

The environmental brief: pathways for advancing green design

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ABSTRACT: The move to ecological sustainable development requires new principles, technology, tools and changes to the process of planning and design. This paper argues that there are emerging pathways that can be developed to meet the goal of ecological sustainable development. The pathways are informing the social, cultural and political milieu in which designers' work and present new opportunities for improvement. The paper argues for the need to explore the opportunities found in the scope of design in particular pre-design through utilization of the briefing for environmental purposes, sketch design through the integration of new tools for performance evaluation and for post occupancy study of the environmental existing buildings to create blue prints for future development. The approach, which links these three opportunities is called 'environmental briefing' since it creates a new direction with regard to the changing social, cultural and political landscape for designers.

Conference theme: Social, cultural and political.

Key words; Green design, briefing

INTRODUCTION

The aim of this paper is first to expand the definition of green design, second, to define the tenets to a green approach to design and given consideration to the complexity of the process. Third, to identify some of the opportunities for advancing green design within the design process, in particular the use of tools and methods. This work is some of the outcomes from a research project into the consequences of the move to ecological sustainable development for designers. (Hyde 2003). The methodology for this research project involved examining changes in the principles adopted, technologies utilized, tools that have been developed and processes used in green design. From this analysis some themes emerged which led to the concept of environmental briefing.

1. DEFINING GREEN DESIGN

Green design is a response to the new Age of Information and Ecology of the 20th century (Wines 2000.) Whilst green design can mean utilizing ecological principles in design, a substantive dilemma arises if green buildings do not provide improved environmental performance in their operations. Ecological design principles have come about due to the effects of human activity on the planets ecological cycles such as the carbon cycle, hydronic, nitrogen and sulphur cycles (Yencken and Wilkinson 2000). Green design means adding further dimensions concerning the consideration of the state of the ecological systems. Hence the approach of 'Form follows environment' is a simplified description of the approach designers can take. Yet there is a substantive matter concerning green buildings both to provide a meaningful expression of the ecological principles on which the design is based and providing high operational environmental performance (subject to appropriate management).

1.1 Form without substance

Examining the nature of ecology can extend this argument. Ecology was established as a study of the relationships and interactions between individual organisms and their natural as well as developed environments. Green architecture is concerned with these interactions and relationships as a fundamental design premise. Yet this is not an easy task given the complexity of the relationships in nature. What approach should designers take to achieve this goal?

This is essentially an argument about substance, that is, environmental performance versus form, the meaningful architectural expression of the ecological concepts, which created the building. In essence the term form can mean a number of things; giving users a sense on being closer to nature, using the forms in of nature to generate the building form. Substance on the other hand can be thought of as taking from nature and also giving back. Put another way there, it is an argument about how green buildings may use nature to provide the well spring of design ideas but also assist with repairing its ecological cycles damaged by human kind.

2. CHANGING CONTEXT TO GREEN DESIGN

Yet whilst Green Design may be defined in terms of its form and substance the context to green design is changing. The process of design appears to be responding the needs of sustainability and new tools to assist with these needs. In fact sustainable design is a term now used by the Royal Australian Institute of Architects (RAIA) to describe their process creating buildings that reduce environmental impacts (RAIA 2005).

2.1 Green design and sustainability

The RAI A approach is a way of dealing with the complexity of design in an environmental context. Watson argues that a problem with putting sustainability into practice is the plethora of information and knowledge that is available to designers.

An already knowledge intensive field of research is complicated by new information, literature and websites creating an information glut. (Watson 2004.) The problem is how to navigate this sea of information? Watson proposes design frameworks that are founded on basic ecological principles to reduce the complexity. He lists the types of information needed to match points in the design of the building. For example, different information is required at the brief from that required for design documentation. These points can be used as markers to working through the stages of the building project from inception to documentation to construction. The design phase of a building is organized around these points. It has four steps, each with particular documentation outcomes (as seen in Table 1.) This classification is simply a series of steps to arrive at specific points in the resolution of the building. Hence matching information to the phases of design is one way of dealing with this complexity.

Table 1 Design phase classification Source: (Pedrini, A., and Hyde, R.A 2001)

	Royal Institute of British Architects	American Institute of Architects
1. Pre-design	Inception, feasibility, outline proposals	Programming
2. Sketch	Scheme design	Schematic design
3. Detail	Detail design, production information, Bills of quantities, tender action, project planning, operation on site, completion	Design development, construction documentation
4. Post occupancy	Feedback	Bid, construction supervision, commissioning, post occupancy survey

2.2 Use of tools

Another way has been to use tool. Yet the rapid increase in the number of tools that have been developed to help building designers integrate sustainability issues within the design phase has grown. The last ten years has seen hundreds of tools dealing with aspects of green design, which has led to confusion for designers as to which tool to use. It is beyond the scope of this paper to define all the tools since Watson (ibid) provides a useful summary. The main tools are for goal setting, validation through checklists, computer based guidance, blue prints through case studies, design rules through principles, priorities through preference, manuals for sustainable building, Life Cycle Assessment, scoring systems and eco labels. The next part examines how these tools have evolved into methodologies or pathways for designers to apply sustainability. Three pathways have been identified which can be utilized in design.

1. Making greater use of the brief: These tools, called environmental briefing systems, are noted for integrate goal setting, checklists, preference lists and principles in their frameworks.
2. Applying performance assessment: These are called environmental assessment systems and are note for utilizing scoring systems, eco-labels and life cycle assessments. These are commonly created into rating or benchmarking systems and assist with measuring the environmental impact of the building.
3. Learning from existing high performance buildings: These can act as exemplars or blue prints for further projects. This approach is often carried out post construction. These are called blueprints since a case study methodology is used. The outcome provides the designer with knowledge to feed forward to the next project. The pathways for green design can be mapped and related to the design phase classification. These pathways are conceptualised as lines of enquiry involving tools and systems, which progress green design.

Table 2: Stages in the design process related pathways for green design

Stages	Stage 1: Pre-design	Stage 2: Sketch design	Stage 3: Detail design/construction	Stage 4: Post occupancy
Pathways				
Environmental briefing systems	Charettes Briefs Reports Principles	Analytical studies		
Environmental Assessment systems	Checklists Pre-assessment	Design Phase Rating Systems Design Phase Benchmarking Systems		Operational Phase Rating Systems and Benchmarking Systems
Blue printing systems				Case studies Surveys of buildings in-use. Monitoring Analytical studies

3 THE PATHWAYS

The pathways identified are shown in Table 2, but looking at these in more detail some arguments for each approach can be determined.

3.1 Arguments for environmental briefing

Building designers consider the design brief to be the most crucial part of the design process for achieving high quality buildings. Environmental design strategies are accorded less importance (Wittmann, S. 1998). It is argued, that the use of an environmental brief, that is, a brief that combines both architectural and environmental issues to drive building design, could be extremely effective in producing high level environmental performance. Using the briefing stage to set

out environmental criteria will allow for assessment of the building's performance throughout the various stages of the design process. This can be effective in ensuring that environmental design strategies integrate with the building. The implementation of the environmental brief could be more important to achieving a high level of environmental performance than the environmental design strategies themselves. The Royal Australian Institute of Architects' Practice Notes define a design brief as 'a written statement, which details the client's expectations and the functions of a proposed building. It should describe the facilities to be provided and the activities to be performed and also clearly identify the broad policies within which these are to be achieved in respect of time, cost and quality of the facility.' (Practice Note: the Design Brief 2003). At present, two approaches to implementing green design are available.

The first is a 'top-down' system where the client sets the environmental goals and objectives. The second is a 'bottom up' system in which the designer initiates the environmental strategies. Research has shown both approaches are fraught with problems. In a survey of architects, Wittmann found designers have a poor track record in understanding an environmental approach to design and often cannot implement the 'top down' system. In the case of the 'bottom up' approach, the designer may have an understanding of environmental issues but there is not a similar interest with the client or the resources are not available to achieve the goals (Wittman 1998). The Wittmann survey pointed to the importance of the brief as a way of increasing the knowledge of both the client and the architect of environmental issues. The main proposition of Wittmann's research is that the brief can be used to influence the level of sustainability in a project and that this sets the direction for implementation of sustainability in subsequent stages of the design. Research has investigated the Wittmann hypothesis and has led to the development of a design-phase framework for integrating environmental issues (Watson 2004). An environmental briefing tool developed from this framework. Pilot testing has been done with design interventions using the briefing tool in four buildings: three houses and one office fit out (Watson Cheshire Hyde 2000). There are four main arguments in the literature for focusing on the brief as a way of controlling the level of sustainability in a building project.

3.1.1 Building design paradigm

Briefing (or programming in the United States) takes place in the early stages of the design of a building when client and designers make decisions that concern the inception and feasibility of the project. The activities in the architect's plan of briefing work include preparing the general outline of requirements, planning future actions and providing the client with an appraisal of the requirements to identify the form and scope of the design work. (RIBA, Plan of Work for Design Team Operation 1973) Similarly, in the United States the programming phase sets the size, use and the budget of the building (AIA, Understanding the Design Process 1999.) In recent years the functional complexity of buildings and performance requirements have increased, in turn increasing the conceptual and technical sophistication of building design. In addition, new knowledge domains are needed such as environmental issues arising from cultural changes to sustainability. The building designer is a generalist by training, and is surrounded by specialists and experts. Research into the way generalists deal with complexity and specialization through investigation of the models of design for building professionals. There are many models of design and much discussion as to which is an appropriate representation of design activity. Early models of design suggest an analysis/synthesis/evaluation set of activities (called the ASE model), where goals are set, problems identified and solutions explored and evaluated (Broadbent and Ward 1968). The approach is characterized by investigation of the parts rather than appreciation of the whole.

In recent years a different model is proposed which focuses on the whole rather than the parts. New designs are seen in terms of existing solution types or solution subsets, principles and strategies. Designing is seen as a conjectural and reflective activity (Schon 1995). Design is about examining which solution set, principle or strategy is appropriate in a particular design scenario. This model is called the conjecture reflection model (CR model). Each model is seen as a separate paradigm with its own design culture and specific methodology. It is not the purpose of this research project to investigate design theory but rather to examine the consequences of the shift to the CR model in terms of briefing.

Observations suggest the plan of work is based largely on office protocols and the ASE model. Briefing is seen as a largely analytical activity. The language is rhetorical and is about goal setting, analysis of requirements and appraisal activities. The proposition advanced in this research project is that the environmental brief can accommodate the expert knowledge in the new environmental domain by redefining briefing as a more complex pre-structuring exercise, reflecting on alternative principles, strategies and solution sets to meet the needs of the design problem.

3.1.2 Front-loading theory

Second, the concept of front loading comes from the notion of defining performance standards 'early in the design process' (Larsson 2000) Experience from practice has suggested that trying to apply performance standards after the building has been designed is fraught with difficulty. Generally, guidelines are used as a way of 'front loading' the design. Limited progress in the field has been made on developing methods to accommodate pre-structuring of design information.

3.1.3 Transferring expert knowledge to non-experts

The third main argument for using the brief to control the level of sustainability in a building project comes out of research on sustainable building that exposes the lack of uptake of sustainable design in the great majority of housing being produced (Wittmann *ibid*). It is an internationally recognized problem and one that concerns those governments that are striving to reduce their greenhouse emissions as outlined in the Kyoto protocol. Initiatives to address this problem are found in the International Energy Agency SHC program for Sustainable Solar Housing. The approach to define a research task called 'IEA-SHC-Task 28' (Task Force from the International Energy Agency 1999). The outcome has been to demonstrate the design of high performance houses that improves the environmental performance of domestic buildings by using sustainable design and provide information for owners, builders and builders. A number of handbooks for various climate types have been produced (Hyde et al 2006 forthcoming) (AGO), which has two initiatives. The

AGO's first initiative is through the Australian Building Energy Council (ABEC). It has developed an environmental building best practice case study web site (ABEC Case Studies of energy efficient buildings 2004), which is being promoted to the building industry in the newsletter "Blueprint". The second AGO initiative is the 'Good Residential Design Guide' (Good Residential Design Guide 2004) project developed and launched by the Institute for Sustainable Futures, University of Technology Sydney.

This is perhaps Australia's ultimate practical guide to sustainable residential buildings. The project includes a set of case studies, many linked to the work of ABEC. These case studies cover all price ranges and all climate zones. There is a marketing introduction to assist the layperson in making decisions. The Chief Investigator of the 'Good Residential Design Guide' was a contributor to the ABEC Task Force (ABEC 2004) who assisted with establishing the case study approach, and since then has worked on developing a way to synthesize the case study work and bring together some conclusive outcomes. This revealed that the strength of the AGO approach is a useful source of techniques and examples, but it falls short of providing design guidelines or briefing information. It does little to establish the extent to which designers can challenge the norms of domestic construction, what the cost penalties are and what the environmental benefits might be.

3.1.4 Challenging the norms

Finally, from the work on the Healthy Home project (Healthy Home Project) a number of strategies and solution sets are found to be achievable. They challenge the design norms of conventional house design and their main strategies are: - Electricity consumption can be reduced by 40 per cent if a solar hot water system for little extra capital cost and a government subsidy. - Zero heating and cooling energy is achievable using passive design with no extra capital cost. - Using photovoltaic systems up to 25 per cent of remaining electrical energy demand can be provided from non-grid, renewable sources at an additional cost of \$4000 with government subsidy - Using innovative water wise strategies 30-100 per cent of the water consumption can be saved (provided Legislative barriers are removed), at a capital cost of approximately \$5000. Using appropriate construction, embodied energy can be confined within the boundary of 1000MJ per m² with no extra cost beyond a small life cost for termite inspection and corrective maintenance. This is half the embodied energy of a conventional masonry home. It became clear that an innovative approach is needed to promote the kind of building developed in the Healthy Home project to a wider market. The project involved a large number of experts and extensive design time to implement due to a lack of information on environmental strategies and cost information. It is not feasible to replicate this approach in every new building, so it seemed preferable to consolidate the experience and information into a briefing document. The briefing document could be expanded with knowledge drawn from other projects. This seemed a more plausible direction to take (Environmental Brief structure 2004) It became clear that research was needed into the form and nature of an environmental brief and this led to the development of the research project described here.

The Healthy Home Project addresses the national need to move to a sustainable Australia through transformation of building design and hence the entire building industry. Environmental design is a complex synthesis of both the pragmatic and poetic aspects of design that crosses the science and the art of the discipline. At the same time, there is a significant trend to employing non-experts to design a large proportion of buildings, particularly houses. If we are to achieve a sustainable future there is an acknowledged need to skill building designers in environmentally sustainable design (Wittmann 1998 92).

A solution may lie in the use of design tools that can transfer expertise and knowledge in a simple and effective way. Research into design tools suggests the environmental brief has the potential to accommodate the complexity of environmental systems and meet the needs of practice i.e. that found in quality management protocols such as ISO 9000 (ISO9000, Quality Management Principles) and ISO 14000 (ISO14000 Environmental Management). It transfers expert knowledge gained through research to non-experts enabling them have a better appreciation of environmental sustainability. Further systems such as building assessment systems can be used for this purpose.

3.2 Building Assessment Systems (BAS)

3.2.1 Environmental Assessment and BAS

An environmental assessment system for comprises a tool to evaluate the environmental performance of a building and a method of applying integrating the tool with in the design procurement process. The tool can be a rating tool, which has a scoring system to assist with measuring the performance of the building. Other systems use a benchmarking tool. In essence, a BAS is a process control system for buildings. The use of environmental assessment tools in conjunction with design, give a path to facilitate green design. It is beyond the scope of this chapter to carry out an exhaustive review of the tools but rather to report on the findings of others who have carried out this kind of research with a view to their relation to design. A comprehensive review is found in the work of IEA- ECBCS 31, (Baldwin 2000) which surveyed 27 tools from 12 countries (<http://www.uni-weimar.de/ANNEX31>). The main outcome of the survey was to make four comments. First, to identify the need carry out 'uncertainty analysis' to assess the rigour of a design tool to reduce environmental impacts. This concerns the environmental criteria in the tool and the model of environmental performance desired. Second, to improve transparency so that the method used in the tools and system so that it is clear and easy for the users to understand. Finally, to develop tools for the early part of the design process (Baldwin 2000 218) Further research works has been carried into how tools address the needs of the design process.

Further research has identified differences in the tools, which arises from the main arguments for using BAS. These arguments are that the tools be effective in assisting with greening the design process, provide a multi criteria approach to environmental design and rewards developers and designers for adopting a green design approach.

With regard to the first issues, a review by Watson (Watson 2004) argues that tools such as the Green Building Challenge (now called GBTool), LEED or BREEAM system have been developed for and are usually applied post-design. Todd (Todd 2000) claims that tools such as the GBC are too abstract and difficult for designers to use. He argues that the LEED system is more effective as the framework matches the process used by designers. The LEED rating system has developed a link between credits in the assessment to strategies in the building. A limitation of the environmental assessment approach is that it can be highly prescriptive and leaves little room for innovative design (Balcomb 2000). The main conclusion is that these systems are best suited to design certification, that is, to confirm that they meet some form of environmental standard once constructed.

With regard the tools such as LEED, BREEAM, Green Star the tools are rating tools, that is a development is rated using a scoring system as to how it matches specific environmental criteria. Problems with these tools refer to the 'one size fits all project' approach adopted by these tools. The criteria and benchmarks are fixed so variations in context (site and climate issues for example) are difficult to accommodate. In some case weightings are used to address this difficulty. Benchmarking systems such as used in Green Globe 21 attempt to address these difficulties by setting different benchmarks to reflect some of the key variables such as site, climate, occupation rate and size of project (Green Globe 21).

Also, differences between design phase and operations so that environmental performance can be assessed at different stages in the life of the development. Arguments against the design phase tools such as LEED, GBC and Green stare are two fold. First they only provide predicted performance and hence are theoretical in nature. There can be little connection between the predicted performance and actual performance (Williamson 2000.) Hence the Australian Government has developed systems such as NABERS to carry out rating of sustainability in housing and offices post construction during the operational phase (Lavery 1998). Furthermore lessons from Green Globe 21 demonstrate the importance of the 'continuous improvement' of the development over its life span. This concept derived in part from policy issues in Agenda 21, which places at its core the concept of continual improvement of performance over the life of the development. This principle is not often articulated in many BAS as is other conditions such as the use of multi criteria.

3.2.2 A multi criteria approach

The argument for a multi-criteria approach for BAS comes from the use of single criteria systems such as energy-based assessment. For some time, energy has become the main criteria for assessing sustainability. Balcomb argues that a number of computer systems for early design work are available. Of the analytical computer tools many are concerned with energy performance or are tools for modelling thermo-dynamic phenomena with in buildings – heat flow, wind flow, and day lighting. Williamson and Soebarto argue for a multi-criteria assessment approach to building assessment is favourable for a more comprehensive assessment of environmental factors. They using program called Enter-Rate (Williamson 2000). It is innovative for a number of reasons. It deals with a broader range of criteria, both qualitative and quantitative and is useful for assessment during the design phase as well as post-design for building evaluation.

3.2.3 Rewarding 'best practice' The use of eco-labels in conjunction with EAS provides an opportunity to reward developers and design teams for their efforts in improving environmental performance of buildings. The Eco-label is a very important 'currency' in the minds of the consumer, the local councils and government. The provision of Eco-label systems assist with differentiation of products (buildings) in a market that until recently has been driven by cost rather than quality. It remains to what extent the 'currency' is accepted with in the building procurement market.

3.3 Arguments for blueprinting

Another pathway addresses what Nibel reports as a current paradox in the quantitative application of EAS tools and says that 'an assessment tool can have the greatest impact in the early design phase...' yet the designers 'only have a rough description of the building and the assessment is made on this basis.' He concludes the precision found in the assessment tool, is not matched by that of the design (Nibel 2000). The statement questions the value of the assessment and demonstrates the lack of fit between tools and the design paradigm. It seems that current tools are criticized for not fitting the building designer's paradigm. Given the reservations about present assessment approaches there is some support for examining the brief as a pre-structuring tool as it may present an innovative solution. Support for this idea comes from both theory and from practice.

There is an emerging emphasis in the field, which stresses the importance of developing a "Green Building Design Process" (Larsson 2000). In the C-2000 Larson argues that one key issues aspect to this is that a client/team workshop approach should be used to set priorities and performance standards. This Green Design process was used in the Healthy Home Project (Hyde 1999) and while possible on large buildings where there are many consultants, is not practical for smaller projects and has some drawbacks even in larger projects. Additional studies of the building as part of the blueprinting process; this included an electromagnetic radiation study Larson suggests changing the design process, which adds to the cost of the project (Larson 2000 142). He proposes that 'researchers and designers are becoming increasingly aware that the potential performance is largely determined at the early phase of design or even in the pre-design phase.'

In this quotation he is signalling a need for more work in the briefing phase and this may be a more cost effective solution. The idea of developing a 'Green process' is appealing, but practicing engineers warn of the difficulties of this approach. Bill Addis (Addis 2000) from Bureau Happold suggests that rather than expanding the process, it should work within the economics of practice, that is, giving the best service for the dollar. He advocates better staging of the design process, with different methods and tools used at different stages. This, he advocates, is the key to marketing

environmental design to clients. He makes a strong case for including both qualitative and quantitative aspects of design within this approach (Addis 2000).

The arguments for using blue printing spring from the comments from Bill Addis. A blueprint in this context means an exemplar or demonstration project that solves a particular problem in a particularly elegant manner. Of interest are both the end result but also the process by which the designers have achieved their goal. The arguments for this approach comes from the way that the case study provides a holistic resolution to the problem, demonstrates the way the design addresses both qualitative and qualitative issues and how issues arise as to how the specific information found in the case study is appropriate general situations such as other design problems, hence blue prints tend too educated and inform.

3.3.1 Whole systems thinking

Taking a 'whole of system' view of a building rather than focusing on its specific parts is bound up in the notion of blue printing. The concept is base on thinking that any system is more than the simple sum of its parts. Hence in examining a building from a holistic perspective much of the discussion involves the interrelation of the parts to form the whole. For example energy efficiency of a building is often discussed in terms of the amount insulation needed to resist heat flow. In reality this is only one of many factors that form the basis of this kind of discussion the disadvantage of the blue printing approach is that it takes into account increasing complexities of relations. Hence some form of analysis or framework is needed to make these types of study workable. An example of this type of blueprinting study is found in the work of the Rock Mountain Institute through sponsorship from the U.S. Department of Energy. The publication comprises 200 green development case studies, which provide examples of a range of building types from education, commercial/offices, retail and laboratory buildings but lacks a framework that provides a summary of the lesson learned (<http://www.rmi.org/sitepages/pid199.php>).

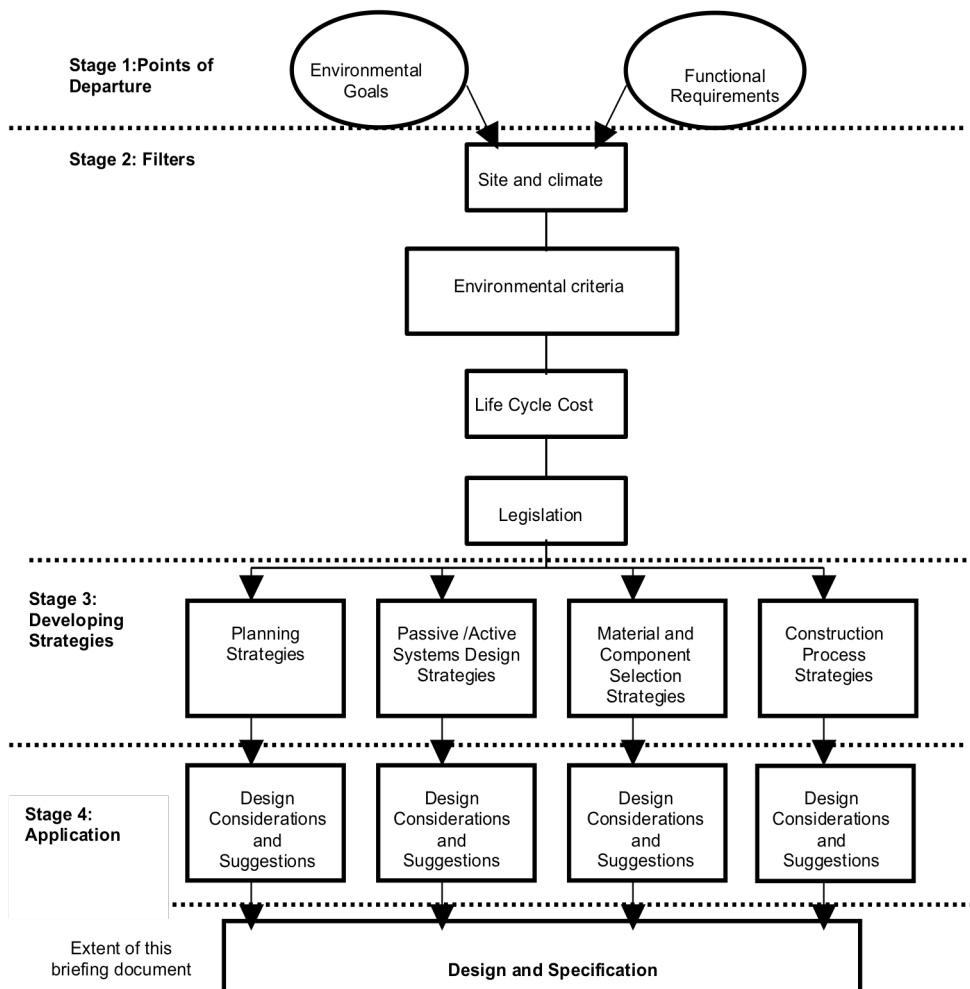


Figure 1: Refined Environmental Briefing approach for organising information pertaining to the design project at the pre-design stage.

3.3.2 Provision of benchmarks of 'best practice.'

A further advantage of blue printing is the value of learning from the post occupancy phase of design. Presently this is recognized but seldom emphasized. Through case studies designers can probe in-depth the way the design intent has carried through to the selection of strategies and finally to performance. This type of study can provide qualitative information concerning design issues as well data on a range of quantitative performance. Information from case studies

can be aggregated and broader patterns of building performance established. An example of this is the report from the International Energy Agency Design Insights from the Analysis of 50 Sustainable Solar houses (IEA Task Report 2004.) Yet the methodologies underlying the use of the post occupancy phase is still to be fully realised, many clients see the data coming from this work as 'in confidence' hence the results are often not available in the public realm. The benchmarking approach used in Green Globe 21 provides a route for utilising this information in a methodology that retains the confidential nature of the data through a third part certification system (www.greenglobe21.com.) Further more drawing from 'best practice' provides a source of benchmarks that are can be realised.

3.3.3 IT, education and training

Finally, the education and training opportunities provided by blueprints is further recognized. The Healthy Home Project utilized Information Technology to provide information on the project through a web site. This has been successful in communicating information through the blueprinting process. The website receives over 600 new hits each month (www.healthyhomeproject.com.) The Healthy Home Project has a virtual tour of the building to promote green design. The tour allows inspection of the quality of the spaces but also the environmental systems used. In addition monitoring information provides data on environmental performance. The future possibilities of improved IT interface capabilities between the user and environmental systems in the house or building have the potential to drive improved environmental performance through ease of access to control systems and quality of life through better control of comfort (The INTEGER Millennium House 2005). The Australian Greenhouse Office has developed a more extensive website for education and training purpose. Called Your Home it is based around a range of case studies, which can act as blue prints. 'The case studies illustrate a range of real solutions to specific challenges faced by people wanting to design, build or buy a more sustainable home. It is important to note that none of them 'get everything right'. There are few major challenges that humans are unable to overcome but building a totally sustainable home is one important goal that still eludes us.' (<http://www.greenhouse.gov.au/yourhome/technical/fs70.htm>)

4 REDEFINING THE ENVIRONMENTAL BRIEF

4.1 The nature of pre design

Work on advancing environmental briefing has been to draw on information from existing information, tools and blueprints to integrate this information into the pre-design phase, Figure 1 shows a framework which can be used in this way to organise information pertaining to the design project. The Environmental Brief contains four stages. First, Stage 1, the point of departure, where goals and objects are set. The functional requirements of the project are separated from environmental objectives for clarity. Stage 2 identifies the project parameters. Conventional issues such as site and climate issues and the legislative requirements are included. Less conventional issues such as life cycle and environmental criteria are included. This provides opportunity to bring in information from other tools such as rating tools and blue printing information. This creates environmental criteria to assist with decision making in the final two stages, Stage 3 deals with strategies with regard to planning, active and passive systems, materials and construction. Stage 4 provides opportunity for discussion of the design recommendation for the possible strategies outlined. This approach has been tested on a few projects through the use of a checklist to assist discussions with clients and allied professions (Watson 2004, Hyde et al 2005). A number of houses and an office fit out have used the Environmental Briefing approach in pre-design. For designers, respondents indicated that information normally considered downstream from the pre-design phase feeds forward in the design process. Research was carried which involved interviews with designers about the benefits and its value in design. The designers found the documents created were valuable for the conjecture reflection (CR) model of design. The information in the brief allows feedback during the sketch design phase, For clients the environmental briefing process provided concise information pertaining to the wide scope of information on sustainability. It helped with education and this enabled the brief to become a living document that meshed with the CR model of design.

Further more since the client controls the level of sustainability in a project, the Environmental Brief provided information to support quality decision-making. For example, decisions could be made on a life cycle cost basis as information was collected and provided to the design team and client. Further work is underway to examine the value of this expanded briefing process to the CR model of design. Initial results suggest that it may simplify the design process as a whole, avoid the need for use of other tools such as rating systems.

5. CONCLUSIONS

Green design is a response to the new Age of Information and Ecology of the 20th century (Wines 2000). Wines argues that green buildings can be superficially green, when they express the environmental science that underlies their design but do not draw deeply from Ecology in terms of their concept and form. He argues that it is a question of fusing art and environmental technology that is a green architecture; is not simply the sum of its environmental technologies, the photovoltaic systems and other environmentally friendly services. To achieve this a number of pathways are found for green design. These include opportunities making more from the brief, utilising new tools and using blue prints involving post occupancy work to feed forward in the design process to new projects. Research into environmental briefing suggests that there has been a change in the design methods and process used by designers. The shift from the analysis synthesis evaluation model to a conjecture reflection model based on the designers' schema has profound influences for the design of green buildings. For green design the reflection process is seen to be crucial for examining the environmental effects of the project. Harnessing the reflection process has led to utilising the pre-design phase of the design process through environmental briefing. Information from building environmental assessment tools can feed into this briefing approach in the form of criteria for design as well as information from post occupancy studies. Creating these studies as blue prints is instructive for the briefing process.

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