' present evolutionary state would not survive. It is thus essential for our continued existence as 'Phase 4' humans that we reproduce successful built environments that provide the conditions for that existence, and allow for it to evolve. With Turner's argument regarding 'the extended organism' (Turner 2000) it may be that culture and building are physiological extensions of the human animal and 'Laland even argues that human culture is just a special form of niche construction' (Douglas 2000 p.33).

Using the Holurbanism/Malurbanism model, the respective capacities for reproduction of healthy and unhealthy cities might read as follows:

11.6.2.1 Holurbanism (Urban Spawn)

Increases population by reproduction of the conditions necessary for continued existence of a healthy urban organism. Achieves this through a process of spawning and colonisation. Successful colonisation recreates conditions of existence; unsuccessful colonisation results in a failed city either in the short term (it does not 'take hold' in its environment) or long term (typically, failure to maintain conditions of existence by consuming its host environment).

11.6.2.2 Malurbanism (Urban Sprawl)

Increase population by unfettered growth (gigantism)⁵. Consumes new environments rather than colonises them. Does not recreate the conditions of its existence but exploits existing conditions through destructive consumption of its host environment. The sickness of malurbanism is not a necessary consequence of colonising activity but a failure to colonise successfully.

11.6.3 Climate Change

...if the trend is one towards global warming, it will cost much more to redesign existing human settlements to ensure that they remain habitable for human beings. The inertial force in these major global adjustments means that thinking must be in terms of decades rather than annual budgets. (White and Whitney in Stren et al 1992 p.30)

Climate has always been a major determinant of cultural morphologies whether manifest through social structures or in the built environment. With anthropo-accelerated climate and ecological change the need to move from culturally unconscious reactions to environmental conditions to pre-emptive, long-range planning for change is essential to the survival of civilisation. This is an implicit part of ecocity design, development and maintenance, but is a recent consideration on the planning agenda for decision makers whether they be politicians or planners. When Stephen Schneider and Randi Londer proposed 'Some General Conclusions and Principles for Living with Climatic Change' as recently as 1984, it was a still a novel idea (Schneider and Londer, 1984).

Prudent planners and managers should consider the implications of a rise in sea level...Generally, the larger the settlement and the closer it is to sea level, the more profound the changes will be. (White and Whitney in Stren et al 1992 p.31)

Inundation of the land is the most obvious consequence of sea-level rise...Many communities would find themselves combatting conditions similar to those with which the Dutch have struggled for centuries. But how many of the world's megacities have the same financial and technical capacity as the Dutch? Is this kind of management of a difficult environment easy to envisage in Jakarta or Calcutta? If these settlements prove too costly to maintain then millions of city-dwellers might have to relocate.' (White and Whitney in Stren et al 1992 p.31)

⁵ Urban problems are not simply to do with increasing population. They are to do with how that population behaves, what it consumes, the land it occupies, the waste it generates. Sprawl is real. Cities are spreading faster than population is growing. In the 20 years between 1970 and 1990 Los Angeles grew in area by 300%, but its population only grew by 48% (Carl Anthony, International Global Forum presentation, Berkeley, 12 April 1997).

11.7 Balance Development

11.7.1 Search for Limits

How do we find the places to draw the line in the making of human settlement? If the city is part of its region, then if its capacity to consume resources outstrips the capacity of the region to provide those resources, it will have to import them, or die. Ecopolis Proposition 1 suggests that for cities to live, they must fit the limits of their place, ie. the region of which they are part. A regional approach to the making of built environments and supporting systems thus becomes an inescapable part of an ecocity program and ideas of bioregionalism obtain particular importance. Equally, the need to be able to measure and comprehend the impacts of urban entities is essential. New tools like Rees and Wackernagel's 'ecological footprint analysis' offer powerful means to quantify these impacts. The North American (Canadian) concept of the 'ecological footprint' is paralleled by the European (Dutch) concept of 'environmental space' which 'describes the scope for human activities by defining environmental conditions... (It is) the share of the earth's resources that humanity can use without depriving future generations of the resources they will need.' (McLaren et al 1998 p.6). As cultural activities, architecture and urban design contain strongly intuitive, non-quantified methodologies that depend on practitioners obtaining a clear 'sense' of the parameters of the place for which they are designing. The process of the Seven Steps, the Ecopolis Development Principles and the performance measures of the Frogstick outlined in Chapter 14 are intended to assist practitioners in gaining and maintaining an intuitive feel for that deeper sense of the limits of place.



SYNTHESIS II

CHAPTER 12

ABC OF ECODEVELOPMENT

Extremely important among the forces which determine the ecological characteristics of human ecosystems is a series of factors that come under the general heading human culture. Consequently, if we wish to understand properly the ecology of a city or a region, it is imperative to take full account of the relevant cultural components as well as the physical, chemical and biotic aspects.

(Boyden et al, 1981, p.19)

The confusion between urbanization and citification is as obscurantist today as the confusion between society and State, collectivization and nationalization, or, for that matter, politics and parliamentarism.

(Bookchin, 1986, p.168)

This Chapter describes aspects of the development processes that may bring ecological cities into existence for these processes are the means by which knowledge can be effectively integrated, ie. by action rather than mere contemplation, This addresses the imperative of Proposition 2 'to integrate extant knowledge'. The rapid integration of knowledge requires uninterrupted communication. Theories of politics, society and economics are considered, in particular, those social and moral arguments which say that authoritarian power structures are inimical to societies capable of sustaining ecologically responsive urban civilisations in the long term because such structures tend to filter and block critical flows of information.

12.1 The Power of Limits

Nature runs on sunlight.
Nature uses only the energy it needs.
Nature fits form to function.
Nature recycles everything.
Nature rewards cooperation.
Nature banks on diversity.
Nature demands local expertise.
Nature curbs excesses from within.
Nature taps the power of limits.

(Benyus 1997 p.7)

In 'Biomimicry,' Benyus (Benyus 1997) stresses the 'power of limits' in nature. She suggests that the last canon in the above list of laws, strategies and principles is the



FIGURE 198:
The attempts
humans make
to breach limits
confirm where
the real limits
lie.

hardest for humans to fathom because ‘we regard limits as a universal dare, something to be overcome so we can continue our expansion.’ (Benyus 1997 p.7). As we have seen in the previous chapter, the concepts of the Ecological Footprint and Environmental Space identify physical resource limitations to human activity. Expansion or movement beyond the limits of any given environment invariably results in imposition upon and exploitation of another environment. To go to the stars requires that we understand the limits of planet Earth. This is the insight that provided the impetus to

create Biosphere 2, which, in turn, proved our ignorance regarding many of those limits. If we leave the environment of Biosphere One we will inevitably affect the environment beyond; stiff flags and detritus on the moon stand in silent testimony to the likely truth of this proposition. And when we travel over borders, whether they are made by humans or emerge from the interface of biomes, we carry cultural baggage with us, conditioned by experiential and mythic knowledge of our environment, determined to fly the flag.

Having recognised the imperative to work within biophysical boundaries, we must also recognise that humans are a species with an imperative to expand. For the next few generations, at least, we will inhabit a planet with a rapidly growing human population that will require healthy shelter and settlements that fit the imperative of limits. (This is reason enough to have a viable theory for the reproduction of cities). To address the extraordinary challenge this represents, we have to work on the deep structure of civilisation. We have to reset Brand’s ‘clock of the long now’ to synchronise infrastructure provision, governance and culture with the pace of nature. We have to deal with the invisible structures on which the entire enterprise of civilisation is constructed. For development to proceed on the basis of principles that are derived from nature’s own systemic functioning we need to understand our own, human ecology, and consider what there is in it that is worthy, and what is self-destructive.

12.1.1 Planning for the Long Now

The term ‘ecological development’ or ‘ecodevelopment’ is used in preference to ‘sustainable development’ for reasons discussed at the beginning of this dissertation. With the idea of developing the ecology, rather than seeing the environment merely as the resource base for sustaining ‘development’, we find new gateways through which we might pass. Ensuring the continuing health of ecosystems may require the death of

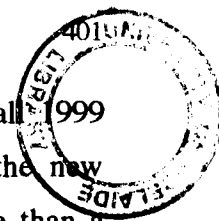
cities. The history of Western civilisation is littered with dead cities, whilst the deeper aspects of its culture have remained, and nature, despite perturbations, remains fundamentally unchanged. The future is with us all the time, in the present. What we build now is the future. 80% of all housing stock in Australia in the year 2010 would have already been built by 1998 (AGO/Shipworth 1999)¹

Long-range planning is, typically, reserved for scientific studies, eg. Climate modeling and the study of phenomena that take place across long periods of time relative to human affairs. These are almost invariably 'environmental' or connected with the environment and the incentive to undertake the studies has come from the 'defence' sector. The earliest long-range, systematic scientific investigations into environmental conditions were undertaken by the English Royal Navy in order to be able to predict the weather on which their vessels, and thus the might of the British Empire, were so dependent.

Climate studies are still primarily about security, although the scope of concern has developed from national to global security. Computers, and the discovery of the mathematics of chaos have made it possible to model complex long-term processes in a short period of time. Currently, the most developed long-range modelling other than for climate simulations is done for the military. At the Lawrence Livermore National Laboratory, in order to study the potential problems of storing nuclear waste in the Yucca Mountains of Nevada, the US Department of Environment commissioned geologists to model the changing structure of rocks and mountains over a 10,000 year time span using 1400 parallel microprocessors controlled by a supercomputer (O'Hanlon 2000). At present, the scale and scope of such modelling can only be sustained by defence-sized budgets but it is reasonable to speculate that effective city modeling with a similar level of sophistication may become affordable within a few years. At a more modest scale, computer simulation of city dynamics is already advancing with tools such as the 'dielectric breakdown model' (DBM²) developed by Batty and Longley to simulate urban growth (Ball 1999 p.246-247). This kind of approach is being further refined by Makse et al to produce convincing models of urban

¹ NOTE 9, Residential Building Baseline Study, BDP Environment Design Guide, p.13. 'This Note presents the Executive Summary of the Study of Greenhouse Gas Emissions from the Australian Residential Building Sector to 2010. The baseline study (and its counterpart, Australian Commercial Buildings Sector) was commissioned in late 1998 by the Australian Greenhouse Office as a basis on which to determine greenhouse gas emissions reduction targets for this sector.'

² 'DBM' is supposedly a physically realistic model for urban growth, according to Ball (1999) because it mimics the way cities expand with their pressure of new development pushing outwards to colonise surrounding land.



growth that quite closely match predicted behaviour with observed cities (Ball 1999 p.251). Advocates of these models claim that 'The time is now ripe for the new approach to cities and urban form for which we have been waiting for more than a generation' (Batty quoted in Ball 1999 p.251). The dynamics of urban management follow clearly discernible and predictable patterns of behaviour to the extent that a program for designing, developing and managing cities has been available for modest home computers for some years. SimCity (Haslam and Wright 1993) is already used for training planners and city managers and the latest versions even include Soleri-like 'arcology' options and 'ecocity' scenarios.

12.2 Invisible structures

It's not enough to change stuff on the design level. The way the whole fabric of the way communal action takes place – the way money flows in society and the way development goes on – needs to change....You cannot produce life by the particular mechanism we have set in motion in the twentieth century to do development. (Alexander in Zelov & Cousineau, 1997, p.263)

That its future is unforeseeable does not alter the fact that its development depends upon the growing consciousness of the people, not upon the growing power of the state – and how that consciousness, concretized in highly democratic institutions, will develop may be an open issue but it will surely be a political adventure. (Bookchin 1995 p.321)

Just as a city needs the highly visible infrastructure of roads and pathways for people and goods to travel on and walls to support loads or divide activities and spaces from one another, so cities need invisible structures too.

These are every bit as important and powerful as visible structures. They can carry value, meaning and messages and they can divide or connect people with each other. Many of us are familiar with the invisible walls which keep us from affecting decisions made by multi-national companies or government. Invisible walls determine which people interact - who is wealthy, who is poor. In a city the invisible structures determine who owns and who controls the making, shaping and running of the city.³ Urban morphology reflects civic structures.

In each of the case studies of Part B the invisible structures were paramount. In the case of Christie Walk, the entire development is taking place on the basis of ethical

³ I am indebted to Shann Turnbull for introducing me to the concept of invisible structures. Shann is an activist for what one might call 'enlightened capitalism' and is author of a number of thoughtful texts based on the proposition that capitalism can be configured in socially responsible ways with structural equity, if the value of money were differently controlled - without the ubiquity of interest, for instance. The publication most pertinent to ecocity theorising is 'Building Sustainable Communities' (Benello, Swann and Turnbull, ed. Morehouse 1989)

investment and extensive participation by the community in the running of all aspects of the project. There are many aspects of the project that would have been eliminated had the financial control not been in the hands of people committed to principles before profit.

Invisible structures eventually become visible. Understanding what they are and the consequences of their revelation in built form has to be a cornerstone of ecocity planning but it is difficult to achieve because of the obfuscatory nature of development processes. The effects are very real however. In 'Welcome, Thinner City' Colin Ward maintains that land speculation has destroyed the functions for which cities arose in the first place with land prices and 'values' undermining the financial viability of businesses and the affordability of housing. (Ward 1989). In Whyalla, it was the hope of most of the original project protagonists that the community land status of the core site would ensure that conventional for-profit development did not undermine the ecological and social principles. It now looks as if this may only be the case to a limited extent.

In researching ways in which to make the Halifax EcoCity Project both financially viable and socially responsible, the author and UEA members made the acquaintance of Shann Turnbull. Turnbull introduced such concepts as Community Land Trusts, an alternative to existing landholding practices 'based on ethical distribution and rational use of resources' and '...designed to hold natural resources like the land, which was created without human intervention, in trust by and for the community' (Benello, Swann and Turnbull 1989 p.32).

Turnbull assisted UEA in its investigations of economic alternatives within the existing economic system and contributed to efforts at drafting appropriate business plans for the proposed HEP development. His major conceptual tool for achieving socially responsible economic development was the Cooperative Land Bank (CLB), and he hoped that the HEP might provide the first opportunity to test the concept in practice. The CLB concept provides:

A means by which a community organisation (ie. a non-profit or for profit corporation representing the entire neighbourhood section of a city with a population of 1,000 to 30,000 persons, or an entire town) can purchase all the land and property within its territory for the benefit of the entire community virtually without the need for outside financing. (Swann in (Benello et al 1989 p.44)

The concept employs a dual system of tenure that separates community economic gain from private property gain to counter the 'grossly inequitable and economically inefficient' present system. Under the present single tenure system private landowners

make money from the appreciation of their property that results from improvements made from community investments in infrastructure funded by taxpayers. Landowners get wealthier at the expense of non-landowners. (Benello et al 1989 p.45)

The CLB is an intriguing and logically consistent idea that turned out to be too difficult to put into practice because ‘the value of all private improvements are captured by a system of space leases over such property’ (Benello et al 1989 p.45) and the issue of combining leases with private property seemed to be culturally, if not legally and technically, impracticable in an inner-city, present-day development project. The introduction of Community Title by the South Australian government has made the CLB more feasible because it makes it easier to disentangle private from public, or community owned, assets, but the full reach of Turnbull’s ideas added a layer of innovation that, despite its merits, could not be accommodated by UEA for the HEP. In negotiations with conventional developers any attempts to introduce radically different programs of land ownership evaporated into a mist of either contrived confusion or genuine lack of understanding.

‘Invisible structures’ are taken here to include any human framework of belief that has the potential for physical manifestation in the built environment. Economic beliefs frame and condition transactions of material and physical resources as well as ideas (‘intellectual property’ in the economic reductionist parlance) and spiritual and quasi-spiritual beliefs have shaped entire landscapes through geomancy. Invisible structures are the connecting systems of human constructed thought and belief that link the mental, emotional and spiritual to the corporeal. The systems of belief codify and thus enable the expression of that connectivity. The following tabulates some of the invisible structures addressed in this thesis:

	Connection	Perceptual Basis	Physical Outcome
Biophilia	Humans with nature	Scientific analysis of sensory perceptions	Designs that suit human predisposition to favour certain environments
Geomancy	Humans to planet and territory	Subjective perception and experience of place	Designs that respond to landscape form and energies, both real & imagined
Social Justice	Humans with each other	Emotional sense of what is fair and appropriate behaviour in a society	Designs that facilitate free and equal interaction between individuals regardless of their abilities

TABLE 15: Invisible Structures (By the author)

In a similar vein: science is a system of codified knowledge, economics is a system of codified transactions, religion is a system of codified belief, citizenship is a system of codified social exchange.

The process of codification is, arguably, what makes complex social behaviour possible. The effective use of any individual artifact depends on shared understanding of its acceptable use. Nothing can be employed in isolation without being dysfunctional. Mumford proposes that ‘...we may lay it down as an axiom that... every labor saving device, every modern material or utility, tends to become a nuisance until it is collectively controlled and integrated into a new pattern.’ (Mumford 1976 p.210).

12.2.1 Geomancy, Sacred Space and Feng Shui

In western tradition the relationship of body to architecture to spirit is, perhaps, exemplified in the concept of the body as temple, the ‘church not made with hands’, but cultural traditions from all parts of the world have related architectural expression to transcendent experience. There appear to be fundamental forms in architecture and design that evoke a spiritual response or a heightening of awareness which Lawlor (Lawlor 1994) relates to elemental patterns in human consciousness. Earth energies have been documented with more or less degrees of credibility in western cultures, with the contentious concept of ‘ley lines’ attracting extensive study and apparently sincere advocates (Havelock Fidler 1988, Watkins 1974). Alfred Watkins claimed to have discovered ley lines and became convinced that they were part of an ancient system of planning. First published in 1925, his book records his observations and ideas, and, complete with numerous diagrams, maps and photographs, with its capacity for being ‘field tested’ carries some conviction. The routes of ancient roads and the siting of towns and villages, churches and monuments appear to be related back to ‘the old straight track’ (Watkins 1974). Often invisible to the modern eye, according to Watkins these ley lines have structured the landscape of the British islands since the beginning of civilization. If so, they may have contributed to the sense of place, and purpose, that is so strong in the old towns. The idea of invisible lines in the landscape is also part of Aboriginal Dreaming. It is interesting to speculate on the possibility of ley lines being similar in effect and purpose to songlines.

‘A healthy primitive people do not advance far towards civilisation before they develop communal gatherings for special purposes.’ (Watkins 1974 p.143) The largest and most important buildings in cultures all over the world have, typically, been constructed for religious purposes. Whether they be ancient Greek temples, Gothic cathedrals or Buddhist temples, there has almost invariably been a canon of geometric instruction associated with their design and construction. Geometry is about ‘earth measuring’ and evidence of attempts to relate sacred construction to the dimensions of

the planet and the movement of the heavens is found from the time of Stonehenge and the pyramids of Egypt onwards (Michell 1972).

In the present era the precepts of sacred geometry are still in use in scattered outposts within various cultures including the Buddhist, Christian and Moslem cultural milieus. In addition, there is revival of the idea that sacred, or spiritually significant space may be a legitimate part of daily life and even be incorporated in domestic architecture. This is manifest in the increasingly popular adoption by clients, architects and designers of the principles of Feng Shui to inform planning and design of domestic environments. Apparent in mainstream lifestyle journals, it is also documented as a significant and valuable contribution to design by 'gurus' such as Papanek (Papanek 1995 p.133). It is worth noting that Papanek identifies Feng Shui within the context of vernacular architecture and argues against acceptance of simplistic aesthetic rationales for design in favour of a context of symbolic meaning because, as he says, 'Too often the study of vernacular buildings is used by the critical establishment to lend historical credibility to some other current fad or fashion' (Papanek 1995 p.135).

In relation to ecological and urban design, Feng Shui can be seen as a way of understanding, or mapping, the energies that make up the 'lifeforce' of nature. According to John Michell it is about

The art of perceiving the subtle energies that animate nature and the landscape, and the science of reconciling the best interests of the living earth with those of its inhabitants. (in Eitel 1984 p.78)



And the role of the Feng Shui expert is to



'...intuit, decode and interpret our environment. They watch for patterns in nature and for the human reaction to it. They listen to the symphony of interrelated occurrences and to the unseen cosmic powers governing the universe and affecting our bodies, minds, and, ultimately, our fates.' (Rossbach 1984 p.5)

Feng Shui is a system of knowledge. It is an empirical system in which methods that appear to work have survived have been maintained in practice. It may be valid as a means of understanding place and ecosystem function by a kind of guided intuition.

Feng shui experts sought out chi'i, the earth's pulse, as though they were the earth's physicians, tapping into the vital energy of the universe. The Chinese took great care when altering the earth's (and) took great pains to avoid tampering with or unbalancing the earth's ch'i... (Rossbach 1987 p.31).

Feng Shui provides a system of codified responses for fitting dwelling to place.

In Whyalla the placement of the Buddhist Meditation Centre was established by geomancy. A Buddhist monk from the Sakya sect circumabulated the ecocity core site and identified the most auspicious siting. The centre of the Gompa (temple) thus found was then marked⁴ and an axis discerned running from the nearby hill of Mount Laura, through the centre of the Gompa to the sea. It was a classic Feng Shui siting between 'mountain' and water. A remarkable aspect of the story of the ecocity development in Whyalla was that the city community, through the city council, supported release of land for the use of the Meditation Centre and it became the first development on the site. Property boundaries and urban planning axes for the entire core site were developed from the initiating point of the geomantically derived Gompa centre. Thus Feng Shui and geomancy were actively and centrally employed in the Placing  and Patterning  of the built environment of this ecocity project.

Later, the position of the Gompa was marked more permanently by the burying of a wealth vase in the ground at the centre point in a Terbum (wealth vase) ceremony undertaken by His Holiness Sakya Trizin, second in protocol to the Dalai Lama. It was the first such ceremony in Australia and was the catalyst for an inter-faith blessing of the entire ecocity core site (see Chapter 8). This ecocity initiative, driven entirely by a non-profit community organisation, helped to Encourage Community  and Enrich Culture & History .

12.2.2 Gendered Space and the Power of Form

For the purpose of this discourse, invisible structures are those patterns in behaviour and thought that are manifest in ways that do not create built form. To a certain extent, built form itself can determine behaviour – if you are surrounded by high walls your freedom of movement and capacity to communicate with others is obviously restricted. The invisible structures of society eventually find physical expression: wealthy people build bigger houses than poor people, fascist regimes build detention facilities for people with traits they consider undesirable, and so on. Winston Churchill is supposed to have said 'We shape our buildings, then our buildings shape us.'

⁴ The site for centre of the Gompa was marked by a thong placed on the ground amidst the salt bush. The thong was chosen because the group was convinced that no-one would bother to interfere with or move a thong, whereas a marker post would certainly have been vandalised. The thong stayed put.

⁵ The small icons inserted in this paragraph are taken from the SHED (Chapter 14) and provide an example of how the author imagines them being used in descriptive and analytical text, or in hypertext applications. This example is a limited one as it was felt that to continue this through the thesis would have been too intrusive.

According to Spain (1992) geographers have been particularly strong advocates of efforts to integrate spatial issues with social theories. Nevertheless:

Geographers are the first to point out the folly of “spatial fetishism,” or the idea that social structure is determined by spatial relations. Yet it is also true that once spatial forms are created, they tend to become institutionalized and in some ways influence future social processes. Although space is constructed by social behavior at a particular point in time, its legacy may persist (seemingly as an absolute) to shape the behavior of future generations. (Spain 1992 p.6)

Spain provides one of the best elucidations of the effect of gender in determining, or influencing, spatial arrangements in the built environment.

In the design, development and maintenance of ecocities there are innumerable opportunities to make deliberate or accidental determinations on the shape of behaviour of present and future generations. Ecological health and social health are intertwined because we are social creatures and cities are social constructs. If gender prejudices are not addressed overtly they will be dealt with, or cause problems, covertly. Just as there is embodied energy in the making of the built environment, so there is embodied value in built form. The spatial structure of buildings is a result of the builders’ knowledge of ‘taken-for-granted rules that govern relations of individuals to each other and to society’ (Spain 1992 p.7). Buildings embody social relationships. In cities, historically ‘Hierarchical social relations produced hierarchical space; egalitarian relations, egalitarian space’. (Bookchin 1986 p.148).

An ‘ecological’ society would contain certain social relations. This thesis maintains that those relations would need to be democratic in form in order that information flows are maximised and to ensure that knowledge and responsibility for action are well distributed in society (see below).

“Spatial segregation is one of the mechanisms by which a group with greater power can maintain its advantage over a group with less power. By controlling access to knowledge and resources through the control of space, the dominant group’s ability to retain and reinforce its position is enhanced’ (Bookchin 1986 p.15-16). One can see this spatial expression of power historically very clearly in towns dominated by castles – or cathedrals. But whereas secret, or controlled, knowledge is about dominance, “Shared knowledge can bind the members of society together.’ (Bookchin 1986 p.16) An ecologically responsive society would need to share information freely. The management structures of urban environments containing multiple networks of systems (water capture, storage, re-use and reticulation, power capture and distribution, waste-as-resource management) would need to have good effective two-way information

channels to incorporate sufficient feedback to retain the responsiveness necessary to avoid systems failure. The requirement for sharing information as the basis of efficient resource management is also a primary precondition for democratic social systems.

In shaping the space of an ecological city, care needs to be taken to ensure that gender segregation is not unnecessarily reinforced by spatial segregation. Although there may be instances where it is deemed necessary, this should always be carefully considered against any relative access to knowledge that may be implied in any such segregation. When set in the context of indigenous and traditional cultures, such a precept can be challenging. Places of 'secret men's/women's knowledge' have become totemic items in Australian debates about indigenous land rights. Whilst respecting the value of such cultures, the positive, liberatory character of city life (Bookchin 1986, Kropotkin 1914) should be taken as the touchstone for decision making regarding gendered space or the creation of any places of restricted access or privileged knowledge. Historically, as Uitz (Uitz 1994) has shown for medieval Europe, city-making has a demonstrated capacity for liberating women relative to their prior circumstances.

12.3 Democracy & Citizenship

Put bluntly and clearly, the municipality would become a theater in which life in its most meaningful public form is the plot, a political drama whose grandeur imparts nobility and grandeur to the citizenry that forms the cast. By contrast, our modern cities have become in large part agglomerations of bedroom apartments in which men and women spiritually whither away and their personalities become trivialized by the petty concerns of amusement, consumption, and small talk. (Bookchin 1995 p.232-233)

A kind of 'ecological politics' is seen in the work of groups like Urban Ecology Australia in their advocacy for the 'Halifax EcoCity Project'. In pursuing ways to bring the ecocity idea into being, UEA has treated the city as a 'theater in which life in its most meaningful public form is the plot.'

12.3.1 Colonisation, Consumers and Citizenship

'Oh! Foxy Loxy!' said Chicken Licken. 'The sky is falling down and we are on our way to tell the king.'

'I know where to find the king,' said Foxy Loxy. 'You had better all follow me.'

(Traditional)

Inherent in the proposition that a single set of principles can be universally applied to achieve place-specific, ecologically and socially appropriate human settlements is the proposition that there is an appropriate way to colonise a given environment so as to create the conditions for human settlement (with all that it

contains and implies) that can be sustained in the long term. The logical extension of this is that if the principles are sufficiently fundamental and robust they could just as well guide the creation of star-ships and extra-terrestrial settlement.

Historically, people have often defined themselves by what they do, rather than who they are. This is reflected in the nomenclature that gives us Smith, Miller, Carpenter. Many cultures have adopted appellations that equate who they are with where they are (Williams 1978). Individuals, families and tribes have also defined themselves by where they come from. Whereas 'Smith' was a name capable of carrying its relevance into the industrial age through its engineered metallic resonance, it is of little more than quaint interest in the post-industrial era. The association of a person's sense of being with their occupation has been strongly linked to economic structures, so



FIGURE 199: Citizens are becoming consumers of the urban environment, with a progressively reduced capacity to influence its making, shaping and maintenance.
(Downton/Dumbleton 1977)

much so that at the societal level it was possible for Karl Marx to define entire classes of society in relation to the mode of production. This way of thinking remains dominant, even as we enter the post-industrial era. We see it reflected in the politics of economic warfare as trade unions continue to fight 21st century capitalist dynamics with theory and praxis developed in the 19th century. We see it in the urban sphere as planners relate their theories of what is desirable to the mode of doing. Instead of defining citizens in relation to the mode of production, however, they define them in relation to the mode of consumption instead. Planners do not plan anymore for citizens, they plan for consumers.

By abandoning the powerful idea of 'citizen' in favour of the concept of a 'consumer', one sees recognition, at least, of the loss of identity previously provided by place, community or productive occupation and its usurpation by a partly post-industrial concept. The idea of 'consumer' allows for mobility, change, and endless variation in patterns of activity, including variants of political and cultural expression,

without any threat to the status quo provided the activity of consumption is maintained. If a smith stopped smithing, it was hard to replace them, their skills were handed on through the family from generation to generation and it was no simple matter to find, locally, the same knowledge and ability. If a worker moved on, because their fundamental value to the production process was based on their unskilled labour, they were replaceable. Even as they moved on, however, they were likely to remain in their class precisely because they had no skills to do otherwise. Consumers are a more subtle and exploitable commodity because they can have any number of skills, move from place to place, change their voting patterns, develop hobbies, change their whole life's direction at the personal level, and yet be no threat at all to the prevailing economic order provided they continued to consume.⁶

By accepting the dominant economic paradigmatic definition of personal value, planners who plan for consumers favour the redundant definition derived from activity and deny the value of citizenship. They run the danger of planning on the basis of definition by opposition and vested interest. Just as the trade unionists fail to deal with the dynamics of contemporary capitalism by working with adversarial definitions of purpose provided by the context of factories and industrialism (the patterns of activism and negotiation adopted by trade unionism are almost always entirely framed by the context set by the employing capitalist interest) so acceptance of definitions based on consumption and its attendant values will serve the interest of that system primarily, and the people so defined secondarily. It is not in the interest of citizens to be defined as consumers by those that plan their urban environments.

Interestingly, the concept of citizen is, in a sense, place-specific, inasmuch as it determines the place of habitation as urban rather than rural. But whereas a consumer lacks rights other than those that relate to the purchase of product, a citizen has rights that cover all aspects of daily existence. The fact of a city is a powerful expression of the inherent human need for interdependence. Cities contain differences, and are unlikely to work well as 'single issue' or ideologically limited environments. Cities are remarkable for being successful because of internal diversity rather than in spite of it.

The political power of cities is undeniable, and history has proved its worth as a cockpit for confronting forces in social change, the demonstrations against globalisation in Seattle and Melbourne being recent examples. Douglas (Douglas 1983 p.202) cites the observation of Cullen and Knox (who, he suggests, are commentating in a manner

⁶ One wonders whether the antipathy towards the unemployed is not exacerbated because not only do

that sees planners as social regulators and ‘middle-class social designers’) that the construction of garden suburbs was a response to fears that the overcrowding of the proletariat in industrial cities would lead to insurrection.

12.3.1.1 The Passively Educated

Democracy is active, consumerism inherently passive. (Swift, 2000, p.12)

Nearly every year since 1995 the author has conducted informal research into the nature of modern Australian citizenship by asking students in Urban Ecology and Urbanity & Landscape classes how many consider themselves to be citizens? Out of a class of 30 or 40, only one or two will raise their hands, after then being asked what rights they have as citizens the typical, often the only answer is, ‘the right to vote’. When asked how many considered themselves to be consumers? Nearly all raise their hands – and when asked what rights they have as consumers the response is ‘the right to choose what I buy.’ Although these straw polls cannot be regarded as having statistically significant scientific value, as snapshots of the knowledge base of Australia’s better educated young people (generally aged 19-22) it does suggest that the civic realm is in a parlous state.

12.3.2 Industrialisation and Urbanisation

Urbanism is not invariably regarded as positive; there is a residual sense of there being an Orwellian refrain of ‘rural good/urban bad’ in the soundtrack of modern culture, epitomised in Australia by the myth of the bush and in the planning culture of the ‘western’ world by the Garden City (Jacobs 1962). Dictionary definitions of ‘urbanise’ includes the destruction of ‘rural quality’ as if that were intrinsically a bad thing⁷. Environmentalism, inasmuch as it is a coherent movement, has been guilty of seeing the environment as ‘out there’ rather than being inclusive of the human environments of cities (Doyle 2000 p.215). But the promise and misery of urbanism have been variously understood and lovingly documented for centuries, and against a background of different times, cultures and locales, it is possible to discern the positive aspects of urbanism. Urbanism is generally associated with positive connotations such as the livability of cities (Crowhurst and Lennard 1995) whereas urbanisation is inextricably part of industrialisation and has to be understood as an historical process. Bookchin differentiates between urbanisation and city-making as an essential epistemological prerequisite for understanding the intrinsic merit of urban life (Bookchin 1992, 1995).

they not produce, but their capacity to consume is also reduced, making them less socially relevant?

12.3.3 The Politics of the City

Throughout history, from ancient Athens to the Italian city-states of the Renaissance to Rousseau's Geneva and the Paris Commune, urban life has been a crucible for democratic ideas and experiments. This remains true today. From Mexico City (where the power monopoly of the PRI has been broken) to London (where the Ken Livingstone campaign fights the whole party system), urban politics challenges the agenda of the political class. (Swift, 2000, p.12)

Regional and town planning and urban design are emotive subjects as perhaps they should be, and cannot therefore be separated from politics.... (Hugh & Roberts, 1979, p.16-17)

Historically, citification has created freedoms that are valuable because they are to do with power relations that are not mediated by the state, nor trammled by traditional social prejudices. It has provided '...an image of a political realm that is neither parliamentary nor bureaucratic, centralized nor professionalized, social nor statist, but rather civic in its recognition of the city's role of transforming a folk or nomadic agglomeration of individuals into a citizenry based on ethical and rational modes of association. (Bookchin 1986 p.167-168).

'Urban Ecology' and 'Ecocity Builders' were both founded by Register on the basis of the idea 'that cities can be consciously designed for the health of natural and human-built environments'⁸. Register is certainly committed to direct democracy and social justice but has seen examples of actions by others and processes that have caused him to be wary. In a letter to Hoyle and the author in 1992, for instance, he writes 'I've seen some of the best of Urban Ecology shot down by some of the worst elements of the 'community' in open process. Democracy in my mind is far better than its lack in public process, but it also has limits, contradictions, and is no better than the people employing it.'⁹

12.3.4 From the Invisible to the Inspirational

It is not enough to deal merely with econometric issues. As with all political issues that reach beyond the 'hip pocket', ecocities must have a visionary quality and some degree of moral imperative in order to capture people's attention, more so, to attract people's engagement and commitment to the processes that might make such cities come to life. An important aspect of the HEP and other ecocity programs has been the idea that they are non-party political in their conceptualisation and realisation. Cities are places which contain political difference. Their great virtue as human

⁷ 'Urbanise: destroy the rural quality (of a district)' in The Australian Concise Oxford Dictionary 1992.

⁸ Open letter from Richard Register 6 July 1999.

⁹ Personal correspondence from Richard Register to Paul Downton and Chérie Hoyle 5 September 1992.

institutions is that they are open to all. If ecological cities are to arise they cannot be so ideologically constrained as to exclude people on the basis of ideology.¹⁰

Environmentalism, when it is reduced to formulaic politics, can be as dreary and uninspiring as any other political 'issue'.¹¹ Bookchin reminds us that mainstream politics is problematical in its dearth of purpose other than the mundane.

Far more than the Right, which practices egoism and class war against the poor even as it emphasizes community virtues, the political middle ground and the Left take up the eminently practical issues of bread on the table and money in the bank, but offer few values that are socially inspirational. (Bookchin 1995 p.239)

Ecocity programs offer the prospect of visions and purpose that can be addressed and understood at the level of individual citizenship. The city is readily understood as a 'place' and as a 'home'. Despite its ever-present mercantile aspect, the city is still seen as more than just a place for commerce. Just as people can be excited and motivated to build their own home, so they can be excited and motivated to address home-making at the neighbourhood and community scale, and at the scale of cities when they are not too large. This is one of the tenets of the Ecopolis theory and it is tested to various extents in the three case studies of Part B. The experiences in Whyalla are of particular interest in respect of the relation between community politics and ethical action.

¹⁰ This is not to say that ecocity development can proceed without paying heed to party politics. When Wirranendi was seeking to engage a concretor to lay the slab for the 'Roman Hut' at Christie Walk the author rejected the lowest tenderer despite his tendered price and technical qualifications to do the job because of his fondness for extremely bad language, propensity to indulge in racist vilification, and support for far-right extremist organisations. He was told this, in the interests of open and clear communication. The concretor that was engaged was slightly more expensive and less skilled, but the quality of the overall project was, arguably, improved by the exclusion of the first tenderer.

¹¹ This was superbly described in Doyle's exploration of party-political/environment-movement interfaces in 'Green Power'.

12.4 Social Interaction and Some Urban Space Relationships¹

The Greek word for city, polis, meant far more to an Athenian like Pericles than a place on the map; it meant the place where people achieved unity. (Sennett 1996 p.39)

An ecological city would encourage community values and community participation at every level of activity. How would this effect city form? Apart from obvious urban accoutrements like civic squares and meeting places it means that building codes should incorporate measures which encourage day-to-day social interaction. In Seaside, Florida, for instance, the developer enforced Code requires all houses to have a porch and that those porches should not be further than a few feet from the street - so that house occupants can be within chatting distance of passersby (Duany et al 1989).

Social interaction is a pre-requisite for all trade, education and entertainment. It is central to the achievement of a sustainable environment as it is through society that all exchanges take place which determine the impact of that society on the physical environment. In contemporary capitalist economies, human beings are regarded increasingly as consumers of products and services rather than citizens. In Adelaide, for instance, the Town Hall now has a 'Customer Service Desk'². This limits the definition of a person to the relationship they have to the systems of consumption rather than the totality of their relationships with each other and the environment as a whole. The concept of a consumer in this sense is unecological. The concept of a citizen defines a person in relation to civil society and thus to all other citizens and to the environment that supports and is affected by the urban constructs of civil society.

In considering the form and functions of urban environments so that social and economic equity are built into design strategies at every level, the issue of local control becomes pivotal. Local control reduces the extent to which external factors can hold a community in thrall. There are a number of levels at which this concept can be applied from the local neighbourhood to the bio-regional scale (the Murray-Darling River Basin, for instance). Having people live where they work is a key element in obtaining effective and meaningful levels of local control, reduction of commuting is important in obtaining better energy efficiencies and both measures lead logically to concepts of

¹ This section is developed around material prepared for a report by Ecopolis Pty Ltd commissioned by the Queensland Built Environment Research Unit (Ecopolis Pty Ltd 1998).

² The role of 'customer' is paralleled by the role of 'stakeholder'. Both are defined in relation to their mode of consumption rather than their status as citizens.

'proximity planning' (putting workplaces near to habitations) and 'proximity hiring' (favouring local people for employment, all other things being equal). This has been put into effect with the building of Christie Walk.

12.4.1 Expropriation of the public domain

The *urbs* in Roman usage were the physical facts of the city, its buildings, squares, streets, as distinguished from the *civitas*, the union of citizens or body politic. That the two words were not interchangeable until late imperial times when the very concept of "citizenship" had declined, indeed to be replaced by caste-oriented names and subjects of the Roman imperium, tells us a very poignant and highly relevant fact. (Bookchin 1986 p. 168)

Civic society requires public space for social exchange. The fluidity of social interaction is conditioned by issues of safety and control of space. Certain preoccupations with 'safety' can lead to expropriation of the public domain by particular economic interests. Expropriation of public space for private use is exemplified in the 'shopping mall' culture in which indoor/outdoor relationships become mediated by control over access and where young people with minimal purchasing power are discouraged from 'loitering' in malls because they are seen as a threat and as 'poor customers' with low disposable incomes. These places became social gathering spaces after the displacement from streets and markets of what had been public domain. Temporal constraints and economic imposts changed the nature of the space from public to privately controlled pseudo-public space. The result has been an environment in which young people are only catered for as consumers, their freedom of movement is restricted and they may even suffer from being seen as threatening to public safety and security.³

The social role of streets and public spaces in cities is widely recognised in urban design literature (Gehl 1987, Sherlock 1991, Crowhurst and Crowhurst 1995, Ben-Joseph and Southworth 1997, Webb 1990), their central place in community has been understood by the most acute urban observers since the 1960s (Jacobs 1962), and Engwicht identified their crucial distinction as 'exchange space' (Engwicht 1992). As emphasis on individual property and space has increased, the public environment has suffered a concomitant decline in quality and distinction through the neglect visited upon the commons. Ecological architect Van der Ryn and new urbanist Calthorpe describe how privatisation of the public realm has diminished both private and public space.

³ Safety is being increasingly defined legalistically, in relation to liability, rather than in respect of human response to the experience of being in the environment.

...our public space lacks identity and is largely anonymous, while our private space strains towards a narcissistic autonomy. Our cities and communities are zoned black and white, private or public, my space or nobody's space... Inversely, private space is strained by the physical need to provide for many activities which were once shared, and is further burdened by needs to create some identity in a surrounding sea of monotony. (Van der Ryn and Calthorpe in Engwicht 1992 p.134-135)

The privatisation of space is dependent on the concept of ownership and with it, relationships are increasingly reduced to, and defined by, economic exchange. Debord (Debord 1970) warns that this is part of a process in which culture is transformed into commodity, and in such a scenario then architecture, even as it represents culture, would be destined to become entirely defined by its value as commodity. This, in turn, presages an urban environment in which the privatisation of all built space and form leads to and supports the commodification of all relationships. City design at micro and macro level is both a result of, and as a means of defining economic and social exchange and there are values embedded in design decisions that are nominally 'functional'.

Built form embodies values. Sennett tracks the built form of prejudice. He explains and describes, for instance, the social and cultural mores that led to the creation and maintenance, through centuries, of Jewish ghettos (particularly that in the Venetian middle ages). Having identified some of the historical and current sicknesses of societies and their refraction into urban form, Sennett goes on to ask, nonetheless, '...if there is any chance in a multi-cultural city, against all the odds of history, that the differences between people racially, ethnically, sexually might become points of contact rather than grounds for withdrawal.?' (Sennett 1996 p.257)

12.4.1.1 Patterns of Space

Medieval Cairo and medieval Paris formed a telling contrast, though to the modern eye they might have seen equally jumbled. The Koran lays down precise instructions for the placement of doors and the spatial relationship of doors to windows. In medieval Cairo, land owned by a Muslim had to be built to these instructions, which were enforced by charitable foundations in the city. Such buildings, moreover, had to relate in form to one another, had to be aware of one another; could not, for instance, block a neighbour's door. Religion decreed contextual architecture, though the context was not one of linear streets. (Sennett 1996 p.191-193)

Apart from its large public buildings, the traditional city developed as a series of small sites and even the grid-iron new world cities of the USA developed on the basis of small lots. (Ward 1989 p.22) Ward argues that this fine grain was part of what made the city legible – understandable by ordinary people without the need for signs to tell them where everything is. 'The functions and functioning of the city were apparent from its built form' (Ward 1989 p.22). It is important to realise that simplicity does not

equal legibility when it is to do with the urban fabric. Not only was fine-grain development 'transparent' to the user, it assisted in establishing the sense of place (Ward 1989 p.22). The build up of many smaller experiences and their intrinsic patterning of relationships through a process of evolved use through time gave a structure to the environment more subtle, pervasive and accessible than that found in modern 'master plans'.

12.4.1.2 Boundary and Edge Conditions

The functionality of urban environments depends on the successful articulation of the relationship of connection and separation between private and public realms. The private/public space relationship often corresponds to inside/outside spaces and to degrees of enclosure. Just as natural boundaries do not have hard edges but are zones of transition between one condition and another, so the transition from one type of space to another in the design of human space should not be regarded as passing through a 'hard' boundary, but be seen as passage through a threshold of intermediate space which can be understood as corresponding to an ecotone within the urban ecosystem. Being the place of interaction, transaction and transition, this interface, edge, boundary zone or urban ecotone is a critical area for consideration, analysis and management.

In urban design, these places of transition may be more, or less expressed with boundary markers. Gateways and thresholds create a sense of arrival, or leaving, and alert people moving through them that the nature of the place/space is changing. An effective gateway controls access by providing appropriate information about movement between different zones of space. Aspects of moving through, experiencing and comprehending space include:

- nodes
- landmarks
- inner and outer realms
- gateways & openings
- pathways
- courtyards
- labyrinths & spirals
- centres & gathering spaces

These can be used as formal, or intentional, planning devices to define the quality and perceived dimensions of urban space(see Chapter 7 for a description of urban design workshops as part of the Whyalla EcoCity Development program). In the long term ecological planning and design has to address the capacity of places to function through time by having sufficient inherent flexibility to adapt to changing circumstances, because as Brand showed, even with the built environment the only certainty is change (Brand 1997).

Planning and design for ecologically sustaining environments should reflect the awareness of transitional space and urban ecotones at the macro and micro level as a means of demonstrating environmental and experiential sensitivity and environmental fact. (Ecopolis 1998 p.55). The author has identified six boundary conditions that derive from consideration of the relationship between public and private domains in urban environments and which thus require particular attention in design as places of interface and exchange, ie. between areas of 1. Private/private, 2. Private/semi-private, 3. Private/public, 4. Semi-private/semi-private, 5. Semi-private/public and 6. Public/public space (see table – adapted from Ecopolis 1998 p.).

1	private	boundary zone of transition	private
2	private	boundary zone of transition	semi-private
3	private	boundary zone of transition	public
4	semi-private	boundary zone of transition	semi-private
5	semi-private	boundary zone of transition	public
6	public	boundary zone of transition	public

TABLE 16: The Public-Private Interface.

It is in these zones that the built environment can either facilitate or mitigate social interaction. For instance, windows that open enable human interactions that sealed windows cannot. If the planning of the built environment forces people to use cars to travel between all their required destinations (eg. home, school, office, park,

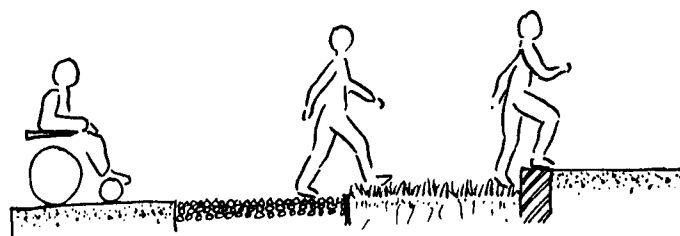


FIGURE 200: One person's barrier is another person's tactile sensation and may be a visual amenity to both (Diagram by author)

shops etc.) their capacity for spontaneous interaction is greatly diminished compared with planning designed around pedestrian traffic. Engwicht's 'exchange space' is a

zone of transition, or ecotone, in this model. The design of boundary environments is intimately linked to ideas of regionalism and environmental responsiveness (see Frampton Chapter 4.3.3). The 'establishment of bounded domains and tactile presences' (Frampton 1987 p.22) can mediate social interaction in both obvious and subtle ways. A visual amenity may be a barrier for one person and simply a tactile sensation for another, as in the adjacent illustration.

12.4.2 The Communal Eye

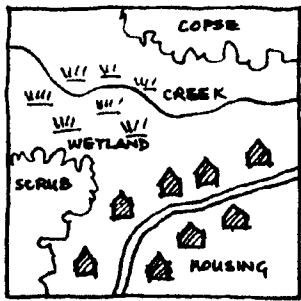
The character of public spaces is crucial in cities. The perception of space and place in urban environments, as well as being something an individual experiences, is also a collective vision.

Through public discourse we need to develop again this 'communal eye', this vision of the characteristics of the buildings and places that are valued, that give a sense of place, identity and meaning to the city. And to facilitate this, of course, we need to create public spaces, streets and squares that are hospitable to social contact, connection and civic dialogue. (Crowhurst & Crowhurst 1995 p.9).

This visual amenity is integral to the creation of built environments as places of social interaction, and thus the human ecology of the city. Any attempt to achieve ecologically sustaining built environments has to support the concept of aesthetic values being generated and informed by an active citizenry, in effect, making the establishment of cultural values a conscious enterprise. We see the world with a cultural eye (see the discussion on aesthetics in Chapter 5 and the reported observation that 'It is only a century ago that mountains were looked upon as hideous.'). Part of that cultural seeing is done with 'mental maps'.

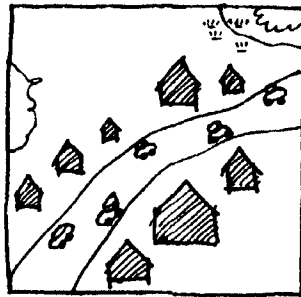
Cognitive mapping is intimately related to the perception of place. Mental maps represent the world as we see it through the filters of experience, with a hierarchy of representation so that the things most important to us loom large in our vision and memory and the less important things assume smaller proportions (Gould & White 1974). Mental maps also distort distance on the same basis of importance relative to the experiential observer. Cognitive mapping may be a useful tool in community participation and education programs, for instance during site identification, analysis and planning processes, and in establishing functional (ie. socially and culturally relevant) bioregional boundaries (as was done in the Bioregion Workshops for the Whyalla EcoCity Development – see Chapter 7).

The following diagrams indicate how the concept of cognitive mapping might represent a change in perception of place according to an individual's level of environmental awareness.



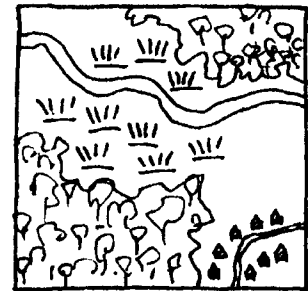
The 'real' map of a place

A



How it might appear to an 'industrial/suburban' consciousness

B



How it might be mapped by someone with an 'ecological' consciousness

C

FIGURE 201: Perception of place. (By the author)

In B and C key environmental elements are drawn with a size and emphasis related to their perceived importance. Neither are 'correct' and both are 'true'. This hints at some of the potential difficulties inherent in trying to balance the complex, inter-related, socio-environmental issues associated with the perception and understanding of place in relation to city-making and ecology.

12.4.2.1 Access and movement

Vehicle movements can sever or damage other social interactions by making foot traffic difficult or dangerous. This has been well documented by Appleyard and others (Engwicht 1992). Access issues are integral to planning all built environments. Pedestrian movement should be paramount, and integrated with other transport systems. If ecologically sustaining built environments are defined as low energy use, community oriented environments then they have to integrate access and movement such that energy use is minimised and social interaction is maximised. Appropriate strategies for achieving such human-oriented integrated planning are well documented, eg. Topp presented Ten Simple Rules of Transportation Planning at the 1st International Making Cities Livable Conference (Crowhurst & Crowhurst 1995 p.77) that spell out the key issues of access and movement and address integration, and in 1988 the European Parliament adopted a Charter of Pedestrians' Rights (Engwicht 1992 p.165-166).

12.4.2.2 Access - Land use and transportation planning

Access issues are integral to planning all built environments. If sustainable built environments are defined as being low energy use, community orientated environments, then they have to be the result of integrating access so that energy use is minimised and social interaction is maximised.

A number of studies have supported this approach. Sustainable urban environments can also be characterised as 'livable cities'. The following is from a presentation by Hartmut Topp (Crowhurst and Crowhurst 1995 p. 77):

Ten Simple Rules of Transportation Planning

1. Make every effort to accommodate the real needs of people. Do not forget the children, the elderly and the disabled. Prepare your plans and programs in cooperation with the public concerned. Urban planning and transportation planning is a social, psychological, ecological, economic, architectural, and engineering job.
2. The prosperity of a city does not depend on private car traffic, but on accessibility in general, on the amenity of its streets and open spaces and - to put it more succinctly - on its genius.
3. Transportation and land use must be balanced. Mixed land use must be achieved to reduce journey distances. High density with mixed land use is effective from the transportation point of view. But don't go beyond the limits of this rule.
4. Mathematical modelling of traffic behaviour and traffic volumes is an important preparation for decision making. But don't stretch it beyond its limited validity.
5. Observe the environmental ranking of transportation modes: walking is preferable to cycling, cycling is preferable to public transit, transit is preferable to private car traffic.
6. Urban streets are open spaces for the general public. Consider all functions of a street - social life, strolling around, providing access to buildings, being a transportation facility for pedestrians, cyclists, public transit and private car.
7. With increasing density the need for traffic regulations and their enforcement grows rapidly. Strict area-wide parking restrictions ; are the most effective measures to control traffic.
8. Most important, especially in high density areas, is urban design and architecture according to human scale. The design quality of a street helps to compensate for the environmental impact of car traffic.
9. The ground level of streets has to belong primarily to pedestrians and cyclists, including wide sidewalks, bike lanes and crossways over the driving lanes.
10. Provide more plantings and trees within the streets, including facade and roof planting, thus opening the sealed street surface, improving street climate and visual impression and hiding bad architecture.

12.5 Economics

Howard's truly original achievement, however, was to associate the new type of city with common ownership of land, not solely as a way of controlling its initial plan and future growth, but equally as a means of securing for the inhabitants the source of wealth and distributing its future benefits for the well-being of all. (Beevers 1988 p.183)

Society constructs money economies as a convenience for facilitating the exchange of goods and services. Cities are constructed to provide for that same purpose, but that is by no means their only purpose. An economy is not a city, neither is it a society. The Ecopolis proposition regarding the economic role of land ownership and development is, at root, not dissimilar to Ebenezer Howard's. It enjoys some of the same problems, prospects and contradictions that derive from trying to work within the prevailing economic order in order to change that order. It is driven by the same concern to precipitate change and produce practical examples because of, and in spite of, the extant conditions of the latter-day economy and society in which it has been conceived.

In the prevailing view of society (the existence of which is not disputed here, despite the protestations of Thatcherites and their ilk) 'The Economy' is taken to be the primary force behind all things. The idea that everything can be reduced to econometrics is a form of economic reductionism. It is only 'rational' inasmuch as it constructs mathematically logical paths for transactions within a framework that excludes more than it includes. Whilst environmentalists are correct to point out that the economic system fails to take account of any number of 'externalities', they should be cautioned that putting a price on 'nature' in this fashion is a way of accepting the 'dominant paradigm' that may play into the hands of those who would reduce the measure of everything to monetary values. In arguing the economic base for any social system or means of valuing 'nature', the costing of externalities, for instance, should only be seen as a partial and tactical response to giving appropriate value to that which is not otherwise explicitly valued in 'the economy' – lest we fall into the old trap of knowing the price of everything and the value of nothing.

'There is no feedback mechanism between money, as a mechanism of allocating resources, and the environment.' (Turnbull 1993 p.15). But society and nature possess inherent worth that need not be quantified in an economic system in order to be valued. Society constructs money economies as a convenience for facilitating the exchange of goods and services.. Cities are constructed to provide for that same purpose, but that is by no means their only purpose. Even city marketplaces have historically served as more than just spaces for economic exchange, as Mumford points out 'Not indeed until

the automatism and the impersonality of the supermarkets were introduced in the United States in the mid-twentieth century were the functions of the market as a centre of personal transactions and social entertainment entirely lost'. (Mumford 1991 p.176). An economy is not a city, neither is it a society. In more dispassionate analyses ' A general view shows that what 'drives' environmental change tends to be economic pressure, and what 'drives' economic activity tends to be social needs and demands.' (Ravetz 2000 p.3) The proper place of an economy is in the service of society.

12.5.1 The Development Process

	Conventional (Greed Driven)	Ecological (Community Driven)
Goal	Merely to make a large profit	To meet community needs and aspirations
Means	Land speculation & community exploitation	Land nurturing and community empowerment
Financial resources	Borrowing from anywhere – mostly banks with profits exported	Ethical investment & LETS – returning resources to the community
Material resources	Anything 'convenient' –Market driven, expedient, capital intensive	Carefully selected – Healthy, environmentally responsible, region specific, labour intensive
Politics	Exclusive, sometimes corrupt, expedient, ego-centric	Inclusive, ethical, open-process, eco-centric
	Nature & people treated as the fuel of economic activity	The economy in the service of the community & the ecology

TABLE 17: The Development Process (Downton 1994)

The table above was published in academic papers and included in the booklet prepared by Urban Ecology Australia documenting the Halifax EcoCity Project. It was compiled in order to draw attention to some of the 'invisible' structures associated with creating built environments and spell out some essential parts of the theoretical basis of the Project. It may be regarded as an overstatement of the differences between approaches to development and is value-laden, but it was intended to be provocative and it can be argued that at least the values are clearly visible! The Ecopolis Development Principles (described in their later form in Chapter 14) were designed to make explicit a set of ideas for ecological, community-driven development.

12.5.1.1 LETS

And given a fundamental level of economic self-reliance in the human scale it is far more likely that people can, to a greater degree, sustain the basic elements of life by their own direct efforts. None of this need be incompatible with the functioning of a sophisticated wider economy and culture. It is more about changing priorities and restoring an underpinning foundation of social cohesion. (Fisher 2000 p.33)

The Local Exchange and Trading System (LETS) runs parallel with, not instead of, the mainstream economy and has an as yet unrealised potential to transform economic exchange at the local level. Michael Linton invented the LETS system. He advised the Halifax EcoCity Project on ways that LETS might be used to effectively

reduce the amount of conventional money (what Shann Turnbull calls 'funny money') required to fund the development. As a first step in this process, Urban Ecology Australia initiated Urban EcoLETS in July 1993; it joined hundreds of successful LETS systems operating worldwide. Urban EcoLETS is still operating. LETS not only provides an economic framework parallel with mainstream economics, it assists in cohering a community of mutual interests.

12.6 Architecture

Loose systems last longer and function better. (Gall 1975 p.93)

12.6.1 Empowerment in the Built Environment



Colin Ward reinforces the observation that when poor city dwellers have been able to 'control their own housing destiny' the results have been positive, not just in terms of providing affordable housing but also for the transformative experiences that self-building provides. It empowers people, promotes collective effort by members of the community and generates self-confidence in individuals. (Ward 1989 p.84-85). Every attempt has been made to factor in self-build opportunities with the case study Ecopolis projects. The Buddhist building on the Whyalla EcoCity core site stands as an example of a successful application of this aspect of ecocity making, and most of the structure of the Roman Hut at Christie Walk was constructed by volunteers and through workshops.

12.6.2 Critical Regionalism – Finding Architecture and Place

Ecopolis is about creating an evolving architecture in a living place, a celebration of what it means to be human, clearly set in the context bounded by the rigorous limits of the biosphere. Nature doesn't negotiate. Architecture has to comply with the demands of natural science in respect to the operation of ecosystems just as much as it has to respond to the physics of construction and the laws of gravity. There is an approach to architecting that is congruent with these aims, and although it is not a movement or style, it is convenient to refer to it as 'critical regionalism'.

In its concern to respond to context, climate and human patterns of use, the 'marginal practice' of critical regionalism reflects an ecological sensitivity and understanding of the role of boundary zones as places which mediate, filter and transmute experience, so that 'It tends to treat all openings as delicate transitional zones with a capacity to respond to the specific conditions imposed by the site, the climate and the light.' (Frampton 1996 p.327). Frampton's precepts regarding Critical Regionalism, being to do with the 'establishment of bounded domains and tactile

presences...' (Frampton 1987 p.22) relate strongly to the perception and definition of place and occupied space and thus the relationships of people to those places and to one another in those contexts.

Frampton tells us that 'Critical regionalism begs the question as to what are the true limits of a region and its institutional status.' (Frampton 1987 p.24) This question arises time and again in relation to defining the city-region and is central to the idea of ecocity design and development. Steps 1 and 2,  'Shedding' and  'Placing' in Chapter 14 are informed by critical regionalist, as well as ecological analysis.

Frampton attempts to eschew the style wars of architectural 'isms' in favour of regional-ism. His concept of regionalism is subtle and connects concerns about the 'ever-expanding power of the multinational corporations' which seeks the elimination of regional differentiation (Frampton 1987 p.20) with the comfort of individual humans in built environments. In his 1987 essay Frampton identifies ten points of critical regionalism as a 'speculative manifesto' to form

...a critical basis from which to evolve a contemporary architecture of resistance – that is, a culture of dissent free from fashionable stylistic conventions... (Frampton 1987 p.27)

An 'architecture of resistance' is a counter to the 'society of the spectacle' in which buildings are presented as a series of scenographic images rather than places of experience.

Frampton's program is perhaps best summarised in the following passage by Speck (Speck 1987), which speaks of an architecture that is simultaneously ancient and informed by history, and modern in its philosophically challenging and questioning approach. It also effectively describes the intention of the design thinking underpinning the architecture and urban design of the three case studies.

Invention that comes from abstract models is particularly vulnerable to irrelevance or misdirection, whereas invention based in tangible realities is more likely to provide true service. Regionalism, as a source for invention, represents a return to basics in architecture – a return to what is primal and elemental. Because it is rooted in physical and cultural investigation, it is de facto a critical and responsive approach. It offers hope for a responsible and eloquent architecture, constantly renewing itself in service to society. (Speck 1987 p.19)

12.6.2.1 Regionalism and perception

Kenneth Frampton's precepts regarding Critical Regionalism, being to do with 'establishment of bounded domains and tactile presences...' (Frampton 1987 p.22)

relate strongly to the perception and definition of place and occupied space and thus the relationships of people to those places and to one another in those contexts. Frampton says, eg. 'Critical regionalism begs the question as to what are the true limits of a region and what is its institutional status.' (Frampton 1987 p.24) Frampton articulates an approach to architecture and the making of buildings which can be seen as particularly relevant to an environmentally responsive design philosophy, eg. in the use of natural light in preference to artificial light, not to save energy, but to model space better and relate the artificiality of constructed environments to the reality of diurnal, seasonal and annual cycles.

Frampton summarises the Critical Regionalist approach as capable of producing '...an architecture of place rather than space, and a way of building sensitive to the vicissitudes of time and climate. Above all, it is a concept of the environment where the body as a whole is seen as being essential to the manner in which it is experienced.' (Frampton 1987 p.27).

12.7 Regionalism

Nor is "consistency" an appropriate way to relate architecture to a democratic political process; a democratic architecture would search for forms that could evolve from a complexity of design interests rather than submerge them into "unified", "consistent" themes. (Goodman 1972 p.139)

In the Ecopolis concept of architecture and the built environment, the making of ecological architecture and urbanism requires that the environments are inhabited - it is the *occupied* state of the built environment that defines it as ecologically alive. The idea that only the praxis of architecture can be regional holds some congruencies to this concept. It holds internal logical preventative measures against seeing objects as critiques. Notwithstanding the capacity of a regionalist building to imply the conditions of its place, the occupation of any building can define it from the critical perspective of those who occupy it. Brand might say that this is 'how buildings learn' (Brand 1997). This fits activity and occupation of place with the definition of the critique and the critique itself and suggests that any built environment may be regional or ecological, This, in turn sits well with the need to re-make, re-cast, and comprehend our built environments in an ecological manner.

12.7.1 The Basic Regional Relationships

The process of creating shelter and human settlement is, of necessity, affected by such things as resource availability, climatic conditions and the effectiveness of social organisation. In tackling the practicalities of construction it is logical to assume that

where there are plenty of trees then the use of timber is an obvious option, where there is a dry climate the use of flat roofs is quite logical, and if society is large and well organised then more complex constructions can be attempted. Fewer, or smaller trees would make extensive timber constructions less feasible, a wetter climate would make flat roofs less desirable, and smaller, less well organised populations would be less able to erect elaborate buildings. In addition, the topography may exert a strong influence on what can reasonably be built - flat sites being generally less difficult than steep slopes, for instance.

It should be plain that regionalism is about a difference in emphasis rather than a major change in architectural style. The differences may be greatly varied but only in limited directions and on a limited number of themes. The superficial differences between domestic doorways in a street may be greater than between doorways in different cities, and certainly greater than those between the doorways of dwelling and city hall, but the regional differences will be a reflection of factors other than those associated with the fundamental purpose of the building.

The structure of the forelimbs in humans, dogs, birds and whales are essentially of the same basic design. These are known as homologous organs because of their shared structural design configuration and descent.¹ Just as in nature so too in architecture we find fundamentally similar components and forms logically adapted to particular circumstance and different emphasis of purpose. Walls, floors, doors, windows, etc are bound to perform essentially similar tasks, but they will vary from building to building and place to place. This variation, when it relates to the overall function of a building, is the difference between building types, when it derives from the difference in emphasis due to climate or other place-related conditions it is a regionalist difference.

12.7.2 Bioregionalism and the Search for Limits

The quest for renewal of the regional is a search for ecological limits. Bioregionalism offers a way of finding those limits from the perspective of both the physical environment and human cultural history. It includes finding out what the actual limitations are - what the limits are on resource use and availability, what limits the climate provides, how the terrain and geology affect what can be achieved, how the social organisations provide the parameters for design, development and on-going maintenance of human settlement.

¹ Koestler, Arthur; *The Ghost In the Machine*; Pan Books; London 1975; p.136.

Criteria for bioregions (Dodge 1998 p.7-8):

- Biotic shift a percentage change in plant/animal species composition from one place to another - that is, if 15 to 25% of the species are different, then the biological regions are deemed to be different. Gradual change - vague and permeable boundaries.
- Watershed, large watersheds may require intradrainage distinctions or sub-divisions eg: headwaters, west/east/north/south slopes etc.
- Landform, closely related to watersheds, almost interchangeable.
- Cultural/Phenomenological, an anthropocentric and essentially romantic criterion - 'you are what you perceive you are'.
- Spirit Places, presences, definition by 'predominant psychophysical influences'.
- Altitude, hill regions having more in common with other hill regions than with lowlands.

As the human species has spread around the biosphere and societies have tended to develop greater sophistication and complexity, so the links of cause and effect have tended to become less clear. In the largest of our modern cities the relationships of shelter and the built form of human settlement with the resource base, climate, terrain and social structure can appear to be so obscure and complex as to be unintelligible. Nevertheless, those relationships are still there.

12.7.2.1 The Same Word for a Place and the People Who Live in It²

Regionalism celebrates a capacity to provide a range of approaches to the solution of similarly perceived problems, it suggests an approach to design more akin to jazz than classical composition (Speck 1987). There is an apparent internal tension, a contradiction within the concept of architectural regionalism which seems to deny the very essence of the idea of regionalism itself, for it seeks solutions which create specific, place-sensitive responses to problems which are *universally* expressed.

With any voluntary architectural surrender to the dictates of the local environment, the idea of 'place' has to be consciously addressed. Whether or not it is experienced as a sixth sense, it does seem to necessarily take us into the realm of ecological thinking as it requires an integration of the elements of both nature and of culture (Relph 1976); there is no 'place' there without the human capacity to engage with it, whether literally or figuratively (Margarey 1996). In discussing the concept of 'authentically created places', Relph (Relph 1976 p.67) reiterates Norberg-Schulz's observation that human life requires a system of places that have structure form and meaning. Relph maintains that the identity of place is derived from '...three interrelated

2 The desire to relate identity to person and place appears to be strong. Already, the future residents of the Christie Walk development are calling themselves 'ChristieWalkers'.

components, each irreducible to the other – physical features or appearances, observable activities and functions, and meanings or symbols.’ There are ‘numberless ways in which they can combine’, there is no limit to the resulting ‘diversity of identities of places, and every identifiable place has unique content and patterns of relationship that are expressed and endure in the spirit of that place.’ (Relph 1976 p.61).

Recent research seems to point to the likelihood that humans have at least some degree of ‘hard wiring’ for directional sense (Phillips 1999). The degree of sensory stimulation and deprivation and their proportional impacts define our entire experience of the world. Our sensing of our place in the environment informs our language and our language informs our thinking about what we perceive.

The Valleys are as committed to the *patria chica* as any *pueblo* of those Spaniards who use the same word for a place and the people who live in it, a practice common in Welsh. (Williams 1978 p.11)

12.7.2.2 Regions, Nazism

The concept of the region is malleable. One or another version of it can be defined to suit use and circumstance; as with the concept of an ecosystem, it is important to establish which view is holding sway in any discussion or analysis (see, for instance, this author’s argument in favour of viewing cities as ecosystems). Dickinson notes that the term region is used to refer to any geographical unit that suits the user but that in the scientific sense ‘it refers to an area in which all places have certain common characteristics by virtue of which it is distinct from the areas around.’ (Dickinson 1970 p.41). Regions may be defined in many ways, none of which are mutually exclusive; a region may contain, overlap, or be contained by one or more other regions; and the built environment may display many regional characteristics at different levels of intensity, in space and in time.

Regions are not simply spatial entities. They have fuzzy edges or boundaries which may change in response to all sorts of factors. Regions are not strictly ‘natural’ phenomena. They are the consequence of human action in and on the environment, and of the human perception of that environment. If city-regions are to be the basis of ecocity design, development and maintenance, then regional definitions are essential.

12.7.3 Bioregionalism Versus Balkanisation

Bioregionalism plays an important and supportive role in the Ecopolis theory but needs to be considered from a critical viewpoint, particularly in the light of ‘Balkanisation’ and the problems that seem to flow from an exaggerated sense of having a place ‘belong’ to any given cultural group. It seems that a ‘sense of place’ can

give way to social pathology when allied to propertarianism and authoritarian power structures. The capacity of an ecological worldview to counter this must be critically considered. The idea of 'region' taken as territory plus the inclusion of the 'life and organization of human communities' was given impetus by German geographer Friedrich Ratzel at the end of the 19th century (Dickinson 1970 p.41). He coined the concept and term 'Lebensraum' which gained notoriety through its abuse in Nazi Germany as an instrument of national policy (Dickinson 1970 p.41). It is difficult not to detect residual concern regarding the use of cultural regional concepts as the basis for planning, something that is inherent in bioregionalism.

Addressing the role of movements like Welsh Nationalism and the vexed issue of nationalism in relation to reactionary politics and regionalism, Berg maintains 'It only takes a slight shift of Global Monoculture's lens to see that these movements stand for more than regressive provincialism. Rather, they embody the ideals of decentralism and biospheric responsibility associated with extremely progressive change.' (Berg 1981 p.27).

Writing about the perception of place and region in literature Magarey warns that 'Like nationality or race, place can be given too much value or too little.' (Magarey 1986 p.113).

12.7.4 Placing

Winikoff et al write of 'Placemaking' as a broadly based community process that involves multiple stakeholders in collectively realising a sense of place.

The best planning, occurs when we all share a vision of a common future which inextricably links us as a community with one another and with our local places. Placemaking is a means to develop such a vision which informs the development and use of a place. (Winikoff 1995 p.82)

What is a sense of place? Taylor suggests 'It is often the difficult-to-describe quality that pervades a space – like the difference between a home, which supports, nurtures, and challenges those who go there – and a house.' (in Winikoff 1995 p.24) This parallels the distinction made by the author which proposes that people and other organisms are integral to the *ecological* description of any architecture or urban construct. In which case, it might be argued that a sense of place comes from being-in-place and may be an intuitive spatial cognisance of the existence of a coherent living system.

Landscape architect Kevin Taylor proposes that, in the making of a 'place', 'The emerging place results from the interaction of these three elements: designers,

community and environment.’ (Taylor in Winikoff 1995 p.24) His insistence that ‘The result is the birth of a new entity, a new place, which has a life of its own and a sense of rightness that is clearly felt.’ is uncritical for there can surely be no guarantee that the ‘new entity’ will be ‘right’.

12.7.5 Finding the Place of Cities

Arguably, without the action of people on the environment, there is no ‘place’. That action may be cerebral as well as physical. As observers of our universe, we can only define (or ‘make’) the universe in response to our experience of it. In the quantum theory of sub-atomic physics the observer is part of the equation, an integral component of the perceived reality; and the nature of the reality depends on the observer. In the more immediate, physical reality provided by our senses, there is no place until we see it to know it (or someone reports it to us). Ours is ultimately an anthropocentric universe of human experience. If our definition of the ‘place’ is one of, say, an ecological city, then it really cannot exist as such unless it is inhabited.



SYNTHESIS III

CHAPTER 13

EDUCATION, ADVOCACY & ACTIVISM

The benefits of the ecological view seem patent to me...But it is in education that the greatest benefits lie.

Here separatism rules, yet integration is the quest. This ecology offers: the science of the relations of organism and the environment, integrative of the sciences, humanities and the arts - a context for studies of man (sic) and the environment. (McHarg 1971)

The urban ecosystem is the most elaborate geographical control-system or integrated resource-management system in human experience. For those who work in any one sector of the system to avoid evaluating the impact of their sector's operation on the rest of the system is unwise....To learn about or to teach about cities without considering both the biophysical environment and the social environment is downright unscholarly. (Douglas 1983 p.206)

13.1 Agents of Change

Ecopolis Proposition 3 states that 'creating an ecological civilisation requires conscious, systemic cultural change'. That change can only come about if people can in some way become familiar with the fundamental ideas that underpin the need to change. This chapter explores cultural 'change agents', those many ways of communicating ideas that inform and affect the cultural, social and individual realms of human life. A number of specific approaches to 'education for an ecological culture' are described, each of which has been attempted by the author to a greater or lesser extent. An underlying theme is that the best education is learning by doing and that knowledge needs to be acted upon to have effective value in changing cultural norms, ie. 'culture' is not a spectator sport or an abstract concept but is about how we live.

13.1.1 Culture and Sacrifice

The western view of 'culture' tends to be historicist, and ideas of modern culture tend to be media-oriented, and all is trivialised by '...the petty concerns of amusement, consumption, and small talk.' (Bookchin 1995). Culture is, amongst other things, about embodying social values in collective action. We do well to review some of our own cultural values before embarking on any critique of it.

Deriving his typologies from an historical review of city development, Lynch shows that what he calls the 'Celestial' city relates to the movement of the heavens through geometric mapping of solar and stellar movement on the ground and how a culture of heavenly worship results. Human sacrifice was often placed at the centre of the ritualistic frameworks which were essential to the continued existence of such civilisations. With the comfortable distance of time between us, we are apt to dismiss such sacrifices as inhuman, cruel and unnecessary. Why sacrifice the youngest and finest of your people in the name of some powerful god? Yet such sacrifice was central to the shaping of some of those cities. It is a lesson in cultural humility to realise that our modern cities owe their form, and are entirely dependent for their continued function on the continual random sacrifice of our youngest and finest to the implacable god of the automobile.

This exemplifies the profound connection between the values we hold and the activities we undertake which are often done without consciousness of how that connection is made. Central to the Ecopolis theory is the idea that something as concrete as city-making needs to be tested in practice before it can have any verity. As all theory-in-action is ultimately mediated by the individual, no matter how collective or abstract its genesis, a fundamental premise is that the theory of Ecopolis requires its practice, and that personal enactment of Ecopolis principles is an essential requirement of those principles. The author has made every effort to abide by this premise¹.

13.1.2 'Capturing the Transmitters'²

Unlike the knowledge that comes from discoveries in other fields of knowledge, ecological understanding cannot be made available in the market-place. It must be built, by general understanding, into the wisdom of the race. (Sears 1962 p.23)

New Urbanist Andreas Duany concentrated on capturing the points of dissemination of the codes and rule books. This is an effective strategy that focuses on the patterns of consumption of key players in the manufacture of the built environment. This can be posited against the need for a more deeply systemic change in the culture as a whole. In the 'modern', 'globalised' world most information and knowledge is

¹ As of July 2001, the author will be consumed entirely in Ecopolis activity through the practice of Ecopolis Pty Ltd in design, as construction manager with EcoCity Developments Pty Ltd in construction, and as 'hands-on' builder and future resident of a dwelling in the Christie Walk project.

² A phrase used by Duany reported in Kunstler (1998).

received by non-experts via popular and mass-media³. Consumers must become citizens lest human life be held in the thrall of economic reductionism.

13.2 Media: Getting the Message Out

I've never needed an intellectual or academic to tell me what cities are about! – particularly the poor parts, I've spent most of my life in them. (Anson 1996 p.189).

13.2.1 Education

The beginnings of the author's attempts to communicate ideas regarding the linkage between ecology and the built environment to a broader public can be found in a short Workers' Education Association course run in Cardiff, Cymru (Wales) in the Northern Hemisphere autumn/winter of 1977. With Ken Shaw (later to be very active in setting up the Cardiff City Farm), the author constructed⁴ an eleven week course entitled 'Ecological Building (Ecology & the Building Process)' organised in three parts: A. The Social and Environmental Context of Building, B. Energy Economics, and C. Zero Energy Building. It was ambitious in scope, asking for exercises in working out energy costs of various buildings, for instance, something that is still difficult to do through lack of readily available information. The 'Zero Energy Building' concept was quite original at the time but has recently emerged in research from the UK as a goal for ecological design. There was very little literature at the time(1976-77) regarding ecological design at the urban scale although some academics in England were working on related ideas (Liddell 1976). An article drafted by the author in support of the course makes interesting reading 23 years later for its apparent parallels with the present developmental state of ecological design and development:

In the early seventies the ecofreaks were the lunatic fringe. By 1975 their basic premises were conventional wisdom. Now it's 1977 and oil companies are investing in solar energy research and diversifying their interests to maintain their control over primary energy sources for when the oil runs out. The eco-house in Britain has seen the light of the sun as an anarchist experiment (Street Farmhouse), as an academic experiment (Cambridge Autonomous House) and as a speculative builder's experiment (Wate's house at the Centre for Alternative Technology). Solar heater companies number over two dozen, have become booming cowboy businesses and are a new growth area for consumer watchdogs. 50% government grants have been proposed for installing solar heaters. Domestic insulation standards have increased slightly and fuel costs a great deal. In short, change is afoot. (From the author's own papers)

³ Although the internet is changing the method of delivery of information and knowledge and is more interactive than 'traditional' media, it is still conditioned by, and is intrinsic to, popular culture and mass-media – much of 'cyberspace' is occupied with the provision of services that reinforce passions and fashions created in other, broadly cast mass-media.

⁴ Ken Shaw did most of the work of presenting the course as the author had organised a trip to the USA in the latter part of that year.

13.3 Exhibitionism: Ecopolis Now!

The cities own everything, govern everything, consume everything. Their pipe-lines and electrical power-grids cross mountains, jungles, tundra; their satellites patrol the frontiers of empty space. The subtle web of their communications wraps the planet in an electronic skin. (Roszak 1993 p.212)

An early effort at 'getting the message out' about the idea of ecocities as 'Ecopolis' was the exhibition 'Ecopolis Now! Escape from the Cities of Boiling Frogs' held at the Old Parliament House in Adelaide at the invitation of the then-director Susan Tonkin in January and February of 1991¹. The invitation came after the publication of an interview with the author by Joanne Painter that was published as 'City of the Future is Green and Clean' in *The Sunday Herald* Melbourne, 14 January, 1990 and republished as 'Future Utopia' in *The Adelaide Advertiser* on the 27 January 1990. This exhibition gave the author an opportunity to give an aesthetic dimension to the Ecopolis proposition (to answer the oft-repeated question 'what would it look like?') and to put into practice ideas on how to communicate the concepts of ecocity design and development in a graphic form in a public venue. Supported by the Gas Company as sponsor and launched by John Schumann, the exhibition attracted a significant amount of attention in South Australia – 'one of our most successful displays ever.' (Tonkin, private communication 4 March 1991). It was an important step on the path towards the formation of UEA and the creation of the HEP (it was through interest in the exhibition, for instance, that the author met Emilis Prelgauskas, who was to play an important role in the creation of UEA and in the initial history of the HEP).

At the time of the exhibition, conceived in mid-late 1990, the idea of ecocities was barely in the public or professional domain. At least one observer traces the rise of the modern ecocity movement to the First International Ecocity Conference in Berkeley held in March 1990 when over 700 people attended from around the world to hear how 'The city can save the world' (Slack 1994 p.27). It was not until 1995 the 'shocking revelation... that the world's environmental crisis is being driven by our cities' (Rogers 1995 Lecture 1) was also being met with the realisation that cities were the key to turning the situation around and that 'Equitable cities that are beautiful, safe and exciting are quite within our grasp.' (Rogers 1995 Lecture 5).

¹ There were a number of other excursions in the media prior to this, including such items as the report by Catherine Bauer published on the front page of the *City Messenger* on 7 February 1990, 'Which Way Adelaide - Lecturer Calls for a Whole New Approach'.

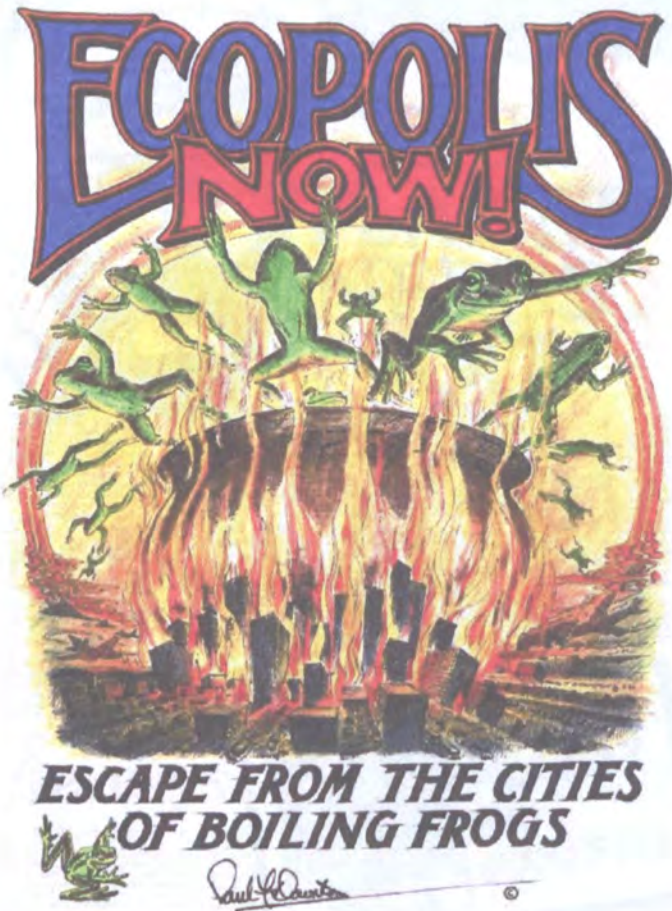


FIGURE 202:
Ecopolis Now!

The poster from the 'Ecopolis Now!' exhibition, prepared for and first held at the Old Parliament House Museum in Adelaide, for the two months of January and February in 1991.

The 'boiling frog' imagery was derived from story the author heard David Suzuki tell on the radio circa 1989. 'If a frog is placed in a pot of water it is happily in its natural element; if you were to heat that pot, the frog doesn't notice the slow change in temperature until it's too late, and it dies.' This urban myth is memorable and has become a staple part of the author's presentations. See also 'Frogstick' in Chapter 13.

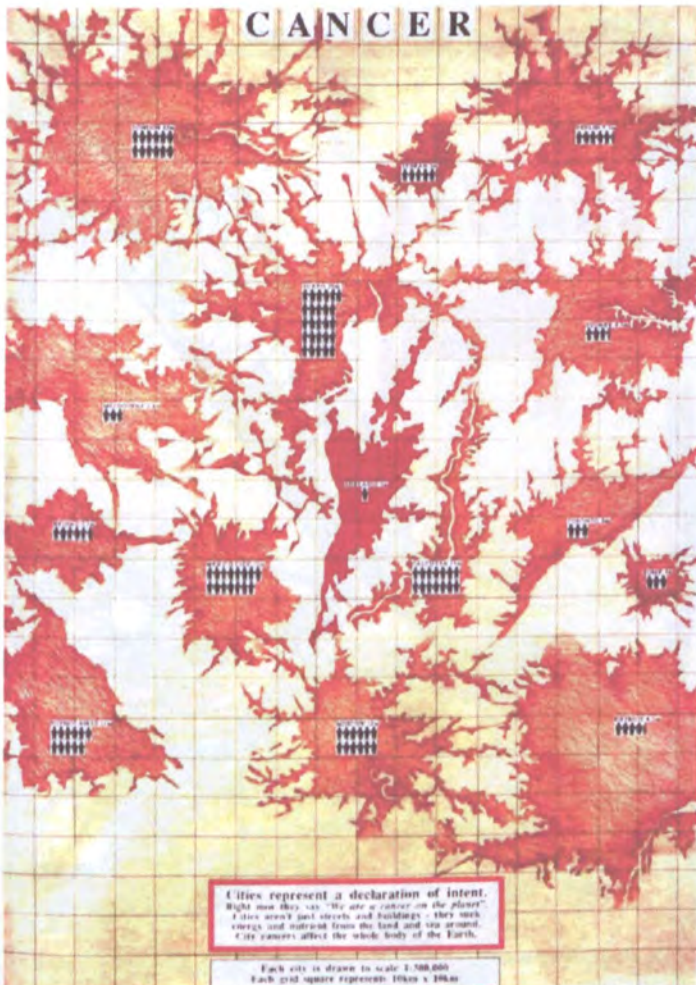


FIGURE 203:
City Cancer

Each city is to the same scale on a 10km grid. City sizes and population figures were drawn from a National Geographic atlas and are approximately correct for circa 1980.

The cities, from left to right, top to bottom are: London, Tehran, Berlin, Melbourne, Tokyo, Sydney, Beijing, Mexico City, Adelaide, Calcutta, Toronto, Rome, Buenos Aires, Moscow and Detroit. The text at the bottom says:

'Cities represent a declaration of intent. Right now they say 'We are a cancer on the planet'. Cities aren't just streets and buildings - they suck energy and nutrients from the land and sea around. City cancers affect the whole body of the Earth'.



FIGURE 204: Your Planet Needs You!

In an attempt to reinforce the idea that there are sufficient human and physical resources to tackle the prospect of rebuilding the world's cities, the author pointed to what was available for waging war. Ironically, the exhibition was launched on the day that the Gulf War began.



FIGURE 205: Beware the Technical Fix!

When the exhibition was on, South Australia was entertaining the idea of building a 'multi-function polis' on low lying degraded mangrove lands around Port Adelaide. There was speculation at the time about the pros and cons of the project but popular consensus was that it was a grandiose political folly (which is what it turned out to be after costing the taxpayer \$100 million). The author was one of very few people prepared to publicly criticise the otherwise popular government of the day on the MFP. Hoyle believes that the political ramifications of this are still current, with UEA still regarded unfavourably by certain political groups because of the trenchant critique represented by this poster.

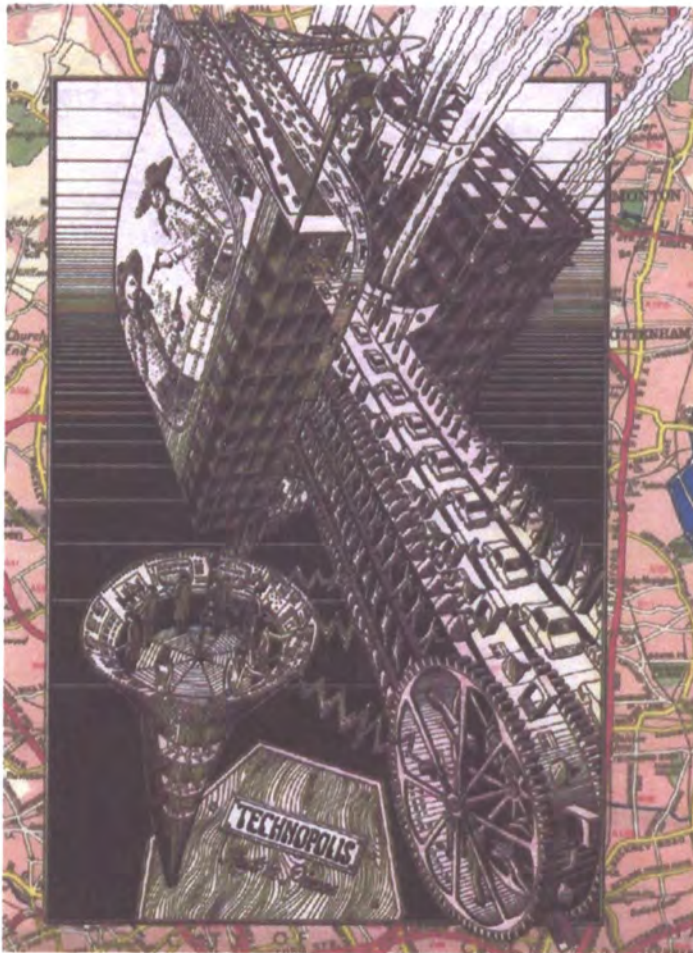


FIGURE 206:

Ecopolis

This panel summed up the Ecopolis philosophy and was produced as a poster for UEA and FoE, funded by Roman (the Hut) Orszanski.



FIGURE 207:

A Sense of Place

The Tandanya Bioregion

This panel introduced the concept of the bioregion to many people in South Australia and was reprinted in the ACF 'Habitat' journal later in 1991 as part of an extensively illustrated article on the Ecopolis idea.

This is the first known image of the bioregion of the Adelaide Plains and the first presentation of the region as a place defined by indigenous people, linked to an ecological perspective. Kaurna people confirmed the general veracity of the bioregional boundary which, it is important to note, extends into the waters of the Gulf of St Vincent.



FIGURE 208:
Desert Power

South Australia is a mining state with large coal, oil and uranium reserves. It also has an extremely sunny climate and a large land area. A number of people over the years, notably Bockris (Bockris et al 1991) have tried to advance the cause of solar-hydrogen as a future energy base for the state, without success. The author included this image to try and bring to life the idea that there could be a different energy base to the economy and that the entire urban infrastructure could be powered by renewable energy through this kind of major investment in solar technologies – with all its positive economic implications.



FIGURE 209:
Going Bush

Based on a view of the landscape around Callington and Monarto, about 60km west of Adelaide, as seen from Emilis Prelgauskas' glider, this image was intended to show how the landscape could be restored to productive, ecologically sustainable use by inserting 'new country towns' into the degraded present landscape.



FIGURE 212/213: Partly as a result of the Ecopolis Now! Exhibition, three drawings were commissioned from the author for an SA Planning Review exhibition through Gavin Jones. They were to be for inner-city, inner and outer suburban sites. The author selected real sites (in keeping with the Ecopolis Principles of responding to actual context). One illustration was of the Halifax EcoCity Project (see Chapter 7), one was of a proposed design for Salisbury City Council which was taken through to full concept design stage with preliminary costing (*above*); and the other was for a suburban block on which the author and his family were living at the time in Myrtle Bank (*below*).



13.3.1 The Power of the Image

For a period of about two years, the initial presentations of Ecopolis ideas were not illustrated with images. This was a deliberate policy on the part of the author, who was determined that the ideas and principles of ecocity development should make the primary impact and that the Ecopolis idea should not be seen as a stylistic posture. After the success of the 'Ecopolis Now!' exhibition and the favourable reception given to the architectural style represented therein, the strategy changed to one in which the power of the image was to be exploited as a means of disseminating the principles that shaped them. The first HEP image, like all the drawings of ecocity concepts prepared by the author, was designed to be readily reproduced (see Figure 64). This has facilitated its dissemination as has been proven by its reproduction with and without permission, in a number of publications (see, for instance, the frontispiece of 'Sustainable Cities', Arkin et al 1992, Ecocity Cleveland p.11, etc). The policy of making images 'media-friendly' has continued with some success. Easily reproducible images are the visual equivalent to media 'sound bites'¹.

Mass-media hegemony makes it a challenge to get ideas into the public domain without them being distorted or obscured. It becomes important to reduce ideas to their essentials and present them in formats suited to media 'sound bites'. Recognising that the media is important and the role of journalists as vital, UEA and the author learned to view journalists as individual members of the community open to education rather than merely representatives of impersonal organisations. This has contributed to a history of mostly positive and accurate media coverage.

City within city ecological first

By Chris Rapson
ANDREW DAVIES

AUSTRALIA'S first ecological housing project being built in the heart of Adelaide has its first residents.

Internet website designer Roman Orszanski, 43, and his son Dylan, 7, have moved into a straw cottage in the development in the city's south west.

Named Christie Walk, the project has been planned for nine years by non-profit group Urban Ecology Australia.

Project managing director Cherie Hoyle said Christie Walk was a milestone because it showed that environmentally friendly developments could be achieved.

"This project will give people the opportunity to live in a way that does not destroy the earth," she said.

About 30 people will live in two straw cottages and 14 concrete townhouses and apartments in Christie Walk once it is completed later this year.

Mr Orszanski said he expected his \$150,000 cottage, made out of 400 straw bales, would be a cheap to run that he "would be selling power back to the grid" within a year.

"It is a very well designed house. It has squeezed a lot into a small space," he said.

Architect Paul Downton said homes would not need heaters or airconditioners because they would be thickly insulated and well ventilated.

The homes in Christie Walk would also be SOLAR powered USING recycled water from the site.

MADE of toxic-free, recycled and environmentally friendly materials.

Mr Downton said gardens would surround all the homes and also be planted on rooftops.

Residents would use a community hall for washing and some cooking.

It would also have space for a small library, wine cellar and workshop.

Prices for homes in the former 200sq m former bottle recycling depot ranged from about \$130,000 to more than \$300,000.

Only one apartment and two townhouses were still available.

Urban Ecology Australia first proposed the housing project in 1992 as an "ecocity" for the former health depot site.

But the plans were not considered economically feasible by Adelaide City Council and another developer was chosen to build on the site.

SETTLING IN: Roman Orszanski with son Dylan at their cottage. **PHOTO: SMITH MARTIN**

FIGURE 214: Roman, Dylan and the 'Hut' provide a media 'hook' for a positive story on the Christie Walk project. (Source: Advertiser 26 April 2001 p.30)

¹ With the architecture of the Roman Hut, the 'sound bite' quality of image-making has, it seems, continued into architectural expression. The author's experience over the first months of 2001 have demonstrated that the Hut is seen as a photogenic artifact. Its obvious difference from conventional architecture sends out the message that 'something different' is happening and opens the door to questioning and dialogue about the principles that underlie its making and the making of the project of which it is a part.

13.4 The Ecopolis Barefoot Architecture Program

The recent history of architecture and planning has created the false impression that architects and planners are the only people who know how to lay out buildings. The evidence from the last two or three thousand years of human history tells the opposite story. (Alexander et al 1975 p.45)

13.4.1 Participation

UEA and Ecopolis Pty Ltd have run a number of workshops in support of their ecocity projects. Through the 'Barefoot Architecture' program a determined (but under-resourced) effort was made to involve people in the evolving designs for complex urban environments. The idea that community participation is integral to ideas of urban sustainability is reflected in European, North and South American and Australasian texts. UK Friends of the Earth researchers note that :

Direct community involvement in the planning and management of the locality can develop into a commitment to sustainability, starting at the local level but visible in a number of dimensions. (Elkin, McLaren & Hillman 1991 p.216)

The editors of Sun Dial are also referring to the UK experience, but it is one that appears to be universal in modern civilisation:

The planning system is very poor at giving people a say in decisions which affect the places where they live, work and shop. The resulting sense of powerlessness is inked to a widespread view that urban areas have been damaged by planners, engineers and architects. (Sun Dial 1998 p.1)

Architects are notoriously ego-driven and have pandered to the demands of capital and fashion rather than popular concerns (Wolfe 1981) There is a tendency for the architectural sub-culture to regard the involvement of non-architects in design as a threat to creativity or a guarantee of mediocrity.

13.4.1.1 Successful Examples of Participation

Examples of participation in architecture are not unknown but neither are they usual. In the design of Ton Albert's NMB Bank in Holland there was a legal requirement to include participatory processes and they were apparently a successful part of creating an original and effective architecture which has transcended its original role as a bank to become a cultural icon and community resource. In Bremen, Germany, one architect in particular is known for his participatory (and ecological) approach to architecture. 'Peter Hübner's architecture is most obviously green in its grass-roofs, untreated timber, and passive solar heating, but it is also green at a deeper level in terms of social and psychological engagement.' (Blundell Jones 1999 p.40). His projects include a school in Frankfurt, a youth club in Möglingen, a kindergarten in Stuttgart

and a crèche in Bremen. Each project involved working with organisers, parents or students and building users, working with elemental, even atavistic architectural imagery and conscious myth-making on the one hand and advanced computer aided design on the other, Hübner has produced architecture that is evocative, organic and successful, built to conventional budgets. His oeuvre demonstrates the potential of participatory, ecological design and stands as an example of what might be achievable at the wider scale of neighbourhood and city-making given the necessary release of constraints that, as his work proves, are mostly in the mind (Blundell Jones 1996, 1998, 1999).

Planning streets and infrastructure can engage the community as much as 'architecture'; given the chance people are quite prepared to work on the size, disposition, extent and type of roads, for instance, that are used in shaping the built environment. This was evidenced in the Urban Design Workshops during the Whyalla EcoCity Development program with UEA and Ecopolis (see Chapter 7). At a less radical level, Newman and Kenworthy note that 'To be successful, traffic calming requires widespread community consultation.' and that 'It can even provide a focal point around which communities can mobilise to fight for more sustainable and socially acceptable solutions to traffic problems' (Newman, Kenworthy & Robinson 1992 p.17) – as happened in Brisbane with the 'Route 20' freeway proposal that precipitated Engwicht into the ecocity fray (Engwicht 1992).

Participation is a key strategy for involving citizens in the making of cities. One might even venture that without a participatory role in the civic environment with real consequences in its urban expression, then a citizen is not a citizen at all but merely a 'worker', 'consumer', or other kind of 'end-user'.

Franklin (Franklin 1999) observes that there are two key premises to ecological design, one is that it is based on an holistic view with the second, related premise, being that product and process are one. Ends do not justify the means because they are essentially inextricably interlinked. This recalls Alexander's early 'Notes on the Synthesis of Form' and the idea of design being about the ensemble of object and context (see chapter 4). By extending the field of action in this way, all potential participants in the outcomes of a design become potential participants in the process by which it is achieved. There appears to be a strong trans-disciplinary consensus on the intrinsic need for participatory processes in models of ecological design. Although she

lapses back into the use of the 's' word,² this is succinctly expressed by this landscape architect in terms that fit that design:

The ecological design process is inclusive and basically democratic, a relationship of consenting equals that builds consensus as a project proceeds. In traditional design relationships, we successfully divorce many of the obvious partners from the design process. Redefining the players and their roles, breaking down old boundaries, and empowering new parties in new partnerships is critical to a sustainable design process, which is inherently representative, interactive, and consensual. (Requiring)...new and unexpected partnerships, where all concerned parties are empowered to advocate for their needs and desires. (Franklin 1999 p.18)

This change from a 'traditional' to 'inclusive democratic' approach has been integral to the ecocity work of Ecopolis and UEA from the outset. For the author, it evolved from architectural preoccupations informed, as we have seen, by an intellectual and political allegiance to non-authoritarian social structures and continual questioning of the status quo in architecture, design and planning.

13.4.2 Barefoot Architecture

By enabling people to be involved in the development process and participate in the 'barefoot architecture' design of their own homes, the Halifax EcoCity Project is leading the struggle to democratize the built environment. Public art will be part of the fabric of the Project but, unlike the ubiquitous bureaucratically-dictated chrome pretzel, it will speak to and for the residents because they will have a hand in its creation. Like a kind of architectural Mandelbrot set, the basically simple structure of the architecture will generate a cohesive pattern, within which an abundance of artistic detail can flourish in the many public spaces, created with the assistance of experienced community artists. (Munn 1995 p.61)

In the case study projects, the idea of integrating 'inclusive democratic' design processes was tried by way of what became called 'barefoot architecture'. The term was inspired by Manfred Max-Neef's phrase 'barefoot economists' which was in turn inspired by the 'barefoot doctors' of Mao's revolutionary China. A similar sensibility is reflected in Engwicht's observation that the training of engineers and town planners 'must take on a life-experience orientation.' (Engwicht 1992 p.81)

After several years of trying to make the principles of barefoot architecture a means of practice it became clear that, at the Centre for Urban Ecology, even with the support of a number of energetic volunteers, the exercise was hopelessly under-resourced and lacked enough people with sufficient architectural skills to provide the kind of enabling and educational service demanded by the concept. There was, nevertheless, a period of high creative energy and a sense of accomplishment that gave

² That is 'sustainability' which she earlier condemned for its implication that 'if we just develop carefully and responsibly we can continue to over-populate the earth and to build what we like.'

people who might otherwise never have worked with an architect an opportunity to learn a considerable amount about design generally and ecological design in particular. For the volunteer 'experts' there was the benefit of unusual and valuable experience with long-term value.

Digby Hall, member of the Project Design Team, commented on the BAP at one of the on-going public meetings about the Project convened in Adelaide in December 1994:

The BA (Barefoot Architecture) program has now become an integral part of the drawing office and is a constant source of interest and inspiration for all of us. The development of a BA client Database has enabled us to keep up to date with the growing number of clients who have had at least one Barefoot meeting. We have had meetings with almost 50 clients so far.

And Design Team member Glenn Versteegen³ describes the Program thus:

The development of the city as we are now familiar with it in Australia has led to the segregation of individual households and the removal of the opportunity for people to express themselves. Our communities have been fragmented and the making of our dwellings has been removed from us in every possible way. The EcoCity provides its inhabitants the opportunity to live in an ecologically sustainable manner. Of equal significance, however, is that the EcoCity gives people the chance to express themselves through their dwellings.

...This is the significance of the Barefoot Architecture Program - it returns the ability to be a part of the making of a dwelling to the people to whom it matters most - the occupants. The dwellings will suit the occupants but this is a small matter, every dwelling should do this. The dwellings in the EcoCity will be crafted things, each one expressly unique and uniquely expressive of those who live in it.

Essentially the difference between the EcoCity and a conventional development is not as vast as it might seem. Developers make decisions regarding a development purely for their own benefit. The inhabitants of the EcoCity also make decisions regarding the development for their own benefit.

The Potential Residents Meetings which were the preamble to entry into the BAP also prompted the creation of the future community of Project in an embryonic way as people met some of their potential neighbours. This outcome reinforced the idea that 'community' comes before the buildings in the Ecopolis approach to development and contributed to the resilience of the whole UEA organisation in the face of disappointments with the eventual fate of the HEP. A number of the future residents of Christie Walk are 'ex future residents' of the Halifax EcoCity Project.

³ Glenn Versteegen and Digby Hall were both with UEA and the Ecopolis design team for over 3 years. Glenn joined the team after making a trip from Victoria and finding that the HEP fitted his sense of social purpose in architecture. He has battled the rare Fabris disease all his life but was an energetic contributor to the work at the Centre for Urban Ecology.

13.4.3 Popular Communication Methods

Part of making multi-faceted concepts like ecocities understandable is the use of communication to which people can easily relate. Architectural models and drawings, for instance, are all too often deliberately complex, arcane, or obtuse in their meaning. Ecocity drawings and models should be understood by non-professionals.

In the Halifax EcoCity Project and Whyalla EcoCity Development some drawings and many models were created by non-professionals working with the Ecopolis Design Team. The aim was always to use techniques which inform rather than tantalise. At the same time there was always attention given to aesthetics which was continually tested through being developed in an open, semi-collective working environment.

13.4.4 Getting the Numbers Right

In the attempts made by UEA and Ecopolis Pty Ltd to achieve a participatory design approach the number of people involved was never great. In a related exercise with the members of the Koorunga CoHousing Cooperative designing a permaculture co-housing development in Burra, the group size of 8-10 seems about the maximum that could reasonably be dealt with coherently. This observation is reflected by Alexander in *The Oregon Experiment* where he says that 'no group of more than about 10 people working together can comfortably undertake a building project.' (Alexander et al 1975 p.64)

Alexander also claims that, though people can successfully participate in small projects, they cannot be properly involved in the design of large projects such as building complexes and redevelopment projects. In his third reason supporting this view, Alexander says that people 'will take part only if they feel responsible for their environment; and they feel responsible only if they can identify the parts of the environment which belong to them. Large building projects do much to rob people of this feeling.' (Alexander et al 1975 p.65) Without the benefit of having read Alexander at the time, the author conceived the idea that a large project, in particular the Halifax EcoCity Project, should be designed overall in such a way as to enable its development and design in 'bite-size chunks' that could be comprehended by relatively small groups of people and that each had a character and sense of place which could be finally defined by the involvement of future residents with its development. This approach is being tested with the current construction of Christie Walk (see Chapter 9).

13.4.5 Healthy Builders

Building is a complex activity. It makes people aware and take heed at different levels: at the level of having to make pragmatic decisions; of envisioning architectural spaces in the mind and on paper; and of committing one's whole being, mind and body, to the creation of an ideal. (Tuan 1979 p.106)

From the builder's point of view there is more consideration and work required to produce a given floor area of housing when ecological material choices are combined with individualised design, but there is potential for much greater job satisfaction. There is less of the stress associated with doing endlessly repeated construction operations with identical components.

A construction site is often something of a battlefield, with the needs of construction workers set against the needs of capital-intensive industry and where the only antidote to the pressure of that industry, and maybe the only way to ensure a fair slice of the cake, is to go slow. The proposition behind the Ecopolis approach is that the time spent on site may be the same as with currently normal approaches to building, but the time will be spent in more varied and creative tasks. The theory is that rather than be merely the extension of a machine fulfilling the plans for maximising the investment of distant capital, the building worker is put back into the picture as an integral part of the creative process, liaising with occupants, clients, architects and others as part of a team. With the whole project also set up to create a healthy environment, the building process itself becomes closer to life-enhancing exercise with the elimination of toxins and pollution contributing directly to the physical health of all concerned.

In the Christie Walk project, UEA and Wirranendi were compelled to create a building company because none could be found that satisfied the client as to their preparedness to work with the client for a reasonable price. In the event, this has provided very thorough engagement with the construction process and has brought the concept of an 'across the board' team approach much closer to realisation. Although there are still problems with the occasional recalcitrant sub-contractor⁴, the overall result has been that the work site has a co-operative and positive ambience. Some workers have been able to return to the construction industry because of the absence of

⁴ There have been major 'teething troubles' with site management too, attributable to inexperience on the part of all concerned, ie. the board of Wirranendi Inc., and their appointed site manager.

toxic materials and finishes in the buildings⁵, others have been able to enter the industry for the first time.

13.5 Education and Community

Not industry but education will be the centre of their (citizens) activities; and every process and function will be evaluated and approved just to the extent that it furthers human development, whilst the city itself provides a vivid theatre for the spontaneous encounters and challenges and embraces of daily life. (Mumford, 1961/1991 *City in History*, p.653)

There is no question that at present the university offers a unique combination of circumstances which allows some of its members to criticize the whole of society. It provides time, mobility, access to peers and information and a certain impunity – privileges not equally available to other segments of the population. But the university provides this freedom only to those who have already been deeply initiated into the need for some kind of obligatory public schooling. (Illich 1973b p.43)

The contention of the Ecopolis thesis is that education regarding the making of ecological cities has to become part of the culture and at the same time not be élitist and separate from the daily life and concerns of ‘ordinary’ citizens. It is not unusual to hear people say that environmental education in schools is a good thing and that it is only when such an education has been the basis of everyone’s learning experience that we can expect to see environmentally responsible behaviour as the norm. This popular view supports Illich’s contention that the school is ‘the reproductive organ of a consumer society’ (Illich 1973b p.77) but fails, or chooses not, to recognise that if we rely on schools to educate people there will always be a tendency for the adult population outside of formal learning institutions to be ignorant relative to the current state of knowledge. The internet has provided one means by which this adult ignorance can be, and perhaps has been, countered to some extent and Illich presages this in his 1973 *Deschooling Society* in his chapter on ‘Learning Webs’ (Illich 1973). In this chapter he is calling for what amounts to direct democracy in learning without coercion, and institutional control - encouraging spontaneous communication supported by ‘liberated’ access to skills and knowledge. In some respects this is similar to the concept of urbanism discernible in the work of Alexander, Jacobs and Engwicht in which well-designed or successful city environments are those that support multiple levels of communication, where zoning and hierarchic design has not diminished or prevented the potential for people to trade, exchange, meet in spontaneous rather than predetermined patterns. In this scenario, to accelerate the increase in the level of knowledge in the wider community, ecocity ideas would need to be exchanged and

⁵ Notably Ian Rundle, who had been made ill by working with conventional materials and processes but has returned to construction with a vengeance as one of the key people in the Christie Walk building team.

promulgated through non-formal, non-institutional means rather than formal mechanisms in schools and universities. By way of acting on this perception, Urban Ecology Australia, as a non-profit educational institution, has worked predominantly in the non-institutional 'community' sector. Through the process of working with UEA in creating the ecocity projects described in Part B, the author has consciously tried to encourage learning through environmental experience and sharing of information and ideas through peer networking.

At the same time, UEA has been responsible for many presentations to schools and tertiary institutions and the case studies, notably the Halifax EcoCity Project, have been adopted in various forms in curriculum material.

It is pertinent to note that, whereas there has been much published material on various aspects of ecocities and urban ecology in the past ten years, there are relatively few texts that condense the topic in a manner that makes it quick and easy to digest. Some of the best work has been done, ostensibly, for children. In particular, American Urban Ecologist member Nancy Bruning's (Bruning 1992) entry in the Children's Press' Saving Planet Earth series, aimed at young people, puts many adult books on the subject to shame. To quote the Urban Ecology Bibliography co-editor David Munn 'The book begins with an appealing vision of what it would be like to live in a clean, safe city where we could walk or cycle to school, work or shops. It then gives a grim account of why our cities are not like that and how they waste resources, harm our health and destroy nature. The solutions to these problems are then outlined with practical examples of people in various countries working to make their cities ecological.' (Downton & Munn 1996)

Unfortunately, books and other publications, even intensely active and exciting public meetings, can do little more than stimulate the imagination. The problematic is inherent in the process. As Illich said in regard to 'Celebration of Awareness' 'We can only live these changes: we cannot think our way to humanity. Every one of us, and every group with which we live and work, must become the model of the era which we desire to create.' (Illich 1971 p.17). Part of the contention in this thesis, and the primary rationale behind Urban Ecology Australia's efforts to move from the realm of theory into practice, has been that building 'a piece of ecocity' would provide the best means of demonstrating and promulgating ecocity ideas. The case study projects were all intended to have educational processes and results integral to their design, construction and maintenance.

13.6 Thinking Machines

There are many and diverse aspects to ecocity design, development and maintenance including: water management, energy systems, air quality, waste and resource management, construction materials selection and use, food security, biological systems design, habitats for non-human species, disease vectors and amelioration, aesthetics, urban design, place making, bioregionalism, geomancy, spirituality, the role of professionals, gender, education, civil liberties, civics, competition, cooperation, and the role of community. In order to make sense of the complexity and diversity of human affairs we are compelled to employ simplified versions of reality, to model the inter-relationships of society and thus, for the purpose of ecocity theory, the links between the various activities of city design, making and maintenance as the basis for reviewing the type and extent of changes in both those activities, and their relationship to one another.

Patrick Geddes sought ways of expressing complex concepts regarding human settlement by reducing them to diagrammatic essentials. Geddes used 'Folk', 'Land' and 'Work' as convenient ports from which to launch his exploration of the many relationships that conspire to make up human settlement. Independently of any reading of Geddes, the author found that there seem to be three irreducible parts to the human settlement equation that can be called 'People', 'Place' and 'Work'. They might also be thought of as 'Community', 'Ecology', 'Activity'. The inter-relationship between these elements may be regarded diagrammatically thus:

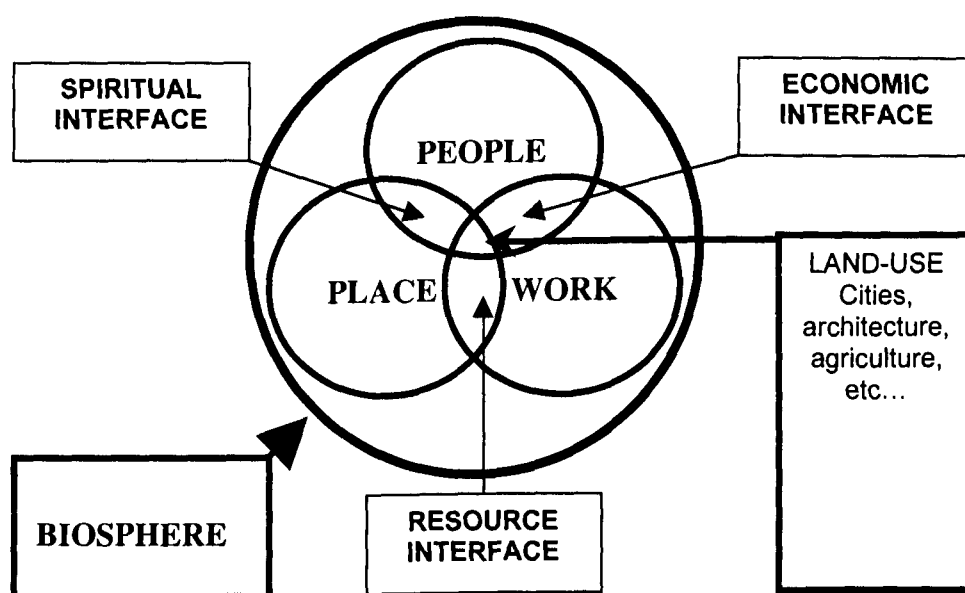


FIGURE 215: 'People Place Work' A diagram deriving inspiration from Geddes that identifies the main interfaces of human activity that determine land-use. (By the author)

Here the study of Place grows into Geography; that of Work into Economics; that of Folk into Anthropology. But these are commonly studied apart...here we have to bring them into a living unison. Place studied without Work or Folk is a matter of atlases and maps. Folk without Place and Work are dead...So too for economics, the study of Work, when apart from definite Folk, comes down to mere abstractions. (Geddes in Kitchen 1975 p.323-325)

The intent of the Ecopolis Development Principles described in Chapter 13 is to find ways of addressing the essentials of human settlement while at the same time reinforcing their interactive and interdependent nature. Taking Geddes' 'Notation of Life' diagrams (one of his 'thinking machines') and discourses, it is readily possible to see correspondence between the development principles and his 'Place/Work/Folk' (Chord of Simple Practical Life) continuum. Development principles 1 to 3 relate to Place, 4 to 6 relate to Work, and the remainder relate to Folk.

13.6.1 The Outlook Tower

'On which point, 'Outlook Tower' is a pretty ordinary name isn't it?

'Maybe. But it's actually a tribute to a bloke called Patrick Geddes who, in many ways, started this whole idea of holistic planning and ecological development. He created an Outlook Tower in Edinburgh as a sort of educational tool to show people that their city was not just a 'thing' all on its own but a hive of human activity and culture in the middle of a living landscape. We think that he'd like what's happening here.'

'Where can I find him?'

Sunny laughed.

'I think he's been dead for over a hundred years!'

(Downton 1996 p.16-17)

After discovering the work of Geddes and both its parallels and relevance to Ecopolis ideas, the author incorporated an 'Outlook Tower' in the Halifax EcoCity Project proposal intending it to have a similar function to the Geddes original. In the short story, 'Whyalla Why Not?', published by UEA as a means of introducing the ecocity consultancy and community participation program for the Whyalla EcoCity Development, the author employed the device of an imaginary Outlook Tower to introduce an overview of Whyalla as an ecological city in the year 2021 (see above, and Chapter 7). The Tower is an educational device. It may appear quaint now that we have computer imagery, databases and an internet that enable ready access to massive amounts of data and images from local to global scales. Nevertheless, physical models of the environment possess a beguiling attraction. There remains a possibility that something of the Outlook Tower idea may resurface in the final stage of the Christie Walk development.

13.6.2 Fiction as Education

As was noted in the commentary on Morris and Callenbach in Chapter 4, utopian novels can be effective vehicles for presenting ideas. The fictional form is more honest than that of literature which purports to be fact but presents material in a slanted way, or is embedded with values that are either there by default or deliberately misrepresented in order to exploit the preparedness of readers to believe what they read. By allowing the author to present ideas about society, culture, etc, in an integrated, fictional manner, more complex propositions can be made about the nature of those ideas. For instance, the description of the merits of solar energy may be presented as a factual list, or a story might be constructed that engages the reader in a process of imagining the use of solar energy in a realistic situation. Although the list may be more formally and objectively accurate, a moderately well written fictional narrative may convey more information and be more explicit about the relevance of that information to the reader.

The author has used the fictional narrative form to communicate ecocity ideas on four occasions⁶ with some success (gauged by immediate and subsequent responses from listeners and readers) and considers it to be a valuable tool in the educational process. In the case of Whyalla the story was written with the deliberately provocative ending 'The first part of this story is true. The rest depends on you. What would you see from the Outlook Tower?', and a request for readers to send their view from the Tower to the Centre for Urban Ecology. This prompted local teachers to run a successful competition for school students in which they had to respond to, or continue the story.

Amongst the outcomes that have come from the UEA promotion of ecocity projects and ideas, there have been self-publishing exercises which use fiction for educational purposes. After EcoCity 2 Garth Dutton was inspired to publish a book of environmental short stories (Dutton 1992). Emilis Prelgauskas produced a book of short stories sketching various scenarios based in and around the hypothetical future existence of the Halifax EcoCity Project (Prelgauskas 1994).

⁶ 1. 'Letter from Kangaroo Avenue', presented as an informal paper on a couple of occasions in 1989 and subsequently published in an abridged form as the exhibition brochure for *'Ecopolis Now! Escape from the Cities of Boiling Frogs'* in January 1991, also later published in *'Raise the Stakes - The Planet Drum Review'*, no. 23, Summer 1994 (Northern Hemisphere); 2. 'Frogs Fight Back: A Future History of the Ecopolis Project' presented at *Ecopolitics V* in April 1991 and published in the Proceedings the following year; 3. 'The Art of Living', p. 6 - 8, *Artlink* - Special issue on Art, Architecture and Environment, Vol. 11, no. 4, Summer 1991/92; 4. *Whyalla Why Not?* Published in 1996 by the Centre for Urban Ecology, Adelaide, in support of the Whyalla EcoCity Development community participation process.

13.6.3 Urban Ecology in Academia

Historically, architectural design and urban planning have been able to exist very separately from 'ecological' subjects. Within the academic environment, although a 'university' may evoke concepts of integration, of a bringing together of knowledge, the reality is a kind of divide and rule, with the separation of things being more important than their integration. In the author's experience there are few linkages between subjects within a course, let alone between courses.

The author introduced the subject of Urban Ecology to the undergraduate programs at the University of South Australia in 1992 and after a couple of years succeeded in getting it into the core of the syllabus. The concept of urban ecology adopted for the development of that syllabus had been borrowed, in the first instance, from American eco-city activists, and subsequently used as the focus for developing a theoretical framework able to accommodate the essentially pluralistic nature of a growing eco-city movement. This dissertation is inevitably connected with the author's endeavours as an academic and his work with UEA, Ecopolis and the case study projects has profoundly informed his teaching and research activities⁷.

13.6.4 INTERNational Outreach and Education

Since 1993 UEA has hosted interns from overseas. These young people have come to work at the Centre as volunteers in exchange for the learning experience and free lodgings. They have come from Denmark, Malaysia, Germany, Canada and the USA and have made important and useful contributions to the life and work of the Centre. Their topics of study have generally been directed by UEA in consultation with each student. Some of the students had expectations regarding their studies set by their home institutions, others had no institutional allegiances and were pursuing personal growth and adventure. Each intern has produced a report.⁸ In particular, the work of Thomas Jensen (1994), Norbert Schulz (1995), Neils Lautsen (1998), Wilko Kannenberg (1998), and Nina Creedman (2000) have contributed directly to material cited in this thesis.

⁷ In the 2001 academic year Urban Ecology and other environmental subjects which had been introduced by the author and had run successfully for a number of years, were deleted from the syllabus in a move which subsumed 'environment' in broader, less specific course material. The author subsequently delivered a letter of resignation in April 2001 and left in July 2001 with extreme misgivings about the future of ecologically responsible education in the School of Architecture and Design at the University of South Australia.

⁸ Several of these reports are listed in the Bibliography.

13.7 Shadow Plans

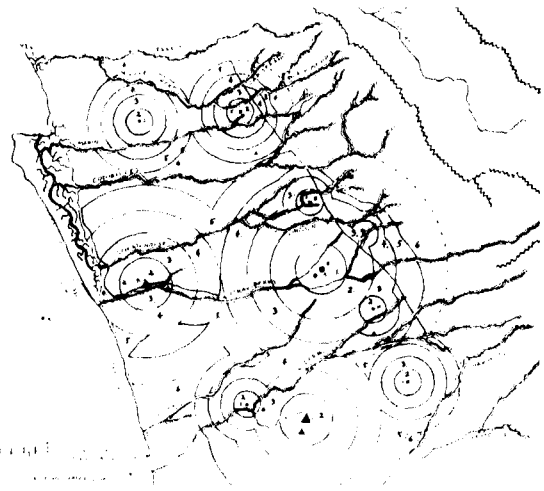
Take time you earth fullas.
 Let the spirit of this mighty
 Land touch you as it
 Touches my people.
 (Noonuccal and Noonuccal 1988)

13.7.1 The Birth of Shadow Planning

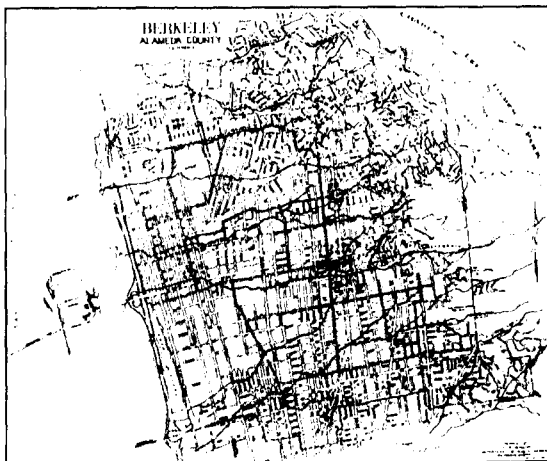
Richard Register first explained the ideas of what he later came to call ‘shadow plans’ in his chapter on ‘Mapping Out an Ecocity Strategy for Berkeley’ in *Ecocity Berkeley* (Register 1987 p.119-130 – see diagrams below). In the 1987 book he refers to ‘ecocity zoning’.



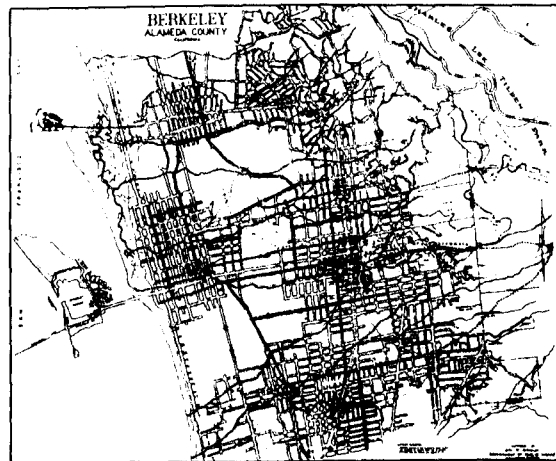
Map 1. BERKELEY BEFORE EUROPEANS ARRIVED



Map 2. ECOCITY ZONING GUIDE—
 SELECTING CENTERS, MAPPING ECOCITY ZONES



Map 5. BERKELEY, 15 TO 50 YEARS HENCE



Map 7. BERKELEY, 40 TO 125 YEARS HENCE

FIGURE 216: 'An Ecocity Strategy for Berkeley' (Source: Register 1987 p.119-130)

The term 'shadow plan' came after Register visited Adelaide as guest keynote speaker in 1991 for the Second National Greenhouse Conference, organised by UEA. At the conference he met a shadow minister (Hon David Wotton) and became intrigued by the idea of 'shadow' power structures – the American political system does not have a direct analogue. By the time of the EcoCity 2 Conference he had taken to the terminology of 'shadow planning' or 'shadow zoning'. In his proposal for redeveloping the Alameda Naval Air Station, Register describes how the term was derived and, broadly speaking how it is applied. It is quoted at length because it gives an insight to the thinking behind the ecocity zoning concept, the American view of parliamentary democracy, and how the Shadow Plan of Adelaide might be regarded or used.

The term 'Shadow Zoning' comes from the 'shadow ministers' and 'shadow governments' of some parliamentary countries like Australia, where the idea appeared at the Second International Ecocity Conference in Adelaide, Australia in April of 1992. Shadow ministers belong to the party that is not in power at a particular time. These people are those most likely to assume the ministry positions should a new government be formed... The shadow ministers have great influence and are sought out by the media as key critics of the present administration and are a channel for new ideas into the system.

So too for Ecocity Zoning, and therefore the occasionally-used term 'Shadow Zoning'. The term is a nod to the fact that at this early stage there are no city-approved and functioning Ecocity Zoning Maps in existence, though some exist and function to give guidance to environmental activists and planners. However, the legitimacy of powerful thinking in sync with the times is represented by these shadow maps, and they relate to future truths ignored by present zoning, truths that are not easy for present representatives and planning departments to embrace because they suggest that we need profound changes from land uses on up... What needs to be done in relation to declining biodiversity and resources, and increasing human population, and regional and global pollution *is* confronted by Ecocity zoning. Thus its tremendous legitimacy.

Ecocity Zoning is 'Shadow Zoning' in another sense too: it does not need to be officially accepted and functioning before it can be used by environmentalists, community activists, developers, business promoters, city planning departments, and military conversion planners¹ in their work. It can be used as a 'zoning overlay' dropped down on top of the existing zoning plan to influence its gradual change over time. Or, it could virtually replace the conventional zoning quickly should communities decide they want to choose a speedier route to ecological health and economic vitality. (Register 1997 p.12-13)

¹ UEA, particularly through Chérie Hoyle, was heavily involved in assisting the community in the neighbourhood of the CSIRO property of Glenthorne Estate, O'Halloran Hill. The community was keen to maintain open space options rather than see the property developed for more housing (it is the only major green space break in Adelaide's southern metropolitan sprawl). Ecopolis Pty Ltd, with the support of UEA, was commissioned by the CSIRO to prepare a report on 'Urban Ecological Issues'. The exercise of undertaking the report (primarily by this author) was instructive in itself – there was, for instance, no mention in the major consultant's report of climate, an aspect of the urban ecosystem that Hough claims as the means to make connections between all other parts of the system. The community was successful in stopping further tract housing development of the site.

Register is familiar with the shadow plans described in this chapter and uses slides of the incomplete panels in presentations around the USA and overseas. Details of three of the panels (1996, 2076 and 2136) are published with his article on Ecocity Mapping in the proceedings of the Ecocity 3 Conference (held in Senegal in 1996) illustrating 'concentrated island cities, towns and villages surrounded by restored rivers and natural and agricultural lands.' (Register 1997 p.63)

13.7.2 Shadow Plans of the River Torrens Catchment Tandanya Bioregion

In the tradition of Geddes' Outlook Tower, but without knowledge of its contents in the initial stages of the author's investigations, the idea of using physical models of a region to assist in planning and conceptualising the perception of place led the author to experiment with models as a way of visualising and communicating the kind of planning that Register outlined. The author took these concerns into his university school of architecture design studio of 1994 and over the next few years it led to a Geddes-like commitment to models as a means of communicating, not just architecture and urban design, but regional planning. Thus were the Adelaide 'Shadow Plans' born.

The Shadow Plans for Adelaide span some 300 years, from the day before Europeans came along and started altering the landscape (1836) to Adelaide's 300th anniversary in the year 2136. The plans are 'snapshots' along the timeline and the dates have been chosen to best describe the process that might take place in the Tandanya Bioregion under a shadow planning approach.

In 1994 in the architecture course at the University of South Australia the author ran a design studio for level 3 called 'City As Organism'. Students were asked to look at the city as if it was a living organism and they began by investigating the creeks of Adelaide. The watercourses of any environment are like the veins and arteries in a body, and the health of these watercourses greatly reflects the health of the surrounding catchment. After investigating the creeks the students began constructing scale relief models of the River Torrens Catchment, extending from the coast all the way to the source of the Torrens near Mt Pleasant. This was inspired by Register's proposition that creeks should be restored, and informed by the fine photographic and historical study, edited by Warburton, of the five creeks which drain into the River Torrens (Warburton

1977)². The aim was to build six identically configured relief panels upon which a progression of the shadow planning process would be shown.

Constructing the panels proved to be a huge task and by the end of the first term they were still incomplete. The second term saw students involved in their own visions of what a part of Adelaide might look like after many years of shadow planning. Some students took to the hills and designed hill top cities with soaring walls and tall spires, others stayed on the plains and transformed the suburbs into compact and vibrant ecocities. The end result was a wide range of interesting and diverse ecocities and settlements that all existed within the same water catchment.

Since that time the panels have been completed by volunteers, trainees and interns at the Centre for Urban Ecology. The ideas begun in 1994 have been applied to the model bases with biological paints and there is now a clear progression from the first panel to the last.

13.7.2.1 Other Bioregions

The Shadow Plans are focussed on the River Torrens Catchment using principles that can be applied to any bioregion in the world. While the catchments of the Sturt River and the Little Para River can be seen at the edge of the panels, the focus of the panels remains on the River Torrens.

13.7.2.2 How the Process Takes Place

Watercourses become 'backbones' of future green corridors. Existing urban centres become future ecocities. In many cases these urban centres have grown from the original villages around the Adelaide Plains and so the progression from village to ecocity is a natural evolution. Selected main roads within the existing city are marked as future multi transit corridors. The main roads once carried trams throughout Adelaide, in the shadow planned future some of these 'roads' carry light and heavy rail, and a main road. The light rail line might be a monorail. These multi transit corridors link the ecocities; people can walk to their local train station and catch a train to any other city. Each city could also be served by its own tram system. The physical footprint of many of the cities is influenced by the transit lines running through them;

² Most of the creeks have suffered badly since city making began and the damage continues, with a private boys' school building its sports hall, as recently as 1992, right over one of the few remaining bits of First Creek that had not been culverted. Nature fought back later that same year and a flood tore away at the foundations as the creek reasserted itself.

hence a linear arrangement. The plan shape for each city has been designed to show individuality, the shape does not indicate a specific function.

Each city has its own particular climate and microclimates, its own soil types, water availability and solar aspect. Hence each city would have its own particular industries, eg. cities around the foothills might specialise in orchards, valley cities might have many vineyards, hills cities might produce building timber and coastal cities might farm seafood and marine products. Trade between cities and other bioregions would be through the highly efficient multi transit systems.

13.7.2.3 Indicator Species

Animal graphics are planned for every panel, with simple drawings of animal 'indicator species'. Indicator species are those whose presence shows the health of their habitat. If an indicator species is absent then its habitat may be in poor health, eg. if the creek is polluted and unhealthy for a frog to live in then the frog will leave or die. These indicator species are yet to be determined and research needs to be undertaken to choose suitable animals. Some plants will be included eg. seagrasses. The same animals would be shown on every panel; the graphic might be divided into a grid of nine squares - if that species' population is in poor health then most of the squares would be blacked out, leaving only a little of the animal showing. Through the shadow planning process the health of the animals' habitat should improve, thus the animal would be gradually 'revealed' on the journey to 2136. A good cross section of land and marine animals will be needed, including feral species. The idea of using the colours to indicate health came from the 'City as an Organism' studio. The city is a living organism and the vitality of its colours shows the state of its health. Hence the 1995 panel looks pale and 'unhealthy' whilst the 2136 panel is full of rich and healthy colours³.

The following text accompanying the scanned photographs of the Shadow Plans was prepared by UEA intern Nina Creedman under the direction of the author, based on the earlier work of Digby Hall et al. The vegetation mapping was derived from interpretation of the excellent studies by Kraehenbuehl of the pre-European flora of the Adelaide Plains (Kraehenbuehl 1996).



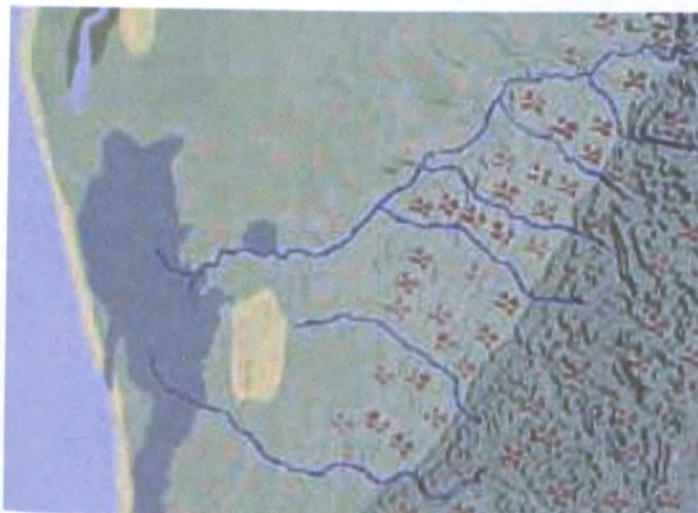
FIGURE 217: Intern Creedman & Shadow Plan (Photo by author)

³ The only paint used is the 'Bio-Products' paint donated for the Shadow Plans by Bio-Products Australia Pty Ltd.



This panel depicts the River Torrens Catchment as it was (to the best of our knowledge) before Adelaide was colonized by Europeans. Aboriginal people occupy parts of the region but their low-intensity way of life has a relatively minimal impact on the ecosystem. The entire landscape is vegetated with native bush, the creeks and rivers are healthy, the coastal wetland systems are extensive and the Gulf waters sustain a healthy marine ecosystem. The plants and animals here aren't threatened by pollution or high-intensity urban development. They function in a closed-loop ecological web, where waste from one species provides the sustenance for others.

FIGURE 218: Shadow Plan 1836 (above) Tandanya 1836 (below) Detail of the Five Creeks of Tandanya



River Torrens & the 5 Creeks



FIGURE 219: Shadow Plan 1996 (above) Tandanya 1996 (below) Detail of the Five Creeks of Tandanya



This panel shows Adelaide in its present state. You see a watershed blanketed in what is commonly referred to as Suburban Sprawl— an expanse of low-density developments, roads, unsustainable agriculture and industry. In just 160 years since European colonization began, this ‘development’ has almost entirely wiped out the original ecosystem of the bioregion. The Torrens Catchment is highly polluted with six of the 15 ANZECC substances tested at unacceptable levels, making the water unsafe for both human consumption and many riparian species.¹ Regionwide, 44 of the indigenous animal species find themselves either ‘vulnerable’ or ‘endangered’ while 24 are already extinct. On a single day, Adelaide City alone disposes of an average of over 28 TONNES of domestic waste, and only 5.1% of possible recyclable materials are salvaged. And in one year, the same City emits 400 tonnes of CO₂ into the atmosphere solely from electricity consumption. Add to this the alienation of suburban living, high levels of suicide, murder, depression, deaths from automobile crashes (and the list goes on), Metro Adelaide can hardly be considered either healthy or ecologically viable.

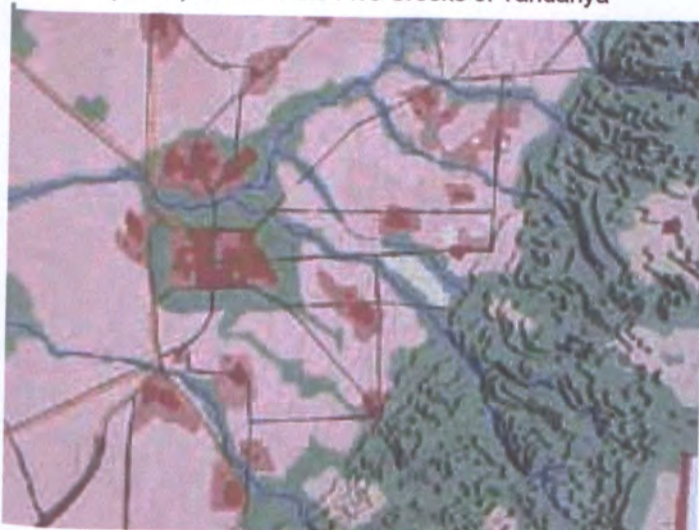
¹ *Torrens Comprehensive Catchment Water Management Plan, 1997-2001*; Torrens Catchment Water Management Board, May 1997.

River Torrens & the 5 Creeks



This panel marks the halfway point between old practices of 1996 and the Shadow Planned bioregion of 2136. You can see the dichotomy between old and new land uses, urban sprawl and higher density urban centres— the beginning of a balance between human settlement and nature. Green corridors have begun to form and the sprawled urban development of 1996 has contracted into established urban centres— the future ecocities of 2136. Water quality in the river catchment has been restored to acceptable levels, endangered species are making a comeback, and car use has dramatically declined due to the implementation of more accessible public transportation networks. Citizen participation in local government has already become the norm, as communities demand a better city.

FIGURE 220: Shadow Plan 2076 (above) Tandanya 2076 (below) Detail of the Five Creeks of Tandanya

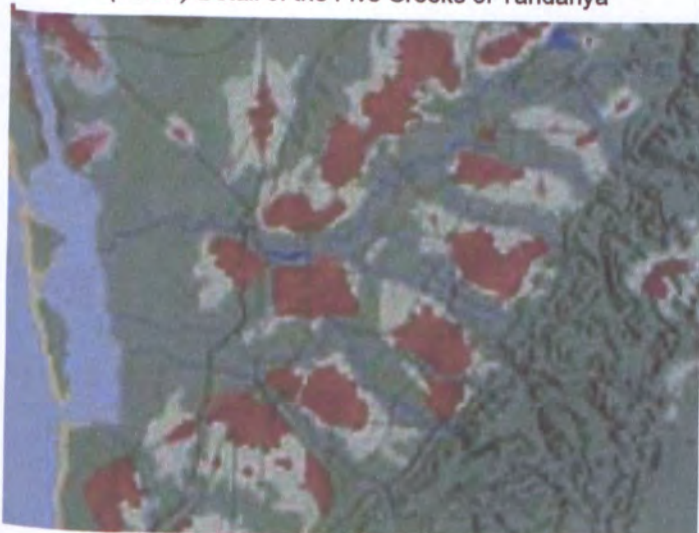


River Torrens & the 5 Creeks



This panel represents the Adelaide Shadow Plan Vision fully realised. Urban centres have evolved into individual, compact ecocities, each with their own character, industry and transport. Areas of sustainable agriculture circle each urban centre and provide the primary food supply. Public transportation dominates the efficient and comprehensive transit corridors— a mix of roads, light and heavy rail— with zero-emission technology in all modes of travel. Air quality is, consequently, exceptionally clean. The Torrens Catchment is the primary drinking water supply, protected by the indigenous vegetation along Riparian Buffer Corridors. It passes through naturally filtering reedbeds and mangroves before emptying into the Gulf of St. Vincent. Endangered species have established healthy population levels in restored areas of their native habitat. Ecopolis Adelaide is lively, safe, and beautiful. Citizens are active and play the principal role in shaping and reshaping their cities. Here, everyone has access to the basic human needs— clean water, nourishing food, healthy buildings for shelter, employment, healthcare, and support within close communities.

FIGURE 221: Shadow Plan 2136 (above) Tandanya 2136 (below) Detail of the Five Creeks of Tandanya



River Torrens & the 5 Creeks

13.7.3 Shadow Plans – Enabling Vision or Hopeless Fantasy?

The assumption that what currently exists must necessarily exist is the acid that corrodes all visionary thinking... (Bookchin 1995 p.248)

Shadow Plans are intended to provide vehicles for enabling visionary thinking at a grassroots level. They could be dismissed as mere fantasies rather than workable future possibilities. They have not been sufficiently tested as yet.

The fundamental idea behind shadow planning as envisaged here, is as the conceptual framework for ecocity design. The context of an ecological city is the region of which it is a part. An ecological city is defined by the city-region as an entity rather than as a discrete urban structure unconnected with the landscape (Ecopolis Proposition 1). The shadow planning process supports the designing of small pieces of ecocity by setting out the context for their future incorporation in a city-region whole.

Interestingly, Peter Sellars' proposal for the 2002 Adelaide Festival involves a kind of collective mapping and visioning for the city that resonates strongly in its outlook and process with the shadow planning exercise. At the time of writing¹ discussions are under way between UEA and Cathy Woolcock, one of the Assistant Directors of the Festival, to seek commonalities of approach with a view to engaging UEA in the Sellars' Festival visioning and mapping process. Whether or not UEA is involved, the process promises to have enough similarity with the shadow plan concept that it will provide an example of the technique for study and critique, and thus add to the evolving theory of Ecopolis².

13.7.3.1 Kannenberg

In his study undertaken as an intern with UEA, Kannenberg makes the observation that 'The regional level used to be the most neglected of all planning levels. Even the common slogan 'Think globally – act locally' excludes the regional level, which – on the other hand – is essential to hold both levels (global and local) together.' (Kannenberg 1998 p.27). He goes on to note that in South Australia there is no government for the metropolitan area other than the state government and thus there is no environmental management plan for the region nor any comprehensive development strategy that provides a model or goals for metropolitan Adelaide with particular reference to sustainability and ecological principles. Kannenberg observes that 'ecologically sustainable development' only merited half a page in the 1992 planning

¹ September 2000

² Nothing had eventuated from this exchange as of February 2002.

strategy for metropolitan Adelaide released by the Department of Environment and Planning (Kannenberg 1998 p.27).

Kannenberg maintains that the only way in which the shadow plans could be effective as practical planning tools would be as goal setting mechanisms in a structure that used the Agenda 21 process to achieve the goals and a metropolitan planning authority to ensure that all the scales of action could be successfully coordinated and integrated (Kannenberg 1998 p.34)

‘The main visions of how the future view of the city could look like could be provided by single ECOCITY proposals which would be able to play a similar role to the SHADOW PLANS on regional level. This would mean that the ECOCITY proposals and the ways to achieve them, as explained in the LOCAL AGENDAS 21... would complement one another.’ (Kannenberg 1998 p.35).

In comparing the South Australian and German experiences, Kannenberg concludes that the German model of ‘democratically legitimated self-governing bodies consisting of elected deputies of each involved municipality’ would be a prerequisite for the implementation of regional planning that coordinated inter-local landuse in the entire area, to make possible ‘the creation of really sustainable and ecological sound urban patterns and human environments.’ (Kannenberg 1998 p.36). His proposed structure for South Australia is reproduced in tabular form below – the shading indicates priority; no shading indicates that a current plan exists, light grey indicates some existing plans (in some towns, for some sites...), dark grey means a lot of work has to be done, and black indicates the presently non-existent regional level.

Level	Vision	Way	Report
Global Level	Rio Declaration on Environment & Development	Global Agenda 21 (International Action Plan for Sustainable Development)	Global State of the Environment Report (periodical)
National Level	Declarations on Sustainability & Development	National Agendas 21 (National Action Plans for Sustainable Development)	National State of the Environment Report (periodical)
State Level	Plans for a sustainable development of the entire human environment	State Agendas 21 (State Action Plans for Sustainable Development)	State of the Environment Report (biennial)
Regional Level	Shadow Plans	Regional Agendas 21 (Comprehensive Regional Development Programs)	Regional State of the Environment Report (annual)
Local Level	EcoCity proposals	Local Agendas 21 (Local Environmental Management Plans)	Local State of the Environment Report (annual)

TABLE 18: Proposed new structure for an integrated system of general development planning and environmental planning (Kannenberg 1998 p.38).

The clear implication is that ecocity projects are ultimately useless unless they become integral to the entire planning process. Kannenberg’s proposition for a revised planning system integrates ecocity proposals and introduces ‘Ecocity Zones’ as areas in which there are ‘strict building regulations’ (Kannenberg 1998 p.54). Whyalla has now

created just such a zoning for the ecocity 'core site' on which was focussed the work of Ecopolis and UEA described in Chapter 7.

In Chapter 3 the influence of Robert Goodman as a advocacy planner was noted. Unlike Goodman, most planners are far from being advocates, and more typically soothsayers of informed complacency, explaining why things cannot change. Reiterating the conventional wisdom of extrapolatory planning does little more than second-guess the future on the basis of a partial view of past trends. The Shadow Plan process directly confronts this approach. By showing images and mappings of the city shown as it might be were particular goals to be pursued, it challenges the more comfortable idea that things will continue to be much the same. It is questions the veracity of 'plus ça change...'. Whereas the Shadow Plan mapping proposes that Adelaide should look significantly different in 50 years time, more conservative voices suggest that 'In reality, despite recent flurries of residential development in the city centre and places like Burnside, Adelaide's physical fabric is likely to change only slowly and if you were to fly into Adelaide in 50 years time it would still be recognisable from the air as the city we know today.' (Hamnett in Hayward-Brown 2000 p.21) Hamnett's view is typical of the 'complacent extrapolatory' view in contrast to the 'provocative goal-oriented' shadow plan approach. It might be argued that its implicit claim to be more realistic and legitimate is as much a position of advocacy as that of any advocate for change. This issue of the nexus or relationship between professional knowledge and action is central to the Ecopolis theory of ecocity process in which its theory requires its practice, and its principles require their personal enactment by those engaged in the process.

13.8 The City as the Basis of Social Action

13.8.1 Red Flag

Myth-making is at the heart of culture. Symbolic action provides images around which the myths accrete. The first red flag of revolutionism was raised on 2 June 1831 above the massed uprising of thousands of working people protesting against the iron rule and exploitation of English mine and ironworks owners. According to Welsh historian Gwyn A. Williams, as part of 'a full ritual of vengeance', at Hirwaun near Merthyr Tydfil, angry and determined men '...sacrificed a calf and bathed a flag in its blood.' (Williams, 1978, p.142). Popular legend tells that the origin of the flag was when, after English troops had shot at the protesting workers and their families, a woman bathed her white petticoat in the blood of the wounded and waved it in protest. The red flag remains a potent symbol of cultural change. On 11 September 2000 in Seattle the street protests against globalisation received massive media coverage and that 'S11' protest has already gained mythic power for people, symbolising far more than it achieved. The anti-globalisation protests are significant for the Ecopolis idea because they show the modern city being used as a primary arena for precipitating social change.

And finally, we need every citizen involved, and 'every citizen' means including those who, in the present scheme of things, don't have any power at all, people who don't vote, people who are too old or are too young, or whatever. One analogy about the potential power of the city idea intrigues me - at the time of the social revolution associated with Marxism, et al, what happened was that capitalism had brought the workers together into factories, it created armies of workers on the factory floor. The response of the workers was to take that disadvantage of having to come together in these horrible places to get work and to use that as the basis for organisation. Thus the workforce, having been turned into an army to 'man' the factories, became a massive force for social change. It is from that the great traditions of unionism arise. I think we need to do the same for the city. The factory floor is rapidly becoming redundant as a basis for generating social change, there are not enough people there and most of them are men. And the unemployed are almost completely disenfranchised in our society at the moment. But almost everybody lives in the city and it is through the city that we can really do those things necessary for change.¹

In bringing together workers in factories as servants to machinery and the forces of capital, the potential existed to create a 'change agent'. Unionism capitalised on the historic moment when 'Never before had such large groups of people been brought together for one purpose other than for war.' (Downton 1992a p.240). Cities have brought together much larger groups of people for the purpose of creating a place to live (and to fulfill the demands of consumerism) and this provided the means,

potentially, to effect social change just as unionism did.² This idea, though barely sketched out in the above-quoted conference presentation, became a central tenet of the strategy for developing the Halifax EcoCity Project and has remained at the core of the Ecopolis idea. In the HEP, the didactic qualities of the project were seen as fundamental in two ways: 1. As built form (reflecting a little 'architectural determinism' in the tradition of people like Howard) and 2. As a process of education and empowerment for social change. Geddes had implied such an approach and although Howard's vision was reformist rather than radical, he tried to precipitate change using 'Garden Cities' as the means of improving the physical and social conditions of the time.

Such ideas operate in the cultural realm too. In 2000, Peter Sellars surprised the South Australian public by proposing a program for the Adelaide Festival of the Arts that was based on a long-term program of community workshopping and an ethos that was clearly intended to catalyse change in the conceptualisation and consequent development of the City of Adelaide. Basing his approach on principles of equity and access in relation to artistic endeavour and with the view that the city is, in effect, a 'living canvas' for collective creative action, Sellars appears to be attempting to use the city as the basis of social action.

NOTE:

This figure/table/image has been removed to comply with copyright regulations. It is included in the print copy of the thesis held by the University of Adelaide Library.

FIGURE 222: Cathy Woolcock and Adelaide Festival 2002 Director Peter Sellars checking out the application of 'Bio Products' non-toxic finishes at the Christie Walk project. (Photo by author)

The idea that ecological city-making as a *process* may be even more important than as a *product* has evolved into the central tenet of the Ecopolis thesis. The Seven Steps of the SHED in Chapter 14 may be seen as the basis for an educational program structured around the processes of making ecological human settlement, and as a framework for social action.

¹ Unpublished transcript of the author's presentation at the Students, Science and Sustainability Conference at Griffith University, Brisbane, 16 July 1992.

² Bookchin's 'confederal municipalism' seems to reflect a similar view of the potential of cities for undertaking progressive social change and is discussed in Chapter 8.

13.9 The Ecopolitan Muse

Breaks my heart to see the city
Wonder why it ain't pretty

('River Song' by Dennis Wilson 1977)

13.9.1 California Dreaming and Popular Culture

To some extent, popular culture reflects the prejudices and contradictory attitudes displayed towards the city by intellectuals and professional pundits. Modern American culture does it best, with both its insidious and overt manifestations of what are now globalised values and perceptions. With an economy ranked number six in the world California is the epicentre for the post-industrial mass-cultural earthquake (and, perhaps inevitably, for its counter-cultural antidotes)³. The California Dream is almost synonymous with the American Dream. Because of the pre-eminent position of the USA in the global consumerist economy, California's dreams are at the cultural core of modern myth making around the world.

Ooh, living out in LA, such a beautiful day
The skies are clear, it's a beautiful day in LA
People in motion on wheels, moving all kind of ways
Indoors, outdoors, in the sun
There are people everywhere having fun, fun, fun

('It's a Beautiful Day', theme from the movie 'Americathon', words by Michael Love and Alan Jardine 1979)

Arguably, no one band has done more to evoke, evolve and engender that myth than The Beach Boys. The ultimate irony is that The Beach Boys premier songsmith and consummate mythmaker, Brian Wilson, has never been able to live out the dream.

Now, as a result of the cocky outbursts of his brother Dennis, he was something called a Beach Boy. But Brian wasn't into surfing, didn't care about the sport, didn't know a thing about it. He was scared, and *really* scared of the ocean. Even when his father insisted he at least try surfing to help the group's image, he wouldn't go out. Instead, Dennis told him stories and Brian made up songs. (White 1994 p.146)

Reading like the script of a bad 'B' movie, Wilson's life has been like the nightmare flip-side of the California Dream⁴. From the beginning, his experiential base for composing the dream images has come 'second-hand' from others. His whole life can be seen as a metaphor for intermingling of power and helplessness, pleasure and

³ Any attempt to separate the counter-culture from the culture that spawned it would seem to be logically inconsistent.

⁴ Including battles with drugs, dysfunctional families, untimely deaths, sibling rivalry, internecine squabbles with creative partners, and even salvation by a psychiatrist later sued for malpractice!

pain that resides in a Dream that, in the same way Wright's Broadacre City became an anti-city, has become, in the anti-city of suburban sprawls and malls, an anti-dream.

Wilson's own life has been a parody of the dream he composed and sold. His paradoxical experience of reality has had that heavy overlay of the vicarious and virtual that to some extent now informs the daily life of every consumer on the planet. Yet the myth he helped create is powerful, and Wilson's sincere belief in its restorative powers is shared by millions. And, like other resilient components of modern pluralist capitalism, it has the capacity to assimilate criticisms of itself into its own continued evolution - when the dream goes bad, it just provides more fuel for the dream machine!

There is a consciousness of how civilisation has reshaped the pre-urban landscape recorded in popular song.

From the Beach Boys:

Trader got the crown okay
 Cleared humanity from his way
 He civilized all he saw
 Making changes every single day
 Shops sprang up on the prairies and the hillsides
 Then roads cut through the mountains to the seaside
 The other kind fled to hide by and by
 And so sincerely, cried

(‘The Trader’ by Jack Rieley and Carl Wilson 1972)

From Billy Joel:

I've seen those big machines come rolling through the quiet pines
 Blue suits and bankers with their Volvos and their valentines
 Give us this day our daily discount outlet merchandise
 Raise up a multiplex and we will make a sacrifice...
 Who remembers when it all began
 - out here in No Man's Land
 Before they passed the master plan
 - out here in No Man's Land
 Low supply and high demand – here in No Man's Land
 There ain't much work out here in our consumer power base
 No major industry, just miles and miles of parking space...

(No Man's Land, by Billy Joel 1992)

From the Eagles:

Some rich men came and raped the land, nobody caught 'em
 Put up a bunch of ugly boxes, and Jesus people bought 'em...
 Who will provide the grand design?
 What is yours and what is mine?
 'Cos there is no more new frontier

We have got to make it here
 To satisfy our endless needs
 And justify our bloody deeds
 In the name of Destiny
 And in the name of God
 And you can see them there on Sunday morning
 Stand up and sing about what it's like up there
 They call it Paradise I don't know why
 You call someplace Paradise, kiss it goodbye

(The Last Resort, by Don Henley and Glenn Fry 1976)

There are a number of ways to address the issue of providing education for an ecological culture, and music may be one of the most important. Over the years, as part of testing the hypotheses that are contained in this thesis the author has tried to put as many aspects of the putative Ecopolis theory into practice as possible. As part of this 'research in action' he worked with his eldest daughter's⁵ long-time boyfriend and partner, Jason Hoberg, to put music to a song lyric written in November 1990. Jason recorded the song and released it on a CD entitled 'Ecopolis Now!' in 1997. It has yet to chart. (CD included in pocket of thesis binding)

13.9.1.1 Ecopolis Now!

Now I was born like everyone
 Under the skies of a friendly sun,
 But at the end of the day
 When the work was all done,
 I'd burn the treasure of ages.

Ecopolis now!
Let me tell you my friend,
If we can't save the city
We're doomed in the end.

In a city of speed, in a city of greed
 I learnt to destroy all the things that I need.
 I fouled up the future
 And wasted the seed
 Of all my children's dreamings.

Ecopolis now!
Let me tell you my friend,
If we can't save the city
We're doomed in the end.

When men came with shovels the people rebelled
 And told them to take their tech-city to hell -
 To take back their poisons
 And garbage as well,
 And let the earth get well again.

⁵ Seren Mari Downton-Hoyle.

*Ecopolis now!
Let me tell you my friend,
If we can't save the city
We're doomed in the end.*

Ten thousand years past, the city was born
Demanding new land and gobbling corn.
Engine of destruction -
Eye of the storm.
Now is the time to tame you.

*Ecopolis now!
Let me tell you my friend,
If we can't save the city
We're doomed in the end.*

Now we're dying in cities like boiling frogs,
Choking and smoking and spewing smogs;
In these deadly machines
We're nothing but cogs,
But in Life we're a part of the garden.

*Ecopolis now!
Let me tell you my friend,
If we can't save the city
We're doomed in the end.*

*Ecopolis now!
Let me tell you my friend,
We must make the city
Our home in the end.*

(Lyric by Downton 9/29 November 1990)

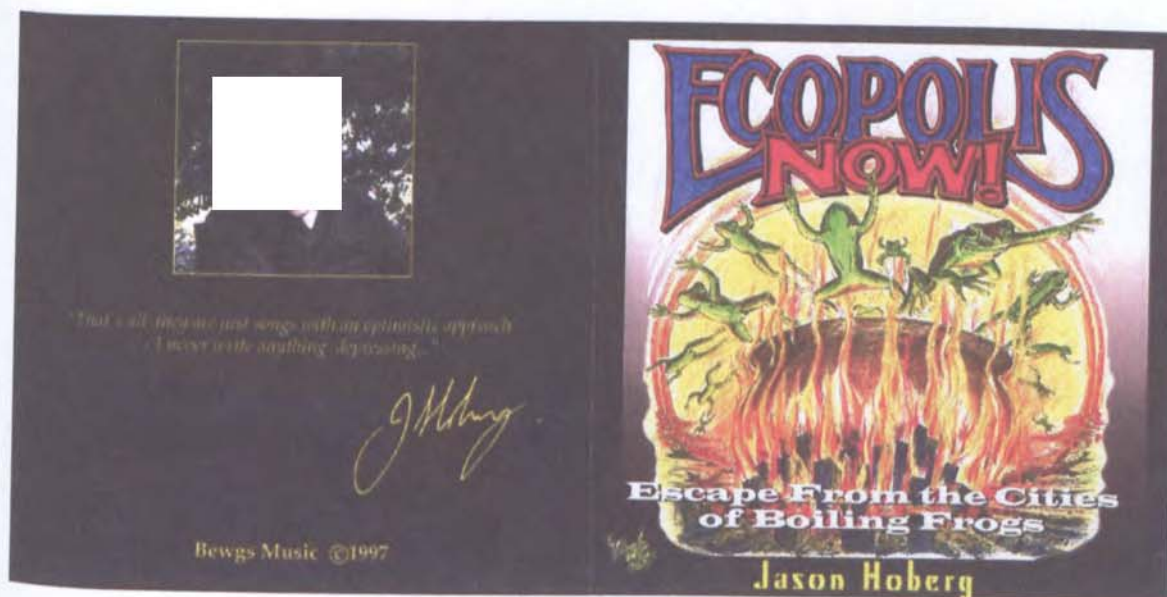


FIGURE 223: The CD cover of 'Ecopolis Now!' (Photo, drawing and concept by the author)

13.10 Ecopolis Propositions – The Sound Bite Version

Education through popular media invariably requires what is pejoratively known as ‘dumbing down’. There is a converse propensity for pretentious phraseology in much of what passes for intellectualism. In order to make the Ecopolis idea accessible to non-specialists, the author has continuously sought ways of expressing key aspects of the idea in the simplest possible way. There may be something lost in the translation but, as has already been noted, the ‘sound bite’ is an integral part of modern mass-communications. Here then, in less than 24 words, are the Ecopolis Propositions:

1. *A city is part of its place.*
2. *All knowledge must be linked.*
3. *Ecocities need their own culture.*
4. *Small projects make a big difference.*

13.10.1 Accelerated Climate Change Requires Accelerated Cultural Change

Cultural lag may be deadly in periods of rapid environmental change. Cultural lag can be seen in the cultural baggage of customs, values and consequent actions that occur when colonisers enter an alien environment (eg. English families in Australia and heavy ‘traditional’ Christmas dinners). Culture is the slowest ‘level’ for change according to Brand (Brand 1999 p.37). For human society to adapt to rapidly changing environmental conditions such as are presaged by accelerated climate change and global warming, requires the capacity to accelerate cultural change. Cities are the crucibles and primary repositories of culture. If there is to be found any mechanism for accelerating cultural change then it is in cities. The concept of ecocities developed by this author is one of that says they can provide the ‘cultural leverage’ for accelerated change (to use a Newtonian metaphor) or create the ‘cultural fractals’ that can rapidly map the shape of the necessary greater whole of changed conditions (to use a Chaotic metaphor).

Cities are perhaps the most powerful cultural change agents of all. They stand as both consequences and key players in the processes of cultural change. This has been an important part of the Ecopolis theory - ‘The aim of the (Halifax EcoCity) project is to act as a seed for the continuing transformation of the city of Adelaide, as an example of what can be done...’ (Orszanski 1993 p.45). It is why UEA and the author have been so determined to initiate a significant project in the heart of an Australian city.



SYNTHESIS IV

CHAPTER 14

'THE SHED'

SUSTAINABLE HUMAN ECOLOGICAL DEVELOPMENT

The powerful technological agents we have unleashed against the environment include many of the very agents we require for its reconstruction.
(Bookchin 1981 p15)

14.1 Introduction

'The SHED' chapter provides a program for putting the various precepts of Ecopolis into action and a framework for cohering the many facets of design, development and maintenance that are necessary to the making of Proposition 4's 'cultural fractal' demonstration projects¹.

The theory of Ecopolis requires that both indicators and assessment tools are incorporated in the ongoing application of the theory. 'The Seven Steps' are about an evolving system of design and development that continually accommodates, incorporates and assimilates methodologies within its overall framework. Much as the success of capitalism is due to its capacity to assimilate anything and everything that can help sustain it, so the success of an on-going, generic process of human settlement development must be able to continually adapt, adopt and evolve.

This chapter describes the 'geometry' of the cultural fractals that can demonstrate this integration of knowledge and technique into social and built form. Four elements constitute the framework for the theory. The first is a mission statement: *The Charter of Calcutta*; the second is a performance measure: *The Frogstick*; third is the set of principles that, in one form or another, have provided the program for the case studies described in Part B: the *Ecopolis Development Principles*; finally there is a patterning tool through which the principles and performance might be employed in pursuit of the

¹ It is intended as the basis for further development into an interactive, hypertext design tool with CD-ROM and website application.

mission to 'save the world' with city making: *The Seven Steps*. Together, these elements constitute the Ecopolis synthesis. That synthesis is the means for addressing the four Propositions described in Chapter 1. A full discourse on the application of all these elements and their interactions would be a tediously distended exercise, but using the case study examples from Part B of this dissertation, what follows in this chapter is a partial discourse which explicates some of the linkages between the propositions of Part A, the case studies of Part B, and the synthesis of Part C.

For a theory to be workable in the sense that it can have practical application, rather than mere intellectual elegance it must be understandable by those who would use it. Any theory of human affairs is, of necessity, subject to approximations. To make a theory usable and understandable it may be necessary to label concepts in a way that appears to reduce their complexity in favour of brevity and, ultimately, clarity.

Thus the Seven Steps are designed to be both a conceptual framework and planning tool. They may also be seen as the basis for an educational program structured around the processes of making ecological human settlement (see Chapter 13). The minimum intent is to provide an armature on which can be wound all and any extant or developing knowledge that is pertinent to making ecological human settlement (Proposition 2)², and for the mutual qualities of that knowledge to made more visible, integrated and usable by its consideration within the Seven Steps process.

The overarching goal is to be able to design, develop and maintain urban systems consciously integrated into the processes of the biosphere with the intent of maintaining the optimum functioning of the biosphere for human purposes. As all urban systems are now set within the context of a planetary environment that is significantly degraded, so the goal of making those systems includes the proposition that we simultaneously 'Heal the Biosphere' (repair, replenish & support the processes which maintain life) through the evolutionary development of ecological cities³. Ten indicators are proposed for measuring the health of the biosphere, set out in the form of a 'Frogstick' (an 'urban ecology checklist') devised by Downton and first presented at the Solar 91 Conference

² Of whatever kind. The definition of knowledge is intended to be non-culturally specific and is here taken to include and accept non-scientific and 'irrational' ways of knowing, such Feng Shui and Dreamtime mythologies.

³ In the earlier versions of the Ecopolis Development Principles employed as the conceptual basis for the projects described in the previous case studies, 'Heal the Biosphere' was development principle number 12. See Appendix for previous incarnations of the Ecopolis Development Principles. 'Heal the Biosphere' recalls the New Alchemist Precept #8 that 'Building and design should help heal the planet.' But was not knowingly reflecting their precept at the time of its authorship.

in Adelaide on 5 December 1991 (Downton 1991 p.54). The means for achieving this goal are the Ecopolis Development Principles, initially drafted as a set of 12 precepts for ecological development in 1991-92 by Emilis Prelgauskas, Chérie Hoyle and Paul Downton, building on the earlier 'Frogstick'. These Principles have subsequently been developed and tested in the public domain, particularly via their application in the ecocity projects described in the Part B case studies. The ten revised development principles are here organised in two groups of five, one set of five directly addresses the *biophysical environment*, and the other set addresses the *socio-cultural environment*. The biophysical set aim to *minimise the ecological footprint*, the socio-cultural set is to do with *maximising human potential*.

Restructuring the building blocks of towns and cities is now a possibility. This is partly because science and technology have reached an unprecedented juncture where centralization, specialization of function and gigantism are no longer either necessary or needed. All of the components of society, including energy, power, waste treatment, transport, and food growing can be decentralized, miniaturized, and integrated on a human scale. (Todd & Todd 1994 p.11)

The intent here is to show that the goals and precepts of other theorists can be integrated (or, at a minimum, accommodated) within the framework of The Seven Steps, the Frogstick and Ecopolis Development Principles. The Seven Steps structure is designed to be able to incorporate any principle, process or technique that is relevant, ie. that fits the underlying ethos and propositions of the Ecopolis theory. The structure does not provide for a specifically 'arts' or 'science' based process. It is designed to allow for a multiplicity of approaches and link them through their relevance to the goal of creating ecological cities. Thus configured to accommodate the arts, sciences, humanities, vernacular and popular culture, it is proposed as a means of facilitating the embedment of a cultural framework capable of integrating and facilitating the application of all and any principles, processes and techniques that can contribute to the design, development and maintenance of ecological cities.

A Greek polis was not an abstract entity: a citizen could know it personally. Even if he had not paced the country from end to end, he should at least be able to see the physical limits of the state to which he owed allegiance. In the clear air he might discern the chain of hills beyond which lay other states that competed with his own⁴. (Tuan 1979 p.175)

A city should analyse and manage its own metabolism (Newman et al in Taylor 1996) and it is a working hypothesis of this thesis that making ecocities is about making the urban organism conscious of its own processes. The Seven Steps are intended to assist in this, by providing a simple, visible structure within which the more complex

⁴ All citizens, of course, were of the male gender.

processes of the urban ecology can be located and understood. Programs like Agenda 21 can be subsumed in this structure to inform and guide the detail of city-making.⁵ The SHED is intended to provide the basis of an integrative process that enables planners, architects, city managers, politicians, citizens, and so on, to each use their own knowledge and skills in a framework that facilitates the coordination of their multifarious activities. It is oriented to non-specialist and non-expert use but has the potential to be employed as part of conventional professional design practice⁶.

⁵ This may be more difficult than it sounds; the Agenda 21 group in Whyalla conspicuously failed to embrace the ecocity concept and connect the two initiatives.

⁶ This fits the pattern of the author's own experience in ecocity design through UEA and Ecopolis Pty Ltd with the concomitant numerous interactions between the realms of formal design and the 'non-expert' citizen.

14.2 Charter of Calcutta

We are at a turning point in history.
Our planetary environment is severely damaged.
Desertification is spreading, the globe is warming.
Entire ecosystems are under threat.
And the City is at the centre of the storm of destruction.

But that is the key!
We must cease seeing the City as a problem.
We must see the City as the solution.
For the City is our home.
It is what we make it to be.
It is where we live.

If we fail to seize the Future,
We will be consumed by the Past.
The Future begins NOW!

Let the Charter of Calcutta be simple and clear,
To be heard by all,
And filled with hope and vision -

The City Can Save the World!

In 123 words, the Charter of Calcutta provides a concise account of urbanisation and its impacts on the biosphere and offers hope that human activity through city-making can turn around the process of destruction to one of repair and reconstruction. The Charter was formally adopted in the concluding session of the International Conference and Exhibition on Architecture of Cities held in Calcutta on the 20th. November, 1990, organised by Santosh Ghosh and the Indian Institute of Architects, West Bengal Chapter. Composed and proposed by the author, it was endorsed by a panel of people from four continents (five, including the author) consisting of Dr. Wale Odeleye from Nigeria, Prof. Christine Boyer from the USA, Mr. Dean Ackemecht from Switzerland and Prof. Santosh Ghosh. Subsequent to its publication in the UEA 'Blue Book' (Downton 1994 & 1996) and on the UEA website, the Charter has been formally or informally adopted by others including the mayor of Oakland, California, Jerry Brown⁷, the City of Bremen initiative in Germany⁸, and the 'Permaculture in Cuba' group.⁹

⁷ See websites <http://oaklandnet.com/government/mayor/mayorhp.html> home page of Mayor of Oakland, also <http://www.oaklandnet.com/>
<http://www.oaklandnet.com/government/government2.html>
<http://www.bluerockpub.com/charter.html>

14.3 The Icons




























The icons have been designed with future application in mind as 'buttons' for CD-ROM, website and hypertext application. Each has been designed for use at a large scale as signage (an imminent project is to set up an exhibition on behalf of Urban Ecology Australia Inc employing them in this manner), and for extreme reduction as an element for embedding in text – as has been done to a limited extent in this thesis. Every effort has been made by the author to avoid culture specific images in generating the graphics, and in order that the icons remained comprehensible to the widest possible audience, the aim was to maintain an element of pictorial readability rather than reduce every icon to a high degree of abstraction. The use of icons was inspired by the work of Pliny Fisk at Max's Pot.

In the following pages, each of the 27 components of the process, principles and performance measures are briefly described. In keeping with the visual emphasis of the SHED process, and to reinforce the links between the theory and practice of Ecopolis, its explication and application are illustrated with images drawn from the case studies of Parts A, B and C of this thesis. Some relevant theorists are also identified in an accompanying text box to draw the threads through from Chapter 4 and point towards relevant material and references for SHED applications.






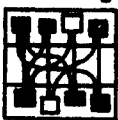
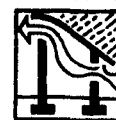





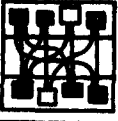
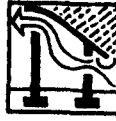
⁸ <http://www.bremen-initiative.de:591/delphi/> Hosted by EcoDelphi, a world-wide study organised by the University of Bremen, Germany and Bremen-initiative, a global campaign for business-municipality partnership. More information is available at <http://www.ecodelphi.de> and <http://www.bremen-initiative.de>.

⁹ <http://members.optusnet.com.au/~cohousing/cuba/hab9606/hab9605.htm>

TABLE 19: Key to the Icons

Seven Steps (The SHED)		Ecopolis Development Principles		Frogstick	
<i>Process</i>		<i>Principles</i>		<i>Performance</i>	
	1. Shedding		1. Restore Degraded Land		1. Air
	2. Placing		2. Fit the Bioregion		2. Water
	3. Biozoning		3. Balance Development		3. Soil
	4. Lifelining		4. Create Compact Cities		4. Energy
	5. Proximating		5. Optimise Energy Performance		5. Biomass
	6. Patterning		6. Contribute to the Economy		6. Food
	7. Architecting		7. Provide Health & Security		7. Biodiversity
			8. Encourage Community		8. Habitat
			9. Promote Social Justice & Equity		9. Ecolinks
			10. Enrich History & Culture		10. Resource Use

14.4 SHED Navigation Matrix, or Concordance

SHED	Shedding	Placing	Biozoning	Lifelining	Proximating	Patterning	Architecting
EDP							
1. Restore degraded land	●●●●	●●●●	●●	●●●●	●●	●	●●
2. Fit the bioregion	●●●●	●●●●	●●●	●●●●	●●	●●	●●●
3. Balance development	●●●●	●●●	●●●●	●●●●	●●●	●●	●●
4. Create compact cities	●●●	●	●●	●●●	●●●●	●●●●	●●●●
5. Optimise energy performance	●●	●	●●●●	●●	●●●●	●●●	●●●●
6. Contribute to the economy	●	●	●●●●	●●●	●●●	●●●●	●●●
7. Provide health & security	●	●●●	●●●	●●●	●●	●●●●	●●●●
8. Encourage community	●	●●●●	●●	●	●●●●	●●●●	●●●
9. Promote social justice & equity	●	●●●	●●	●	●●●	●●●●	●●
10. Enrich history & culture	●●	●●●●	●	●	●●●●	●●●●	●●●●
FROG							
1. Air	●●●	●	●●	●●	●	●●	●●
2. Water	●●●	●●	●●●	●●●●	●	●●●	●●●●
3. Soil	●●●	●	●●●●	●●●●	●●	●●	●●
4. Energy	●●	●	●●●	●●	●●●●	●●●●	●●●●
5. Biomass	●●●●	●●	●●●●	●●●	●●	●●	●●●
6. Food	●●●	●●	●●●●	●●●	●●●	●●●	●●●
7. Biodiversity	●●●●	●●●●	●●●●	●●●●	●●	●●●	●●
8. Habitat	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●
9. Ecolinks	●●●●	●●●●	●●●	●●●●	●●●●	●●	●●
10. Resource Use	●●	●	●●	●●	●●	●●●	●●●●
	1 Shed	2 Place	3 Biozone	4 Lifeline	5 Proximate	6 Pattern	7 Architect

The Seven Steps connect specific Ecopolis Development Principles and Frogstick assessments in relation to the design, development or maintenance of ecological cities. The number of '●' symbols rate the strength of the relationship between the elements: more symbols = stronger relationship. There are, of necessity, functional relationships between all of the elements but the cells are shaded when that relationship is particularly strong, eg. 'Lifelining/Water'.

14.5 The Seven Steps of SHEDding



14.5.1 Settling in Place: Watershed and Region – A Basis for Process

Making ecocities is about constructing human settlement in a particular place in such a way as to maintain the conditions of that place for human settlement. Despite the apparent anthropocentricity, this requires that ecosystems are maintained in a condition approximating that existing prior to human settlement. It certainly requires a profound sensitivity to regional characteristics and a clear view of the place and the intended activities there. It starts with understanding a region and results in habitations that reflect that region in their making and occupation. It is about regionalism and a workable link between biophysical definition and human cultural definition of place is found in the watershed¹ A topographical-built form relationship between region and habitation is readily identifiable through their respective capacity (and major functions) as shedders of water. Sustainable human ecological development depends, at the most fundamental level, on an understanding of the connections between human and non-human life through the flow of water within ecosystems. The SHED system proposed here represents an attempt to make the process visible in a way that can be readily understood by experts and non-experts alike, and at the same time identifies links to appropriate theories and practices for the design, development and maintenance of ecological cities.

The 'Seven Steps' in the process are all defined by verbs ('doing words'). The goals for that 'doing' are set by the Ecopolis Development Principles, which are also described with verbs because they are about on-going process rather than fixed objectives. The measurement of success in terms of the biophysical environment are in relation to the indicators set by the Frogstick (which are also about process). All together, these 27 icon-identified elements of goals, principles and processes configure a matrix of activity that may be recognised as an ecological development process, engaging people, place and action in what might be called 'Communitecology'.

¹ Usually 'catchment' in Australian and UK usage.

14.5.2 Communitology

From large scale, 'big picture', cultural shedding of ideas and the shedding of rain in the landscape, from the shedding of rain off buildings to the shedding of skins that Brand describes in 'How Buildings Learn', the process of shedding links the human presence with the presence of nature.

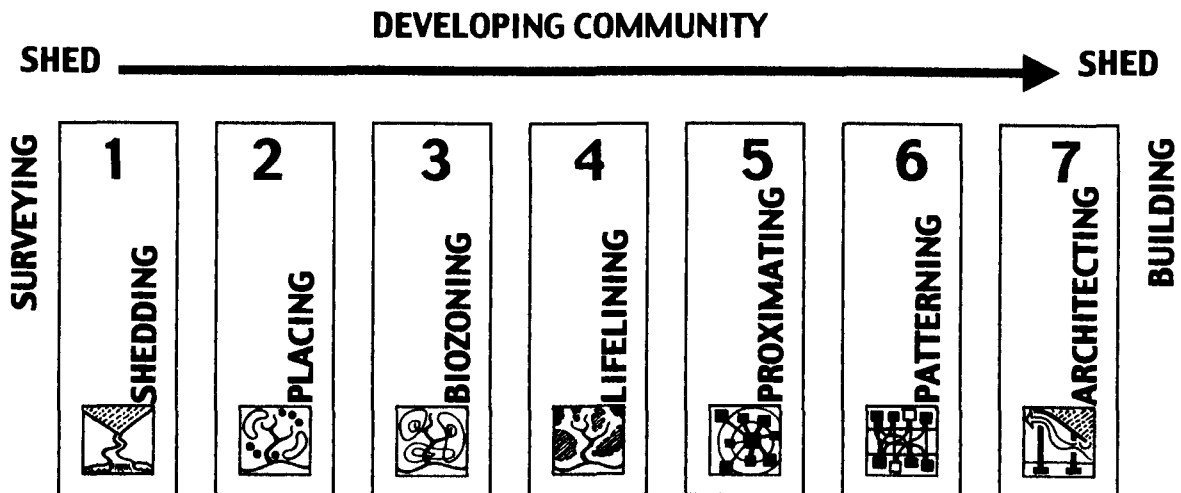


TABLE 20: The SHED sequence

The SHED sequence starts with surveying the landscape and progresses to building shelter. That progression is tied to the development of community. It is also cyclical and richly interwoven (see Navigation Matrix).

14.5.2.1 The Emptiness and the Way

The etymology of 'shed' is also rich with meaning – another reason for its use.

- *Shed* as in watershed and its biophysical reality, but also as in letting go or shaking off cultural prejudices...
- *Shed* as in causing to fall or flow...
- *Shed* as in casting off seed, or shedding leaves...
- *Shed* as disperse, diffuse, radiate...

And returning to the theme of the preface in this dissertation, the *shed* is also that opening between the warp threads in a loom through which the shuttle carries the weft. With this metaphor, the fabric of civilisation is woven as the shed provides the passage for the short, busy creative threads of the weft to join and pattern the long, slow warp threads of cultural and social change. Thus the steps of the SHED provide the emptiness and the way that enables the weaving to take place.

The Seven Steps (The SHED) are organised, partially, on a scalar basis, having regard to the shift in magnitude from the macro to the micro, from the region (watershed) to the individual shelter (shed). Although numbered sequentially, any Step may be the first. Biological processes are given strong emphasis, dominating the content of the first four Steps. This provides the context for all the other Steps in which community processes are always implicit – it is taken as axiomatic that there is no need to make cities unless there is a community to settle and provide for. Although The Seven Steps are ultimately about building environments, architecting is effectively de-emphasised, even as it remains essential to the culmination of the whole process of making a place for dwelling. As a design strategy, the Steps might be antithetically compared with those many theories that nominally incorporate ‘sustainability’ such that biological and human processes are described *within the architectural and planning framework* (eg. New Urbanism). The Ecopolis theory is an attempt to *set architecture and planning within the framework of the biophysical and biosocial realities of place* as part of the conscious making of ecological civilisation.

To illustrate something of the interweaving of the thesis themes, the following format is used for each Step in the SHED:

<i>Image of project</i>	PROJECT
	(left) An image taken from one of the various projects mentioned in the dissertation, eg. a case study project or the Shadow Plan project.
	PROPOSITION
	The Ecopolis Proposition, or part of a proposition, that is most immediately related to this Step, EDP or Frogstick item.
	ACTIVITY
	An activity or process that relates closely to this Step, EDP or Frogstick item, eg. The Whyalla Urban Design Workshops (see Chapter 7).
	THEORIES/THEORISTS
	Relevant theories or theorists.

14.5.3 SHED 1 Shedding



For that which is boundless in you
abides in the mansion of the sky,
whose door is the morning mist,
and whose windows are the songs
and silences of night. (Gibran 1926/1979 p.41)

To see a stream without visualizing its sources, its qualities, the power it represents and the unceasing work of that power in shaping its valley, is to be more than half blind. The needless devastation of every great flood is sufficient testimony to this. (Sears, 1970, p.167)

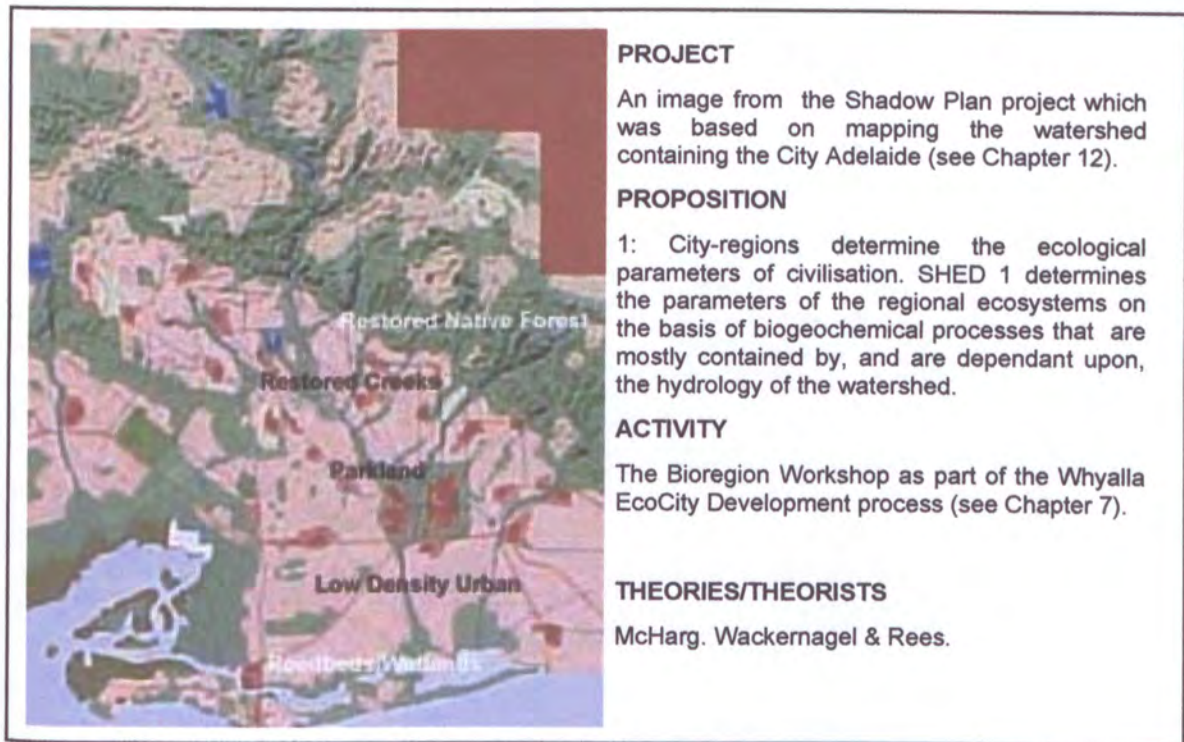


FIGURE 224: Shedding –Adelaide Shadow Plan image based on exhibition panel
(Source: Downton et al 1996-2001)

SHEDDING INVOLVES: Identifying the biophysical context and its inherent developmental constraints for city making. Watersheds, ‘bioregioning’ and McHargian ‘design with nature’ methodology. Finding the purlieu – “the bounds or limits within which one ranges”. Carrying capacity. Ecological footprints. Environmental space.

In the Shedding stage, account should be taken of accelerated climate change by identifying potential scenarios.

The author first began exploring the idea of making human habitat fit the boundaries of watersheds, or catchments, after being inspired by the 'Watershed Consciousness' issue of CoEvolution Quarterly in the Northern Hemisphere Winter of 1976-77. Working with Richard Chamberlain and Andrew Lees, he began a project to map the watershed of the Gower in South Wales as the basis for planning a human settlement that sourced all its materials, energy, water and nutrient flows from within the catchment.

The Icon

Derived from a simplified image of a valley collecting rain, with water streaming to a sea or lake – a stylised watershed.

14.5.4 SHED 2 Placing



You are not enclosed within your bodies,
nor confined to houses or fields.

That which is you dwells above the mountain
and roves with the wind.

It is not a thing that crawls into the sun for warmth
or digs holes into darkness for safety,

But a free thing, a spirit that envelops the earth
and moves in the ether. (Gibran 1926/1979 p.108)

In setting out the walls of a city the choice of a healthy situation is of the first importance... (Vitruvius circa 1BC in Gwilt 1967 p.14)

Every place should have a spirit; indeed, unless it has been destroyed by brutal unresponsive actions, every place does. (Day 1990/1995 p.107)

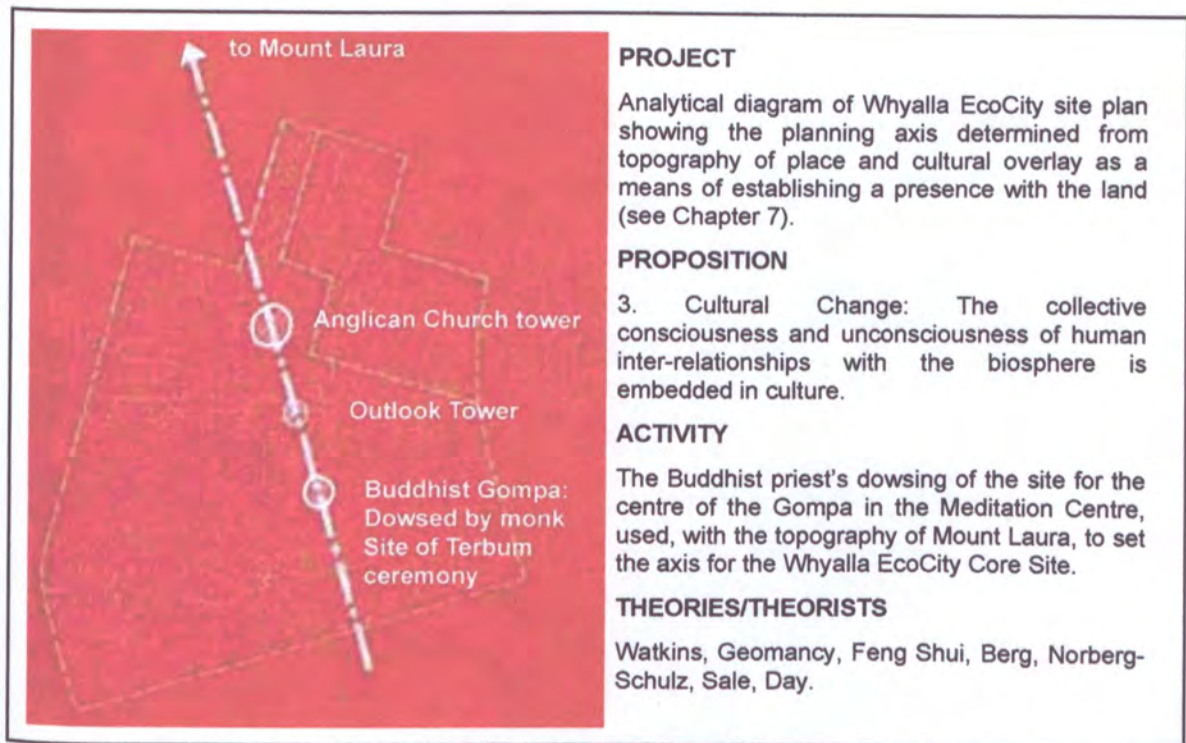


FIGURE 225: Placing –Whyalla EcoCity Development project core site analysis
(Source: Downton 1997)

PLACING INVOLVES: Exploring cultural and spiritual aspects of the bioregional analysis. 'Placing' -because this is about putting people in a place, finding the right fit. Identifying the 'genius loci'. Also includes 'Spirting' - discovering the spirit of place, geomancy and Feng Shui. Related techniques include Berg's 're-

inhabitation'. Seeking the non-physical structure of place as the basis for maintaining deep continuities².

Integration of the built environment with the site should occur at the aesthetic level but most importantly at the level of ecological function. Buildings should be integrated in functional harmony with landscaping and vegetation. The important relationship of any building must be with the place it inhabits rather than simply the space it occupies.

The Icon

The stylised watershed diagram is bounded by shapes that can be taken to mean topography or hint at aboriginal meanings of place, or they may be interpreted as people sitting together or seeking the best place to dwell, or joining in a circle of embrace with the landscape. The flow of lines are intended to link ideas of water and growth.

² The concept of 'spiritual' space may be quite instrumental:

'This spiritual dimension underpins our responsibility to our planet and its stewardship. This relationship must be forged in cities where most people live. A first step is to recognise people's strong need for nature, which may be a very deep emotion: the need for something green and wild or a place to go for sanctuary or solitude, a place to experience 'wilderness' in the city. The need for such places, whether in the form of ecology parks, city farms, allotment gardens or just neighbourhood wildspace, lies at the heart of the livable city.' (Ekin et al 1991 p.245)

14.5.5 SHED 3 Biozoning



In understanding the natural landscape come the benefits of sensible land-use decisions as well as personally and socially rewarding benefits of enjoyment of our surroundings and the satisfaction of greater understanding of an incredibly complex, dynamic, and beautiful whole. (Lewis 1996 p.26)

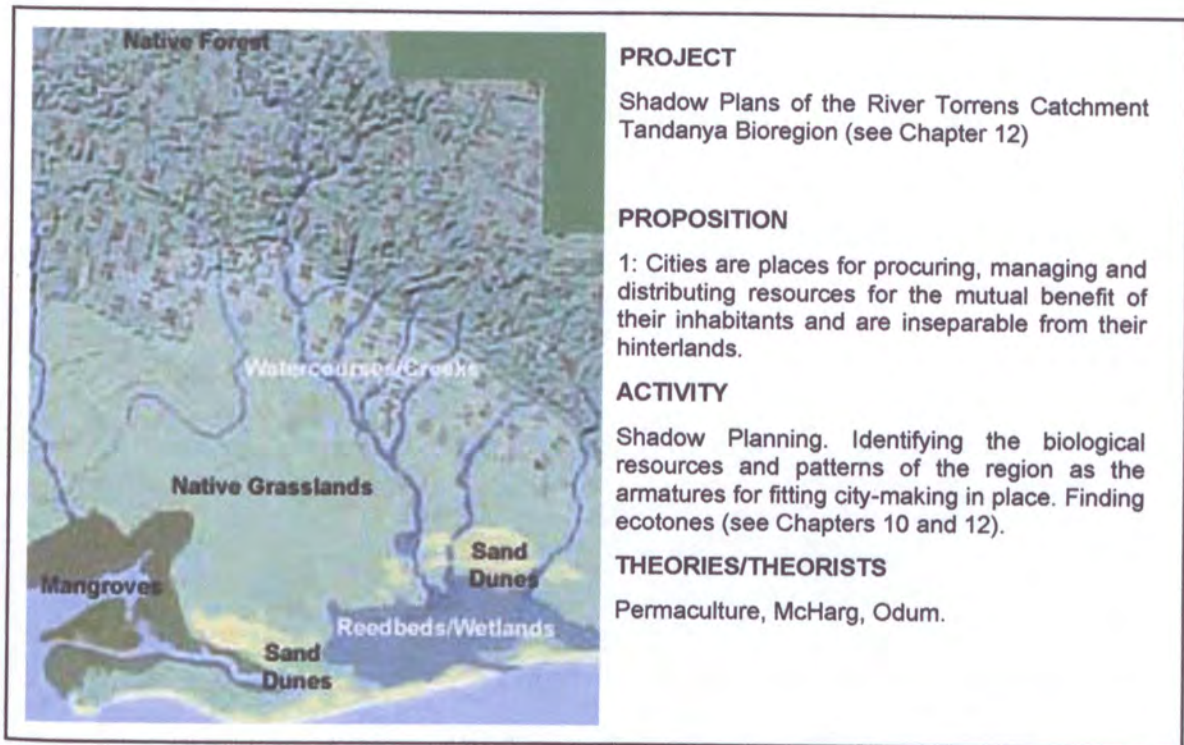


FIGURE 226: Biozoning –Adelaide Shadow Plan image based on exhibition panel
(Source: Downton et al 1996-2001)

BIOZONING INVOLVES: Locating food and biological resource sites on the basis of proximity or least energy planning. Includes biome identification and soil analysis. Provides for critical application of appropriate integrated land management techniques including Permaculture practice and theory.

The Icon

The stylised watershed shows three 'biozones' linked by watercourses, two overlap with each other, one does not, indicating the diversity of biomes and existence of ecotones. Within the biozones concentric forms suggest the relative proximities of biological resources. The kidney shapes also allude to the cleansing function of healthy ecological systems.

14.5.6 SHED 4 Lifelining



Together earth, plant world and atmosphere form a single great organism, in which water streams like living blood. (Schwenk 1965 p.14)

By identifying and protecting ... veins of 'natural' habitat, humans would be acknowledging a fundamental change in the definition of progress. We would be accepting that life depends on life, and that the first principle of human survival is to reintegrate bioregional cultures into matrices of native ecological associations. (Aberley 1994, p.127).

The notion of corridors linking 'habitat islands' is one of the more practical uses of island biogeographical theory in urban areas. (Douglas 1983 p.144).

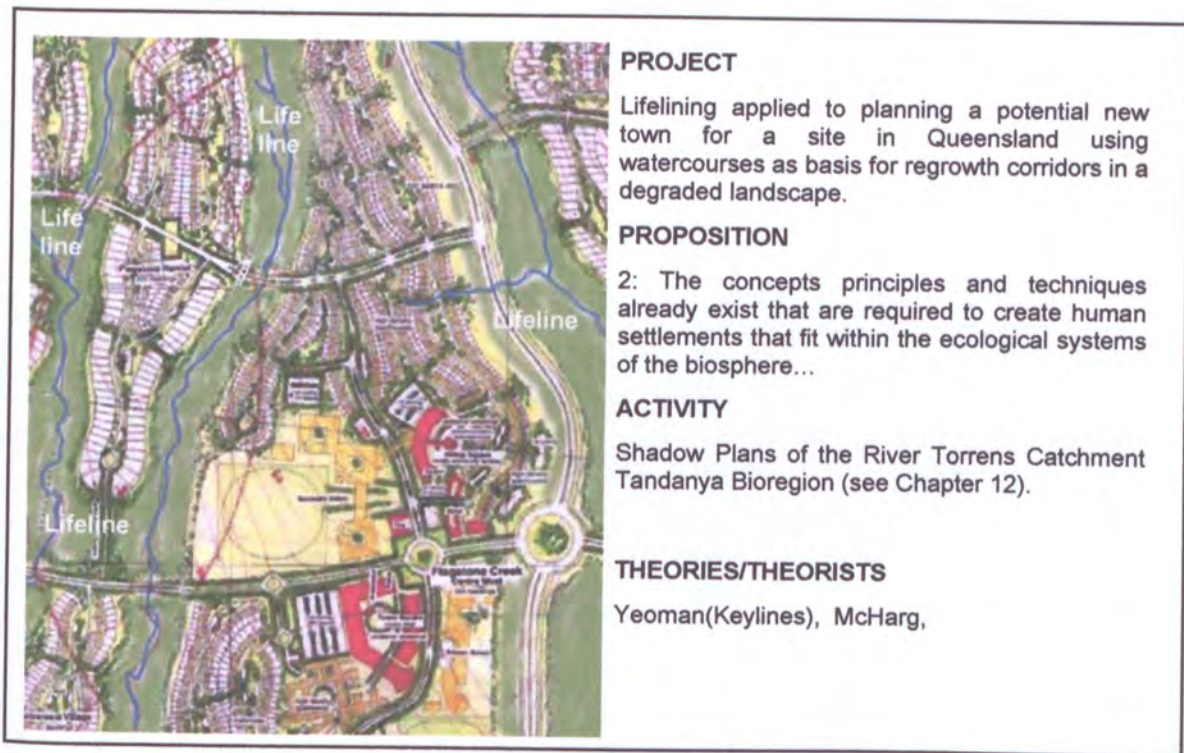


FIGURE 227: Lifelining –Concept planning for Queensland new town
(Source: Downton et al 1998)

LIFELINING INVOLVES: Identifying and mapping the minimum weave of ecosystem elements in the landscape that are vital to continued ecosystem function. Living links, island biogeography, ecological corridors, waterways, creeks, Yeoman's keylines, etc. Ecological restoration and natural infrastructure. Relates to 'ecolinks' Frogstick analysis. Interface between urban occupation of the landscape and its pre-urban ecological structure. Conservation and restoration of lifelines across the landscape are essential to maintaining ecosystem connectivity and functionality.

Lifelining is the process and idea intended to inform human settlement development, Frogstick 9 Ecolinks is the relevant indicator.

The Icon

Using the same stylised watershed as Placing and Biozoning (and EDP2 Fit the Bioregion), the Lifelining icon is based on the idea that watercourses are the arteries of the landscape, linking biological zones.

14.5.7 SHED 5 Proximating



Their circuit (the city walls) being completed, it behoves us to consider the manner of disposing of the area of the space enclosed within the walls, and the proper directions and aspects of the streets and lanes. (Vitruvius circa 1BC in Gwilt 1867 p.21)

Instead of thinking of *going* places, think in terms of *being* places. That is, think in terms of establishing desirable places close to one another. Transportation is what you have to do to get to places inconveniently located: the less the better. (Register 1987 p.33)

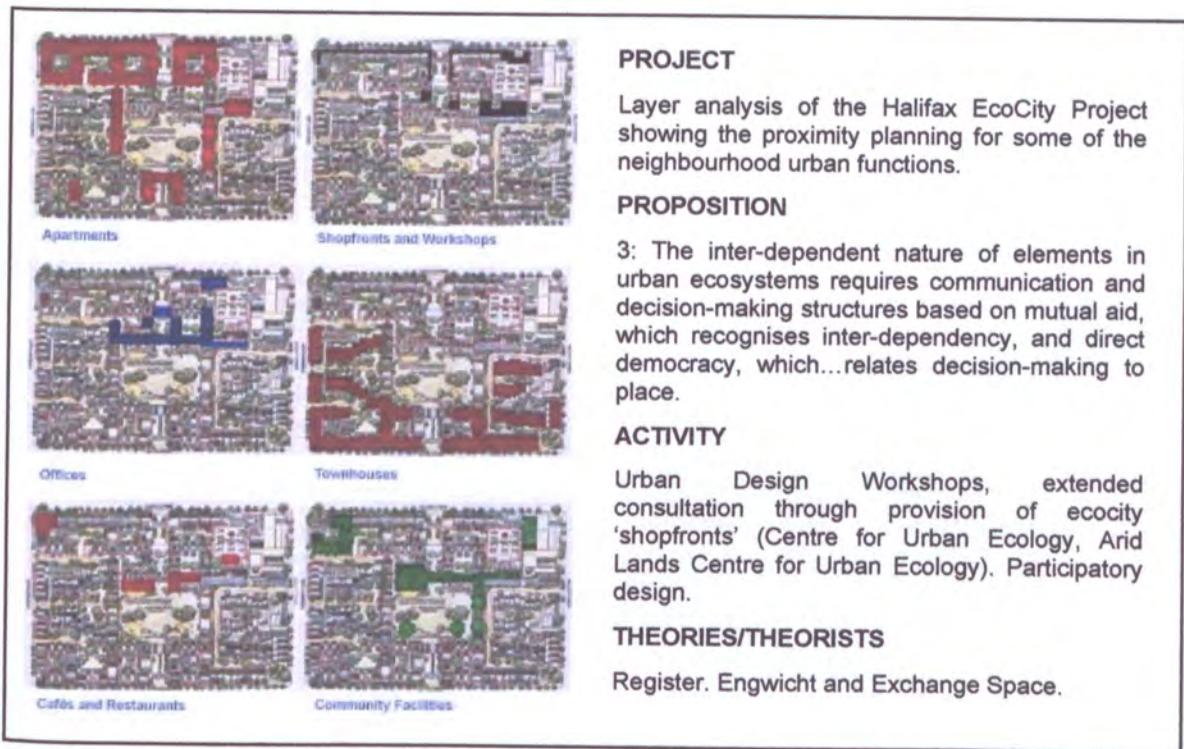


FIGURE 228: Proximating –Halifax EcoCity Project site analysis diagrams
(Source: Downton 1998)

PROXIMATING INVOLVES: Locating cultural, social, economic and community resource centres on the basis of proximity or least energy planning. Human links, 'Registering' or mapping existing and potential urban centres. Recognition of historical patterns of pre-industrial 'walkable' urban form developed on the basis of somatic energy. Establishing the framework of Engwicht's exchange space. Trading places, markets and meeting places.

Efficient planning reduces all energy expenditure to a minimum. In transport this is best achieved by reducing traffic to a minimum and this is best achieved by keeping destinations close together wherever possible. Richard Register calls this 'proximity

planning'. Proximity planning favours pedestrian access over all others. Wheeled transport and other means of moving people or goods should be used as a last resort.

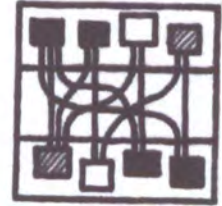
Proximating requires meeting places, marketplaces, people spaces. City squares are enormously important elements in the weave of the urban fabric.³ Surprisingly, perhaps, the world's greatest public places are often quite small and intimate. Great places are essential to the success of the compact urban form proposed for eco-cities yet greatness is not a function of size. This was a central precept in the design for the main squares in the Halifax EcoCity Project proposal.

The Icon

The location of key places in relation to a central place, typically a city or town square, is intimated by the diagrammatic representation in the icon. Concentric circles represent time and distance from the centre, ie. the degree of proximity, as in Register's proposition of designing for proximity.

³ The scale and function of a successful urban space is best understood by experiencing it as Michael Webb explains so well in his book on The City Square (Webb, 1990).

14.5.8 SHED 6 Patterning



You see then that the patterns are very much alive and evolving. In fact, if you like, each pattern may be looked upon as a hypothesis like one of the hypotheses of science. In this sense, each pattern represents our current best guess as to what arrangement of the physical environment will work to solve the problem presented. (Alexander 1977 p.xv)

The traditional city had a fine grain (Ward 1989 p.22)



PROJECT

Images from one of the Urban Design Workshops that were part of the Whyalla EcoCity Development process (see Chapter 7).

PROPOSITION

4: Ecocity demonstration projects must contain sufficient characteristics, in process and form, to represent ecocities in microcosm....with a high level of participation from the wider community in their design, development and maintenance.

ACTIVITY

Workshops (charettes), extended consultation through provision of ecocity 'shopfronts' (Centre for Urban Ecology, Arid Lands Centre for Urban Ecology). Participatory design.

THEORIES/THEORISTS

Alexander's Pattern Language, Fractal Cities, Indicators. Tradition.

FIGURE 229: Patterning –Whyalla EcoCity Development urban design workshops.
(Source: Downton et al 1997)

PATTERNING INVOLVES: Identifying the essential patterns necessary for creating urbanity with and for the support of community. Invisible structures and their manifestation. Citification rather than urbanisation. Bookchin and municipal libertarianism. Patterning neighbourhoods.⁴ Alexander et al.⁵ Also, predicting potential patterns of urban growth and morphologies consequent upon the observance of fractal

⁴ NB: This is not the same 'patterning' identified in Mollison (1988, p.8).

⁵ To establish and maintain civic qualities in the urbs, when practical considerations require the use of cars, vans, trucks and so forth, then traffic calming measure should be integral to all transportation design and layout so that 'exchange space' is maximised and movement space is minimised.(Engwicht 1992). Vehicle access should be limited to necessity - emergency vehicles need ready access to all buildings but there is rarely any justification for private cars to drive right up to the front door. Parking areas should be kept to a minimum and fit around the imperatives of other activities. In all cases parking areas should serve more than one purpose, such as water harvesting.

scaling laws (Batty and Longley – Fractal Cities, in Ball p.244). Note the use of local codes where they exist (eg. Islamic precepts for town planning in Arabia), or identify what they may have been.

The Icon

Based on Appleyard's diagram of traffic-conditioned social interaction in a street (see adjacent FIGURE) the icon is intended to convey the idea of the concurrency and interconnectedness of the physical pattern of built form with the social patterns of human interactions. Patterning is not a static disposition of objects in space but an active realisation of social exchange integral with built form.

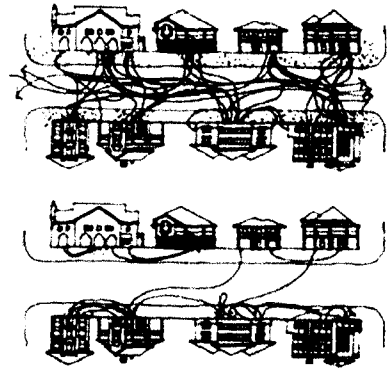


FIGURE 230: Lines are between friends or acquaintances, dots are where people gather. Light traffic above, heavy traffic below (Source: Engwicht 1992 p.48, adapted from Appleyard)

14.5.9 SHED 7 Architecting



Your house is your larger body.

It grows in the stillness of the night; and it is not dreamless. Does not your house dream? and dreaming, leave the city for grove or hilltop? (Gibran 1926/1979 p.38)

Houses are shaped not just by materials and tools, but by ideas, values, and norms. (Spain 1992 p.111)

Buildings are mini ecosystems. Pipes and wires link every building to the city's water supply, utilities, and sewage system. Water and energy flow in, sewage flows out, and waste heat radiates to the surrounding environment. The building interacts not only with the urban infrastructure, but also with the surrounding air, land, and water. (Spirm 1984 p.246)

Say on, sayers! sing on, singers!


Delve! Mould! pile the words of the earth!

Work on, age after age, nothing is to be lost,

It may have to wait long, but it will certainly come in use,

When the materials are all prepared and ready, the architects shall appear.

(Whitman 1991 (1856/1881) p.69)



PROJECT

'The Roman Hut', first dwelling to be completed and occupied at Christie Walk.

PROPOSITION

2: Architecture and urban design are major components of culture and must be conceptually expanded...

ACTIVITY

The Ecopolis Barefoot Architecture Program (see Chapter 12) . Construction workshops (Whyalla EcoCity Development Buddhist building and Christie Walk).

THEORIES/THEORISTS

Wright, Brand, Wells, Frampton, Day, Alexander, Fuller.

FIGURE 231: Architecting – 'The Roman Hut' at Christie Walk
(Source: Downton 2001)

ARCHITECTING INVOLVES: Designing with the principles of Gaean (Gaian) architecture and the Ecopolis Development Principles. Brand and his six skins. Barefoot/community architecture and timeless building. Healthy construction and

industrial ecology. Biophilia and biomimicry. Synergy. Architecture as organism and ecosystem. Wells' Gentle Architecture, Brand, Frampton and Barefoot Architecture. More patterns.

Ecological architecture is about designing to fit the climate, save energy and create healthy buildings which respond to the needs of their occupants. Although there is no single agreed definition of ecological architecture but there are a number of available definitions which typically include the following concerns: orientation to make the most of sunlight and the natural climate, using building materials with low energy content and minimal ecological impact, encouraging use of local skills and resources - supporting the local economy, making non-toxic, allergy neutral structures that contribute to the health of their inhabitants, avoiding waste in the use of water, energy and resources, good neighbourliness or regional responsiveness, respecting and reflecting local character, a 'cradle to grave' concern for the impact of a building over the whole of its lifecycle.⁶

In the days of hand-power it was easier to go round a tree-root or a boulder or follow a contour than go straight through. The lines that resulted - for path, field boundary or building placement were, for pragmatic reasons if no other, in conversation with the landscape. Powerful machinery finds it easier to disregard the irregularities of the surroundings. When you get to know old buildings and old fields you can start to notice how the climate differs when you step beyond their boundaries. This sort of sensitivity in placing does not occur when you design things on paper. Paper design and mechanical

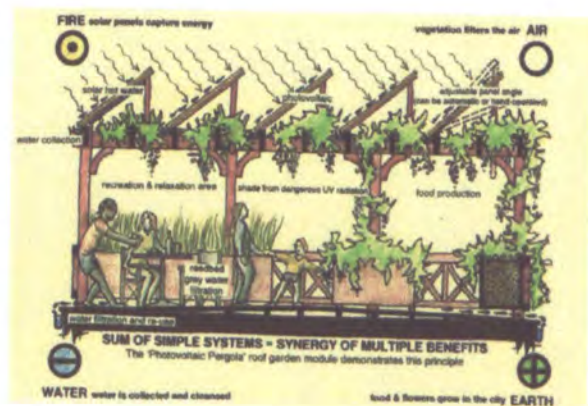


FIGURE 232: The synergy of multiple functions. Not just a roof but a place that harvests energy, supports vegetation, grows food, cleans and captures water, creates shade and amenity, and provides thermal insulation.
(Drawing by author)

⁶ Taking the Measure of Green Architecture:

The making of green buildings requires a measure of what is 'green'. One of the most promising methodologies for establishing a comprehensive rating system is the 'Green Building Tool' devised by Cole and Larsson. The GBTool has been the focus of a substantial international effort to create a thorough and credible measuring stick for architectural performance. The Christie Walk project provided the initial incentive for research undertaken to establish whether the 'GBTool' could be used 'to assess the environmental performance of residential building developments, with a focus on Adelaide, and hence to encourage environmentally responsible development in Adelaide.' The researcher⁶ determined that 'many problems of interpretation and implementation' made it difficult to use 'in a meaningful way' and that in its present form the GBTool was unable to meet that goal (Sheppard 2000 p.71).

construction have changed the relationship of buildings to surroundings much more dramatically than first appears. (Day 1990/1995 p.13)

Architecting is about making healthy human habitation that co-supports the habitat of non-human species. It is linked to the health, wellbeing and productivity of the population, eg. 'Students in classrooms with the most daylight had a 20 to 26% faster learning rate than students in classrooms with only artificial light.'⁷

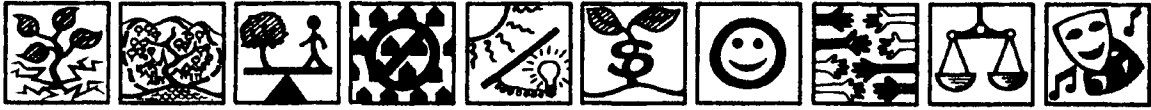
The whole is greater than the sum of the parts. Photosynthesis is only about 1-2% efficient. (An engineer would never design a tree!) But that is exactly what the Ecopolis design philosophy is all about - each element may not be 100% efficient in itself, but all the elements together add up to something with a rich, organic integrity derived from the synergetic interaction of the parts – an approach that encourages emergent properties.

The Icon

Based on the same section that informs the design of 'The Roman Hut' in Christie Walk, the icon indicates an integration of building with function, working with the climate to create comfort conditions, harvesting ambient energy and resources, and fitting its place.

⁷ Environmental Building News September 1999 p.12.

14.6 The Ecopolis Development Principles



Initially drafted in association with Chérie Hoyle and Emilis Prelgauskas, the Ecopolis Development Principles (EDP) were intended to provide a clear set of precepts for developing human settlement that restored, rather than destroyed, ecological health. In its first incarnation there were 12 principles (see Appendix 11). The revised version employed here has 10 principles divided into what might be termed ‘biophysical’ and ‘biosocial’ groups. The one being about minimising ecological footprints, the other being about maximising¹ human potential. The revision has been informed by the work of intern Norbert Schulz from Germany who worked with UEA for 4 months in 1995. Schulz was responsible for suggesting that the principles should be considered as a set of five related primarily to the physical environment and the other five related to the human ecology of the social environment. Thus:

In order to repair, replenish and support the processes which maintain life, the Ecopolis Development Principles seek to:

14.6.0.1 Minimise Ecological Footprints (biophysical)

- *Restore Degraded Land*
- *Fit the Bioregion*
- *Balance Development*
- *Create Compact Cities*
- *Optimise Energy Performance*

14.6.0.2 Maximise Human Potential (human ecology)

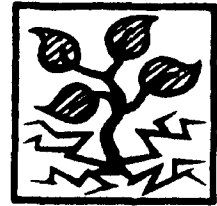
- *Contribute to the Economy*
- *Provide Health and Security*
- *Encourage Community*
- *Promote Social Justice and Equity*
- *Enrich History and Culture*

¹ It was felt that the idea of positive behaviour should be reinforced, thus ‘maximise’ was used rather than language which was punitive or negative, and all the principles are active, positive verbs.

MINIMISE ECOLOGICAL FOOTPRINTS

14.6.1 EDP 1 Restore Degraded Land

Use urban development to restore the health and vitality of the land



It is only possible to make healthy places for humans by maintaining the health of non-human habitats. (Hough 1995).

Rehabilitate and maximise the ecological health and potential of land as a consequence of the development of human settlement.

Land should be assessed in terms of its Potential For Development (PFD) relative to its ecological condition (see Yeang in Chapter 4, Table 4). The more land has been degraded by human activity the greater its need for restoration and the greater its PFD. Wilderness and productive green field sites generally have correspondingly low PFD and should not be built on. Degraded farm land where the soil is 'mined out' (as it is in much of South Australia's agricultural region) may have a high PFD where ecological urban development would contribute to an overall improvement in ecological health.

Restoring Degraded Land includes:

- Clean-up contaminated land
- Heal degraded rural areas
- Re-establish native vegetation
- Encourage farming practices which sustain ecological health
- Introduce green corridors of native vegetation in rural & urban areas

The Icon

With a branching form similar to that of the stylised watershed watercourse, the icon shows vegetation breaking through cracked, parched soil, or concrete-covered streets.

MINIMISE ECOLOGICAL FOOTPRINTS



14.6.2 EDP 2 Fit the Bioregion

Create human settlements which work with the natural cycles of the region

While I find an amazing depth of agreement among bioregionalists on what constitutes bios, and on what possibilities attend our place in the skein of things, there is some disagreement - friendly but passionate - on what actually constitutes a distinct biological region... (Dodge 1981 p.7)

...to become dwellers in the land...the crucial and perhaps only all-encompassing task is to understand place, the immediate specific place where we live...' *we need to appreciate* 'the cultures of the people, of the populations native to the land and of those who have grown up with it, the human social and economic arrangements shaped by and adapted to the geomorphic ones, in both urban and rural settings... (Sale 1991 p.42).

This principle requires respect and conformity to the parameters provided by the bioregion, fitting the landscape with the patterns of development which follow the inherent form and limitations of the land, understood in socio-biophysical terms.

- Maintain the natural cycles of water & nutrients in the landscape
- Create buildings and urban form that fit the landscape & respond to the climate
- Conserve water & recycle effluent
- Use locally produced building materials as much as possible
- Respond to the culture of the region - 're-habitation'

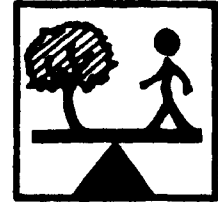
The Icon

Based on an archetypal watershed/catchment derived region, the icon implies the inclusion of the water body adjacent to the terrestrial environment and a 'city' demonstrates the inclusion of human habitation in the bioregional definition.

MINIMISE ECOLOGICAL FOOTPRINTS

14.6.3 EDP 3 Balance Development

Balance development with the 'carrying capacity' of the land



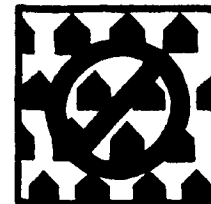
Balance the intensity of development against the ecological carrying capacity of the land whilst protecting all viable existing ecological features. Develop and enhance links between urban and rural areas of an integrated city-region approach.

- Reduce the impact of the city on the land beyond its boundaries (the 'ecological footprint')
- Encourage the diversity of land-use: residential, commercial, recreational, educational, etc
- Develop urban food producing gardens
- Recognise the place of all living organisms in the environment - urban design for non-human species

The Icon

The icon is a simple depiction of the idea of balance between the natural and human world, the same basic design that underlies the Urban Ecology logo.

MINIMISE ECOLOGICAL FOOTPRINTS

14.6.4 EDP 4 Create Compact Cities***Reverse sprawl and stop ad-hoc development from consuming the landscape***

In living nature, the notion of unlimited sprawl seems to be adopted by organisms at the lower levels of evolution. (Soleri 1987 p.12)

Walking provides particularly for increased informal social contacts, which help build up a sense of community...Sustainable development promotes (accessible local facilities), with the aim that as much daily activity as possible can be conveniently transacted on foot. (Elkin, McLaren & Hillman 1991 p.243)π

A sustainable city has the advantage of compactness. An emphasis on 'urban' housing densities should ensure the survival of local facilities like shops, pubs, schools, doctors' surgeries, open spaces and bus stops within walking distance of everyone's front door. (1991 p.244)

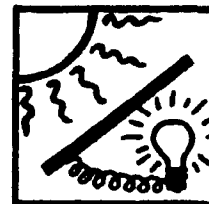
Develop human habitation at relatively high density within inviolable green belts of natural or restored ecologically viable landscape with the overall development density constrained by ecological limits.

- Have clearly identifiable (but not 'hard') boundaries for urban areas
- Provide for most daily needs within the city
- Create 'walkable' cities & promote non-motorised forms of transport
- Develop integrated transport networks which minimise car use
- Access by proximity
- 3-dimensional built form

The Icon

Sprawl is the antithesis of compact urban form. This is the only icon where a 'negative' image is used to elicit meaning because the imperative to stop sprawl is so urgent.

MINIMISE ECOLOGICAL FOOTPRINTS

14.6.5 EDP 5 Optimise Energy Performance***Generate & use energy efficiently***

Operate at low levels of energy consumption, using renewable energy resources, local energy production and techniques of resource reuse (see Frog 10).

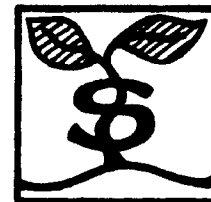
All ecological development should seek to be energy self-sufficient. Nevertheless some human activities need large amounts of energy which may need to be provided from more centralised sources such as desert solar power stations. The primary energy base development must come from renewable sources - in the immediate short-term it may be necessary to supplement energy supplies from fossil sources but all energy provision should be made readily convertible to renewable sources - thus natural gas systems may convert to biogas or hydrogen. Energy should be used on the basis of calorific efficiency - thus gas is best used for heating and cooking rather than electricity (however, the need to maintain EDP7 'Maintain Health & Security' and the quality of Frogstick 1 'Air', means that gas may not be an appropriate fuel where its combustion is within occupied spaces, Minimise energy consumption

- Use renewable energy of solar & wind power
- Generate power locally
- Reduce fossil fuel consumption
- No nuclear power
- Design buildings with solar access and natural ventilation
- Use effective insulation and 'thermal mass' in buildings
- Climate responsive design

The Icon

A solar panel captures power from the sun to light the darkness.

MAXIMISE HUMAN POTENTIAL

14.6.6 EDP 6 Contribute to the Economy***Create work opportunities & promote economic activity***

Support and develop ecologically and socially responsible economic activity.

Materials and component manufacture should be derived from, or be located in the local bioregion to the maximum practicable extent. This being done on the basis of a total systems analysis which seeks to reduce energy expenditure and material waste. The pursuit of this goal should strengthen the regional economy by generating activity and shepherding the wealth within the regional boundary.

Finance for ecological development from ethical sources, exclude financial support derived from exploitative activity. Capital input to ecological development should be local. Any financial structures associated with ecological development should ensure that ownership and control of such development ultimately rests with the users and inhabitants of the development. Industry must at all times be congruent in purpose, process and product with ecological development goals and the maintenance of the points in the 'Frogstick'. Weapons related technologies would generally be inadmissible in an ecological economy but space technologies may be appropriate.

- Develop ecologically responsible industries
- Develop exportable 'green technologies' & services
- Create appropriate information technologies
- Provide incentives for innovation & enterprise linked to ecologically responsible performance

The Icon

A representation of the economy as an expression of natural systems.

MAXIMISE HUMAN POTENTIAL

14.6.7 EDP 7 Provide Health and Security*Create healthy & safe environments for all people*

The evidence we have all points in the same direction: passers-by help in deterring crime. More visible neighbours is better than fewer, good visual relations to the public domain is better than seclusion. (Hillier & Shu 1999 p.6)

One wants to keep in mind that the most violent environment is the smallest of them all, the home. (Soleri 1987 p.93)

Employ appropriate materials and spatial organisation to create safe and healthy places for people to live, work and play in the context of an ecologically resilient environment.

Healthy buildings are those in which the construction materials, design and building operation are all environmentally benign and non-allergenic.

- Reduce pollution & promote environmental quality
- Ensure a safe water supply, Recycle effluent, Maintain clean air
- Provide food security – urban agriculture
- Provide habitat for animals & birds

The Icon

As a symbol of creativity and well-being the 'smiley' face has a respectable ecocity history which reflects a deeper history of activism for peace and security and is congruent with the UEA proposition to 'make ecocities not war'.²

² The Smiley Story: At age 21, Register inaugurated the organisation 'No War Toys' to contribute to the peace movement 'as the Vietnam War was heating up'. He calls it his 'activist training grounds for ecocity work too'. Seeking a logo he sought 'a universal symbol based on the human body' that was a 'symbol of creative themes... against the destructive themes of war play, violent entertainment – and real war.' Noticing that children drew 'happy faces' he based his design on them and discovered 'that coming up with an intelligent looking, bright eyed happy face is a bit harder to accomplish than you might imagine'. The 'wry, off-balance smile' was 'to the best of (his) knowledge on this bit of historic trivia, the first 'happy face' that became so ubiquitous within four years.' 'You should have copyrighted the thing' said his friends 'You'd be a millionaire by now.' (Register 1996 Chapter 10 'One Person's Ecocity Odyssey' unpublished manuscript p.297-298)

MAXIMISE HUMAN POTENTIAL

14.6.8 EDP 8 Encourage Community*Cities are for everyone*

...there is room for everybody in the ecocity effort. It is not vicarious but participatory, not to be dictated, but to be created in a million ways simultaneously from the grassroots to the highest levels of planning and back down again, with a role for each of us. (Register 1987 p.49)

Create cities with strong citizen involvement - community participation, not just consultation. The community should govern itself. Incorporate provision for a wide diversity of social and community activities including secure and attractive, physical and electromagnetic communication networks within a 3-dimensional urban structure. Community needs must drive ecological development. Ecological development must meet community requirements including the community of life that is the eco-system.

- Create development as a community driven process
- Ensure community involvement in public administration & management
- Provide community facilities

The Icon

Hands reaching out. Many cultures. Many colours.

MAXIMISE HUMAN POTENTIAL

14.6.9 EDP 9 Promote Social Justice and Equity***Equal rights & access to services, facilities & information***

What is interesting to note in the urban context is that certain integrated land use and public transport policies – assuming no other changes – can have an income and substitution effects on the less well-off; for example, if a household does not require two private motor vehicles to travel to work and engage in other everyday activities of modern living, there is more money available for, say, housing. (Hundloe & McDonald 1997 p.93)

Employ economic and management structures which embody principles of social justice and equity. Ensure equal rights and access to essential services, facilities and information.

There should always be a significant self-build component in ecological development for two reasons: one is that there should always be the option to invest ‘sweat equity’ in lieu of any other currency so that the poor and dispossessed citizens can still contribute to making the city - this principle is of particular relevance to developing countries and periods of recession; two, eco-systems don’t stand still and an ecological development has to allow for easy adaptation and change which can be effected by individual citizens from the ‘back yard’ level upwards. Alleviate poverty & create work opportunities.

The marketing of ecological developments must be ethical and in tune with the overall goals of such developments. Management should be responsive to community demands and there should be continual community liaison between the promoters, professionals and practitioners associated with ecological development. All marketing, management and liaison practices must be kept under review to ensure ethical and equitable performance.

- Involve all levels of the community in development processes
- Provide affordable housing
- Public use of public space
- Direct democracy

The Icon

The scales of justice.

MAXIMISE HUMAN POTENTIAL

14.6.10 EDP 10 Enrich History and Culture***Respecting the past whilst looking to the future***

If we define culture as a way of life, there can be no doubt that urbanization and the growth of cities are the most significant cultural shifts in this (20th) century. (Streeten 1997 p.200)

Spaces should be created for cultural expressions, such as music, amateur theater, and the arts. (Streeten 1997 p.204)

Maximise the value of previous worthwhile human endeavour in terms of both heritage and manufactured artifacts.

- Restore and maintain cherished local monuments & landmarks
- Identify & celebrate the spirit of place
- Celebrate and encourage cultural diversity
- Respect indigenous peoples' inhabitation of the land

Diverse cultural & social groups provide the basis for socially vital cities

Support and promote cultural diversity, incorporating ecological awareness into all aspects of the making and maintenance of human settlement.

Art and craft should be integral to both the construction and the operation of ecological development from the individual site to the city and its region. Art and craft must be part of the buildings and the physical environment, not applied after the event, nor stuck proudly and pretentiously in windswept plazas or inaccessible locations. Art and craft should be part of their lives as much as the air the citizens breath and the water they drink.

- The whole process of creating ecological development and its subsequent operation requires education and skill development.
- Develop culture by involving all aspects of the arts including music, electronic media & technology
- Develop culture by integrating the arts & sciences with both daily life and special events and occasions
- Promote ecological awareness as part of cultural development
- Support community art & craft events, fairs, fêtes & functions & develop festivities & events which relate to the locality
- Encourage multicultural art & festivities

The Icon

This icon was designed to evoke the idea of culture and the history that is necessarily part of it, without being culturally specific. Masks, smiles and frowns are part of most, if not all cultures. Musical notes have become as universal a language as any.

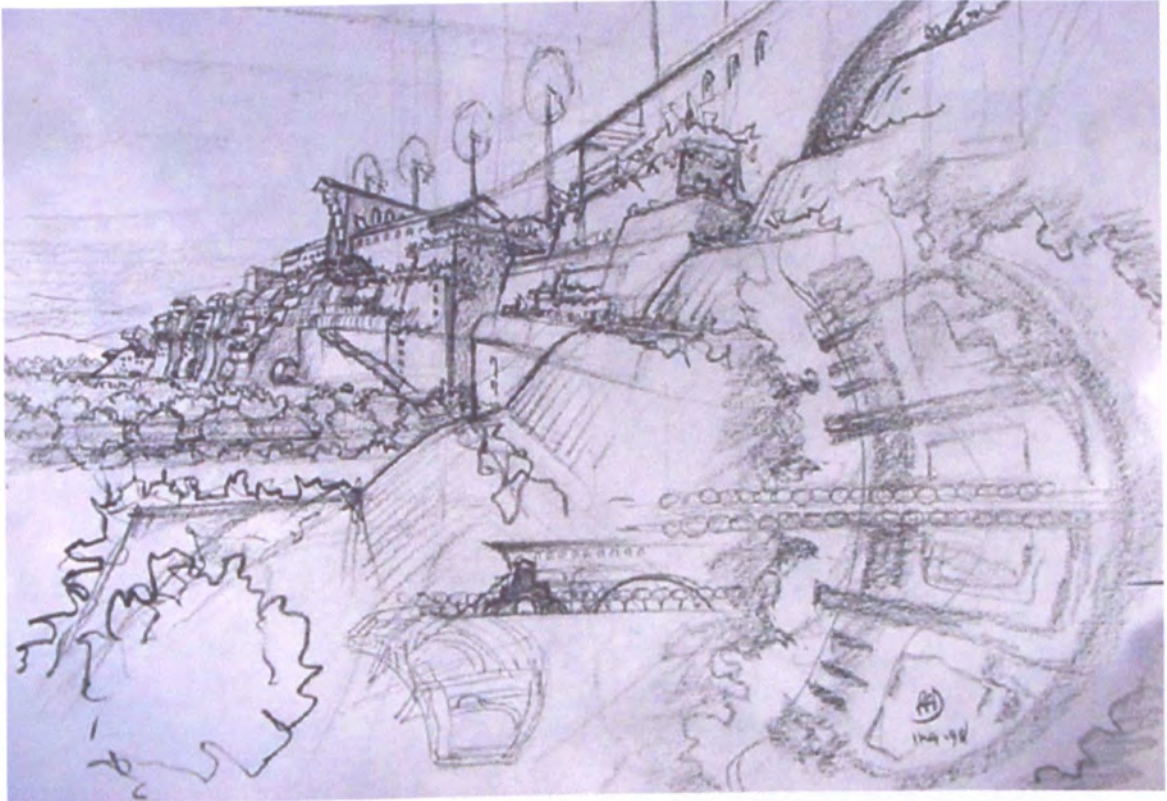
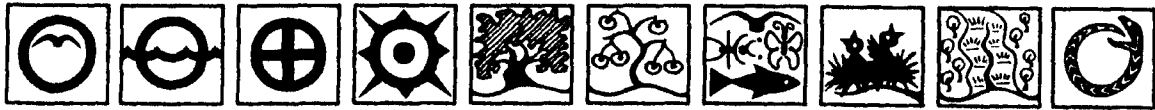


FIGURE 234: EcoCity Fantasy – The morphology of future ecological development may not resemble current urban forms (Source: Author's notebooks 11 April 1998)

14.7 The Frogstick



Architects need their own mini-McHarg system and this is what I have attempted to develop in my own system of pre-design studies over the past decade. (Vadasz 1989 p.83)

Vadasz was writing in respect of non-urban architecture, but this author was primarily concerned with better understanding the relationship between ecology and urban environments when compiling the system here proposed under the rubric of the 'Frogstick'. Urban design and planning have, historically, lacked reference to environmental indicators. The urban patterning process needs to be linked to indicators and measures of ecological performance. Many such indicators have been established during the last decade in response to the growing need to measure 'sustainable development'.

Inspired by Malcolm Wells' 'Wilderness-Based Checklist for Design and Construction' (Wells 1981 p.33-40) the Frogstick was designed as a means of providing an indication of how well an environment was performing in relation to ten key issues related to the maintenance of ecosystem health. The frog is used as an example of a species which demonstrates extreme sensitivity to its environment. The presence or absence of frogs in their preferred habitats provides an indication of the relative health of that habitat. The author's use of the boiling frog story has also influenced its use (see 'Ecopolis Now!' in Chapter 13).¹ The 'Frogstick' is an example of what is now widely recognised as a set of 'indicators'. It was first published in the proceedings of the Solar 91 conference (Downton 1991a p.54) in a paper titled 'Solar Cities for a Sustainable World - Making places fit for frogs'². It was later incorporated in the original Ecopolis Development Principles as Principle 12: 'Heal the Biosphere'.

The Frogstick is a set of indicators developed by the author. Local Agenda 21 derives indicators from a consultative process. This engages the community, which is valuable as an educational and awareness-raising process in itself, but the urban

1 . Boyden et al are responsible for the introduction of the 'boiling frog principle' to the lexicon of usage in the context of urban ecology, a fact that the present author is embarrassed to admit not discovering until 2000, ten years after employing the 'boiling frog' story that had initially been discovered from listening to David Suzuki on the radio!

2 Nearly ten years later, one is tempted to suggest that progress has been made in this respect with the Olympic Solar Village development being tied to restoration of habitat for the endangered green-and-golden bell frog.

metabolism requires scientifically verifiable measures. The Frogstick is designed to be developed as such a set of measures. Indicators derived from LA 21 and similar consultative processes should supplement the scientific 'measuring sticks', not be employed in their stead. In other words there should be a conscious and considered use of conventionally scientific and community (culturally) derived assessments in the analysis and management of urban ecosystems. Consultative processes should not be used to stand in the place of good basic science. Scientific measuring processes determine the knowledge of urban metabolism. This knowledge should be generated and harnessed by city managers and made available to the citizens. LA 21 (or any consultation-based processes) should not be used as an excuse for poor science.

EcoCity developments repair damage by closing the ecological loops severed by past urban development. The 'Urban Ecology Checklist', or the 'Frogstick', can be used to identify those impacts of the conventional built environment which separate it from the natural environment, or 'wilderness'. The author is in agreement with landscape architect and environmental planner Jerry deGryse that 'If there are buildings in it wilderness does not exist' (deGryse 1989 p.49). With this 'measuring stick' one may begin to assess the ecological impact of urbanisation and evaluate the performance of ecological developments by gaining a picture of the extent to which they move away from or towards 'sustainability'.



14.7.1 FROG 1 Air:

Pollutes - Purifies



Increases in childhood asthma and the clustering of lung cancers around cities with dirty air are telling us something. (Steingraber 1998 p.188)

A fresh analysis of a classic pollution study has vindicated its conclusion that city-dwellers in Europe and the US are dying young because of microscopic particles in the air. (Boyce 2000 p.5)



FIGURE 235: The Roman Hut in Christie Walk filters city air through vegetation in a landscape integrated with the building and its neighbours. (Drawn by the author)

Cities differ from the countryside not only in their temperature but in all aspects of climate and city air carries a heavy load of solid, liquid, and gaseous contaminants (Lowry 1971). The load should be as near to zero as possible. Extensive use of vegetation would ensure that dust and pollutants are filtered out. The city would not be a 'heat island' and its net effect on the climate would no longer be disruptive. Solar power would virtually eliminate air pollution.

Every building affects the climate at the very local level. Cities can affect the climate at the regional level. Ecological development requires that the built environment be used intentionally to produce desirable micro-climate changes, creating shelter when the wind blows to hot, too cold or too hard, generating local breezes or warm places to suit the needs of building occupants and so on. An integrated approach to air quality issues is required to recognise the links that extend within and without the built form. Thus there is a need to pay attention to maintaining air quality at all levels of the making of human settlement.

The Icon

Based on the ancient alchemical symbol for air, an empty circle, with the addition of an avian silhouette to indicate the connection of the atmosphere to all living things through respiration and through the atmosphere's composition which is conditioned by living systems.



14.7.2 FROG 2 Water:

Pollutes/wastes - Purifies/recycles

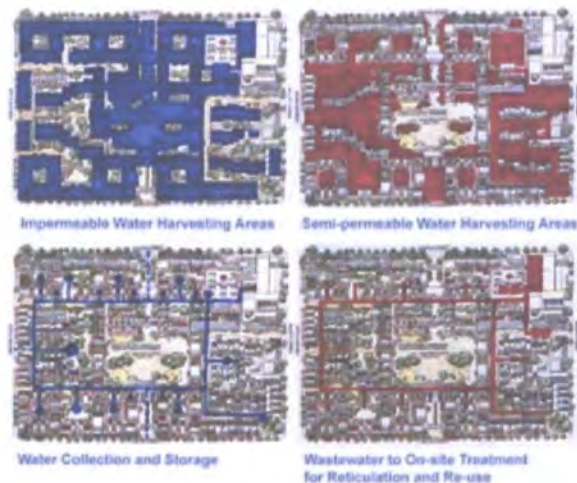


FIGURE 236: Layered analysis diagrams of the Halifax EcoCity Project proposal showing permeable and impermeable water harvesting areas, storage and wastewater treatment tanks. A similar configuration has been adopted for the Christie Walk project where the stormwater storage tanks were put in place in early 2001 and a full on-site wastewater treatment system is scheduled to be put in place in early 2002.

Development interferes with the hydrological cycle/balance (Barton 2000 p.102) Ecopolitan development uses the concept of replicating ecosystem function as the basis for designing the hydrology of the built environment. Thus an ecological development would see the same percentage of water lost to evaporation, soaked into the ground, run off to water courses, or absorbed by organic life as existed in the pre-developed environment.

The water supply for an ecological development should be drawn entirely from within the watershed of the

bioregion and the entire hydrological cycle should be maintained within its pre-human settlement patterns and fitting the boundaries of the bioregion³.

An EcoCity would neither pollute nor waste water and would purify and recycle any supplies available to it. Solar-electric ozone water purifiers (to be used on Christie Walk) and solar stills would contribute to purification/recycling and water can be harvested off all impermeable surfaces including the clean smooth surfaces of roof-top solar collectors.

The Icon

Based on the ancient alchemical symbol for water, a circle with a horizontal bar, with the bar extended and made more obviously reminiscent of water to improve the universality of the symbol's readability (eg. to distinguish it from the logo of the London underground railway!).

³ Cities are dependant on centrally-administered water supplies vulnerable to disruptions and pollution. Nearly two billion people drink and bathe in water contaminated with deadly parasites and pathogens (Durning 1990).



14.7.3 FROG 3 Earth (soil):

Destroys - Renews



FIGURE 237: Straw waste from construction of the Roman Hut used as mulch in city gardens.

The food consumed by city dwellers is often produced by agricultural practices that involve the clearance of indigenous vegetation and the destruction of ecosystem stability. Farming with irrigation for thousands of years has left a trail of salination and soil degradation; modern chemical farming depletes the organic structure of soil. Soil can only be renewed over very long timescales. EcoCities must have sustainable agricultural (and horticultural) systems as part of their planning and function.

Maintenance of soil fertility is closely linked with maintaining biomass (FROG 5), biodiversity (FROG 7) and habitat (FROG 8), and also food production (FROG 6). Recycling of nutrients from productive areas in the city-region can be achieved by transporting composted sewage from neighbourhood treatment plants (eg. facility to be constructed for Christie Walk), reinforcing the relationship between urban and rural areas. Roof gardens and soil based horticulture integrated with built form can extend productive landscapes across urban areas (eg. roof gardens). Building waste from innovative construction can contribute to maintaining soil quality (see adjacent Figure 237).

The Icon

This is an essentially unmodified use of the ancient alchemical symbol for earth, a circle within a cross.



14.7.4 FROG 4 Fire (energy):

Non-renewable - Renewable

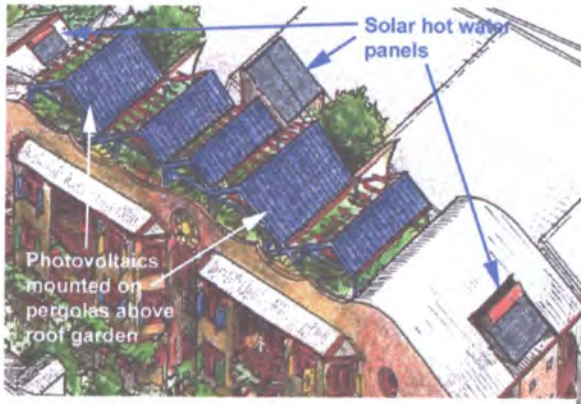


FIGURE 238: Detail from perspective of Christie Walk project showing solar energy collectors on the 'Stage 2' building. The low energy, passive climate responsive building envelope represents an energy optimising solution and the vegetation supported by pergolas, balconies and the roof garden captures ambient energy through biological means.

Cities are energy-hungry. At present, virtually all energy is derived from non-renewable sources. An EcoCity would still use a lot of energy, as all living systems do, but it would not waste that energy. Thus it would need much less energy per head of population than present cities. This energy would come from renewable sources, from such sources as biomass plantations, wind and other forms of solar power. The goal of powering the functions of the built environment and of running all the

technologies necessary to advanced civilisation from renewable energy is achievable⁴. This Frogstick measures the extent to which it is achieved.

Whenever possible ecological development should employ readily available appropriate technologies rather than exotic or unnecessarily high energy or high complexity technologies. Thus dwellings with integrated climate control would favour the use of bimetallic strips over computers as a control mechanism for ventilation devices.

The Icon

Based on the ancient alchemical symbol for fire, a circle containing a point in the centre, with the addition of rays to suggest the sun and, because of the importance of orientation in solar-responsive design, to echo the markings of a compass.

⁴ The entire food chain is also a kind of solar engine.



14.7.5 FROG 5 Biomass:

Decreases - Increases/stabilises

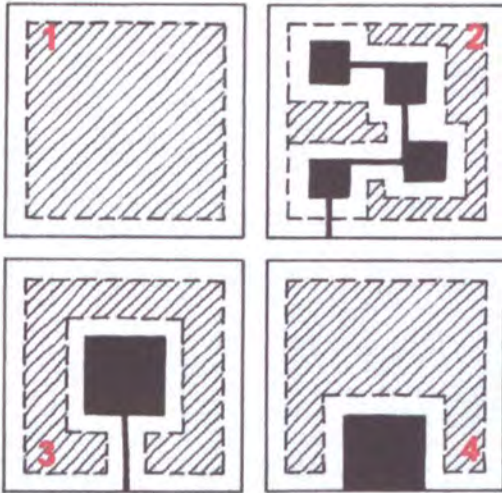


FIGURE 239: Appropriate site planning is crucial to maximising the potential for supporting biomass. Edge effects impact on ecosystem function. Of the three ways to develop the site, #4 above has more than twice the 'core' area of biologically productive land with the same 'developed' area as #2 (see Chapter 11.3 Design Guidelines for Non-Human Species).

Historically, the sum total of living matter in a region is drastically reduced when humans set up an urban centre there. An EcoCity would reverse this trend, increasing the effective biomass (and sequestering Carbon Dioxide) as part of an ecosystem re-instatement programme which would aim to achieve a steady state of dynamic balance once the biomass had been maximised. Biomass represents a Carbon Dioxide sink and solar energy resource accumulated through photosynthesis.

Revegetation has to be a priority in ecological development.

The Icon

Biomass includes all living matter, but here a massive tree image is used to imply the collective mass of living organisms that might belong to any given place. The curving, branched form of the watercourse used in other icons is repeated here in a modified form.



14.7.6 FROG 6 Food:

Consumes - Creates



The prolonged tending of plants began with the fruit and nut trees, the mango and the durian, the olive and walnut and palm, the orange, and...the apple. Here in orchard and garden, a world in which life prospered without inordinate effort or systematic carnage, man (sic) had his first glimpse of paradise, for paradise is only the original Persian name for a walled garden. (Mumford 1970 p.383)



FIGURE 240: Detail from perspective of Christie Walk project showing the Community Garden.

Food production should be maximised. City dwellers usually consume food which is almost exclusively imported from outside the urban boundary. An EcoCity would make the maximum use of opportunities to grow food plants within its nominal boundaries. Streets would have minimum amounts of hard paved surfaces. Street trees and plants would be chosen for productive potential as well as aesthetics.

Maintenance of soil fertility (FROG 3) is intrinsic to sustaining food production but the built environment may incorporate greenhouses (solar harvesters) and hydroponics to supplement the productive capacity of natural soils. It is possible to imagine a city that was a net exporter of food.

The Icon

Again, the branching, curved form of the watercourse is repeated here, with the tree-like image shown carrying fruit to symbolise 'food'.



14.7.7 FROG 7 Biodiversity:

Decreases - Increases



Biodiversity has to be promoted in the context of human communities of the 21st Century. Setting up nature reserves and providing legal protection for species, valuable though they may be, are not enough on their own. A much broader approach is needed, and one which connects biodiversity to the activities of daily living. (Faulkner 1999 p.12)

We depend on biodiversity for our survival and quality of life. (Taylor 1996 p.ES-13)



FIGURE 241: Possums are part of the urban biodiversity in many Australian cities. Their presence needs to be actively accommodated rather than merely tolerated.
(Drawn by the author)

Historically, biodiversity in a region is drastically reduced when humans set up an urban centre. In a biological sense, people and wildlife compete for territory and people are most concentrated in cities (Faulkner 1999 p.12). An EcoCity would reverse this trend, increasing effective biodiversity. This would be part of an ecosystem re-instatement programme which would aim to achieve a self-regulating dynamic balance once biodiversity had been maximised. In some places, the first steps have been made with initiatives like the South Australian Urban Forest Biodiversity Program that encompasses the Adelaide metropolitan region (UFBP Steering Committee 1997).

The Icon

Biodiversity includes all living things. Here, an attempt has been made to suggest something of the diversity of creatures with swimming, crawling and flying creatures including decomposers, predators and prey. Vegetation has been used in many of the other icons, its absence in this one was considered acceptable in order to provide sufficient visual space to allow complexity and clarity in a reduced image.



14.7.8 FROG 8 Habitat:

Destroys - Creates



FIGURE 242: Paper Wasp nest in the City of Adelaide. Creation of human habitat is paralleled by the habitat manufacture of other organisms that can be facilitated or damaged by human intervention.
(Photo by author)

Much of the habitat created in conventional cities favours humans, rats and cockroaches. This artificial habitat nevertheless relies on extended life-support systems to remain functional. We are now approaching the point where dysfunctional events are becoming common.

Some species extinction in the Amazon is directly attributable to plundering of rainforest for timbers used in urban environments half a globe away. Habitats have multiple value, eg. wetlands can filter pollutants. An EcoCity would be planned and evolved to create diverse habitats and relate its activities to the global web of life.¹

The Icon

Birds in a nest seemed a good a way to symbolise habitat because it reminds us that it is not only humans who modify their environment to create comfort conditions. It illustrates a co-dependency between environment and constructed habitat that is common to human and non-human species.

¹ The idea that urban development need not destroy habitat requires that habitats are properly studied prior to development. There are examples of this kind of study being undertaken, either as compilations of existing knowledge of a regional ecology – as with the study undertaken by Steve Baker for Ecopolis in support of the Whyalla EcoCity Development (1996), or as specifically commissioned studies - as with the Homebush Bay Ecological Studies undertaken for the Olympic Co-ordination Authority (Olympic Co-ordination Authority 1996). With no statutory requirement for ecological studies to be undertaken in relation to development except for high-profile, ‘major projects’, and with no conventional expectations for such studies to be related to built environment projects, such studies rely on a ‘culture of concern’.



14.7.9 FROG 9 Ecolinks:

Reduces - Increases



In greatly modifying nature by building...the city, people have created new habitats for plants and animals and have developed new food chains. (Douglas 1983 p.13).



FIGURE 243: Ecolinks were incorporated in the planning of the Whyalla EcoCity Development as a key determinant of the overall design strategy. (Downton)

‘Ecolinks’ is a term coined by the author and refers to the natural links between ecological regions and the need to maintain or replace them in city making. A conventional urban development cuts across routes followed by birds, bees, animals, and seeds, severing these functional ecosystem linkages. An EcoCity would be planned in relation to its entire region (and beyond) within an inviolable network of ‘ecological corridors’. Such corridors need to be introduced into the planned redevelopment of existing cities. They already exist in prototypical form with corridors such as that formed along the River Torrens linear park in Adelaide, and in the USA similarly conceived ‘greenways’ may

interconnect parklands and habitat whilst acting as buffer zones for adjacent land uses (Schiller & Horn 1997 p.103)

We have now reached a state in which urban areas need to be ‘undeveloped’ to re-establish functional ecolinks. The restoration of creeks is a good example of this. The creation of solar-powered transport and other infrastructural developments would provide opportunities to create or reinforce ecological corridors.

The Icon

Ecolinks have much in common with Lifelining (SHED 4). Lifelining is the process of setting up biologically functional links across the landscape. Ecolinks are a measure of whether they exist. Thus the icon shows part of a ‘lifeline’.



14.7.10 FROG 10 Resource Use:

Consumes - Conserves & recycles



FIGURE 244: Resource recovery and reuse practised on the Christie Walk project. The bricks are from demolished structures on the site and will be used for paving – here they are also used to form moulds for paving slabs made from ‘waste’ concrete that otherwise would have gone to landfill. (Photos by author)

There is no such thing as waste in nature. There should be no such thing as waste in the human part of nature. All systems of resource, energy and materials use in ecological development should be designed and constructed to have little or no waste products. Our collective ‘nests’ should be kept clean through aiming to recycle all materials as valuable resources.

The appropriate use of recycled materials should be encouraged to reduce waste and unnecessary energy expenditure. Buildings should be constructed in such a way as to be readily recyclable in whole or in part with building components made of material appropriate to their function and to ‘life-cycle’

The Icon

With this **Frogstick’s** implicit requirement for the promotion of recycling and resource re-use, the icon is based on the ancient symbol for endlessness, Ouroboros, the serpent eating itself.

14.7.11 Frogstick Scoresheets



Frogstick 1 Wilderness (TABLE 21)

	Away from Sustainability	-10	-7.5	-5	-2.5	+2.5	+5	+7.5	+10	Towards Sustainability
1 Air	Pollutes								☺	Purifies
2 Water	Pollutes/Wastes								☺	Purifies/Recycles
3 Earth (soil)	Destroys								☺	Renews
4 Fire (energy)	Non-renewable								☺	Renewable
5 Biomass	Decreases								☺	Increases/Stable
6 Food	Consumes								☺	Creates
7 Biodiversity	Decreases								☺	Increases
8 Habitat	Destroys								☺	Creates
9 Ecolinks	Reduces								☺	Increases
10 Resources	Wastes								☺	Recycles/Reuses
TOTAL PERFORMANCE									100.0	= plus 100%



Frogstick 2 City of Adelaide (TABLE 22)

	Away from Sustainability	-10	-7.5	-5	-2.5	+2.5	+5	+7.5	+10	Towards Sustainability
1 Air	Pollutes			☹						Purifies
2 Water	Pollutes/Wastes	☹								Purifies/Recycles
3 Earth (soil)	Destroys			☹						Renews
4 Fire (energy)	Non-renewable		☹							Renewable
5 Biomass	Decreases	☹								Increases/Stable
6 Food	Consumes		☹							Creates
7 Biodiversity	Decreases	☹								Increases
8 Habitat	Destroys		☹							Creates
9 Ecolinks	Reduces	☹								Increases
10 Resources	Wastes	☹								Recycles/Reuses
TOTAL PERFORMANCE		-50	-22.5	-10						= minus 82.5%



Frogstick 3 Halifax EcoCity Project (including rural restoration)

(TABLE 23)

	Away from Sustainability	-10	-7.5	-5	-2.5	+2.5	+5	+7.5	+10	Towards Sustainability
1 Air	Pollutes						☹			Purifies
2 Water	Pollutes/Wastes							☺		Purifies/Recycles
3 Earth (soil)	Destroys					☹				Renews
4 Fire (energy)	Non-renewable							☺		Renewable
5 Biomass	Decreases								☺	Increases/Stable
6 Food	Consumes								☺	Creates
7 Biodiversity	Decreases								☺	Increases
8 Habitat	Destroys							☺		Creates
9 Ecolinks	Reduces							☺		Increases
10 Resources	Wastes						☹			Recycles/Reuses
TOTAL PERFORMANCE						2.5	10	30	30	= plus 72.5%



Frogstick 4 Whyalla EcoCity Development (TABLE 24)

	Away from Sustainability	-10	-7.5	-5	-2.5	+2.5	+5	+7.5	+10	Towards Sustainability
1 Air	Pollutes						☹			Purifies
2 Water	Pollutes/Wastes							☺		Purifies/Recycles
3 Earth (soil)	Destroys					☹				Renews
4 Fire (energy)	Non-renewable							☺		Renewable
5 Biomass	Decreases						☹			Increases/Stable
6 Food	Consumes						☹			Creates
7 Biodiversity	Decreases							☺		Increases
8 Habitat	Destroys							☺		Creates
9 Ecolinks	Reduces							☺		Increases
10 Resources	Wastes							☺		Recycles/Reuses
TOTAL PERFORMANCE						2.5	15	45		= plus 62.5%



Frogstick 5 Christie Walk (including rural restoration) (TABLE 25)

	Away from Sustainability	-10	-7.5	-5	-2.5	+2.5	+5	+7.5	+10	Towards Sustainability
1 Air	Pollutes							☺		Purifies
2 Water	Pollutes/Wastes							☺		Purifies/Recycles
3 Earth (soil)	Destroys							☺		Renews
4 Fire (energy)	Non-renewable							☺		Renewable
5 Biomass	Decreases								☺	Increases/Stable
6 Food	Consumes							☺		Creates
7 Biodiversity	Decreases							☺		Increases
8 Habitat	Destroys							☺		Creates
9 Ecolinks	Reduces							☺		Increases
10 Resources	Wastes							☺		Recycles/Reuses
TOTAL PERFORMANCE								67.5	10	= plus 77.5%

CHAPTER 15

CONCLUSIONS

Changing our present human habitats into flowering ecocities – an impossible task? Urban Ecology Australia, a small, non-profit organisation, has proven the opposite.
(Arnold 1999 p.24)

And if you could hear the whispering of the dream you would hear no other sound
(Gibran 1926/1979 p109)

The best way of predicting the future is to invent it.
(Douglas Adams¹)

The Introduction to this thesis stated that

‘The case studies in Part B of this thesis are descriptions of projects that set out to test the propositions that there was enough extant knowledge to go about making ecological cities, that the techniques and technologies were already sufficient to begin the task, and that the key determinant in getting the process under way was to do with some notion of ‘community’ and the idea of active citizenship. The ecocity projects described were all conceived as ‘pieces of ecocity’, as microcosms of the larger whole – cultural fractals.’

Furthermore

‘...although this dissertation describes and analyses various projects and theories and presents a set of theoretical syntheses in Part C, the real thesis is being attempted through praxis - making ecocities in microcosm as described in the case studies of Part B...’

Although the case studies go some way towards testing the four propositions, any conclusions drawn from this thesis must be tentative and incomplete because they have to be based on the three case studies of which two are still in process.

There are no significant quantifiable data from the case studies to date. Building performance, resource use, post-occupancy evaluations and much more all remain to be done. The case studies may provide a basis for future research in many fields, but the cohering of those fields of enquiry is what an urban ecological view promises. Descriptions of living communities may still best be achieved through literature rather than science but the case study projects, although unquantified, provide examples of the integration that any scientific studies might seek to find.

Given that, and considering the case studies in the light of the theories and syntheses presented herein, it is nevertheless possible to draw some conclusions.

¹ Repeat broadcast of ‘Margaret Throsby’s Interview’ on ABC Classic FM 17 May 2001, previously broadcast in 1999.

15.1 The Case Studies

The author's engagement in the process of designing, developing and initiating the maintenance of the three ecocity case study projects led to extensive activity outside the normal role of an architect, but in the realisation of each project the least problematic area was that of architecture, urban design and planning. This was most clearly shown with the Christie Walk project where development (planning) and building approval were obtained quickly and easily. This lends support to the contention of Proposition 2 that 'The concepts, principles and techniques already exist that are required to create human settlements that fit within the ecological systems of the biosphere whilst sustaining their biogeochemical functionality.'

That there has to be a functional link between theory and practice is a fundamental tenet of the Ecopolis idea. The three case studies have shown that the integrated approach to principles, processes and ideas embedded in the theory of Ecopolis are realisable in practical projects. Each case study project was an attempt to apply the Ecopolis idea and succeeded to varying degrees. The author contends that the establishment of two projects 'on the ground', along with the influential 'virtual' existence of the Halifax EcoCity Project, has resulted in the accumulation of significant evidence in support of the propositions that underlie this thesis.

(The most problematic areas have been in funding and organisation. Although community organisations were successful in setting the agendas for all the projects, in each of the two cases where there was any reliance on governmental processes the vision was compromised and the outcomes were diminished.) In the case of Christie Walk the project has maintained its original goals and the outcomes are thus far congruent with those goals. (It would seem that the idea of community control of finances and developmental processes is being vindicated in this case.)

(Thus, the urban ecology of socio-cultural and political factors have had more to do with determining the success or otherwise of the projects than architectural or planning considerations per se.) This is in keeping with that part of Proposition 3 that states that (Ecological cities cannot exist except as the consequence of the creation and maintenance of societies capable of sustaining the responsiveness necessary for managing such settlements.')

15.1.1 Community and Patronage

The role of 'community' as a system of mutual aid based on direct democracy is central to the Ecopolis idea. It has been the basis of undertaking the case studies

(without donated community effort none of them would exist). It is fundamental to Proposition 3 'Cultural Change' and thus to Proposition 4 'Cultural Fractals', especially that 'These catalysing 'cultural fractals' can only be brought about with a high level of participation from the wider community in their design, development and maintenance'.

It has been an implicit and explicit part of the case studies and the theory that community expectations are not, and cannot, be entirely conditioned by the state of global capitalism. It might be surmised that what Frampton calls 'a contemporary architecture of resistance' (Frampton 1987 p.27) can be conceptually and practically extended into an 'urbanism of resistance' against the monocultural, monopolistic, life-threatening practices inherent in conventional city design, development and maintenance. Direct democracy and active citizenship require approaches to architecture, planning and urban design that are as responsive to the body politic and social demands as they are to the sun, the weather, and the living processes of the biosphere.

It would seem that allied understandings of buildings, cities and living systems *can* be placed in a framework that facilitates creation of 'urban systems consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes'. The nature and intent of those human purposes are about the fundamentals of culture and society and they are crucial to any notion of 'conscious integration into the processes of the biosphere'. Just as patrons of the arts enable innovation to take place by supporting artistic activity that extends or challenges the status quo (and the Cadbury family patronage was essential to the realisation of early Garden Cities), so the role of community patronage is fundamental because of its intimate relationship to the nature and intent of human purposes.

(The case study experiences indicate that patrons are needed for promoting democratic processes as part of design and that through community organisations like Urban Ecology Australia those processes can be articulated and developed. Without that participation the full engagement of the community in something called an 'ecocity' or 'ecopolis' cannot take place. With the Halifax EcoCity Project there would have been no project without enormous non-professional community participation, the 'patron' should have been the Corporation of the City of Adelaide but was, effectively, Urban Ecology Australia Inc. In Whyalla, the city council supported UEA and Ecopolis Pty Ltd in their bid to integrate participatory processes in the design program for the EcoCity Development, but without UEA's volunteers that program would not have been financially supportable, so again, in effect, UEA was a key patron for the process.)

With the development of Christie Walk, there was no other potential patron except the community itself, for which representation was provided, once again, by UEA.

In the description of these ecocity projects, the role of the community cannot be disentangled from that of the built environment, reinforcing the proposition that people and other organisms are integral to the ecological description of any architecture or urban construct. The Halifax EcoCity Project came to life partly because it engendered the existence of a kind of community even without a physical environment built to house it. The Whyalla EcoCity Development has entered a 'zombie-like' phase of existence because although it has a community of supporters, its built environment is sparse and the full extent of its development remains in question. Christie Walk is living as a community in formation and as a spawn of the HEP. Its inhabitation has begun and the impact of its existence is already out of all proportion to its physical extent². This would seem to support the idea that there is a distinction between the inhabited and uninhabited states of buildings and cities, with the inhabited, active state representing the flowering, or coming into being, of the thing we call a 'building', or a 'city' in an ecological sense.

15.1.2 Vision First

The vision of the HEP and the visioning process of the Shadow Plans represent 'vision driven' development ideas that are at the core of this evolving Ecopolis theory. This approach puts people first in a process intended to realise a vision that is inclusive of them and envisioned by them. This inclusivity and responsiveness is a recipe for a rigorous design approach that does not allow for one-eyed stylemongering or narrow agendas. Alexander composed a set of rules to underscore the idea that this kind of design process was viable and credible. Rule number 3 was 'Visions', so that 'Formulated as a rule, every project, then, must first be experienced, and then expressed *as a vision, which can be seen (literally, in the inner eye), communicated to others, and felt by others... as a vision.*' (his emphasis) Furthermore (and this fits the history and experience of the author with the HEP) 'In practical terms, this vision must come into play *before anything else...* that is to say, at the moment when the project is first formulated, first conceived.' (Alexander 1987 p.51). Such visioning was also essential to the realisation of the other two case studies.

The case study projects all derive from, and rest upon, the idea of wholeness emerging from an inclusive approach to design and development. Proposition 4 about

² With the first house (The Roman Hut) being, almost certainly, the smallest new house built in South Australia for many decades!

'cultural fractals' effectively develops Alexander's 'Visions' rule by suggesting that demonstration projects, which may have been brought about by visioning processes, themselves provide the means to catalyse cultural change.

15.2 Our Cities, Our Selves - Testing the Propositions

15.2.1 City-Region

Proposition 1 'City-Region' is a set of ideas about the role of cities. A city is not a discrete object in quite the same way as a beehive or a beaver's dam, although ancient walled cities and Soleri's fanciful megastructures are objects as clearly bounded as any beehive. Cities are part of a regional network of parts and processes that procure, manage and distribute resources for the mutual benefit of their inhabitants. Consequent land-use patterns express the city-region morphologies and processes. With their biotic and abiotic components, cities are constructed ecosystems that have some of the characteristics of organisms³.

It is increasingly clear that city-making, with all its associated processes, creates the greatest human impact on the biosphere. As part of evolving the extended phenotype of our built environments so as to sustain our species' survival, it is logically necessary for us to make those constructed ecosystems contribute to the ecological health of the biosphere. Thus ecological cities are those urban systems that are consciously integrated into the processes of the biosphere in order to optimise the functioning of the biosphere for human purposes. Achieving this depends on the socio-cultural processes that we know as politics. Metaphorically and literally, if this analysis and synthesis is correct, we need to be 'taking it to the streets'.⁴

15.2.2 Integrated Knowledge

The case studies demonstrate that the concepts, principles and techniques required to create human settlements that fit within the ecological systems of the biosphere whilst sustaining their biogeochemical functionality do already exist (Proposition 2). The breadth and depth of available information provided by relevant theorists has been sufficient to enable ecocity projects to achieve some degree of realisation. The same projects also demonstrate that these ideas and ways of doing things are not yet embedded in a cultural framework that integrates and facilitates their application in the design, development and maintenance of such systems - except in microcosm through

³ Although even an organism is multiple, being 'a living individual consisting of...a group of interdependent parts sharing the life processes' (Concise Oxford Australian Dictionary).

⁴ Or as the Situationists might say: 'The hacienda must be built.'

the sub-culture generated in and by the projects and their protagonists. This is precisely how change is initiated and the ecocity sub-culture thus generated has provided the means to explore, in a practical, applied, detailed manner, ways to integrate relevant extant knowledge.

15.2.3 Cultural Change

The case studies in Part B of this thesis may not be sufficient to demonstrate the part of Proposition 3 that says ‘the collective consciousness and unconsciousness of human inter-relationships with the biosphere is embedded in culture’ but the study of city ecology, development and education in Part C points to the veracity of that proposition. (By extension, it does seem unlikely that ecological cities can exist except as the consequence of the creation and maintenance of societies capable of sustaining the responsiveness necessary for managing such settlements.)

That responsiveness needs to be in relation to the management of all the inter-dependent elements in urban ecosystems. The case studies tacitly support the part of Proposition 3 that says the only communication and decision-making structures that recognise and support non-hierarchic, inter-dependent network-based structures are based on mutual aid and direct democracy. The need to have short channels of communication and on-site decision-making did not necessarily favour such models in the short term of initiating the case study projects, but would appear to be necessary for maintaining them into the foreseeable future.

The case studies seem to bear out the idea that the creation of ecocities is dependent on cultural change. The Halifax EcoCity Project bears this out in both a negative and positive way. Even though the concept of the Halifax EcoCity Project was convincing to at least several thousand people, (it failed to materialise because of deep cultural inertia in local government; there was insufficient cultural change to move conventional institutions far enough to result in changes ‘on the ground’.) At the same time, the HEP managed to achieve semi-mythic status as an example of something genuinely achievable. Christie Walk is reinforcing the credibility of the HEP ‘myth’ as it is a partial realisation of the HEP and, in microcosm, contains all the key components of the HEP in the process and artifacts of its design, development and maintenance.

It may be premature to claim that any cultural change has been catalysed by the creation of the ecocity demonstration projects described in the case studies, but there is evidence that they have been influential and the spreading of influential ideas through a culture is a fundamental requirement for cultural change.

15.2.4 Cultural Fractals

The ecocity demonstration projects that were attempted and are described in the Part B case studies contained many of the characteristics, in process and form, that might be found in an ecological city but the scale of each project determined to what extent it could represent ecocities in microcosm. These ‘cultural fractals’ were only brought about because of a high level of participation from the wider community in their design and, in particular, their development, per Proposition 4. The absence of a conventional capital or government funded basis to the projects (particularly the HEP and Christie Walk) highlights and confirms the complete dependence of each project on the community sector. To achieve anything on this basis required the socio-cultural phenomenon of a created community with sufficient shared ideas, and preparedness to translate those ideas into activity, that the absence of capital and government support could be overcome. In effect, a cultural change was necessary, with enough depth and substance to be translated into activity with palpable outcomes. That cultural change was built around the idea that ecocities could be built. It was a conscious effort to make a cultural shift on the part of many people. The nature of the changes required to make ecocities imply a cultural shift in approaches to city-making. This is as close as the case studies can hope to get to proving Proposition 3; the beginnings of ‘conscious, systemic cultural change’ required for an ecological civilisation may be discerned in this.

The participation of a (relatively) small committed community almost certainly represented a conscious engagement of that community with the urban ecosystem (Proposition 4). Whether the broader community could be more completely involved with a relatively high level of consciousness of its evolutionary role can only be tested in time. The idea that we are an evolving species is challenging enough, the idea that our cities are tools for that evolutionary process will take much more than a few small examples to convince even the most self-aware of those people who are already conscious of engagement with the urban ecosystem that sustains them⁵.

⁵ Environmentalists are more likely than most to have a conscious engagement with the urban ecosystem, but even they may not be prepared to understand that engagement in evolutionary terms.

15.3 Evolutionary Cities

The ecocity is the next step in the evolution of our urban environments: built to fit its place, in cooperation with nature rather than in conflict; designed for people to live whilst keeping the cycles of atmosphere, water, nutrients and biology in healthy balance; empowering the homeless, getting food to the hungry and shelter to the homeless; creating a place for everyone, in every land, for all time. (Downton in Beach 1998)

It is possible to understand cities as living systems, sustained by culture as a form of niche construction. This evolutionary nature of human settlement and its relevance to the concept of the ecological city deserves further research.

If the theory of evolution is correct and Laland is right about human culture as a form of ecological niche making (Douglas 2000 p.33) then cities and buildings are cultural artifacts integral to the life of human organisms, and they may be regarded as having a tendency to evolve towards 'fitness' through natural selection of the most workable types. Evolutionary fitness in this sense would mean the same as it does for other living organisms. Thus cities (or any built environment) will necessarily evolve towards increased energy and resource efficiency. Most human city-making cultures use some kind of money to represent energy and resource value. The continual drive for perceived 'cheapness' or 'value for money' can be seen to represent a drive to maximise energy and resource efficiency. One can thus speculate that when money values are closer approximations of resource value then the equivalence of fitness in evolutionary terms may be better, eg. as scarce rainforest timber increases in price its use is gradually curtailed.

Manufacture of built environments is not simply about energy and resource efficiency, however. Optimisation of the metabolic rate of human settlements is but part of a larger equation. Cities are cultural constructs intended to maintain (sustain) the conditions of their own existence. Cities of good evolutionary fitness for purpose must therefore sustain the cultural processes that are essential to their continued function. These processes include those social fabrics that facilitate community interaction rather than individual atomisation. The ecocity sub-cultural fractals show some of the characteristics of such fabrics.

(Evolutionary cities must address energy and resource use (particularly through *appropriate* economic means), equity, and community processes. These issues are to do with the *maintenance* of the conditions that support ecological cities and are thus fundamental to the Ecopolis thesis.)

15.3.1 Culture and the Art of Lifecycle Maintenance

(The maintenance of ecological cities is not so much to do with regular painting and the clearing of drains (although it includes that) but *about the maintenance of processes*. Even keeping the drains clear is primarily about human organisation. The human organisational forms and activities that maintain all the components of a culture ultimately *are* the culture. The design and development of ecological cities are ongoing processes that need to be maintained for the ecocity to exist and they are integral to its operation as a living system. That integral nature is part of the definition of cities as living systems.)

For a project like Christie Walk to continue to develop and maintain its viability as an ecological development the conditions that created its existence must be maintained. That viability depends on maintaining systemic, sustained ecologically and societally responsible, (self-replicating) conditions. The problem of ecocity maintenance is that of maintaining the socio-cultural systems that result in ecological cities. Community-based 'bottom up' planning strategies, rather than top down planning strategies, are fundamental to the foundation and sustenance of any ecologically viable human settlement in the long term.

Maintaining the cycles of life means understanding that the corollary of life is its absence, and that if cities live, they must also die.

15.3.2 Cities as Extensions of Human Physiology

Historically treated, architecture has seemed too long but a description of buildings, like fossil shells and corals, past and dead. Yet as an evolutionary science it begins anew with the living and growing city reefs... (Geddes 1968/1915 p.142)

By placing the design, development and maintenance of the built environment within the conceptual framework of a living systems approach it is possible to assess those activities in terms of their ecological function. By identifying whether the energy for making a building is from somatic or extra-somatic sources the notion of embodied energy is made much more specific. By articulating the relationship between the biotic and abiotic components of architecture and cities it is possible to understand what part of these culturally generated phenomena are dependent on living systems and to track ecological relationships.

The Ecopolis theory is predicated on an approach to the making of architecture and cities that defines them as potential living systems, in effect as extensions of the human organism. Recent work by life scientists Turner and Laland support the idea that building is a form of extended physiology and is a result of genetic adaptation.

Buildings and cities can thus be understood as components of living systems. They are, in effect, special cases of niche adaptation. (New Scientist 28 Oct 2000 p33). Turner attempts to demonstrate that physiological processes can occur outside of an organism (Turner 2000 p.27), so that the constructions of living creatures can be seen as extensions of themselves.

Turner sees physiology as central to the definition of life and living things as continuous flows of energy and matter (Brown 2000 p.30). His ideas are built on Dawkins' philosophy of the extended phenotype which proposes that construction activity undertaken by organisms are an extension of their expressed genes. Thus 'A beaver's carpentry genes help it build just the right dam' which results in the beaver increasing its chances of finding food and surviving (Brown 2000 p.30).

This promises to be a rich field of enquiry. If the making and maintenance of cities were to be analysed on the basis of them being extended phenotypes of the human gene it may be possible to look forward to achieving a kind of 'unified theory' of urban ecology. Architecture and associated creative activity could then be seen as integral to life processes, as ways of making our habitat function better, increasing our chance of survival as a species.

15.3.3 Urban Evolutionaries

If organisms create extended phenotypes as part of their evolutionary development, and if the human organism is creating extended phenotypes in the form of architecture and cities, then architecture and urban design can properly be regarded as having evolutionary content, and the making of them as being evolutionary activity. This would be entirely congruent with the first part of Proposition 1 in this thesis, i.e., that cities are a habitat for human survival and evolution. It would also fit that part of Proposition 2 which says that architecture and urban design are major components of culture that must be conceptually expanded to recognise the central place of human settlement as an evolving agent of change in the biosphere.

Will architects and planners have to become biologists? Yes, but only insofar as architects are already physicists. Architects are expected to know enough about physics to make a building stand up but it is a rare architect who does the calculations to prove it. Just as architects now work with skilled people to 'do the calcs', so the boundaries of trans-disciplinary engagement must expand to include biologists and ecologists so that it will become as routine to deal with the sustainment of ecosystems as it now is to keep a building standing. Nevertheless, community processes are crucial and ecological design '...cannot be the work of experts only. It is ultimately the work of a sustainable

culture, one skilled in reweaving the multiple layers of natural and human design. Ecological designers are facilitators and catalysts in the cultural processes underlying sustainability.’ (Cowan and Van der Ryn 1996 p.25). In the end, it is not the words that count, it is whether the awareness of *cities in evolution* can be achieved.

Were you thinking that those were the words, those upright lines? those curves, angles, dots?

No, those are not the words, the substantial words are in the ground and sea,

They are in the air, they are in you.

(Whitman, 1991 (1856/1881), p.65)

15.4 After Words

House Hold

As I glide through the mansions of the eco-sphere
Rivers of sunlight fill my forests
And beaches lie down beneath crying mountains
That yearn for the flow of seasons,
Drip nectar of wings with the revolving grace
That only a spinning planet can make.

Like a pond in time, frozen,
A room in this grand house
Whose builders were ignorant of the plans
That no architect had ever drawn
Whilst the daylight fled the night
For morning starlight to re-kindle.

And on the wings of air
I glide again
Doors open
And the roof falls away, stripped by chlorine
Choked with carbon, an exhalation of life on speed
With footings deep in a vital web of decomposing soil
Through aeons of black gold and fossil wood.
The house rocks on its foundation
Begins to topple into a lost future
Where the demons come to life
And the horsemen ride.

The walls, all that is above the actual past
And is swayed in the possible future,
All depend on our life force
Our conscious grip of the great construction,
Fix a tile, patch the walls, mend a window
Or build it again from stardust
Over another billion years.

14 February 1999

APPENDICES
&
BIBLIOGRAPHY

APPENDIX 1

Nature, Form, Beauty and Biophilia

Divine Proportions

The relationship of natural forms and proportions to beauty has been explored and explained in many ways since antiquity, vide, for instance, the architecture of Greek temples and the works by Pythagoras about the Golden Section or Divine Proportion (Huntley 1970) and later in a scientific manner by Thompson (Thompson 1961). With the advent of biophilia as a testable hypothesis about human aesthetic and environmental preferences, the argument for beauty may be intertwined with the more overtly functional ideas of designing with nature.

Geometry might be regarded as a structured way of seeing the earth. Geometry, literally 'earth measuring', was once a way of comprehending the dimensions of the earth and linking those dimensions to the scale of the human being, and human constructions. Although it may now only be imperfectly understood, the tradition of sacred geometry has carried through cultures and centuries as a means of fixing the size and shape of structures of central importance such as cathedrals. (Lund 1921). Competing theories exist regarding methods, means and meaning, but convincing analyses show complex, organic sacred structures being developed from fundamentally simple rule and compass geometry (Dudley 1995 & 2000). Mathematically derived harmony and proportion have been preoccupations of the shapers of space since at least the time of Pythagoras, with even the geometric relationships inherent in particular rectangles being regarded as 'divine'. (Huntley 1970). Le Corbusier attempted to relate the rectangular 'golden section' to an architecture founded in industrialism and accordingly offered the world his 'modulor' system of measurement in the early 20th century. Thus the relationship of aesthetics to one or another idea of human comfort, whether or not it be sublime, has been acknowledged and treated with guidelines, commentaries, codes or prescriptions for millennia. In recent years, the potential for scientifically codifying that relationship has been explored through the work of 'biophilic'.

The first publication to specifically explore, 'the need for nature' premise was E.O. Wilson's, 'Biophilia.'. He proposed that this human behavioural trait was in fact a hereditary response, a phenomenon now known as 'biophilia.'¹

¹ Elise Maynard in an unpublished honours research work-in-progress, University of South Australia 2001.

Life of any kind is infinitely more interesting than almost any conceivable variety of inanimate matter. (Wilson 1984 p.84)

Wilson described 'the human bond with other species' and defined it as 'biophilia'. If we have 'the innate tendency to focus on life and lifelike processes' (Wilson 1984 p.1) then it may be inevitable that we view cities as, at the very least, simulacrum of life. We understand the world as a living place. The idea of biophilia has resulted in the development of a number of research programs in recent years which suggest that a scientifically verifiable relationship exists between humans and nature that is mediated by aesthetic experience and has physical and psychological impacts. This is of particular interest to designers of the built environment and opens the possibility of proving that urban environments need to be integrated with nature for reasons of psychological health as well as environmental fit.

Over thousands of generations the mind evolved within a ripening culture, creating itself out of symbols and tools, and genetic advantage accrued from planned modifications of the environment. The unique operations of the brain are the result of natural selection operating through the filter of culture. They have suspended us between the two antipodal ideas of nature and machine, forest and city, the natural and artificial, relentlessly seeking, in the words of the geographer Yi-Fu Tuan, an equilibrium not of this world. (Wilson 1984 p.12)

The idea of ecological cities may be the most complete attempt to find that equilibrium in this world.

The natural environment shapes human physiology and consciousness and the natural environment is affected by human activity. Human activity applies an organising principle (mental world consciousness) to its actions, which shapes society and which shapes activity in the physical (environment) world which change that environment. The altered environment is 'built' to the extent that it changes from its natural state. The built environment, in turn, shapes human physiology (example: in extremis, eg. weightless space station environment) and consciousness. There is an intimate relationship between the form-giver and the forms.

D'Arcy Thompson was probably first to show with scientific rigour that there was an inherent relationship between natural processes and form. He demonstrated that the additive Fibonacci series (1,1,2,3,5,8, etc) was a natural consequence of growth and led to such characteristic natural features as branching and spirals. Much of the current work on patterns (eg. Ball 1999) derives from Thompson's earlier work. In recent years the rediscovery of nature's engineering achievements have inspired researchers to develop techniques of 'biomimicry' (Benyus 1997). This has yet to impact greatly on architecture or urban design, although there are signs of things to come with proposals to make giant arches, bridges and walls from artificial bone (Sample 2000 p.7).

APPENDIX 2

The Charter of the New Urbanism

We assert the following principles to guide public policy, development practice, urban planning, and design:

The Region: The Metropolis, the City and the Town

1. Metropolitan regions are finite places with geographic boundaries derived from topography, watersheds, coastlines, farmlands, regional parks, and river basins. The metropolis is made of multiple centers that are cities, towns, and villages, each with its own identifiable center and edges.

2. The metropolitan region is a fundamental economic unit of the contemporary world. Governmental cooperation, public policy, physical planning, and economic strategies must reflect this new reality.

3. The metropolis has a necessary and fragile relationship to its agrarian hinterland and natural landscapes. The relationship is environmental, economic, and cultural. Farmland and nature are as important to the metropolis as the garden is to the house.

4. Development patterns should not blur or eradicate the edges of the metropolis. Infill development within existing urban areas conserves environmental resources, economic investment, and social fabric, while reclaiming marginal and abandoned areas. Metropolitan regions should develop strategies to encourage such infill development over peripheral expansion.

5. Where appropriate, new development contiguous to urban boundaries should be organized as neighborhoods and districts, and be integrated with the existing urban pattern. Noncontiguous development should be organized as towns and villages with their own urban edges, and planned for a jobs/housing balance, not as bedroom suburbs.

6. The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.

7. Cities and towns should bring into proximity a broad spectrum of public and private uses to support a regional economy that benefits people of all incomes. Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.

8. The physical organization of the region should be supported by a framework of transportation alternatives. Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.

9. Revenues and resources can be shared more cooperatively among the municipalities and centers within regions to avoid destructive competition for tax base and to promote rational coordination of transportation, recreation, public services, housing, and community institutions.

The Neighborhood, the District and the Corridor

1. The Neighborhood, the District, and the Corridor are the essential elements of development and redevelopment in the metropolis. They form identifiable areas that encourage citizens to take responsibility for their maintenance and evolution.

2. Neighborhoods should be compact, pedestrian-friendly, and mixed use. Districts generally emphasize a special single use, and should follow the principles of neighborhood design when possible. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and parkways.

3. Many activities of daily living should occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.

4. Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.

5. Transit corridors, when properly planned and coordinated, can help organize metropolitan structure and revitalize urban centers. In contrast, highway corridors should not displace investment from existing centers.

6. Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.

7. Concentrations of civic, institutional, and commercial activity should be embedded in neighborhoods and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk or bicycle to them.

8. The economic health and harmonious evolution of neighborhoods, districts, and corridors can be improved through graphic urban design codes that serve as predictable guides for change.

9. A range of parks, from tot-lots and village greens to ball fields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts.

The Block, the Street and the Building

1. A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.

2. Individual architectural projects should be seamlessly linked to their surroundings. This issue transcends style.

3. The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.

4. In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.

5. Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.

6. Architecture and landscape design should grow from local climate, topography, history, and building practice.

7. Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.

8. All buildings should provide their inhabitants with a clear sense of location, weather and time. Natural methods of heating and cooling can be more resource-efficient than mechanical systems.

9. Preservation and renewal of historic buildings, districts, and landscapes affirm the continuity and evolution of urban society.

Accessed 7-9-00 from the website of Duany Plater Zyberk & Company Architects and Town Planners - //www.dpz.com/E-00-principi.htm

APPENDIX 3

Density and Urban Villages

Private courtyards, gardens and other spaces for intimacy or leisure can be designed into any kind of housing that is no more than 4 - 5 storeys high. The public realm comes alive when urban environments have well designed and appropriate public spaces (Webb 1990). Food can be grown in greenhouses, rooftop and community gardens even in the city. Swimming pools, tennis courts and other facilities can be provided as shared resources. Transit, cycles and walkable streets can replace the near-total dependence on private cars. Attached dwellings, clusters and terraces can provide more energy efficient houses. Co-housing can provide other shared facilities like laundries and playrooms for young children. And so on...(Moughtin 1996).

One of the main functions of the quarter acre block is to demonstrate the power of its owner. Control of a large area of land speaks of dominance, control, power, success. But ultimately, control of territory is to do with control of resources - at root, it was to do with ensuring enough food to eat and water to drink. In a civilised society it should be possible to find less primitive ways of demonstrating success. Cities can be good for us (Sherlock 1991). In the culture of an ecological city the clearest demonstrations of success will be those that show understanding of the need to nurture nature and restore ecosystems - to stop being 'future eaters' (Flannery 1994).

Keeping down the size of a building's physical footprint can contribute to reducing the overall size of its ecological footprint (Rees and Wackernagel 1995). The need for greater dwelling densities suggests that EcoCities may have some high buildings in them, but high densities can be comfortably achieved with 3 - 4 storey housing as centuries of civilised town and city building has proved, so except for the few childless couples or individuals who choose it, there is no need for high-rise housing (Sherlock 1991).

Keeping developments compact to encourage and allow for the greater spread of natural environments and restore the health of the ecosystem would be powerful demonstrations of real social responsibility, but one of the arguments in favour of 'urban consolidation' or denser living, has been an economic one. You simply need less pipes, wires and roads if houses are closer together. This simple economic argument is a strong one. Having people live within easy walking distance of one another facilitates spontaneous personal interactions, helping to generate community. So as long as the quality of life provided by denser living is at least as high as that provided by low

density living, then the ecological, economic and social arguments in favour of higher densities begin to make sense.

Urban Villages

In exploring scenarios for 'urban village' development options for 43 hectares at North Coogee in West Australia, Scheurer et al identify three approaches which effectively illustrate the difference between 'medium density' Australian models of urban form and European models. Scenario I 'Liveable Neighbourhood' supposes compact layouts so that people are within 5 minutes walk of local centres, simply connected streets where people can walk, cycle or take public transport, windows and verandahs for passive surveillance, and shops, businesses and community facilities forming 'neighbourhood hearts' (Scheurer et al 1998 p.34-35). Scenario I is essentially 'new urbanist' in its scope. Scenario II adds 'characteristics of ecological housing and lifestyles' using an 'Urban Ecology' approach which combines a range of ecological aspects in a single space and is 'often pursued by local activists (bottom-up projects)' with 'an experimental and explorative character' producing 'unique and very locality-based results'. (p.40) Stressing the need for interacting with the community in implementation, Scenario II proposes more community space, car-free housing and upgraded public transport along with rainwater capture, greywater recycling and community gardens (p.40-46). Scenario III applies 'some of European best practice of sustainability-oriented urban planning' to the mobility management and ecological components of Scenario II (p.49). Scenario III is most similar to the Halifax EcoCity Project in its scope and rationale.

In the comparative review of the three scenarios it is concluded that whilst I may be easiest to implement, the potential synergies provided by II and III would be more likely to support the development of an economically strong community, primarily due to their greater density and lower relative infrastructure cost, eg. a light rail link to nearby Freemantle becomes viable. The comparative chart of the Scenarios indicates that whereas the amount of built-up land is little different in either case (52%; 53%; 55%) the number of residents increases substantially in each scenario (1,800; 2,500; 4,500) and the number of car parks declines dramatically (1,584; 733; 450) (p.56). This clearly illustrates the greater land-use efficiency of 'urban ecology' development options, and also shows the vital need for public transport in such options.

Because they are sited in the heart of the City of Adelaide which is relatively well serviced by public transport, the Halifax EcoCity Project and Christie Walk development should be viable as 'Scenario II' or 'Scenario III' equivalent

developments, in which case Christie Walk with its maximum population of 31 (stages 1 & 2), for instance, would only require car parking for 10 vehicles (Scenario I) or as little as 3 (Scenario III). The development approval for Christie Walk has 10 car parks for the first two stages.

A similar, though less comprehensive comparative review of scenarios was undertaken by the author for Greater Taree City Council to demonstrate alternatives to 'rural residential' zoning. It showed that on a typical 5 acre (2,025 hectare) rural residential block most of the wildlife habitat was lost and only one dwelling could be erected; with conventional suburban development 25 dwellings could be erected but all the original wildlife habitat was lost; whereas in a 'village development' model 25 dwellings could still be erected with 50% of the land retained as wildlife habitat. This was a simplification for the purposes of illustration. (Ecopolis 1994b p.4-7)

APPENDIX 4

City Size: the Case of Somerset and Adelaide

Cities and Size

In discussing cities, size is important. The word 'city' can mean anything from multi-million population conurbations to the traditional pre-industrial cities of less than 100,000 people, or even the tiny urban concentration of a place like Wells in Somerset, England, population 10,000 and a city by virtue of its possessing a cathedral. Mumford and Bookchin favour smaller cities over the sprawls of urbanisation whilst Roszak is hardly an advocate of the modern urban experience. He supports the idea of what may as well be understood as a country town so that, 'Ideally, as in ancient Attica, the country roundabout should be regionally integrated with the opportunities of an accessible, humanly scaled polis.' (Roszak 1973 p.419). Whilst this author supports the idea of smaller cities, the merits of country towns is, in his experience, less than liberating²



FIGURE 245: Metropolitan Adelaide (red) overlaid on an outline of Somerset county in England - dots represent towns & villages. (Drawn by the author)

The walkability, rural integration and population concentrations of the pattern of settlement in southern England can be gained by noting a series of predominantly *rural* walking routes published in a guidebook for eight routes around Wells (10,077) which range from 2 to 12 miles (3.2 to 19.2 km) and cover an area of approximately 100 sq. km. to include the nearby villages and towns of Wookey Hole (1,322), Priddy (632), Westbury-sub-Mendip (794), Cheddar (4,500), Chewton Mendip (509), Croscombe (628), Shepton Mallet (7,657) and Dinder (not available). (the 1991 population estimate shown in brackets is taken from 'Somerset Population and Housing Estimates 1981-1993').

² The population size of ancient Greek 'polises' may have been similar to modern English country towns, for instance, but there needs to be a cultural basis to city life that is of and about the city, rather than the country, lest the exercise of the intellect be diminished by compliance with agrarian-derived custom and the circumscribed world of local agriculturalism.

It is instructive to compare the densely populated 'living fabric' of a part of southern England (in this case, Somerset) with the metropolitan sprawl of Adelaide (see diagram). One maintains its biological productivity with ambient rainfall and is characterised as 'countryside', the other depends on imported water for irrigation and is characterised as a suburban 'city'. One contains many places and is regarded as an environment to explore, the other is not.

APPENDIX 5

Adelaide, Calcutta and the Western Comfort Zone

In Calcutta, slum dwellings may hold a dozen or more people per small room, whereas ‘...25% of households in Adelaide have a single adult living in them either as a single parent or as a lone person – the lone person is 20% of the total household.’ (Clements 1992 p.446). This fact is integral to the comfortable, low density lifestyle that Stretton argues would be disagreeably changed by a move towards compact cities. This sub-urban apologia, curiously, ignores the real human cost of the transport system on which its ‘equitable’ low density form relies. Whilst praising the Australian auto-dependent lifestyle for its freedom and provision of private space Stretton fails to address the price paid in carnage on the roads (Stretton 1996). Worldwide, one quarter of a million people are killed every year by cars. Many more are maimed. Even setting individual human and social costs aside, the economic cost of death and disablement is an enormous price to pay for personal space (Newman et al 1992 p.5). Other respected Australian researchers support the idea that cars are problematic and do not provide a sound basis for city planning. Forster, for instance, points to the issue of equity, noting that ‘Households without cars are obviously disadvantaged.’ (Forster 1999 p.66) Stretton ignores this issue and argues that more efficient cars would resolve the problem of transport energy consumption. Leaving aside the fact that more efficient vehicles are necessarily newer vehicles and are unlikely to be affordable for people on low incomes who struggle financially just to keep old, inefficient cars on the road, they do not assist in maintaining efficient city morphologies. In the two decades dating from the Oil Crisis of 1973, vehicles became more efficient, but whilst California’s population increased by 50% in that period, the area of its cities increased by 100%. (Register 1997). Confirmed sub-urbanists like Stretton may complain about the arithmetical skills of compact city protagonists (Stretton 1996), but they seem blissfully ignorant of the rigorous mathematics of Wackernagel and Rees that measures urban resource consumption to clearly demonstrate the unsustainable nature of the western industrial model of urbanisation. Indeed, Australia’s ecological footprint is ten times greater than that of India – 8.1 hectares/capita vs. 0.8. Calcutta thus has approximately the same ecological impact of Adelaide, even though its population is 11 times greater (Wackernagel et al 1997).

APPENDIX 6

Halifax EcoCity Project - Letters of Support

The success of the Halifax EcoCity Project as a 'cultural fractal', albeit unbuilt, can be gauged to some extent by the sentiments and support iterated from around the world:

'This community-based organisation can take Australia's best vision for a sustainable future to the world.'

Basil S Hetzel AC, Lieutenant-Governor of South Australia - 1996

'...before I left Australia I stepped into your office at Adelaide, the Halifax Project office. I was moved then. I was excited then. I was so happy to see a thing like that happen...god what a light. It gives me the power to believe...'

Oded, Jerusalem, Israel - 26 September 1996

'(The Halifax EcoCity Project) ..would rejuvenate and re-populate a decadent area of the City...it would provide employment for artisans, tradesmen, service providers, professional people...being self-sufficient, it would relieve the pressure on existing services...the example it would set would inspire other areas in need of rehabilitation to follow in Adelaide's footsteps..it would make Adelaide the focus of environmentalists from most countries of the world...'

O B Kermode, EcoCity Supporter, Adelaide - 15 December 1995

'By involving scientists, government and Urban Ecology, in a research project, bio-remediation...would provide an educative opportunity which could bring a huge financial return to the state.'

Bob Marshall, Vice President, Conservation Council of South Australia - 15 March 1995

'We write to express our support for the Halifax EcoCity Project as a national model for urban development. On the basis of community-driven development, it offers what is desperately needed - the promise of an ecologically and socially healthy future.'

Michael Lynch, Director, Tasmanian Conservation Trust - 11 April 1995

On behalf of Queensland Conservation Council and Environment Centre; North Queensland Conservation Council and Environment Centre; Big Scrub Environment Centre; South East Forests Conservation Council; Nature Conservation Council of NSW and Environment Centre; Conservation Council of the SE Region and Canberra, Canberra and SE Environment Centre, Environment Victoria, Conservation Council of South Australia; Arid Lands Environment Centre, Denmark Environment Centre, Western Australia Environment Centre; Tasmanian Environment Centre; Tasmanian Conservation Trust; Marine and Coastal Community Network and Threatened Species Network.

'The Halifax EcoCity Project - a world first - is one of the few, if only, exciting and proactive developments currently underway in this State...We are fortunate indeed in South Australia to be host to such an innovative project which will pave the way for sustainable living in the 21st century...'

Michelle Grady, Executive Officer, Conservation Council of SA - 16 March 1995

'Visionaries like you are the forerunners in the planet! You have truly gob-smacked me - I'm in awe, charmed and astounded. Please keep in touch!'

Annita Roddick, Founder & Managing Director, The Body Shop - 1994

'I was excited to learn of 'The Halifax EcoCity Project' at the 'Partnerships for Change Conference' that Manchester hosted in 1993. The project...represents in microcosm every

aspect of what is involved in creating clean, healthy, exciting and socially just urban environments for the 21st century and beyond.'

William T Risby, Lord Mayor of Manchester, England - 21 March 1994

'We'd like to express Friends of the Earth Australia's extreme interest in your proposals for developing an inner-city site in Adelaide...(we) hope that you can hasten the move to EcoCities in Australia and overseas.'

Cam Walker, National Liaison Officer, Friends of the Earth Australia - December 1993

'The Halifax Project offers an opportunity to create a model for development which builds community, contributes to the economy, and promotes ecological sustainability.'

Frances Milne, Co-ordinator, National Economic Summit - 30 November 1993

'The project is superb in concept, and strikes me as precisely the type of project that should be embraced by cities around the world as we approach a new millenium...the contribution that could be made by realising the Halifax EcoCity Project is immense. My hope is that it would set a new standard for urban development to be followed by cities around the world, including Austin. As someone who has ben immersed in ecological development for over twenty years, I fully endorse the Halifax EcoCity Project, and urge...support for this initiative which would clearly identify Adelaide as being on the leading edge of urban planning and design.'

Pliny Fisk III, Co-Director, Centre for Maximum Potential Building Systems, Austin Texas, USA - 29 November 1993

'We would love to have such a project in Canada !...the Halifax Project will certainly be the envy of countless other cities across North America that are struggling to revitalise their city centres to make them into healthy, sustainable communities.'

Lucy Segatti, Co-ordinator, Auto-Free Ottawa, Canada - 21 June 1993

'This project is outstanding...Nothing like this is in process in America...The Halifax EcoCity Project will without doubt bring global distinction to Adelaide.'

Clark A Buchner, Architect, Memphis Tennessee, USA - 24 November 1993

'I thoroughly enjoyed learning about the Halifax EcoCity Project. It is obviously a very exciting model, and one that I hope the rest of the world will begin to recognise and replicate.'

Tamar Chotzen, Executive Director, Hawai'i Nature Centre, Honolulu, Hawai'i - 15 November 1993

'This project has already captured the imagination of many people in Elizabeth, particularly our young people.'

Lance Jones, Team Leader, Recreation, Sport & Youth, Elizabeth City Council - 18 May 1993

'It would be tremendous for Adelaide and indeed for South Australia to be involved in a world class project.'

Alderman Jane Rann, City of Adelaide - 5 May 1993

'I cannot too strongly urge you to lend all possible support to the effort to create the Halifax Project. It may well be the first realised well integrated urban sustainable project to reach fruition anywhere in the world...If you rise to this challenge, I am confident that Adelaide...can be a world leader in this search. The cost will be so small and the possible benefits to all of us so great that it would be extremely foolish to pass up such an opportunity.'

Phil Hawes, Architect of Biosphere II, Oracle Arizona, USA - 16 April 1993

'I share your enthusiasm for the "Halifax Project", especially the strong emphasis that the council is placing on consultation...the whole project could set new criteria for future developments in our city and beyond.'

AC (Bert) Taylor, present Adelaide City Councillor - 12 April 1993

'We recently had the opportunity to attend, in the European Parliament, a (presentation) on the "Halifax EcoCity project". Absolutely enthusiastic about this pilot project...which honours its promoters and deserves to be widely publicised all over the planet.'

On behalf of the Greens in the European Parliament

Solange Fernex & Jean-Pierre Raffin, European Parliament, Brussels, Belgium - 24 February 1993

'This project deserves ACF support because it embodies practical proposals for implementing ESD principles.'

Graham Harbord, Australian Conservation Foundation Councillor for SA - 5 November 1992

'We would like to congratulate you on this excellent initiative for proposing a model eco-city development project. It shows that it is possible for housing communities to be built on a sustainable and economically viable basis, incorporating sound environmental practices with the needs of the community.'

Cathy Piccone & Yumi Lee, Co-ordinators, Women's International League for Peace & Freedom - 22 October 1992

'After watching mediocre central city developments spring up in the past decade, we wholeheartedly support a project which emphasises energy efficiency, good design and the involvement of the community in the development of an inner city residential and commercial project...'

Sharon Mosler, President, Aurora Heritage Action - 2 October 1992

'Congratulations on the convening of EcoCity 2, the Second International EcoCity Conference. I regret that my busy schedule prevents me from being with you in person...You are certainly on the cutting edge of some of the most critical issues of our times...I commend you for your efforts...'

*Albert Gore Jr, United States Senator (later Vice President of the USA) - 14 April 1992
(Author of 'Earth in the Balance')*

Other letters of support have been received from individuals and groups in many countries, including:

Argentina, Brasil, Bulgaria, Canada, Chile, China, Cuba, Cymru (Wales), Czech Republic, Denmark, Ecuador, Egypt, Eire (Ireland), Estonia, Fiji, Finland, France, Germany, Ghana, Greece, Grenada, Hong Kong, Indonesia, Israel, Italy, Jamaica, Japan, Latvia, Mali, Mexico, Nepal, Nigeria, Palestine, Panama, Papua New Guinea, Phillipines, Portugal, South Africa, South Korea, Spain, Sri Lanka, United Arab Emirates, Ukraine, Vanuatu, Virgin Islands, Zimbabwe

APPENDIX 7

UEA Assessment of Pentroth Proposal

Preliminary assessment of the Halifax Village proposal by Pentroth Pty Ltd

With regard to its achieving an integrated approach to sustainability, Urban Ecology Australia's present assessment of the Pentroth proposal is as follows:

Energy:

- on-site renewable energy provision is being incorporated to the maximum extent congruent with financial constraints associated with an 'affordable' development;
- off-site renewable energy production linked to the project appears to be a highly likely possibility with the support of ETSA;
- significant reduction of energy consumption through reducing demand would be achieved by the various measures proposed, including efficient appliances, insulation, uses of natural ventilation, and solar space and hot water heating.

Water:

- on-site water capture and re-use is likely to be high;
- off-site treatment of all sewage and greywater has been proposed by UEA and adopted by the developers as the most environmentally and economically efficient solution for the development, with the potential to catalyse the development of a 'whole-of-city' approach to sewage treatment;
- it is understood that some on-site greywater recycling may be incorporated as a demonstration feature.

Air quality:

- indoor air quality should be excellent if there is continued commitment to non-toxic materials and products;
- outdoor air quality would be affected by vehicle emissions, particularly if there is significant intrusion into the site by roads and car parking provision.

Vegetation:

- low water use, native and indigenous vegetation is being favoured in the design development and it should be possible to ensure that landscaping will be considered in close conjunction with building design and the layout of external spaces to create a 'sustainable' environment indoors and out.

Waste/resource stream:

- considerable effort is being made to integrate waste management with city-wide processes;
- appropriate detail design of the site and building interiors should ensure a user-friendly waste disposal/recycling regime.

Built form:

- UEA has been assured that the built form will be designed to respond to climate in order to achieve solar space heating, natural ventilation, and natural light to the maximum extent practicable in an urban context.

Pedestrians and vehicles:

UEA has some concerns about the likely intrusion of motor vehicles within the site curtilage and although 'woonerf' type (traffic calmed, pedestrian dominated) streets would create a far better environment than the typical existing streets in Adelaide, the likelihood of having to provide extensive on-site, above ground car parking could seriously compromise the potential for the site to become an international model for state of the art ecological development;

UEA recognises that the developers are responding to ACC pressure for firm answers on this and other aspects of site planning and built form and believe that the City Council should make more allowance for a process which enabled the developers to achieve the optimum solution for the site which incorporated active feedback from those community participation processes which were a requirement of the Council's brief.

Planning and urban design

At the time of writing UEA has not seen the current plans for the proposed development and thus is not able to comment on the extent to which the planning and urban design for the project integrates ESD issues.

Community and management:

- the overall effort being made by Pentroth is excellent and there is strong evidence for a very real attempt to integrate all aspects of the development including building performance, non-toxicity, embodied energy, use of renewables, energy conservation, water harvesting and treatment and resource recycling;
- the community corporation for the site should have 'ecological management' requirements set into its articles and byelaws to ensure on-going application of the principles and processes which promise to be embedded in the physical development;
- community participation processes are being pre-empted by the City Council's insistence on firm responses to aspects of the project which may still, quite reasonably, need further refinement if the project is to achieve a genuinely 'world leading' status.

Urban Ecology Australia Inc

24 July 1998

APPENDIX 8

Dream in a Bin

When the Halifax EcoCity Project ideals were finally abandoned, the Adelaide Advertiser reported it thus:

Ecological city dream ends in bin –

by Civic Reporter, Brady Haran

The dream of building an 'ecological city' in the heart of Adelaide has been abandoned - partly for economic reasons, says Lord Mayor Jane Lomax-Smith.

But the 233-home development, to be built at the old council depot in Halifax St, will still have 'a degree of environmental sustainability', she says.

Adelaide City Council, which owns the site, is paying for the removal of toxic soil. The clean-up cost recently blew out from \$4.7 million to at least \$6 million after a series of contaminated wells were uncovered.

The council has signed a heads of agreement deal to sell the land to developer Pentroth Pty Ltd when the clean-up is complete. Under the deal, Pentroth will build a \$35 million residential development.

Dr Lomax-Smith yesterday conceded the project would not meet all requirements in the council's original design brief.

For example, plans to store and re-use storm water underground and treat sewage on the site were abandoned, she said.

'Some features could not be achieved because of constraints on the site.

'There were also factors of economic viability to take into account,' she said.

'None of the tenderers met the brief, but Pentroth came closest and the council decided to negotiate with them and get the best possible outcome.

'Those negotiations have taken a couple of years. What we have now will probably be the best development in the city.

'It will be more green and environmentally sustainable than anything we have seen in the square mile but it could not achieve all the parameters.

'Environmental features included insulation, no east or west facing windows and 'a percentage of solar panels'.

The council recently completed public consultation about the Pentroth proposal, with results tabled at last night's council meeting.

It featured numerous criticisms of the project, particularly its failure to meet the design brief.

Dr Lomax-Smith described the consultation process as 'hostile' but worthwhile, with supporters of environmental group Urban Ecology behind most of the criticisms.

Urban Ecology was involved with a failed proposal to build a world-first 'Eco City' at the site.

Dr Lomax-Smith said: 'There were people who dreamt of an outcome with little towers and turrets and serpentine roads, and once you are fixated on something, anything else is a letdown.'

Urban Ecology Australia responded to the Advertiser article with a Letter to the Editor, written by Sharon Ede which was not published, the full text of which follows:

'Dear Editor

The article in relation to the Halifax site development ('Ecological city dream ends in bin', Advertiser 18/1/2000) does little justice to the hundreds of people who have been involved, through the non profit community group Urban Ecology Australia (UEA), in contributing thousands of volunteer hours to an 'ecological city dream' since the launch of the Halifax EcoCity Project proposal in April 1992. The idea is hardly 'in the bin', given UEA's involvement with ecocity projects in Whitmore Square and Whyalla, which are based on the same ecocity principles and processes as those originally envisioned for the Halifax EcoCity Project. The Halifax EcoCity Project proposal was about solar roofs feeding into the grid, low embodied energy building, non-toxic allergy-neutral construction, biological management and reuse of sewage and grey water, no through traffic, environmentally rigorous selection of building materials (eg. no newly felled rainforest timbers) and most importantly for any legitimate claim to ecological sustainability, community participation processes which allow people to shape their own environmentally and socially responsible lifestyles.

It is therefore unclear who or what the Lord Mayor is referring to when quoted as saying that 'There were people who dreamt of an outcome of little towers and turrets and serpentine roads...'. '

Genuine ecological development puts people at the core of decision making processes. The process for Halifax Adelaide has failed to do this, and in doing so has failed to comply with the brief which was put forward by Council after a significant investment of time and resources. The brief is an excellent, award winning document, and although it was voted on and approved - but not rescinded - by Council, there has not been a satisfactory explanation as to why the process has deviated from that stated in the brief. It should also be noted that the public consultation process on Pentroth's proposal for the site referred to in the article was organised only after intense lobbying of the City of Adelaide by Urban Ecology Australia.

Urban Ecology Australia is proud have been the catalyst for creating that special vision which is now being so thoroughly abandoned by the City Council. One version of that vision was articulated in the proposal for the Halifax EcoCity Project, and although UEA failed to get that particular project up and running, the Development Brief for the site reflected what UEA had fought for as a community organisation for the best part of ten years, incorporating the best ideas of real community involvement and ecological performance. At the end of the day it was not important that UEA became the 'developer', what was important was that the best outcomes were guaranteed through proper, established democratic processes.

Millions of dollars of ratepayers' money have been poured into releasing the Depot site from its previous use, and to clean it up for re-use. Those funds for remediating the site were committed because there was an expectation that it would pave the way for something special to happen on what used to be polluted industrial wasteland. This would have provided a good financial return for the Council. The current proposal for redevelopment of the site is, in the final analysis, business-as-usual and very ordinary.

Certainly, many of the attendees at the public consultations were supporters of Urban Ecology Australia. They were citizens of the City of Adelaide, residents & business people who believed that what UEA had put forward and what was included in the Council brief

would benefit them, and people from other areas of metropolitan Adelaide who wished to be future residents of the project.

It is remarkable that the goal of creating an environmental development on the Halifax site appears to have been 'abandoned' on the basis that it wasn't commercially viable. At no time did Pentroth or the Council ask to contact any of the hundreds of people who had registered an interest in living in the ecological city project proposed by Urban Ecology Australia, even though UEA had suggested that Pentroth should do so. Urban Ecology Australia knows that ecological development is viable, as all dwellings planned for the two sites that our 'daughter' organisation Wirranendi Inc has purchased in the City of Adelaide have been sold, with construction imminent.

The apparent attempt to portray Urban Ecology Australia's criticisms of the current Halifax site proposal as 'sour grapes' because UEA didn't 'win' the project is offensive to the people who have volunteered their time and energy in support of the EcoCity vision for so many years.

This isn't about 'sour grapes' it's about the difference between two very different ways of developing our city - one way invests confidence in people and the power and imagination latent in the community while the other way relies on entrenched power structures, 'safe' decision making, and 'business-as-usual'.

The people of Adelaide will be badly let down if a golden opportunity for a world class ecological development on the Halifax site is abandoned.

Written by Sharon Ede on behalf of the Board of Urban Ecology

APPENDIX 9

Halifax Hypotheticals

In 'The Halifax Hypotheticals' Emilis Prelgauskas set out a series of scenarios that explored the potential future history of the HEP (Prelgauskas 1994). Some of his speculative stories read quite presciently in relation to the current Christie Walk development.

From the story 'No Ticket, No Start' written from the point of view of a site supervisor:

'Then they said 'keep the site open for the occupying families and tourists'. I thought the works safety inspectors wouldn't wear that one for a moment. Wrong again; now we've got tour guides touring the site with their hordes; intending residents bringing their nicknacks onto site for the boys to build-in as the job goes on; family members coming in after work to put in work hours on their own or on a friend's place. All in amongst normal trades and subcontracts.' (1994 p.15)

'Here the client on this job is the 'community', which is also the builder, which in theory is supposed to be easier; the whole chain of command looks good on paper.

In reality of course it's far more complicated than that. Not only do I get my instructions for the project as a whole the official way – my boss EcoCity Developments contracted to the Land Trust on behalf of the community; but inevitably there are continuous demands from each household wanting their bit first, wanting their special unique aspects taken care of...' (1994 p.16)

'The idea of building-in non standard 'arty' components as construction proceeds had the initial contract prices way up there; again with a bit of experience it has proven to be no more difficult than spec and off the shelf stuff.' (1994 p.17)

'The site has changed a lot since we began. At first no one knew how all this complexity was going to work... It takes more project office support than a normal job; but in the end lots more people have a sense of owning the job.' (1994 p.17)

And from 'Sweat Equity':

The barefoot architecture program. Get involved , they say; what for, I say. Hey, I know what I want. It's easy. What did you say the available floor area is? That can't be right. No one can live in that postage stamp floor area. How much was it again for extra floor space? Boy, the first offer will do just fine thanks.' (1994 p.21)

'Well what can I build. Oh, these bits I have to have done to meet the regulations; and I can work as a gopher for the contractor. Thanks heaps.' (1994 p.21)

'I have to source my own fittings? Yea, that's fine. Like a bit of a rummage in the second hand yards and trash and treasures. What's this list? Fixtures with formaldehyde, plastics, and stuff you won't allow on the job. Oh brother.' (1994 p.22)

APPENDIX 10

Urban Ecology Checklist – The ‘Frogstick’

As First Published

The following is the ‘Frogstick’ as originally presented in the paper ‘Solar Cities for a Sustainable World – Making Places Fit for Frogs’ published in the proceedings of the ‘Solar 91’ conference (Downton 1991a, pp.44-56).

Urban Ecology Checklist The ‘Frog-stick’

1. WILDERNESS - Virtually extinct

	Away from Sustainability	-100	-75	-50	-25	+25	+50	+75	+100	Towards Sustainability
1.Air	Pollutes								✓	Purifies
2.Water	Pollutes/wastes								✓	Purifies/recycles
3.Earth (soil)	Destroys								✓	Renews
4.Fire (energy)	Non-renewable								✓	Renewable
5.Biomass	Decreases								✓	Increase/stabilize
6.Food	Consumes								✓	Creates
7.Biodiversity	Decreases								✓	Increases
8.Habitat	Destroys								✓	Creates
9.Ecolinks	Reduces								✓	Increases
10.Waste	Generates								✓	Recycles
TOTAL PERFORMANCE									1000	= plus 100%

2. ECOPOLIS - A feasible Ecocity: effect on artificially degraded land

	Away from Sustainability	-100	-75	-50	-25	+25	+50	+75	+100	Towards Sustainability
Air	Pollutes						✓			Purifies
Water	Pollutes/wastes								✓	Purifies/recycles
Earth (soil)	Destroys							✓		Renews
Fire (energy)	Non-renewable								✓	Renewable
Biomass	Decreases								✓	Increase/stabilize
Food	Consumes								✓	Creates
Biodiversity	Decreases								✓	Increases
Habitat	Destroys							✓		Creates
Ecolinks	Reduces							✓		Increases
Waste	Generates							✓		Recycles
TOTAL PERFORMANCE						+50	+300	+500		= plus 85%

3. ADELAIDE, SOUTH AUSTRALIA

	Away from Sustainability	-100	-75	-50	-25	+25	+50	+75	+100	Towards Sustainability
Air	Pollutes			✓						Purifies
Water	Pollutes/wastes	✓								Purifies/recycles
Earth (soil)	Destroys			✓						Renews
Fire (energy)	Non-renewable		✓							Renewable
Biomass	Decreases	✓								Increase/stabilize
Food	Consumes		✓							Creates
Biodiversity	Decreases	✓								Increases
Habitat	Destroys		✓							Creates
Ecolinks	Reduces	✓								Increases
Waste	Generates	✓								Recycles
TOTAL PERFORMANCE		-500	-225	-100						= minus 82.5%

4. MULTI-FUNCTION POLIS - Assessment based on published feasibility studies

	Away from Sustainability	-100	-75	-50	-25	+25	+50	+75	+100	Towards Sustainability
1.Air	Pollutes				✓					Purifies
2.Water	Pollutes/wastes						✓			Purifies/recycles
3.Earth (soil)	Destroys		✓							Renews
4.Fire (energy)	Non-renewable					✓				Renewable
5.Biomass	Decreases		✓							Increase/stabilize
6.Food	Consumes		✓							Creates
7.Biodiversity	Decreases	✓								Increases
8.Habitat	Destroys	✓								Creates
9.Ecolinks	Reduces	✓								Increases
10.Waste	Generates	✓								Recycles
TOTAL PERFORMANCE		-400	-225		-25	+25	+50			= minus 57.5%

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NOTES ON THE MULTI-FUNCTION POLIS ASSESSMENT

- 1.Air** Pesticides to keep the mosquitoes at bay would pollute the air
- 2.Water** Generous! The most credible aspects of the proposal to date deal with water quality
- 3.Earth (soil)** Digging out the lakes
- 4.Fire (energy)** Not as advanced as currently available technology allows - and see '10.Waste'
- 5.Biomass** Urban forest is not an ecological substitute for wetlands
- 6.Food** No provision for food production of any significance
- 7.Biodiversity** Reduced substantially
- 8.Habitat** Wetlands adversely affected and mangroves encroached upon
- 9.Ecolinks** Cuts links where they could be improved
- 10.Waste** Any waste mitigation measures associated with the MFP are rendered irrelevant by the economic rationale for the project which includes commitment to enormously destructive and wasteful weapons industries

APPENDIX 11

Ecopolis Development Principles

The 'Original' Version

The following presentation of the Ecopolis Development Principles is the one that has had most currency. It was widely promulgated in the 'Blue Book' about the Halifax EcoCity Project that UEA published through the Centre for Urban Ecology (Downton 1994 & 1996).

Ecopolis Development Principles

'Ecopolis' seeks to create patterns of human settlement in which built form and natural processes are functionally integrated to satisfy human needs as part of the dynamic ecological balance of living systems.

'Ecopolis' development principles apply to all places for all time.

Objectives

'Ecopolis' development principles are only fulfilled where a human settlement achieves all of the following fundamental objectives in an effective and integrated way:

Ecopolis seeks to

1. restore degraded land
2. fit the bioregion
3. balance development
4. halt urban sprawl
5. optimize energy performance
6. contribute to the economy
7. provide health and security
8. encourage community
9. promote social equity
10. respect history
11. enrich the cultural landscape
12. heal the biosphere

by contributing to the repair,
replenishment and improvement of

- air
- water
- soil
- energy
- biomass

- food
- biodiversity
- habitat
- ecolinks
- waste recycling

to achieve the first principle set out above.

1. Restore degraded land –

rehabilitating and maximising the ecological health and potential of land as a consequence of the development of human settlement

The ecosystem of the bioregion has been virtually obliterated and must be restored as the basic foundation of ecological health - the new urban development proposed for the Halifax site will drive the restoration process in two ways:

Rural

Areas of degraded rural land would be purchased or brought into the realm of the Land Trust as part of the total development package to promote ecological restoration, and to provide a food source, recreation destination and additional educational facility for the city site.

It is proposed that at least one hectare of degraded land be restored for every resident. Ultimately, once the ecological footprint of an 'average resident' has been calculated, the goal will be to restore enough land to balance the full impact of the site population. Already, 17 hectares (42 acres) of degraded land (at Monarto) have been purchased by members of Urban Ecology Australia.

The excavation of soil required for the stabilisation of erosion gulleys in these rural environments will provide the main building material for the new urban environment of the Halifax EcoCity Project.

City

Parts of the site have been used for industrial processes (service station, bitumen plant and works depot) leaving a legacy of contamination and wastes. This redevelopment project allows for repair of contaminated soils in the medium to long term by revegetation of some of those site areas. Soil in areas which might be identified as containing consolidated waste may need to be replaced but this contingency is expected to account for only small parts of the total development. Decontamination of any such soil may be achieved as a component of revegetation projects associated with the development, but out of the city.

The rural/urban land restoration program will provide a model for the always present, but often neglected, regional relationship that exists between the rural and urban environments.

2. Fit the bio-region –

respecting and conforming to the parameters provided by the bioregion within which the development is situated, fitting into the landscape with the patterns of development following the inherent form and limitations of the land.

The project respects the intrinsic features of the original landscape of the Tandanya Bioregion. It is integrated with both the current surroundings and the anticipated ecological redevelopment of Adelaide ('Ecopolis Adelaide') into the future.

Associated research projects are taking place at the Centre for Urban Ecology and through the auspices of the University of South Australia. These include the 'Future History of Adelaide' being authored by Sharon Ede and the 'Shadowplan' project coordinated by Paul F Downton and inspired by the work of Richard Register in California.

3. Balance development –

balancing the intensity of development against the ecological carrying capacity of the land whilst protecting all viable existing ecological features

The project has a rural as well as an urban focus so that the total ecological, energy and resource impact of the development is dealt with. The built form integrates the diverse elements of a community to form a whole place, rather than the 'monoculture' of single land use or single development projects such as a conventional 'housing development'. A green thread of 'ecological corridor' reinstates indigenous vegetation whilst providing the planning 'axis' of the urban design.

4. Halt urban sprawl –

developing human habitation at relatively high density within inviolable green belts of natural or restored ecologically viable landscape with the overall development density constrained by ecological limits

The project represents a major increase in inner-city housing and associated community infrastructure. This reduces the need for further suburban sprawl with its expensive and resource consuming requirement for land, services and transport infrastructure.

5. Optimize energy performance –

operating at low levels of energy consumption, using renewable energy resources, local energy production and techniques of resource reuse

Including:

- most appropriate fuel for each use (solar electricity & hot water, gas heating & cooking).
- minimisation of energy demand (passive heating and cooling of buildings, with high levels of insulation and extensive use of thermal mass, emphasis on public transport, easy pedestrian movement and cycling)
- the ability for occupants to manipulate buildings for comfort (user-friendly – openable windows and no reliance on central control systems)
- on-site inter-relationship of energy production and use (exporting electricity to the grid)
- renewable energy production

6. Contribute to the economy –

supporting and promoting appropriate economic activity

The project adds value to the City. It encourages the creation of new building skills and generates employment both during construction and in on-going operation. Ecologically orientated 'green' businesses and business practice will be focussed on the site and overall the project will demonstrate the economic values of ecological urban development. It will provide a major eco-tourism destination reducing the load on wilderness areas and extending the boundaries of environmental education.

7. Provide health and security –

employing appropriate materials and spatial organisation to create safe and healthy places for people to live, work and play in the context of an ecologically resilient environment

Ecological development produces a healthier day-to-day living environment minimally dependant on mechanical support to achieve comfort. The project creates a range of public and private spaces (designed with the participation of the community) with secure separation to private spaces, and visible and accessible public spaces enhancing security. The social mix and diversity of accommodation provides the basis for a full community life and a challenging but balanced social environment.

The building materials and processes involved will be ecologically sound and healthy and the project will catalyse research into and use of healthy buildings.

8. Encourage community –

incorporating provision for a wide diversity of social and community activities including secure and attractive, physical and electromagnetic communication networks within a 3-dimensional urban structure

The project includes community facilities and a market place as well as craft and business opportunities. In addition the development approach is based around a management team, involving progressive redevelopment of the land and a diversity of community organisations, groups and individuals. The variety of processes involved, like the ‘Barefoot Architecture Program’, will help generate a sense of community on and around the site by requiring people to work together making the project happen.

9. Promote social equity –

employing economic and management structures which embody principles of social equity

The Management Team has ensured that financial and management structures embody principles of social equity in theory and practice. Integrating these principles with the development process sets this project apart from all conventional developments and is intended to guarantee ecological balance in the ‘invisible’ structures which ultimately determine the physical structures of the built form.

- No restriction to access to project on the basis of sex, colour, creed.
- Opportunity for a wide diversity of social mix , economic backgrounds and housing development methods.

10. Respect history - maximizing the retained or redeployed value of previous worthwhile human endeavour in terms of both heritage and manufactured artifacts

The project retains heritage elements and integrates these in the redevelopment. The development form respects the Design Principles below, echoing traditional forms, building and urban design elements while also addressing climatic and functional imperatives and avoiding architectural pastiche.

11. Enrich the cultural landscape - supporting and promoting cultural diversity and incorporating ecological awareness into all aspects of the making and maintenance of human settlement

An Ecology Centre is the first building planned for the development. Incorporating dwellings, a café, workshops, a bookshop, and offices for Ecopolis Pty Ltd as 'barefoot architects' on-site, the Ecology Centre will provide an important education and agitation role to establish an ethos for the development and ensure the integrity of the program's invisible as well as visible structures.

The project does not repeat the limited development forms usually found in the City, and as well as mixing housing types and forms, integrates these into a three dimensional urban environment. Existing street frontage cottages are retained and restored, occupant-funded housing, co-op and co-housing projects, street frontage, pedestrian mall fronted, apartments over shops, all inter-relate, with access from street and upper levels.

12. Heal the bio-sphere – contributing to the repair, replenishment and improvement of:

- air
- water
- soil
- energy
- biomass
- food
- biodiversity
- habitat
- ecolinks
- waste recycling

to achieve the first principle set out above.

APPENDIX 12

The Halifax EcoCity Project

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