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VALUING GREEN

HOW GREEN BUILDINGS AFFECT PROPERTY VALUES AND GETTING THE VALUATION METHOD RIGHT.

Sustainability victoria

Building Commission

green building council australia

THE GREEN BUILDING COUNCIL OF AUSTRALIA WISHES TO THANK THE VICTORIAN BUILDING COMMISSION AND SUSTAINABILITY VICTORIA FOR PROVIDING THE FUNDING REQUIRED TO RESEARCH, WRITE, DESIGN AND PUBLISH THIS PAPER.

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On the front cover: MFB Burnley (VIC) – 5 Star Green Star – Office Design v1.

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FOREWORD

THE GREEN BUILDING COUNCIL'S MISSION IS TO DEVELOP A SUSTAINABLE PROPERTY INDUSTRY FOR AUSTRALIA AND DRIVE THE ADOPTION OF GREEN BUILDING PRACTICES THROUGH MARKET-BASED SOLUTIONS.

Recent feedback from industry indicates that the valuation of green buildings is an area where there has been little research and analysis to date, and there is much work to be done. This paper is intended as a contribution to advancing the debate on this important issue, both in Australia and internationally. The Green Building Council of Australia looks forward to being a part of the discussion.

Romilly Madew
CHIEF EXECUTIVE

1 EXECUTIVE SUMMARY

IN ONLY A FEW SHORT YEARS, GREEN STAR BUILDINGS HAVE CAPTURED SERIOUS ATTENTION, NOW ACCOUNTING FOR AS MUCH AS 30% OF THE NEW BUILDING MARKET.

INVESTORS, OWNERS, MANAGERS AND DEVELOPERS IN AUSTRALIA OVERWHELMINGLY CONFIRM THAT 'GREEN VALUE' IS STARTING TO HAVE AN IMPACT ON PROPERTY VALUATIONS THROUGH LOWER BUILDING OPERATING COSTS, EASE OF SALE AND RENT, TENANT RETENTION AND IMPROVED OVERALL OCCUPANCY RATES. THERE IS A STRONG INDUSTRY CONSENSUS THAT GREEN STAR BUILDINGS WILL OUTPERFORM CONVENTIONAL BUILDINGS IN COMING YEARS.

In only a few short years, Green Star buildings have captured serious attention, now accounting for as much as 30% of the new building market. Such rapid shifts in market sentiment are difficult for professional valuers to incorporate into traditional models, which rely on tangible evidence from sales and/or leasing from multiple properties. That evidence is coming, but with many Green Star buildings still under construction, the data base remains limited. In the interim, valuers will need use their expertise to assess the extent of the advantage Green Star buildings will enjoy. Ignoring the likely impact of this advantage is not an option: this report has found Green Star buildings are already having a market impact. At the very least, non-Green Star buildings face accelerated value depreciation.

To be able to make informed judgements with limited information, valuers will need to share knowledge in order to keep pace with the marketplace. By surveying and interviewing industry leaders, this report aims to contribute to this knowledge sharing and pave the way for further exchange and learning. It is based on an extensive literature search, case studies of eight recently completed Green Star buildings and interviews with some 50 of Australian property owners, valuers and developers, responsible for some 30% of total property fund assets within Australia, with a combined value of $85 billion.

The majority of investors indicated that they would pay more for a Green Star building. The improved marketability of Green Star buildings is their main current competitive advantage: they are easier to sell and lease, which reduces vacancy times and hence income losses. While some tenants are willing to pay the rental cost of achieving Green Star, a rental premium is not yet proven in all cases. Corporate and government demand for improved lifecycle economic and environmental performance are key drivers of green, but these tenants can negotiate green as a bonus for long rentals with predetermined review patterns, rather than paying an up front direct premium.

In the longer term, however, the industry expectation is that rental growth, tenant retention and operating cost savings will become the key drivers for the market value of Green Star buildings, relative to non-Green Star buildings. Green Star buildings also claim improvements in productivity; wellbeing; and occupational health and safety, but market acceptance of these intangible values is limited.

It is highly likely that a two-tiered market will emerge, with Green Star buildings attracting premiums and/or existing assets being discounted. Non-Green Star buildings may suffer from lower rental rates, rental growth and higher long term risk with greater potential capital expenditure requirements resulting in decreasing value. Many investors and owners/managers believe Green Star buildings are 'future proofed' against the risk of rising energy costs, market rejection of non-Green Star buildings and tightening regulations on building sustainability performance. Non-Green Star buildings may face the prospect of major capital works to meet future performance standards, which currently appears omitted from contemporary valuation consideration.

Subject to the availability of adequate comparable rental and sales evidence, each of the conventional market-based methods of valuation could be adopted for green buildings. However, the Discounted Cash Flow (DCF) valuation methodology, allows the valuer to more explicitly reflect the various aspects of comparable rental and sales evidence in the valuation process. The DCF method facilitates transparency in the various rental rates, outgoings rates, growth rates and capital expenditure allowances adopted, enabling the valuer to more fully reflect all aspects of the comparable evidence.

Sensitivity modelling, via movement in key valuation factors, shows value is most sensitive to movements in rental growth. Thus, if non-Green Star buildings fail to maintain rental growth in the face of tenant preference for green, owners of such buildings will be confronted with a significant loss of value – modelling shows that a fall from 3.5% rental growth to 2% rental growth would wipe off almost $13 million from the value of a $100 million property.

The potential upsides for Green Star buildings are in increased renewal probabilities, decreased downtimes and lower terminal yields. Valuers need to make clients aware of the potential impact of Green Star buildings on future values.

IT IS HIGHLY LIKELY THAT A TWO-TIERED MARKET WILL EMERGE, WITH GREEN STAR BUILDINGS ATTRACTING PREMIUMS AND/OR EXISTING ASSETS BEING DISCOUNTED.

1.1 RECOMMENDATIONS

Given the state of the market for Green Star buildings and the challenges this poses to the valuation profession, the following recommendations are made:

1. The valuation profession should continue to assist its members by providing professional education on how to incorporate the emerging market value for green buildings, specifically highlighting:

- the inclusion of DCF valuation method for green buildings as one of the optional methods used under the IVSC or Red Book standards;
- the need to advise clients of the sensitivity of building values to the emerging market value attached to Green Star buildings and the potential impacts on tenant retention, downtime and terminal yield as well as the possible value loss and capital costs facing non-green buildings; and
- the inclusion of a sustainability section in valuation reports .

2. Property professionals should be encouraged to undertake Life Long Learning in sustainability issues such as the Green Building Council of Australia's Green Star Accredited Professional course to improve their understanding of Green Star buildings and their economic and environmental performance.

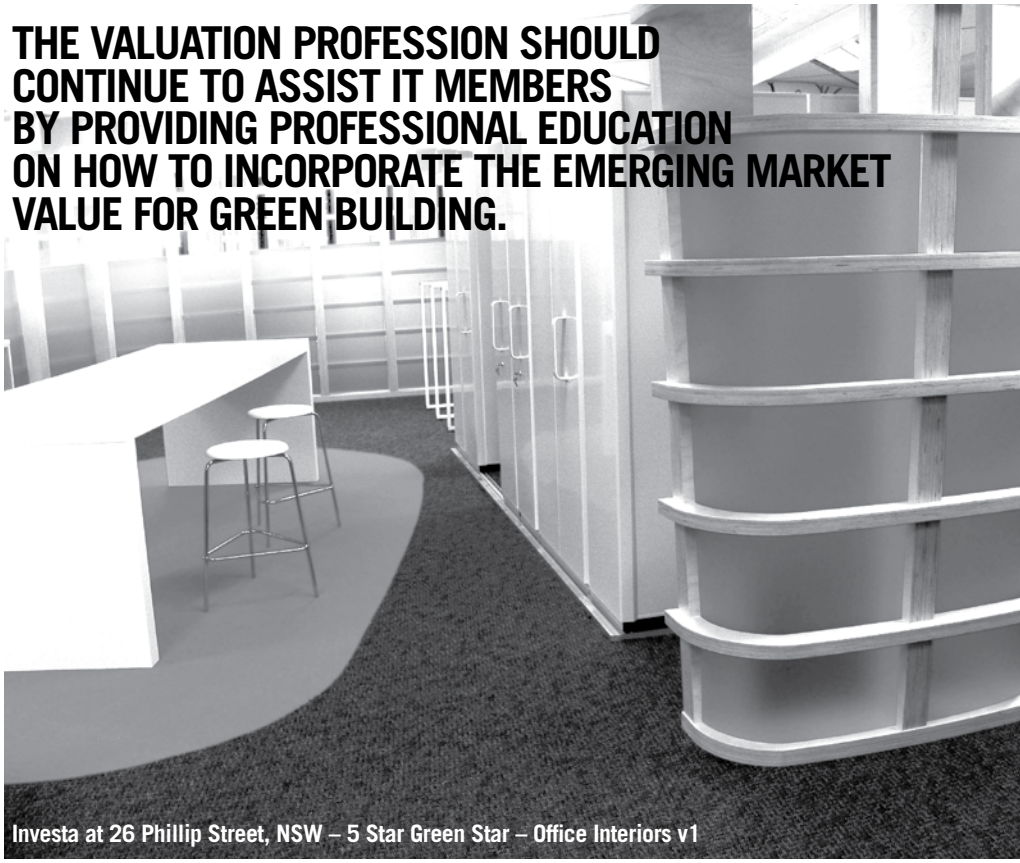
3. Regulators, policymakers and professional associations should investigate ways to improve awareness of the impact of sustainability features on specific market transactions so that valuers can more quickly detect and assess sustainability market trends.

4. The valuation profession should continue to foster discussions about Green Star buildings within the valuation industry and with key stakeholders from the wider property industry and from government. This should include conferences and academic papers.

5. The valuation profession should also share information globally with other professional bodies, given the growth of green buildings in overseas markets.

6. Asset and fund managers should also investigate means of improving understanding of how sustainability can be incorporated into asset management plans.

THE VALUATION PROFESSION SHOULD CONTINUE TO ASSIST IT MEMBERS BY PROVIDING PROFESSIONAL EDUCATION ON HOW TO INCORPORATE THE EMERGING MARKET VALUE FOR GREEN BUILDING.



Investa at 26 Phillip Street, NSW – 5 Star Green Star – Office Interiors v1

2

IF A POSITIVE IMPACT ON BUILDING VALUATION CAN BE DEMONSTRATED FROM A GREEN STAR RATING, MARKET ADOPTION OF SUSTAINABLE PRACTICES WILL ACCELERATE.

INTRODUCTION

2.1 PUTTING A VALUE ON GREEN

THE POTENTIAL OBSOLESCENCE OF NON-GREEN BUILDINGS AND CONSEQUENT EROSION OF VALUE POSES A MAJOR CHALLENGE TO THE PROPERTY VALUATION SECTOR. VALUERS DON'T HAVE THE TOOLS OR PRACTICE TO MANAGE THE ISSUE. THE SECTOR RECOGNISES THAT "GREEN BUILDING EVOLUTION IS THE INEVITABLE AND RIGHTFUL FUTURE BUT THERE WILL NEED TO BE A MAJOR INFORMATION/EDUCATION PROGRAM TO IMPROVE VALUERS' TECHNICAL SKILLS ON ASSESSING THE ESD [ENVIRONMENTALLY SUSTAINABLE DESIGN] PERFORMANCE OF BUILDINGS AND THEIR ECONOMIC IMPACT"

(Green Building Workshop 4: Green Valuation, Leases and Productivity – Capturing the Benefits of Green Building, August 2004).

The Dollars and Sense of Green Buildings report 2006 provided a comprehensive business case for Green Star buildings that reflected the rapid growth of the industry since 2000. It also examined a number of challenges facing market acceptance of Green Star buildings, among which was the need for improved valuation techniques.

This report responds to this challenge. It aims to demonstrate how a Green Star rating can affect property value, and to review the techniques available for valuations of Green Star buildings. If a positive impact on building valuation can be demonstrated from a Green Star rating, market adoption of sustainable practices will accelerate.

The property industry has spent years developing, testing, and re-testing numerous theories, formulas, and ideas to determine the most accurate way to assess a property's market value. These approaches have wide application, but most rely on data from many buildings over extended periods of time.

Case studies and other evidence about the benefits of Green Star buildings to developers, occupants and investors are becoming increasingly available both in Australia and internationally. Yet, because the rise of market interest in Green Star buildings has been rapid, in-depth analyses of the impact of this interest based on rigorous quantitative financial analyses have been limited.

This report seeks to lay the foundation for such analyses to take place. The focus is to identify and isolate the key important variables that valuers should consider when assessing the market value of a Green Star building.

2.2 STAKEHOLDERS

Many parties are involved in the development, letting, financing, ownership and management of a property asset. The "value drivers" for different participants are shown in Table 1.

While this report is primarily aimed at helping professional valuers, it may also be of interest to those stakeholders in the property industry that use the results of professional valuations.

Table 1: Property Players

PARTICIPANT	VALUE DRIVER
Financier	Return on capital, development profitability and cash flow, value on completion, marketability, financial banking ratios, ease of letting or selling
Developer	Company profile and exposure, return on capital, internal rate of return, development profit, marketing exposure
Occupant	Organisational productivity and profitability, organisational vision, image and identity, corporate brand and reputation, corporate social responsibility
Accountant	Fair value, current market value, depreciated replacement cost, tax implications
Regulators	Building standards, safety standards

2.3 WHAT ARE GREEN STAR BUILDINGS?

The Green Building Council of Australia defines a Green Star building as a property that incorporates design, construction and operational practices that significantly reduce or eliminate the negative impact of development on the environment and occupants. Specifically, a Green Star building is any building that achieves a 'Green Star' rating of four or more stars under the Green Building Council of Australia's holistic Green Star rating system. Under the Green Star – Office Existing building rating tool, which in 2008 was still an EXTENDED PILOT, projects that do not acheive a 4 Star Green Star benchmark can still achieve a certified rating of between one and three stars.

The Green Star rating separately evaluates the environmental initiatives of projects based on the following environmental impact categories:

- management
- energy efficiency
- water efficiency
- Indoor Environment Quality (IEQ)
- transport
- material selection
- land use ecology
- emissions
- innovation

For each green feature that a building incorporates, as specified by the rating system, it receives a point in one of the above strategy areas, which are also pre-weighted. Based on the number of points received, the building is then classified as either:

- 4 star – best practice;
- 5 star – Australian excellence; or
- 6 star – world leadership.

The capability of the market to deliver Green Star buildings, as well as the actual performance of these buildings, is improving as both expertise and knowledge improve. New technology; material type and use; integrated design; and computer modelling and operation techniques that optimise overall performance are creating energy, water and resource efficient buildings and that offer occupants superior work, retail, recreational and living space compared to conventional buildings.

2.4 MARKET GROWTH OF GREEN BUILDINGS

There is excellent potential to improve resource efficiency in the building sector, while also achieving significant gains in both the life-cycle economic performance of buildings and the productivity and quality of the built environment. The Inter-Governmental Panel on Climate Change (IPCC) Fourth Assessment report recognised that buildings represent the best opportunity to make significant reductions in greenhouse gas emissions while maintaining economic growth – in fact, the IPCC estimates that by 2020 CO2 emissions from building energy use can be reduced by 29% at no net cost.

Recent Australian research has confirmed the significant role that the building sector can play in greenhouse gas abatement. A report commissioned by the Australian Sustainable Built Environment Council (ASBEC) found that energy efficiency alone could deliver savings of 30-35 per cent across the

whole building sector, including the growth in the overall number of buildings out to 2050[1].

The market both in Australia and overseas is beginning to recognise this: sustainable buildings already have some 10% of the new US commercial building market, and its market share has more than doubled every year since 2000. In Australia, the commercial building market has moved rapidly in recent times, as evidenced by the growth in both membership of the Green Building Council of Australia and in the use of the Green Star rating system. In 2005/2006, there were 56 new registered projects, with a further 12 new certifications. Just one year later, these figures have increased to over 360 registered projects and 29 certified projects.

The first commercial green building project in Australia was the headquarters for the Australian Conservation Foundation at 60 Leicester Street in Carlton, Victoria. Completed in 2002, it was a demonstration project of how the sector could improve its environmental performance. Only five years later, leading industry investors have reported that the commercial market has shifted: Premium and A-Grade buildings now invariably strive for superior sustainability performance – for example, Daniel Grollo, the Managing Director of Grocon, commented that no-one would build a new commercial building that wasn't green in Melbourne because it would be obsolete on completion[2].

The Green Star building market in Australia is now driven by some of Australia's largest companies such as ANZ, IAG, Lend Lease and major consulting firms. Some of these companies believe that their green investment will pay off in lower costs and higher productivity, some want to attract the best and brightest young employees, and others want to trade and profit on their green brand.

A review of Green Star Certified buildings estimates that, on average, they achieve:

- A reduction in energy use of up to 85% against equivalent conventional buildings;
- A reduction in potable water consumption of over 60% against conventional buildings;
- Average CO2 reduction equivalent to removing 130 cars off the road permanently; and
- An average of 69% of construction waste being diverted from landfill.

8 Brindabella Circuit (ACT) – 5 Star Green Star – Office Design v1

IN AUSTRALIA, THE COMMERCIAL BUILDING MARKET HAS MOVED RAPIDLY IN RECENT TIMES, AS EVIDENCED BY THE GROWTH IN BOTH MEMBERSHIP OF THE GREEN BUILDING COUNCIL OF AUSTRALIA AND IN THE USE OF THE GREEN STAR RATING SYSTEM.

[1] Capitalising on the building sector's potential to lessen the costs of a broad based GHG emissions cut, Centre for international Economics, Sydney 2007. [2] It's not easy being green, the Age, p1, 26 August 2007

GREEN STAR RATING TOOLS

Green Star - Office Design

This tool assesses the environmental attributes of new office buildings as well as additions and major refurbishments to existing offices. Tenancy fitouts are not rated under this tool. The target audience is office building owners, designers, developers and investors.

Green Star - Office As Built

This tool validates the construction and procurement of office designs. This is a retrospective tool; hence the documentation process is different from the other tools.

Green Star - Office Interiors

This tool assesses the environmental attributes of new office interior designs as well as additions and major refurbishments of existing interiors. A green office interior will include features such as access to natural light, waste management, energy conservation, low emission paints and timber from sustainable forests.

Green Star - Office Existing Buildings

This tool assesses the environmental attributes of existing office buildings, i.e. buildings that have been constructed over more than 24 months prior to a Green Star rating application. The tool is suitable for identifying upgrade possibilities and for corporate environmental reporting.

Green Star - Education PILOT

This tool assesses the environmental attributes of new education facilities as well as additions and major refurbishments of such existing facilities. The interior fit out is included in the assessment of these buildings.

Green Star - Healthcare PILOT

This tool assesses the environmental attributes of new healthcare facilities as well as additions and major refurbishments of existing healthcare facilities, including general and acute care hospitals, community health clinics, diagnostics centres, aged care facilities and mental health facilities.

Green Star - Shopping centre design PILOT This tool assesses the environmental attributes of new base buildings used for shopping centres as well as additions and major refurbishments of existing shopping centre buildings. Tenancy fitouts are not rated under this tool. The target audience is shopping centre owners, developers and investors.

Green Star - Multi-Unit Residential PILOT This tool assesses the environmental attributes of new multi-unit residential facilities as well as additions, and major refurbishments to, existing facilities. The target audience is property owners, designers, developers and investors.

Green Star – Industrial PILOT

This tool assesses the environmental attributes for industrial buildings designed and constructed for the production, assembling, altering, repairing, packing, finishing or cleaning of goods or produce for sale, trade or gain. It targets industrial property specialists, private developers and contractors, as well as state and local governments.

3 PROPERTY VALUATION

VALUERS SELECT A PRIMARY VALUATION METHOD FROM THESE ON THE BASIS OF INFORMATION AVAILABILITY AND THE NATURE OF THE PROPERTY TO BE VALUED.

A VALUATION IS AN OPINION ON THE VALUE OR WORTH OF A PROPERTY GIVEN BY A PERSON QUALIFIED OR EXPERIENCED TO DO SO. THE PURPOSE OF A VALUATION IS TO FORECAST THE FUTURE BENEFITS OF A PROPERTY AND CALCULATE THIS INTO A CURRENT PRICE. THE ACCURACY OF THAT VALUATION WILL DEPEND ON THE ABILITY AND SKILL OF THE VALUER IN UNDERSTANDING THE FACTORS THAT DETERMINE VALUES, AND THE WEIGHT THAT THOSE FACTORS HOLD.

Property valuers provide independent professional advice to the other participants in the property sector. The key standards for property valuers are set through various governing bodies for the profession including the Australian Property Institute and The Royal Institution for Chartered Surveyors.

International Valuation Standards recognise three basic valuation approaches. These are:

- Sales Comparison;
- Income Capitalisation; and
- Depreciated Replacement Cost.

All valuation methods and techniques are either subsets or combinations of these fundamental approaches. Depreciated Replacement Cost is a surrogate for market value, based on estimates of the cost to construct another property that is either a replica of the original or of equivalent grade It includes an estimate of the depreciation of older buildings.

Valuers select a primary valuation method from these on the basis of information availability and the nature of the property to be valued. A secondary valuation technique or "check" methodology is then selected, to support and/or confirm the valuation.

The most commonly used market valuation techniques in Australia and the focus of this paper are:

- Sales Comparison;
- Income Capitalisation; and
- Discounted Cash Flow (DCF), which is a specific subset of Income Capitalisation.

Further detail on each of these valuation techniques is provided below.

3.1 SALES COMPARISON

Sales Comparison uses recent transactions on similar properties to infer value, usually on a rate per square metre basis. Factors such as the date of sale, terms and conditions of sale, land dimensions, age, size, design and condition of improvements, income and lease covenants, topography, zoning and other elements which differentiate between properties are benchmarked

against the sales evidence to determine current market value.

Sufficient recent, transparent and homogenous transactions are required for an accurate valuation. This methodology is seldom applied to rare or special-purpose properties because few similar properties have been sold in the marketplace.

3.2 INCOME CAPITALISATION

Commercial properties acquired by an investor generally deliver a return via their income stream. The annual income is calculated by summing the gross potential income that the building can generate. An allowance (where appropriate) is then made for factors such as vacancy loss and operating expenses, including taxes, management fees and insurance and capital expenditure items.

Value is calculated by the capitalisation of the net annual income of the property using a market derived capitalisation rate. The capitalisation rate is the return required by a potential investor and is derived from the analysis of similar property transactions. The capitalisation rate is then adjusted to appropriately reflect variations in risk. Use of this approach requires an accurate capitalisation rate as the single rate is reflective of numerous factors and the determined value is susceptible to minor changes in the rate applied.

3.3 DISCOUNTED CASH FLOW (DCF)

This approach is one of the most common forms of Income Capitalisation. It provides an assessment of value by discounting the projected future revenues and expenses generated by a property over the holding period, which is generally a term of ten years

Airport Drive (QLD) – 4 Star Green Star – Office Design v2

VALUE IS CALCULATED BY THE CAPITALISATION OF THE NET ANNUAL INCOME OF THE PROPERTY USING A MARKET DERIVED CAPITALISATION RATE.

for commercial office buildings. The approach involves numerous factors and assumptions regarding the timing and duration of cash inflow and outflows. It includes modelling of:

- Rental growth;
- Renew/re-lease probability and vacancy;
- Miscellaneous/other income;
- Operating expenses and outgoings;
- Capital expenditure; and
- Terminal yields.

The DCF approach is the only valuation technique which explicitly accounts for such factors, though the accuracy of the valuation remains subject to the assumptions entered and, therefore, subject to the valuer's knowledge and relevant expertise. The discount rate is a composite of the risk free rate (usually the ten year bond rate), the inflation rate and the perception of risk for the individual property asset. However, it can be any, all or none of these things, depending on the required valuation objective.

4

RESEARCH AND ANALYSIS

WHILE THERE IS GREATER RECOGNITION OF GREEN ATTRIBUTES IN THE VALUATION OF BUILDINGS, DOCUMENTED VALUATIONS OF BUILDINGS INCORPORATING GREEN FEATURES ARE FEW AND FAR BETWEEN.

4.1 OBJECTIVES

The research objectives of this report were to:

1. Document current market thinking and practices for investing and valuing Green Star buildings;
2. Identify what factors (higher rents, occupancy etc) enable Green Star buildings to gain market value;
3. Determine which valuation techniques are best suited to valuing Green Star buildings; and
4. Model hypothetical buildings to identify the key valuation assumptions that could be considered by valuers to recognise inherent market value for Green Star buildings.

4.2 METHODOLOGY

The authors used three approaches to assess whether Green Star buildings have an impact on property market value:

- A worldwide literature search of the topic;
- A survey of Australia's leading property owners, valuers and developers about their perception of how these emerging trends are affecting property values and the likely emerging trends in this sector of the market; and
- A case study review of eight recently certified Green Star buildings.

The investigations were carried out in parallel and analysed collectively to meet objectives 1-3. The key factors identified as affecting market value for Green Star buildings were then incorporated into modelling the sensitivity of the value of a hypothetical 20,000 square metre commercial building to these factors.

4.3 KEY FINDINGS FROM THE LITERATURE SEARCH

There is extensive emerging literature in the valuation of green buildings. Initial searches of academic journals and industry publications through the use of Emerald (the Electronic Management Research Library Database) resulted in 959 articles. Inclusion of conference notes, presentations, research by international professional bodies and annual reports added another 435 reports and papers.

A review of this wide body of literature suggests that while there is greater recognition of green attributes in the valuation of buildings, documented valuations of buildings incorporating green features are few and far between.

The potential benefits of such buildings are well recognised. These include direct

economic benefits such as operational cost savings, but also indirect social and psychological benefits such as improved health and comfort of occupants.

Efforts are underway to quantify these benefits and a few have borne fruit. A study of the US market by McGraw Hill found that green buildings delivered the following added value[3]:

- Operating costs decreased by 8% to 9%;
- Building values increased by 7.5%;
- Return on Investment (ROI) improved by 6.6%;
- Occupancy ratio increased by 3.5%; and
- Rent ratio increased by 3%.

A Canadian study of the experience of twelve green buildings also found improved values of a similar order of magnitude[4].

On the other side of the equation, numerous studies indicate cost premiums, both marginal and significant, that are attributable to the design and construction of green buildings. But again, there is no easy consensus on what a green building costs. Studies by the US Green Building Council show that a building certified under their LEED rating system (the US equivalent of Green Star) costs on average only 0.66% higher than a conventional building. A Gold LEED (5 Star Green Star equivalent) building costs only 2.2% more while a Platinum rating (6 Star Green Star equivalent) comes in at 6.8% higher.

Another study, "Examining the Cost of Green", by the quantity surveying firm Davis Langdon, examined the construction cost of 45 libraries, laboratories and academic institutions that aspired for LEED certification from the US Green Building Council[5]. These were then compared to the cost of 93 non-LEED buildings. The study concluded that many projects achieve sustainable design within their initial budget, or with very small supplemental funding. This may require trade-offs with other building features during the design phase, where leverage over final outcomes is greatest: for example, trading off lavish granite walls for energy efficient double skin facades.

While these and other studies provide tangible evidence of the value and cost of green buildings, they are not numerous enough for valuers to extrapolate general rules from. The different technologies that might be deployed, and trade-offs with other building features, make it difficult to 'commodify' green. Thus, while it appears possible to assess green value using a traditional cash flow approach, it is not clear which assumptions within that approach are being affected by green initiatives. The newness of green buildings also means that there is limited post occupation data to confirm the findings over time.

This situation will change naturally over time as experience of Green Star buildings improves. Indeed, industry bodies responsible for valuation standards are beginning the process of embedding sustainability in valuation standards and practice. The Vancouver Valuation Accord, which was released in March 2007, represents a formal expression and commitment by signatories to advance understanding, knowledge, education and practices about valuation and sustainability. (www.vancouveraccord.org). The Australian Property Institute and the Royal Institute of Chartered Surveyors (RICS) have already adopted this accord.

[3] Referenced in What Would a Sustainable Market Look Like? Presentation by David Gottfried to the Sustainable Building Leaders' Project Workshop, 10 February 2006, Melbourne Business School, Mt Eliza, Victoria

[4] Referenced in Managing the Cost of ESD: Understanding the Value. Presentation by Lisa Matthiessen to the Australian Property Institute, 13 February 2006, Port Melbourne.

[5] Ibid.

4.4 SURVEY OF COMMERCIAL PROPERTY INDUSTRY STAKEHOLDERS

Pending the development of consistent standards, valuers will need to share information on current practice so that they can place a current value on Green Star buildings and keep pace with the marketplace. The survey of industry stakeholders undertaken for this report aims to provide a snapshot of current industry practice. The survey was undertaken by Ernst & Young and involved:

- Representatives of five leading property advisory and valuation firms; and
- Representatives of fourteen fund managers and developers.

Based upon the Australian Property Funds Survey 2006, the interviewees own approximately 31% of the total property fund assets within Australia, representing $85 billion.

The surveys comprised face-to-face interviews based on a standard set of questions to obtain both quantitative and qualitative responses. Key conclusions are set out below.

1. All respondents believed that the investment performance of a Green Star building will outperform traditional buildings over the medium to long term, but not necessarily the short term.

Most investors see sustainability as inextricably linked to future market value. "Sustainability of buildings over the long term is considered paramount in today's market and the long-term hold of the asset" (CBUS). One respondent observed that the result of disregarding green factors in the refurbishment of a traditional building "would limit the tenant pool".

2. Forty-five per cent of survey respondents indicated that tenant demand is driving the need for their organisations to implement green building practices.

Respondents nominated the drivers of their interest in Green Star buildings as shown in Table 2 below.

Table 2:

Regulatory requirement	9%
Other	11%
Investor demand	13%
Asset management/fund manager's decision	22%
Tenant demand	45%

Tenant demand emerges as the dominant reason for interest in Green Star buildings. Companies that derive significant income from state and federal government occupancy must meet increasingly ambitious sustainability guidelines. In an interview separate to this survey, Valentino Tanfaro, the CEO of ING Office Fund, states his belief that Government standards will filter to the private sector. "For the corporates, it's more of a cost issue. But they are really starting to jump on the bandwagon as well"[6].

Despite the importance of tenant demand, however, two thirds of respondents in the fund management area believe that tenants are not willing to pay more to lease a Green Star building. A consistent response was that a small number of corporate tenants are willing to pay a premium for Green Star accommodation for branding purposes and to demonstrate corporate responsibility. However, the vast majority of tenants want green without

having to pay a higher rent to get it. The situation was summed up by one particpant: "Some tenants are willing to pay for the typically high capital costs associated with developing green buildings. However, in the main, tenants are unwilling to take the leap from talking about and requesting green initiatives to accepting the additional costs in a higher rent and other commercial terms to enable it to be provided".

Still, many investors believe that this is an indicator of a market in transition, and that the willingness to pay will come in the future. Hence, they are starting to factor in the prospect that non-Green Star buildings will be at a disadvantage in the future.

3. A Green Star rating is important in reaching an investment decision, but financial return cannot be compromised.

Most respondents ranked the importance of green factors in reaching a decision to invest in a commercial property asset as "very important", although some still attached little or no importance. The majority of respondents indicated that they would not forsake return (as measured by Internal Rate of Return or yield) for Green Star buildings, and most would not buy or hold exclusively Green Star buildings.

However, some indicated that environmental performance was directly affecting their investment decisions. One company has a sustainability committee that has the objectives of minimising the impact of the business on the natural environment; maximising the efficiency of the operation of assets; ensuring ongoing market appeal of the assets; and enhancing the investment return of these assets. The decisions of this committee have resulted in both the acquisition and sale of investments on the basis of their sustainability performance.

4. The majority of respondents indicated that they would pay more for a Green Star building.

About two-thirds of interviewees would pay more for a Green Star building. Some reported that they already pay more if convinced of the value. Most also said they would not undertake refurbishment of a building without considering a Green Star rating.

The remaining third would only pay a comparable price to a conventional building – suggesting that, like many tenants, they would only take a Green Star rating as a bonus. Here again, however, the market seems to be moving: several indicated that although they would only pay the same price at present, in future they would expect to pay a premium.

[6] *Property Australia, Vol 20, No 4, p.60.*

Bendigo Bank (VIC) – 5 Star Green Star – Office Design v2

ABOUT TWO-THIRDS OF INTERVIEWEES WOULD PAY MORE FOR A GREEN STAR BUILDING.

5. The overwhelming majority of respondents would be prepared to invest in a Green Star building despite the possibility of incurring a short-term loss.

Almost all respondents were prepared to invest in a Green Star building, even knowing that it may incur a short-term loss, provided they were convinced of its long term potential. This is really no different to their approach on any investment. Some indicated a willingness to incur a short-term loss "as long as it is not significant", and was part of a strategy of assessing the investment by "looking at a total return over the long term". Some are even contemplating investments in leading edge green buildings – one respondent is considering the viability of a building with zero emissions.

6. The improved marketability of green buildings is highly regarded by the respondents.

The survey sought respondent views on the key influences on the decision to invest in Green Star buildings. As shown in Figure 1, marketing, operational cost savings and attracting and retaining government tenants dominate. The key marketing instrument nominated was the Green Star rating rather than any particular green feature in the building.

7. Long-term rental growth, tenant retention and operating cost savings are the key drivers of the increasing market value of green buildings.

As already noted, investors believe that tenant willingness to pay for Green Star buildings will increase in future. The implication of this is that it will lead to long-term rental growth, and this was indeed nominated as a key driver of market value as shown in Figure 2 below. This shows the percentage of respondents who believe Green Star buildings have an impact on the different market value variables.

Respondents believe that green buildings attract better quality tenants, such as government and organisations focusing on the importance of corporate social responsibility. These organisations have stable businesses and are more accountable for all obligations associated with the lease. Attracting and retaining good quality tenants means that there is less risk associated with the building and its value is likely to increase.

The operational cost savings for Green Star buildings typically quoted by respondents were approximately $5 per square metre (3–6% of total outgoings). One respondent has identified savings of up to $13 per square metre per year in energy costs for tenants, and now provides a Greenhouse Gas Guarantee. Existing or prospective tenants who accept the Guarantee receive an Australian Building Greenhouse Rating (ABGR) Commitment Certificate; a guaranteed cap on energy bills; a guaranteed cap on greenhouse emissions; a guaranteed ABGR performance rating; and lower operating costs.

The Property Council of Australia (PCA) also noted that water cost can be reduced by almost 50% if grey water systems are integrated into the initial design and construction of new buildings.

Figure 1: Economic Impact of Green Buildings // *Scale: 1 equals no weight - 5 equals most weight

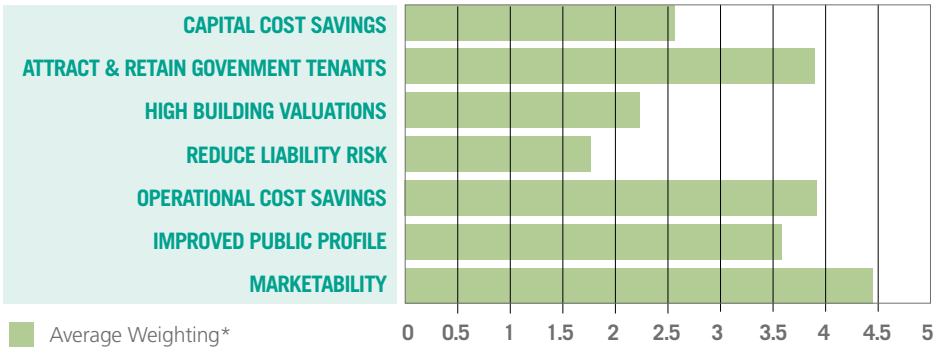
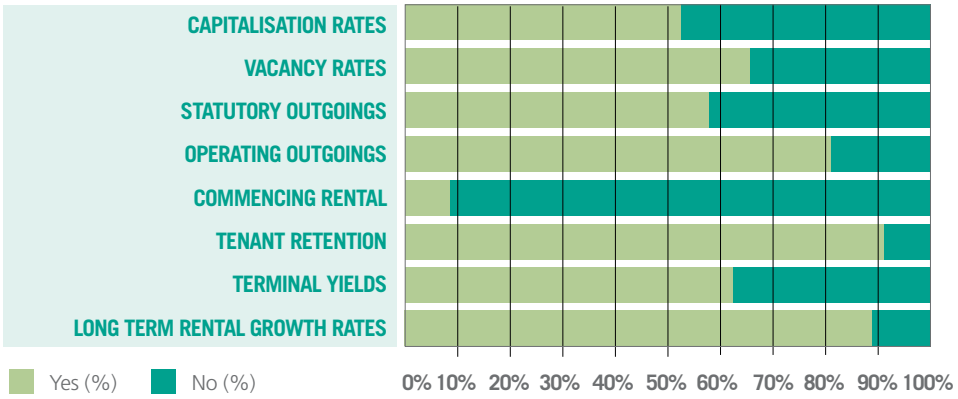


Figure 2: Market Impact of Green Buildings



8. All respondents identified the DCF approach as being the most suitable method to assess the valuation of green buildings.

All respondents named DCF as the number one valuation method, with Income Capitalisation followed by Sales Comparison as the appropriate check methods. DCF is the preferred method because the valuer can be explicit about assumptions such as tenant retention, terminal yield, growth rates, etc.

None of the respondents suggested changing current valuation techniques or approaches to accommodate the valuation of Green Star buildings. All felt that the current accepted valuation methodologies are adequate to assess the value of Green Star buildings, but a better understanding of key assumptions is required. As noted by one respondent, "the green nature of any building should not alter the utilisation of a normal, appropriate valuation technique".

Some of the valuers were suspicious of any calls for special valuations of Green Star buildings, seeing this as another way for owners to argue higher building valuations. Valuers were keen to put the issue of Green Star buildings "into perspective", by describing it as just one of many issues considered when undertaking a valuation.

However, most valuers recognise that they have a limited understanding of Green Star buildings, both in technical terms and in appreciation of the impact on value. None currently comment on sustainability in their valuation reports or had consciously tried to adjust their valuation assumptions either by analysing comparable sales evidence or in the valuation of the subject property. These valuers — some of the most experienced in the industry — noted that there have been relatively few requests to undertake valuations of Green Star buildings.

Nevertheless, they recognise the emerging importance of Green Star buildings in the market and the need for solid data on their impact. The overwhelming majority of respondents wanted further and ongoing education of valuers and the production of reports, such as this one, to provide guidance and better understanding about the impact of Green Star on value.

9. All fund managers and developers interviewed are developing an internal sustainability capability.

The survey responses indicated that most organisations now have in house resources to assist them in the area of sustainability, and at least one key person dedicated to sustainability issues. One respondent observed: "Both in the investment and development arms, the business is resourced with people that have practical and current experience with green buildings". In most instances the dedicated sustainability officer reports to board level or at least to senior management.

There also appeared to be a sound understanding of Green Star issues at the portfolio/asset management level, and this collective awareness is driving decision-making on Green Star internally. Some organisations already view excellence in sustainability as a competitive advantage.

4.5 CASE STUDY FINDINGS

Eight case studies were chosen to provide a cross section of Green Star buildings, covering owner occupiers and investors with public and private tenants, as well as a broad geographic spread. The properties were:

- 30 The Bond, Hickson Road, Sydney, New South Wales
- Royal Australian Airforce, Richmond Airbase, Richmond, New South Wales
- 8 Brindabella Circuit, Brindabella Business Park, Australian Capital Territory
- City Central Tower 1, 11 Waymouth Street, Adelaide, South Australia
- Flinders Link, Flinders Street, Adelaide, South Australia
- Green Square (South Tower), St Pauls Terrace, Brisbane, Queensland
- Council House 2, Little Collins Street Melbourne, Victoria
- Bordo International, Lot 3 Kingston Park, Scoresby, Victoria

Detailed descriptions of the case studies are given in Appendix 3, using a consistent base report format completed in consultation with the building owner or manager. As most of the buildings were new developments or recent green refurbishments, the quantitative data on the buildings did not allow a comparative assessment of the value captured from their Green Star rating. Interviews with owners and managers, however, identified a number of consistent experiences from the buildings which provide important pointers for valuation.

These benefits can be grouped into economic, social and environmental gains.

Economic

- Construction costs were equal to, and in two instances lower than, budget expectations. A slight cost premium still exists for delivering buildings with a 6 Star Green Star rating.
- The owners/managers all believe that the buildings are future-proofed against rising energy costs, market rejection of non-green buildings and tightening regulations on building sustainability performance.
- Operating costs (including salaries) are below expectations.
- From examples in Canberra and Adelaide, Green Star buildings have achieved a reduced capitalisation rate to the order of 0.25–0.50% when compared with the rest of the market.
- Owners commonly made use of the asset's sustainability performance for marketing purposes, not only to assist in the sale of the asset or leasing of the space, but to demonstrate their green credentials to the wider market.
- Green Star rated buildings appear easier to sell – it is not possible yet to infer whether this also adds a price premium, but a faster sale potential alone should infer value via a tighter capitalisation rate.
- Let up periods were reduced by improved exposure and marketing from being 'green'.
- Attraction of 'blue chip' tenants was improved by meeting tenant requirements and briefs. Importantly, the case studies reveal that these tenants are prepared to pay for 'green'.
- Lease terms reveal a preference by green tenants for what, in the Australian marketplace, would be considered long-term leases, e.g. 15–20 years. This in turn leads to increased cash flows for owners.

- Green leases improve tenant certainties on costs (capital costs and long term recurrent costs).
- No significant changes to facility management contracts were evident.
- The market responded to Green Star ratings overall rather than to the individual designs and technologies used to achieve the rating. Some owners/managers felt that this may change as market sophistication increases, so valuers may need to identify individual sustainability features in much the same way as they do with say an attractive vista in conventional buildings.

Environmental

- Most of the case studies make optimum use of the sites on which they are located, i.e. how the land is prepared, orienting the building to maximize the use of solar power for heating and lighting, and shade for cooling.
- Green Star buildings reduce water consumption (e.g. low flow, recycling and capture), energy (e.g. lighting strategy controls, efficient lighting, use of natural light) and reduced waste. For example, the simulated carbon emissions from the Richmond Airbase building are equivalent to taking 50 cars off the road each year.
- The use of recycled and renewable materials, together with waste management plans, significantly reduces waste.
- All of the Green Star buildings studied claimed better Indoor Environment Quality (IEQ) compared to conventional buildings via improved ventilation, low emission finishes, better natural light and improved thermal comfort.

Social

- Green Star buildings claim improvements in productivity, wellbeing, and occupational health and safety. A number of the organisations have undertaken post-occupancy evaluations that support this, but direct evidence of better workplace productivity as a result is limited.
- Green Star buildings have served as demonstrations of how to build, operate and profit from green buildings, with flow-on benefits into the wider community understanding of sustainability.
- Green Star buildings preferentially select proximity to public transport and so discourage private car use.

5

IMPLICATIONS FOR VALUATION

OF THE THREE VALUATION TECHNIQUES CONSIDERED, THE DCF APPROACH IS THE MOST TRANSPARENT AND EXPLICIT FOR GREEN STAR BUILDINGS.

THE FINDINGS OF THE LITERATURE SEARCH, STAKEHOLDER SURVEY AND DISCUSSIONS WITH THE OWNERS AND DEVELOPERS OF THE CASE STUDIES CONFIRM THAT THE HIGHER VALUE OF GREEN STAR BUILDINGS IS STARTING TO BE FELT IN PROPERTY VALUATIONS, THROUGH FACTORS SUCH AS LOWER BUILDING OPERATING COSTS, EASE OF SALE AND RENT, TENANT RETENTION AND IMPROVED OVERALL OCCUPANCY RATES.

A Green Star rent premium may also be emerging as a value factor, but it is still too early to quantify this. Likewise, the view that Green Star rated buildings are 'future-proofed' will, if accurate, eventually translate into market value, but it is still difficult to find specific market valuations.

Similarly, it is still too early to quantify the value impact for non-Green Star buildings. Whilst lower rental rates, rental growth rates and higher capital expenditure may be anticipated for non-Green Star buildings, there is, to date, limited rental and sales evidence to allow a valuer to accurately determine the value impact.

Of the three valuation techniques considered, the DCF approach is the most transparent and explicit for Green Star buildings as it allows the valuer to consider and reflect all the relevant aspects of comparable rental and sales evidence. In particular, it enables the timing of cash inflows and outflows to be accurately modeled and the time value of money to be considered. This is particularly important when modeling relative future rental growth and capital expenditure for green and non-green buildings.

As with the application to other types of property, the sales comparison approach has limited application to Green Star buildings at present because of the difficulty in finding comparable properties. Green Star is a building differentiator – to compare 'like with like', careful adjustments need to be made in the current marketplace where the number of green buildings are limited.

The requirement for the valuer, within the Income Capitalisation approach, to implicitly reflect many variables in the capitalisation rate, renders the method of limited use for the valuation of green buildings in the absence of extensive comparable sales evidence. Small changes in the capitalisation rate may result in large changes in value as illustrated in the sensitivity modeling.

For all three methods, the lack of market data is a critical constraint that can only be addressed over time. Valuers rely on evidence that must be gained through sales and/or leasing. In rapidly

changing markets they are placed in a difficult position, as it is only when evidence is available that appropriate analysis occurs. One of the project participants interviewed for the case study on Canberra International Airport, summed up the situation, saying

"The availability of 'green' buildings is the heart of the issue for valuers... In rough terms there is approximately 20 million square metres of office space in Australia, less than 100,000 square metres is green... If this is the limit of the market, let alone if they are available for sale, how could a valuer determine the difference?"

Note: As of January 2008 the total number of m² of net lettable area of green buildings (registered) is 6,864,614. There is already 488,765m² net lettable area of Green Star certified buildings.

5.1 A DISCOUNTED CASH FLOW VALUATION METHODOLOGY FOR GREEN BUILDINGS

Even though hard data is limited, the DCF approach allows valuers to factor in assumptions about the future shifts in value of Green Star buildings. This report does not provide a precise forecast of those value shifts, but it has certainly documented a clear market expectation that Green Star buildings will outperform their conventional counterparts in coming years.

Such out performance may result from income and value growth in Green Star buildings, progressively decreasing income and value growth in non-Green Star buildings or a combination of both. The use of the DCF approach for both Green Star and non-Green Star buildings allows the valuer to maintain an explicit relativity between all key variables based on comparable evidence.

The findings of this report suggest that the superior performance of Green Star buildings and/or inferior performance of non-Green Star buildings may be reflected in those variables included within a DCF, as listed below.

- Lease type, gross or net rents – if there are savings in outgoings, due to energy and water efficiencies, logically the net rent achievable from the tenant should increase. This will, in turn, increase the cash flow from the asset, thereby increasing the valuation.
- Lease term – there is potential for Green Star buildings to attract longer lease terms and also the reliability of tenants occupying the asset.
- Lease provisions – new types of leases, commonly referred to as 'green leases' are emerging. These leases split the onus for providing different services between owners, occupiers and managers. This in turn can influence the cash flow from the asset.
- Growth rates – given the growing market interest in Green Star buildings, driven by corporate social responsibility; potential productivity gains; and better OH&S, Green Star buildings appear to have a higher growth potential than conventional buildings.
- Outgoings – these are being greatly influenced by new technologies.
- Let up – Green Star buildings appear to attract tenants more quickly, which reduces the overall vacancy rate.
- Retention – "We are of the opinion that tenants will fall in love with their buildings and want to stay" (case study interviewee). While Green Star buildings have not yet been re-let, higher tenant retention would add significantly to value.
- Capital expenditure and lifecycle – as regulations increase, conventional buildings may be forced to upgrade to a Green Star standard, which will require significant capital expenditure. Also, the fact that Green Star buildings appear to require different capital expenditure patterns (eg because of smaller plant or air conditioning systems) will directly influence the valuation.
- Terminal value – lower depreciation and reduced levels of obsolescence may be anticipated to contribute to higher levels of terminal value for Green Star buildings.
- Discount Rate – investors may consider a lower risk premium to be required for Green Star buildings contributing to the adoption of a lower discount rate resulting in higher value.

Valuers will need to make their own judgements about the size of future movements in these factors until detailed market data is available. However, ignoring their potential impact is not an option: the findings of this report show that any valuation that does not consider them would be seriously compromised.

THE USE OF THE DCF APPROACH FOR BOTH GREEN STAR AND NON-GREEN STAR BUILDINGS ALLOWS THE VALUER TO MAINTAIN AN EXPLICIT RELATIVITY BETWEEN ALL KEY VARIABLES BASED ON COMPARABLE EVIDENCE.

6 SENSITIVITY MODELLING

IF NON-GREEN STAR BUILDINGS FAIL TO MAINTAIN RENTAL GROWTH IN THE FACE OF TENANT PREFERENCE FOR GREEN STAR RATINGS, OWNERS OF SUCH BUILDINGS WILL BE CONFRONTED WITH A SIGNIFICANT LOSS OF VALUE.

Four key impacts of the emerging market preference for Green Star buildings were selected for sensitivity analysis. These were:

1. Improved likelihood of lease renewal for Green Star buildings because of tenant satisfaction and lower operating costs (especially energy costs);
2. Reduced downtime for Green Star buildings due to enhanced marketability;
3. A reduction in terminal yield for Green Star buildings as a result of improved investment performance and the ability to attract higher investment interest; and
4. A reduction in rental growth rates for non-Green Star buildings as the market discounts these buildings.

Reduced rental growth for non-Green Star buildings rather than premium rental growth for Green Star buildings was chosen because of the current tendency of tenants to demand green at no extra cost. However, the key point is the difference in growth rates, rather than whether a discount for non-Green Star buildings, a premium for Green Star buildings or some combination of the two eventuates.

The sensitivity of the DCF value of Green Star and non-Green Star building values to these market factors was modelled using DYNA version 11.4.4. DYNA is a widely used asset forecasting tool in the Australian property funds market.

6.1 BASE CASE

A base case was constructed for a hypothetical commercial building of 20,000 square metres Net Lettable Area (NLA). The model assumes that the status quo continues – ie that no market value is attached to a building's Green Star Rating. Growth rates for insurance, water and electricity were set at slightly higher than the Consumer Price Index (CPI); at 5%, which reflects recent trends.

Other features included:

Model date
1 January 2007

Tenancies
10 x 2,000 sqm with terms from 3–7 yrs

Gross Face Market Rent
$500 psqm

Outgoings
$150 psqm

Capex
$250,000 pa indexed at CPI

The growth rates used were as follows:

Table 3:

GROWTH RATES	
Water	5.0%
Electricity	5.0%
Downtime	12 months new tenant 0 months renewal
'Makegood'	$100 psqm new and renewal
Incentives	Nil
Leasing Commissions	12% new tenant 6% renewal
Renewal Probability	50%
Discount Rate	8.5%
Terminal Yield	6.25%

Assumptions relating to rent, incentives, downtime, leasing commissions and 'makegood' are all affected by the renewal probability. All of the assumptions above are quoted for both new and renewal tenants, and are blended by the renewal probability.

Using the above inputs, the current market value for the property, derived through the DCF method, is $106.8m.

6.2 SENSITIVITIES

The results of the sensitivity analysis are shown in the table below.

As might be expected, value is most sensitive to moves in rental growth. Thus, if non-Green Star buildings fail to maintain rental growth in the face of tenant preference for Green Star ratings, owners of such buildings will be confronted with a significant loss of value.

The potential upsides for Green Star buildings in increased renewal probability, decreased downtimes and lower terminal yields are lower than rental impacts, but still significant. Moreover, these variables could have a compound impact, as the industry is expecting all of them to increase as part of a market trend in favour of green buildings.
The sensitivities are hypothetical rather than proven market values. As noted, valuers will need to exercise their judgements on just how a market preference for Green Star ratings will translate into value. But the scale of sensitivity is such that it would be prudent for valuers to point out the sensitivity of the building value to these factors, which the industry clearly believes will favour Green Star buildings in coming years.

Table 4:

	$ VALUE	% VALUE CHANGE
IMPACT ON MARKET VALUE OF A GREEN STAR BUILDING		
Increase in renewal probability from 50% to 75% in a green building	$3.2m	3%
Decrease of total downtime over ten years from 12 months to 6 months in a Green Star building	$3.2m	3%
Decrease of terminal yield from 6.25% in the base case to 5.75% for a Green Star building	$5.3m	5%
IMPACT ON MARKET VALUE OF A NON-GREEN STAR BUILDING		
Decrease in rental growth rate from 3.5% to 2%	-$13.9m	-13%

7

CONCLUSIONS AND RECOMMENDATIONS

INVESTORS, DEVELOPERS AND VALUERS ALL BELIEVE THAT THE ADVANTAGE OF GREEN STAR BUILDINGS WILL INCREASE IN COMING YEARS.

THE FINDINGS IN THIS STUDY OVERWHELMINGLY POINT TO GREEN STAR BUILDINGS ENJOYING A MARKET ADVANTAGE OVER NON-GREEN STAR BUILDINGS. THIS ADVANTAGE IS BEING FELT THROUGH LOWER BUILDING OPERATING COSTS, EASE OF SALE AND RENT, TENANT RETENTION AND IMPROVED OVERALL OCCUPANCY RATES. INVESTORS, DEVELOPERS AND VALUERS ALL BELIEVE THAT THIS ADVANTAGE WILL INCREASE IN COMING YEARS.

The speed of change and limited data on the actual market performance of Green Star buildings is making it difficult for professional valuers to reflect this market advantage in traditional valuation techniques, which rely on tangible evidence from sales and/or leasing from multiple properties.

The valuation profession needs to recognise this difficulty and develop an effective response. Professional valuers need to be able to give the best advice to their clients, while the profession as a whole needs to acquit its pivotal role as a source of authoritative information to the market – a role that is fundamental to an efficient property sector. The valuation profession, through its various professional bodies, should begin this by incorporating information on appropriate green valuation techniques and market updates into the profession's mainstream education:

Recommendation 1

The valuation profession should continue to assist it's members by providing professional education on how to incorporate the emerging market value for Green Buildings, specifically highlighting:

- The inclusion of DCF valuation method for green buildings as one of the optional methods used under the IVSC or Red Book standards;
- The need to advise clients of the sensitivity of building values to the emerging market value attached to Green Star buildings and the potential impacts on tenant retention, downtime and terminal yield as well as the possible value loss and capital costs facing non-green buildings; and
- The inclusion of a sustainability section in valuation reports.

Given the growing use of Green Star in the industry, property professionals should become familiar with how the tool operates. Green Star provides an easy way for non-experts to understand the relative environmental merit of a building and is becoming the market language of green buildings in Australia.

The links between Green Star and rating tools in common use in overseas markets, such as LEED in the US, makes its methodology fundamental to understanding how to assess the environmental credentials of a building in global markets.

Recommendation 2

Property Professionals should be encouraged to undertake Life Long Learning in sustainability issues such as the Green Building Council of Australia's Green Star Professional Accreditation course to improve their understanding of Green Star buildings and their economic and environmental performance.

The valuation profession's traditional focus on actual market transactions to assess market value remains the ideal of the profession. This evidentiary-based approach has difficulty in responding to the emergence of a whole new market influence, such as we are seeing with Green Star rated buildings but as data improves, the traditional techniques will be able to incorporate the 'green value' perceived by the market. Accelerating the collection and dissemination of this data to the profession will be of benefit to all market players.

Recommendation 3

Regulators, policymakers and industry and professional associations should investigate ways to improve awareness of the impact of sustainability features on specific market transactions so that valuers can more quickly detect and assess sustainability market trends.

Professional discourse between valuers on the challenge of the rise of a market

50 Pitt Street, NSW – 5 Star Green Star – Office Design v2

ACCELERATING THE COLLECTION AND DISSEMINATION OF THIS DATA TO THE PROFESSION WILL BE OF BENEFIT TO ALL MARKET PLAYERS.

value for Green Star buildings will also be important. In particular, the body of professional knowledge on both the value and the valuation techniques of green buildings needs to be developed and disseminated widely, so that it becomes an integral part of the mainstream of the profession.

Recommendation 4

The valuation profession should continue to foster discussions about Green Star buildings within the valuation industry and with key stakeholders from the wider property industry and from government. This should include conferences and academic papers.

As noted in Section 2.4, the emerging market demand for Green Star buildings and hence their market value is part of a global trend. The built environment is a major contributor to environmental impacts and as concern about climate change, water conservation and other environmental issues grows, this is translating into community concern. This concern eventually gets reflected in government regulation and market preferences.

Most property investors now take a global perspective on their investment options. They will thus want a consistent approach to both the ratings and the valuation techniques in different markets. As noted, Green Star is linked to a growing international suite of green rating tools for buildings and so can facilitate comparisons in different national markets. This will also facilitate exchange between professional valuers.

Recommendation 5

The valuation profession recognise this global market trend and make a constructive contribution to the global community of professional valuers.

Hence:

The valuation profession should also share information globally with other professional bodies, given the growth of green buildings in overseas markets.

Asset and fund managers are key users of the services of professional valuers. They too need to improve their understanding of the growing value the market is attaching to Green Star buildings and reflect this in their long term plans for managing their assets. The accelerating obsolescence of non-Green Star buildings may require asset and fund managers to accelerate their refurbishment plans for these buildings. How to do this in a way that will optimise overall portfolio values is a challenge for both these Managers and the valuers that advise them.

Recommendation 6

Asset and fund managers should also investigate means of improving understanding of how sustainability can be incorporated into asset management plans.

THE EMERGING MARKET DEMAND FOR GREEN STAR BUILDINGS AND HENCE THEIR MARKET VALUE IS PART OF A GLOBAL TREND.

8 APPENDIX

APPENDIX 1: ACKNOWLEDGEMENTS

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- Australian Property Institute

500 Collins Street – 5 Star Green Star – Office Design v2

APPENDIX 2: CASE STUDIES

The following properties were selected for inclusion in the case study review.

- 30 The Bond, Hickson Road, Sydney, New South Wales
- Royal Australian Airforce, Richmond Airbase, Richmond, New South Wales
- 8 Brindabella Circuit, Brindabella Business Park, Australian Capital Territory
- City Central Tower 1, 11 Waymouth Street, Adelaide, South Australia
- Flinders Link, Flinders Street, Adelaide, South Australia
- Green Square (South Tower), St Pauls Terrace, Brisbane, Queensland
- Council House 2, Little Collins Street Melbourne, Victoria
- Bordo International, Lot 3 Kingston Park, Scoresby, Victoria

The properties were selected to gain a cross section of different ownerships (private, third party and governmental), together with a spread of assets across the country.

Appendix 2 summarises the sustainable practices and features common to the properties in the case studies, as well as some of the more innovative features of some of the individual case studies.

30 The Bond – 5 Star Green Star – Office Design v1

30 THE BOND

30 The Bond, Hickson Road, Sydney, New South Wales

Address	"30 The Bond", Hickson Road, Sydney, NSW
Gross Building Area	22,700 square metres (excluding car park & atrium)
Net Lettable Area	19,700 square metres
Site Area	4,000 square metres
Completion	January 2004
Owner	DB RREEF Diversified Trust
Valuation	$150,000,000
Valuation Date	June 2006
Book Value*	$150,000,000
Book Date	June 2006
Construction Costs	$118,098,000 (including fit-out)
Date of Interview(s)	19th October 2006 & 6 November 2006
Interviewer	John Wills, Director, The Property Lab
Interviewee(s)	Bill Reynolds – Senior Investments Manager, DB RREEF Peter Inglis – Associate Director, Knight Frank Valuations

** Book Value represents total costs spent and reimbursements received to the end of the financial year.*

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

30 The Bond was targeted as the Lend Lease Corporation's global headquarters.

As detailed in Bovis Lend Lease's sustainability report, at the outset of the development the project team aspired to three objectives. These were to deliver:

1. An environmentally sustainable office building;
2. An innovative building and a work environment that was healthy, efficient, flexible and engaging; and
3. A building that enhanced the local amenity and which enjoys community support.

From the outset, the project was targeted toward Ecological Sustainable Development (ESD) principles. Through a comprehensive process across a two-year period, environmental priorities were established to lead the development process. These were:

- Minimisation of greenhouse emissions;
- Maximisation of the indoor environment; and
- Creating and maintaining biodiversity.

The implementation team

Owner	DB RREEF Diversified trust
Financier	DB RREEF
Developer	Lend Lease Development
Construction Manager/ General Contractor	Bovis Lend Lease
Project Manager	Bovis Lend Lease
Architects	Lend Lease Design, PTW and AEC
Sustainability Advisors	Advanced Environmental Engineers (AEC)
Structural Engineers	Arup
Electrical Engineers	Arup
Mechanical Engineers	Lincolne Scott
Civil Engineers	Bovis Lend Lease
Hydraulic Engineers	Lincolne Scott
Commissioning Consultant	AEC
Valuer	Knight Frank Valuations
Major Tenant	Lend Lease (Approximately 80% of the space)

Green Recognition

The Bond was Australia's first 5 Green Star as Built, as defined by the Green Building Council of Australia's rating tool. The building was also the first commercial office building in the country to commit to a 5 star greenhouse rating under the Australian Greenhouse Rating Scheme (ABGR). 30 The Bond has won in excess of 33 awards in Australia and is recognised as one of Australia's most energy efficient buildings. It is one of the early benchmarks for environmental design within the commercial development industry.

PROPERTY DETAILS

Site / Location

The property is situated on the eastern side of Hickson Road, approximately 800 metres north of Napoleon Street in Millers Point, on the fringe of Sydney's CBD.

Site Design

The building on the site of the former Australian Gas Light (AGL) gasworks plant that was established in 1871, and is part of a historic precinct that includes three heritage buildings and a plaza.

The location of the building meant that remediation works were required to be carried out, which included:

- Removal of tarry waste;
- Installing permanent groundwater barrier walls;
- Excavation of tar; and
- Application of odour suppressing techniques to the removed tarry waste.

The building is oriented to take advantage of a four-storey convict hewn sandstone wall (atrium form), which not only provides a feature wall upon entry but also provides thermal mass to assist in the cooling of the building.

30 The Bond is a nine-storey building comprising approximately 19,700 square metres of commercial lettable area, a 600 square metre communal atrium and basement parking for 113 cars.

BUILDING DESIGN

Building Envelope and Structural Design

The floor system comprises of concrete slab on ground level and suspended concrete slab for the upper floors, appropriately reinforced to allow 100 metre long floor plates.

The building frame consists of structural steel columns and beams supported on concrete bases.

The incorporation of a chilled beam system for cooling, enabled the building height to be reduced by approximately one metre, thereby reducing visual impact on neighbours. It also improves the light access.

The buildings façade has been finished with 3,000 mm high windows on all exterior surfaces in order to optimise natural light, with naturally ventilated sunrooms and operable louvres to allow occupants to modify their environment.

Materials and Resources

Recycled timber together with harvested plantation timber has been utilised in the tenant fit out. Bamboo flooring products have also been incorporated.

Plumbing and Water

A key water saving measure was a rooftop garden to allow water capture for use in irrigation.

Other initiatives include:

- Leak management system connected to the Building Management System;
- Low flow water fittings and fixtures; and
- Waterless urinals.

Heating and Cooling

Heating and cooling efficiencies were high priorities and were integrated with measures to improve indoor air quality.

To minimise energy use natural ventilation was used for cooling where possible. A number of features where incorporated into the design:

- Sunrooms / winter gardens (useable approximately 50-60% of the year due to climate);
- External terrace areas; and
- Use of naturally occurring (hand treated) sandstone walling for thermal massing.

The Bond was the first commercial building in Australia to incorporate a passive-chilled beam system for cooling, rather than the standard air conditioning and variable air volume systems.

Chilled beams operate by pumping chilled water through cooling elements in the ceiling. Hot air rises and strikes the chilled beams. The chilled air falls thereby creating a natural convection process. The system is further augmented by additional radiant cooling from the chilled beam supports.

To assist in the cooling and heating of individual tenancy areas the façade incorporates individually operable external shading. This allows workers to block unwanted glare and control heat levels as desired.

Ventilation and Air Quality

A convection process is used to provide fresh air continually to the workplace. It is exhausted out of the building without being re-circulated.

Air quality is further improved by the sunrooms/winter gardens, the use of low volatile organic compounds and the placement of broad leaf plants around the office to oxygenate the air

The building therefore provides a 100% fresh air supply with no re-cycled component and is in excess of double the Australian Standard.

Lighting and Daylight

The design of the building and the use of glazing aims to maximise natural light. T5 lighting achieves 6.7 watts per square metre. External shading has been incorporated into the design together with selective glazing.

Solar Design

The use of chilled beams assists in increasing the solar access to the building. Solar access was considered carefully in the design process, specifically in regard to maximising the internal environment. Features allowing for the solar design include:

- Façade shading;
- Roof top garden;
- Sunrooms/winter gardens;
- Atrium;

RECYCLED TIMBER TOGETHER WITH HARVESTED PLANTATION TIMBER HAS BEEN UTILISED IN THE TENANT FIT OUT.

- Floor design with incorporation of meeting pods; and
- Maximum perimeter workplace for maximisation of natural lighting.

Landscaping

The main landscaping component is the inclusion of a native rooftop garden. The space not only acts as a capture point for irrigation, but also acts as a social hub for occupants.

Waste Management

As the Bond was built upon a heavily contaminated site, remediation was required. The owner of the building has also incorporated into their building management practices and manuals waste management practices for tenancy areas. Part of the program includes the use of an internal website which allows staff to track tenancy usage in regard to waste, water and energy on a monthly basis.

FINISHES

Finishes and Furnishings

Where possible low volatile organic compounds where utilised in the construction process. For example goat's hair carpet, cork (a renewable resource), bamboo flooring and wood from sustainable plantations were utilised in the internal fit-out.

Equipment

The equipment that would be used within the asset was also considered. The fit-out incorporates the reuse of furniture, together with carefully selected items such as "deep green" chairs (96% of the components of office chairs can be reused and contain 42% recycled materials).

OCCUPANT CONSIDERATIONS

Transportation

30 The Bond is close to various forms of public transport. It is within 500 metres of two railway stations, two ferry stations and a bus stop.

Occupant Health

One of the project's key objectives was to deliver an innovative building and work environment that was healthy, efficient, flexible and engaging. Lend Lease have ensured that these ESD principles cam be measured through the implementation of pre- and post-occupancy evaluation. In this regard, Lend Lease has released the following findings within their Sustainability Report 2005 and company website.

"As part of our ongoing research into how the building is perceived, we conducted pre- and post-occupancy evaluations. These surveys have shown that, since moving into the Bond, employees believe that their productivity has increased by 51%, and more then 84% believe they are 'more comfortable'. All health problems surveyed have dramatically reduced, with tiredness and sore eyes reduced by over 50%." – Bovis Lend Lease, Sustainability Report, 2005

With such a high percentage of workers indicating increased comfort, Lend Lease asked workers to provide the reasons for their increased comfort. The responses were as follows:

- 64% new building;
- 64% overall indoor environment conditions;
- 55% indoor air quality;
- 54% workspace;

- 43% lighting; and
- 40% air conditioning (chilled beams).

Awareness Program

The awareness program for the Bond was implemented from the outset of the project.

"Over two years, up to 300 people were involved in discussions about the development. This process included initial users and external research, web based surveys and task forces that focused on a number of areas to do with the design and running of the building." – Lend Lease, Sustainability Report, 2005

The approach continued through the development of the asset with presentations being given to staff members about the sustainable initiatives incorporated within the asset, how the asset operates and how the asset will be maintained. Evaluations are carried out to continually measure the performance of the building and its occupants. These are presented to staff every 6 months.

The building also incorporates a highly sophisticated building management system that allows various levels of access to building information. For example, the site offers users monthly information in regard to waste, water and energy usage results. The system also offers users an A to Z guide.

VALUATION REVIEW

Owner Type

The building is owned as an investment by DB RREEF Funds Management Limited.

Valuation Firm

Knight Frank.

30 The Bond – 5 Star Green Star – Office Design v1

Valuation Figure & Date

Market Valuation

Independent valuation:
$150,000,000

Date of valuation:
June 2006

Accounting Valuation:

Book value:
$150,000,000

Book date:
June 2006

Development Cost:

Total construction cost:
$118,098,000 or $5,203 per square metre of NLA (Including fit-out)

Methods of Valuation

Income Capitalisation Approach

Capitalisation rate: 6.50%

Valuation: $150,000,000

Net rental: $9,450,000

Discounted Cash Flow

The key DCF assumptions were as follows:

Net Lettable Area: 19,700 square metres

Car spaces: 133 Spaces

Terminal yield: 7.00%

Discount rate: 8.50%

As at June 2006 the building had an average passing rental of $447 dollars per square metre, whilst the market rate averaged $449 per square metre. The weighted average lease term (by income) expiry was 7.6 years.

The major tenant in the building is Lend Lease Corporation Limited.

Sales Comparison

The valuer used the sales comparison method via a rate per square metre as a check method to support the previous methods.

In determining a rate per square metre the valuer has relied upon comparable sales throughout the Sydney CBD. The comparables utilised were primarily A grade properties.

Areas of consideration for valuing green

Valuation of the Bond is influenced by a number of factors:

1. The Bond is locationally challenged; it is situated on the fringe of Sydney's traditional CBD core. This area is, however, changing, due to a number of blue chip tenants occupying newly constructed assets in the immediate area;

2. The depth of the Sydney market in regard to 'green' buildings is limited. In fact New South Wales appears to be lagging behind other states in regard to the take up of the development of such assets; and

Suggestions to make it easier to understand green

Increased costs associated with the construction of the Bond will be offset by savings in operating costs. The chilled beams improve the energy efficiency of the building, reduced tenant costs and also have an impact on maintenance as there are no moving parts in the system. Plus, the improvements in indoor environment quality is expected to improve people's productivity.

The Bond story is about much more than the creation of a building, it is a tale of consultation, collaboration and tenacious commitment to a vision. The extraordinary physical and cultural outcomes achieved in the making of the Bond are the result of extensive and at time challenging conversations within our organisation and with the new community we were joining. Those of us involved in the deliberations, the debates, the interviews, and interpretations know that what we have created is no fluke. We worked hard to make the Bond; we hope that both the outcome and the process taken to reach it inspire those that tread a similar path.

THE BOND STORY IS ABOUT MUCH MORE THAN THE CREATION OF A BUILDING, IT IS A TALE OF CONSULTATION, COLLABORATION AND TENACIOUS COMMITMENT TO A VISION.

RAAF Richmond– 5 Star Green Star
– Office Design v1, Office As Built v1, Office Interiors v1

RAAF RICHMOND

Royal Australian Airforce, Richmond Airbase, Richmond, New South Wales

GROWTH RATES	
Address	36/37 Squadron Headquarters, RAAF Richmond, NSW
Gross Building Area	4,200 square metres
Net Lettable Area	2,582 square metres
'Site Area	8,100 square metres
Completion	October 2005 (occupied)
Owner	Department of Defence
Book Value (Range)	$14,300,000
Book Date	30 June 2006
Construction Costs	$14,275,880 equating to $3,708 per square metre of GLA
Date of Interview(s)	4th August 2006
Interviewer	John Wills, Director, The Property Lab
Interviewee(s)	Lt Col Rupert Hoskin, Project Director Dominic Schimizzi, Project Officer Kin Yam, Assistant Director – Green Building Retired Lt Col Doug Mitchell, Project Director

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

The Department of Defence (DOD) point to four distinct drivers in adopting green at the 36/37 Squadron Headquarters on Richmond.

The redevelopment of the RAAF site was driven by the Government's Defence strategies. RAAF Base Richmond is Australia's second oldest RAAF base and is considered a major operational base, supporting the delivery of airlift capabilities for the Australian Defence Force. In August 1998 the Prime Minister announced that a decision on the future of RAAF Base for Richmond would not be made before 2010. This time frame therefore provided the baseline for investment decisions at Richmond, requiring any redevelopment to meet the specified time frame.

The Department of Defence over the last 10 years has significantly changed its approach to operations, for example, the move from Just in Case (JIC) management to Just in Time (JIT). Such changes have resulted in an ongoing review of business operations and interactions. This philosophy was deemed crucial for inclusion when considering investment in the RAAF base at Richmond.

Another key consideration was OH&S. Being located at an airfield, the correct treatment of air particles to avoid the internal environment being contaminated from avgas required special consideration.

The DOD is a significant landowner and developer across Australia. Defence has $10 billion of land and assets, and spends $350 million per year on new assets. The DOD is a custodian of public money and therefore has significant responsibility. The final driver therefore for the DOD was to deliver a 'lighthouse' project with environmentally sustainable developed outcomes that could be used by the organisation for future reference.

The implementation team

GROWTH RATES	
Owner	Department of Defence (DOD)
Financier	Australian Government
Developer	DOD Corporate Services and Infrastructure Group (CSIG)
Construction Manager /General Contractor	Baulderstone Hornibrookv
Project Manager	Carson Group
Architects	Bligh Voller Neld
Sustainability Advisors	Bovis Lend Lease
Structural Engineers	Taylor Thomson Whitting
Electrical Engineers	Rudds
Mechanical Engineers	Rudds
Civil Engineers	Bill Guy & Partners
Hydraulic Engineers	Hughes Trueman
Acoustics	Richard Haggie
Landscape	J Easthope & Associates
Commissioning Consultant	SKM
Quantity Surveyor	Curry and Brown
Valuer	Not Applicable
Tenants	Squadrons 36 and 37

Green Recognition

The 36/37 Squadron Headquarters, RAAF Richmond, NSW has achieved:

- 5 Green Star as Designed
- 5 Green Star as Built
- 5 Green Star for Office Interiors

The building won the Royal Australian Institutes of Architectures (RAIA) prestigious Sir John Sulman Award for outstanding architecture, 2006, and was also presented with the NSW Architecture Award for Ecologically Sustainable Design, 2006.

The building was a Banksia award finalist and has recently been entered in the Master Builders Association of NSW Excellence in Energy Efficiency Awards 2006.

Suggestions to make it easier to understand Green

Organisations who want to participate in 'green development' need to ensure that the project director understands 'green', knows how to collaborate and is willing to employ the appropriate consultant experts.

In order for sustainable development to work, it is important that individual champions are involved at each level to accept the various forms of risk through the development process. Adopting such an approach ensures adherence to collaboration, as each champion is looking for a win/win outcome.
For example:

- By involving the Commander of the Air Lift Group, rapid decisions and streamlining of the process was achieved. Such personnel involvement was calculated to save six months of construction and $2 million of additional costs.
- By adopting a collaborative approach there was a culture of 'no blame'. This resulted in zero disputes to variations.

Occupants of the building see benefits in three 3 distinct areas.

- Social
  - Increased interaction between staff are improving work outcomes, wellbeing and OHS
  - The development has served as a "flagship" to allow the improvement of processes and approach that will be targeted across the entire Department of Defence
- Environmental
  - The benefits to the wider environment include water and energy savings, and reduced ecological impacts. The simulated performance of the building in regard to carbon emission is the equivalent to taking 50 cars off the road each year
- Financial
  - The construction cost was $3 million below expectations based on a benchmarking exercise that set a budget for the project
  - The operating costs of the asset (including salaries) are well below expectations
  - No additional recurrent costs have been detected in monitoring.
  - There were no significant changes to facility management contracts

The traditional step by step, black box project lead capital expenditure approach to development is no longer applicable. The 'green building' process has shown that there is a new paradigm to the construction process. The new development model must take a lifecycle perspective, incorporating the social and environmental aspects. Project decisions will be guided by the end user's business operations, working environment, culture, budget and desire to limit their impact on the environment. For the DOD, representing approximately 45% of the total Commonwealths energy usage, the decision to focus on the environment as part of the development, would never be in doubt.

PROPERTY DETAILS

Site / Location

The RAAF 36/37 Squadron Headquarters is located on the northern side of the DOD RAAF Airbase at Richmond, on Richmond Road between Richmond and Windsor. Richmond is located approximately 60 kilometres north-west of the Sydney Central Business District.

Site Design

RAAF Base Richmond is a point of entry for explosive ordinance. This became a major constraint in the potential location of the headquarters because facilities had to be located beyond the exclusion zones ('the yellow line').

The chosen site for the headquarters was a car park within the Base confines. The car park was relatively clear of services, however the excavation had the potential to impact the main base telecommunications and storm water infrastructure.

The first major constraint upon the site was the influence of particle matter. The building had the potential to be greatly impacted by particle matter when aircraft were "run up" on the tarmac with a southerly wind blowing. Appropriate positioning on the site, together with appropriate air quality systems, were therefore required.

Other major constraints arose from the need to connect to existing Base infrastructure, which is considerably dated. Appropriate design outcomes were required in order to connect to the existing storm water, water supply, fire services, sewer, underground electricity, telecommunications and data.

The development of the building creates no additional impact on the site ecology. The current development represents a 30% reduction in building size from 'business as usual' (4,000 sqm to 5,600 sqm).

BUILDING DESIGN

Building Envelope and Structural Design

The floor system is a combination of concrete slab on the ground level and light weight hollow core pre-cast concrete panels on the first floor and roof. The building frame consists of structural steel columns and beams supported on concrete bases.

The building façade has been finished with a combination of recycled timber and metal cladding with aluminium windows and shop-fronts. The customised fly-roof was fabricated onsite. It is long spanning deep profiled meal sheeting.

Materials and Resources

During construction approximately 88% of construction waste arising for the project, by weight, was reused or recycled. Over 65% of timber was reused for external cladding and timber flooring within the new headquarters. A further 30% of timber had Stewardship Council certification.

The structural concrete incorporates a minimum of 30% fly-ash content.

RAAF Richmond– 5 Star Green Star – Office Design v1, Office As Built v1, Office Interiors v1

"DURING CONSTRUCTION APPROXIMATELY 88% OF CONSTRUCTION WASTE ARISING FOR THE PROJECT, BY WEIGHT, WAS REUSED OR RECYCLED."

PVC use was reduced to a minimum, in excess of 60% by cost. Alternatives used include Radox cable, HDPE, reinforced concrete pipe and vitrified clay pipe.

All major fitout materials were selected for their recycled content, durability, disassembly, modularity and recyclability

Mechanical Systems

The electrical, hydraulic and mechanical plan and equipment were specifically designed and selected for maximum energy, water, emissions and indoor environmental quality credits under the Green Star Rating System.

The air conditioning incorporates the ability for the operation of 6 mixed modes. The refrigerants in the system have zero depletion potential.

The building incorporates occupant sensors in order to utilise the system effectively and efficiently. Occupancy areas are constantly monitored to ensure there is an appropriate use of natural and mechanical ventilation.

Plumbing and Water

The water features installed achieved a 100% category score when measured on the Green Building Council of Australia's rating tool.

Features include:

- Water efficient fixture and fittings;
- Waterless urinals save approximately 90,000 litres of potable water pa compared to typical AAA urinals;
- Rainwater capture to supplement all toilet flushing; and
- Drought tolerant landscaping (no irrigation is required).

The incorporation of detention tanks (52,000 litre storage tank installed) to capture and store roof water allows the collection of approximately 1,000,000 litres of rainwater per annum. This water is reused within the building. When compared to similar new Defence assets, the building uses approximately 50% potable water.

It is anticipated that the water saving features incorporated into the asset will result in a reduction of water consumption of approximately 1,500,000 litres per annum. This is equivalent to the size of an Olympic swimming pool per year. A solar hot water system is installed.

Heating and Cooling

The positioning of the building maximises natural heating and cooling. This is augmented by the inclusion within the design of under slab natural ventilation culverts, hollow core slabs and automated louvres for control of heating and cooling.

The internal environment is controlled by occupant sensors tied into the 6 mixed mode air-conditioning system. All refrigerants utilised in the air-conditioning system have zero depletion potential.

The impacts of lighting have also been built into the buildings heating and cooling systems.

Ventilation and Air Quality

The natural ventilation system incorporating fly roof convection, hollow core slabs, automated louvres, underground thermal chamber and solar chimneys allows 74% of the net lettable area to be naturally or mechanically ventilated. The remaining 26% is mechanically ventilated for operational purposes.

External air is provided at a rate 150% above the Australian Standard requirement. This is due to design features, together with the cross flow of natural ventilation created by correctly positioning the building on site.

Indoor air quality is improved through the use of low off-gassing paints, carpet and composite wood products.

Lighting and Daylight

There is considerable natural lighting in the building. Natural light and external views are provided to a large portion of the works areas, especially those situated near the perimeter of the building. Lighting levels are further enhanced by the inclusion of a highly efficient T5 lighting design with occupant sensors and switching. This has significantly reduced the energy use for lighting to approximately 5 watts per square metre of floor area.

Solar Design

The long sides were oriented to the north and south to maximise daylight and increase solar gain in winter for heating of the building.

Solar towers have been incorporated to actively promote the ventilation of unwanted heated and stale air by drawing fresh, cooler air from vents at lower levels. The system provides interior cooling and heating to complement the climate control system in the building. An array of 16 rooftop solar collectors provides heating for domestic water services

Landscaping

No fill or topsoil was removed from the site, allowing effective landscaping to be incorporated in to the development. A key constraint was that no bird -attracting plants or trees could be incorporated.

The landscaping incorporated drought resistant evergreen natives. The landscaped areas are primarily hard landscaped with planters.

The landscaping plan was developed to provide a micro-climate between the plantings and the building. Such an approach assists with ventilation, screening and aspect.

Waste Management

During construction approximately 88% of construction waste, by weight, was reused or recycled.

The owners of the building have developed a waste management plan that incorporates recycling facilities. Extensive waste storage areas are provided for the base building to facilitate waste separation and the recycling of office waste. Removal of recycled materials from site has been outsourced to a waste management company.

FINISHES

Finishes and Furnishings

All sealants, paints, carpets and composite wood products used were chosen to minimise risks from volatile organic chemicals (VOCs) and so improve the air quality within the building.

Approximately 65% of timber was reused from the former building for external cladding and timber flooring within the new headquarters.

The building also provides lockers, showers and change areas.

Equipment

The equipment used in the fit-out was designed purely around the specified capability requirements of the squadrons – for example storage areas for flight gear.

A balance between human elements and building innovation was carefully considered. This culminated in a high proportion of laptop use, shared workstations (ratio of 2:1) and hotdesking facilities. Desktop computers are only used in designated work areas.

The remaining office fit-out is completely integrated into the base building works.

OCCUPANT CONSIDERATIONS

Transportation

Public transport to the subject site is limited. On grade parking for 116 cars has been provided. Approximately 25% of these spaces are for small cars only.

Secure bicycle facilities have been provided for 10% of staff (that is 20 spaces). Visitor bike racks have also been provided. Interestingly, the use of the bike racks was expected to be limited, with pilots expected to prefer driving over cycling, however his has not been the case, and there has been a larger than expected use of the racks

Occupant Health

Occupant health was a major consideration due to the users' health status link to flying capability. For example pilots with throat, nose or ear problems are immediately struck from the flying roster. The ventilation and finishes noted above were important measures to improve occupant health.

Awareness Program

The majority of benefits achieved were done so during the initial implementation stages of the project. A project governance board was established with senior representation of all stakeholders. This group took the project risk and directions upon their shoulders. Extensive user engagement in the form of meetings, briefings and newsletters took place. This process was implemented by the change manager, and resulted in achieving a high level of understanding and buy-in by RAAF personnel.

A building user's guide was prepared to inform users of the environmental features of the building and to ensure achievement of the original design intent.

VALUATION REVIEW

Owner Type

The building is owner occupied.

Valuation Figure and Date

Market Valuation

Independent Valuation Range:
Not applicable.

Date of Valuation:
Not applicable.

Accounting Valuation:

Book Value: $14,300,000
Book Date: 30 June 2006

Development Cost:

Total Construction Cost: $14,275,880 or $3,708 per square metre of GLA
Practical Completion: October 2005

8 BRINDABELLA CIRCUIT

8 Brindabella Circuit, Brindabella Business Park, Australian Capital Territory

Address	8 Brindabella Circuit, Canberra, ACT
Gross Building Area	5,000 square metres
Net Lettable Area	4,613 square metres (4,313, office and 300 retail)
Site Area	2,000 square metres (footprint plus curtlidge)
Completion	2004
Owner	Canberra International Airport
Construction Costs	$9,000,000 (The Hub, 2004)
Date of Interview(s)	4th August 2006 and 2 November 2006
Interviewer	John Wills, Director, The Property Lab
Interviewee(s)	Tom Snow – Canberra International Airport Noel McCann – Canberra International Airport

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

8 Brindabella Circuit was designed as a speculative office building with a minor retail component. The property forms part of the Brindabella Office Park, and reflects the progression of various initiatives introduced to the suite of buildings within the park. Canberra International Airport was keen to establish a differentiator in the Canberra market place, by providing a "5 Green Star" alternative.

The implementation team

Owner	Canberra International Airport
Financier	Canberra International Airport
Developer	Canberra International Airport
Construction Manager /General Contractor	Construction Control
Architects	Daryl Jackson Alastair Swayn
Mechanical Engineers	Canberra International Airport
Electrical Engineers	Rudds Consulting Engineer
Civil & Hydraulic Engineers	Rudds Consulting Engineer
Environmental Engineers	Rudds Consulting Engineer / Sustainable FX
Energy Analysis	Exergy
Lighting	Rudds Consulting Engineers
Day Light	Rudds Consulting Engineers
Acoustics	Eric Taylor & Associates
Planner	Canberra International Airport
Landscape	Clouston Associates
Facility Manager	Canberra International Airport
Property Manager	Canberra International Airport
Valuer	MAS Strategic Property Advisors
Major Tenants	Australian Research Council, Deloitte and SMS Technologies

8 Brindabella Circuit was designed as a speculative office building with a minor retail component. The property forms part of the Brindabella Office Park, and reflects the progression of various initiatives introduced to the suite of buildings within the park. Canberra International Airport was keen to establish a differentiator in the Canberra market place, by providing a "5 Green Star" alternative.

The implementation team

Green Recognition

The property has achieved the following:

- First 5 Green Star rating under the Australian Green Star Rating system;
- Winner of the Green Building Award in the United Nations Association World Environment Day Awards;
- Finalist in the Banksia 2005 World Environment Day Awards;
- 1st place – 2005 ACT NO Waste Awards;
- Winner – 2005 Engineering Excellence Awards, Engineers Australia, Canberra Division;
- Winner – 2005 Keep Australia Beautiful Sustainable Cities – Sustainable Building Award;
- Finalist – Australian Business Limited Annual Awards, innovation category;
- 2006 Australian Institute of Landscaping Architects ACT Merit Award for design in landscape architecture Brindabella Business Park Town Square; and
- Royal Australian Institute of Architects outstanding award.

PROPERTY DETAILS

Site/Location

The building is part of the Canberra International Airport property, and is located 500m west of the main runway. Canberra Airport is a 10 minute drive from the city centre.

Other developments on the Airport site include aircraft facilities, office buildings and discount retail warehouses. The land around the airport is primarily used for grazing, with a number of garden nurseries nearby.

Site Design

Prior to the development of 8 Brindabella, the site was previously weed-infested grassland, not used for any specific purpose.

The building sits on an east-west axis, with extensive eaves and shading devices to maximise daylight whilst minimising unwanted heat-gain.

The thermal plant is shared with 6 other buildings to maximise energy efficiency and improve system availability.

BUILDING DESIGN

Building Envelope and Structural Design

The building uses a well-insulated metal deck roof, with a second ceiling to prevent acoustic intrusion into the office space.

Low E Double glazing is used throughout the building, with the remainder of the façade being alucabond with extensive insulation. Extensive overhangs are used on the northern façade, with horizontal shades also provided on the northern and western facades. The southern façade has an angled wall, so that each floor continues to be shaded even when the sun is directly overhead.

The ground floor is slab-on-ground (with insulation around the perimeter), with the upper two levels pre-stressed concrete. Water pipes have been laid around the perimeter of the building so that the thermal mass of the slab can be 'activated' to either cool or warm the space. This provides significant improvements to both occupant comfort and energy efficiency.

Materials and Resources

Construction waste was sorted off site, where it was separated for reuse/recycling.

Recycled materials have been used extensively throughout the building, and include the timber floors in the foyer and structural steelwork. For example, 90% of the steel used in the building is either recycled or reused. The building incorporates a significant amount of steel from demolished buildings, and although this steel has to be reworked, this approach significantly reduces waste sent to landfill.

Products containing PVC were minimised, with the majority of pipework, cables and conduits being replaced with alternative materials such as copper, steel and HDPE. Even the tactile indicators at the top and bottom of stairs were made from polished metal rather than the conventional PVC.

Low VOC materials were used, including carpets and paints. Construction Control spent considerable time sourcing low VOC sealants and adhesives, and used compliant products whenever possible. Low formaldehyde composite timber products were used, and the timber material in these products was sourced from FSC certified forests. The carpet does not contain PVC, and will be taken back at the end of its life by the manufacturer for treatment and reuse.

Mechanical Systems

100% fresh air is distributed throughout the building, with the waste heat reclaimed from the relief air. Air is super-cooled and delivered via active chilled beams. A secondary cooling coil within these active-chilled beams tempers the air to suit requirements. This system significantly reduces energy consumption as the fans do not push as much air, and the system does not use 're-heat' to temper the zones. In addition, each air-conditioning zone is much smaller than the benchmarks set by the Property Council of Australia, and therefore maintains a more even temperature across the floor.

Water pipes have been laid around the perimeter of each floor, and either warm or cool water can be circulated through. This enables the radiant temperature of the space to be controlled, in addition to the standard air-temperature control. Significant energy savings are also achieved, because pumping water rather than blowing air consumes less energy to cool/heat any given space.

Thermal plants (boilers, chillers & cooling towers) are shared with another six buildings (approx 40,000m2). In addition to improving reliability and redundancy (as standby systems are provided), significant energy savings are made because the optimum piece of equipment operates to match the load - rather than having 6 large chillers each operating at 15%, we have 1 large chiller operating at 90% (close to peak efficiency).

Plumbing and Water

Water efficiency fixtures have been used throughout the building, including waterless urinals, hands-free taps and dual flush taps. As 5A rated fixtures were not available during construction, flow restrictors were installed to further and minimise water usage.

Sub-soil irrigation is used throughout all landscaped areas. Further, surfaces are designed to reduce the need for minimise storm water run off, reducing the need for drains and water demand.

Solar hot water panels preheat 100% of hot water and provide approximately 70% of the total heat energy.

The building saves 687,000 litres of water per year compared with a standard building of similar size a 43% saving.

The use of water efficient devices also leads to a 36% reduction in discharge to the sewer, for example the use of infra-red hands free taps reduce both water and energy consumption. Water is only released when hands are under the infra-red beam below the tap spout.

All water used for irrigation is recycled. Canberra International Airport has not had to draw on the ACT's potable water supply for irrigation.

Heating and Cooling

Every fan and pump has a variable speed drive to ensure that it is always operating at its maximum efficiency – this is different to many other buildings, where the air/water flow is reduced by closing dampers/valves to restrict the flow (increasing pressure and energy consumption) rather than by reducing fan/pump speed.

External shading on the outside of the building has been designed to minimise glare and heat. Internal blinds have also been provided to allow occupants to manually adjust the lighting level of each work area.

Ventilation and Air Quality

The office space is continually supplied with 100% outside air, exceeding the requirements of AS1668.2 (1991) by 185%. This ensures continuous fresh air and no accumulation of airborne contaminants or objectionable odours in the building.

Lighting and Daylight

Single lamp T5 lights are used throughout the office space to reduce the tenant's energy consumption. In addition, the ballasts on these lights are dimmable, to allow the tenant to 'tune' their lighting system so that it does not overly light the space – a careful commissioning process on the fitout ensured each lamp was operating at the optimum level.

The perimeter two rows of light fittings also have internal light sensors, allowing each light to automatically sense and adjust its light level to suit the surrounding daylight levels. Computer models have indicated that daylight usually extends well into the floor plate, providing adequate daylight for at least 30% of the workstations.

Waste Management

Over 80% of construction waste was collected and sorted for re-use/recycling. Office waste is also sorted for recycling and utilised where possible. For example, three initiatives include:

- Central waste sorting room (for seven buildings);
- Dual bin system for tenants; and
- Organic waste is either recycled or used as fertilizer for local farmers.

FINISHES

Finishes and Furnishings

- Low VOC paints, carpets and sealants/adhesives.
- Low formaldehyde composite wood products.
- Recycled materials used, including foyer floor timber and structural steel. Other timber (in composite wood) was FSC certified.
- Carpet does not have PVC backing and will be taken back by manufacturer at for treatment and reuse.

OCCUPANT CONSIDERATIONS

Transportation

Canberra Airport provides a subsidised bus service to connect to two interchanges (Russell and City), achieving 4 of the 5 points in Green Star. The frequency of these routes has increased significantly since the design of the building.

Small car spaces together with motorcycle spaces have been provided in the visitor car park to encourage the use of more fuel efficient cars/mopeds and motorbikes. Bike storage facilities, showers and change rooms have also been provided in adjacent building.

Occupant Health

Service noise within the asset contributes less than 5db. The materials used allowed virtually all external noise to be omitted.

Awareness Program

The building was constructed in accordance with a pre-prepared environmental management plan, which in turn exceeded NSW Environmental Management System and best practice guidelines.

A building user's guide was prepared to assist the building manager and users of the building in making the best use of the asset, through an understanding of the systems and how to best utilise them.

VALUATION REVIEW

Owner Type

Canberra International Airport is the developer, owner and manger of the building.

Valuation Figure & Date

Development Cost:

Total Construction Cost: $9,000,000 or $1,800 per square metre of GLA (The Hub, 2004)

Valuers' Perception of Barriers

"The availability of 'green' buildings is the heart of the issue for valuers…… In rough terms there is approximately 20 million square metres of office space in Australia, less than 100,000 square metres is green…… If this is the limit of the market, let alone if they are available for sale, how could a valuer determine the difference?"
– project particpant.

Can such barriers be removed or altered?

"Who would have thought 5 to 10 years ago the Federal Government would be requesting minimum building requirements, green leases and measuring performance relating to same?"
– project participant.

CITY CENTRAL TOWER 1 CASE STUDY

City Central Tower 1, 11 Waymouth Street, Adelaide, South Australia

Address	11-29 Waymouth Street, Adelaide, South Australia
Gross Building Area	36,000 square metres (Approx.)
Net Lettable Area	31,292 square metres
Site Area	2,185 square metres (Approx. form total of 3,520 sqm)
Completion	February 2007
Owner	Commonwealth Property Office Fund
Valuation	$135,800,000 (Upon Completion)
Valuation Date	December 2004
Book Value (Range)	$78,000,000
Book Date	30 June 2006
Construction Costs	$115,000,000 (Source: Adelaide City Council)
Date of Interview(s)	17th October 2006 & 6th November 2006
Interviewer	John Wills, Director, The Property Lab
Interviewee(s)	John Dillon – Senior Portfolio Manager, Property and Alternative Investments, Colonial First State Greg Johnson – Manager, Corporate Sustainability, Colonial First State Alex Smithson – Director, Knight Frank Valuations Che Wall – Joint Managing Director, Lincolne Scott

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

Caversham aims to be at the forefront of sustainable development across all sectors of real estate. 11-29 Waymouth Street forms their first foray into sustainable commercial assets for the organsiation. The asset was built in order to re-use an under utilised Adelaide CBD site. During construction approximately 60% of construction waste material, by weight was recycled or reused.

The 11-29 Waymouth Street property, known as "City Central Tower 1" forms part of the larger planned master planned redevelopment of an Adelaide city block.

Caversham believed in the inherent value associated with "Green" buildings. As such City Central Tower 1 was a speculative development.

The property was sold to the Commonwealth Property Office Fund in late 2004 for a land payment of $10,000,000 and $132,000,000 in construction. Upon completion the asset realises a yield of 7.56% post costs.

The implementation team

Owner	Commonwealth Property Office Fund
Financier	Commonwealth Property Office Fund
Developer	Caversham Property Developments
Construction Manager /General Contractor	Baulderstone Hornibrook
Project Manager	Baulderstone Hornibrook
Architects	Woods Bagot
Sustainability Advisors	Advanced Environmental Engineering
Structural Engineers	Connell Mott McDonald
Mechanical Engineers	Lincolne Scott
Civil Engineers	Connell Mott McDonald
Hydraulic Engineers	Lincolne Scott
Acoustics	Vipac Engineers & Scientists Ltd
Quantity Surveyor	Davis Langdon
Property Manager	Jones Lang LaSalle
Valuer	Knight Frank
Tenants	Deloitte, Lincolne Scott, Woods Bagot Architects, SA Government and advanced negotiations on remainder of the space

Green Recognition

"City Central Tower 1" has received maximum points in a number of credits under the Green Star – Office Design v2 rating tool. The building is rated as 5 Green Star and 5 Star Australian Building Greenhouse Rating Scheme.

The Waymouth Street property, known as "City Central Tower 1" received maximum points in a number of credits under the Green Star – Office Design v2 rating tool. The building is rated as 5 Green Star and 5 Star Australian Building Greenhouse Rating Scheme.

INHERENT PROPERTY DETAILS

Site/Location

City Central precinct is bounded by King William Street, Waymouth Street, Bentham Street and Franklin Street. The precinct is in the core of Adelaide's Central Business District.

Site Design

The City Central redevelopment has been designed to assist in shifting the focus of Adelaide's CBD closer to Victoria Square, the original target for the city hub. Its focus is on sustainable priciples.

The City Central Precinct is the biggest single development ever undertaken in the Adelaide CBD. The master plan for the 1.7 hectare site incorporates the development of 3 commercial towers, an entertainment precinct and redevelopment of the General Post Office.

City Central Tower 1 is the first of the commercial towers to be developed. The building's design delivers average floor plates in the order of 1,450 to 1,770 square metres. The building includes 30,424 square metres of commercial office space and 868 square metres of retail space over 21 levels. Parking is provided over two levels of basement parking.

The building is in the Adelaide Central Business District and therefore in proximity to public transport services, such as bus and train services. Thus only 165 car spaces were provided within the development. This figure represents 80% of what is currently allowable under the local planning regulations.

BUILDING DESIGN

Building Envelope and Structural Design

The floor system comprises of concrete slab on ground level and suspended concrete slab to the upper floors. The building frame consists of structural steel columns and beams supported on concrete bases.

The building façade has been finished with floor to ceiling perimeter spectrally selective glazing on all exterior surfaces to optimise natural light.

Materials and Resources

During construction approximately 60% of construction waste material was recycled or reused, for example:

- Sustainable sourced timber for internal joinery, loose and built-in furniture together with formwork timber.; and
- 80% of steel with recycled content of 100%.

Plumbing and Water

Water saving measures were a key focus. The developer implemented five key strategies, which were as follows:

- Reduction in water consumption (potable water) through the inclusion of AAAA rated water closets and waterless urinals with flow restrictors (maximum 5 credits achieved);
- Inclusion of water meters on major systems, which were then linked to the building management system to allow leak detection;
- Cooling tower that incorporates a 6-cycle system for various concentration;
- Inclusion of a water efficient irrigation system in and around the colonnade planting; and
- Efficient water fittings in order to reduce the flow of water to the sewer system.

Heating and Cooling

Heating and cooling systems have been designed to maximise the indoor environment. The building faces north to assist not only with lighting and heating during winter, and architects have incorporated a highly efficient spectrally selective façade glazing with external shading to assist with cooling.

One of the main features of the building has been the inclusion of a passive chilled beam system, which allows the efficient cooling of offices areas. The cooling tower incorporates direct cooling, enabling the building to be efficiently cooled directly by the chilled beams circulating water through the cooling towers.

The thermal comfort levels is a Predicted Mean Vote within <-0.5 and +0.5 for 99% to 100% of the year.

Ventilation and Air Quality

The ventilation rate to City Central Tower 1 will be a 100% improvement on the Australian Standard. There will be a 100% fresh air supply with no re-cycled component.

The property incorporates a dedicated tenant exhaust riser to photocopy and print areas allowing the removal of indoor air pollutants.

Air quality is further improved by the use of low gassing finishes. CO2 reduction is in excess of the 5 Green Star rating by 20%.

Lighting and Daylight

The design of the floor plates is aimed at maximising the benefits of natural lighting. In this regard 30% of the net lettable area has a daylight factor in excess of 2.5% (the daylight factor characterises the amount of daylight available in a space and is calculated under overcast sky conditions. It is defined as the percentage of the

luminance from the sky outdoors available at a point in a room. The luminance is specified as the horizontal luminance. If the horizontal luminance outdoors is 7000 lux, then a 2.5% daylight factor will give 175 lux at the point concerned).

In addition, lighting comfort levels are further augmented by the use of high frequency ballasts, low energy T5 fluorescent lighting with 2w/m². The lighting is further enhanced by allowing occupant control with dimmable ballast zones of no more than 100m².

External shading has also been incorporated, together with spectrally selective glazing to the façade. The building complies with AS4282-1997 (not disbursing any external light upward).

Waste Management

The careful management of the development has resulted in 60% of the construction waste being diverted from land fill.

The contractors' implementation of an Environmental Management Plan (EMP), together with their accreditation under ISO 14001, has ensured effective environmental management of the site.

The building's user's guide also assists tenants in utilising recycling facilities for office waste.

FINISHES

Finishes and Furnishings

The building's carpets, adhesives, sealants and wood products minimise risks from VOCs. Refrigerants and thermal insulation have zero ozone depleting potential.

Equipment

The building design integrates over 30% of the building with a shell and core fitout.

OCCUPANT CONSIDERATIONS

Transportation

The site is located within 100 metres of public bus services, 800 metres of train services and 100 metres of public parking facilities.

Occupant Health

The Commonwealth Property Office Fund will be encouraging the South Australian Government over the ensuing 18 to 24 months to develop appropriate measures that will be used to monitor occupant health.

With improvements in acoustic levels and lighting, reduction in pollutants and improvements in IEQ, the owners are looking forward to developing measures to track the asset's performance.

Awareness Program

City Central Tower 1 achieved 90% of the management credits available in the Green Star Rating process. This was achieved through a number of initiatives including:

- Extensive commissioning, building tuning, and handover to the building owner via the use of an independent commissioning agent; and
- Preparation and development of a building user's guide to facilitate use of the building to its designed potential.

Behaviour Control

The South Australian Government has written performance measures into their lease, with the onus on the building manager to meet them.

VALUATION REVIEW

Owner Type

The building is owned as an investment by the Commonwealth Property Office Fund

Valuation Firm

Knight Frank.

Valuation Figure & Date

Market Valuation

Independent Valuation:
$135,800,000 (Upon Completion)

Date of Valuation:
December 2004

Accounting Valuation:

Book Value: $78,000,000

Book Date: June 2006

Development Cost:

Estimated Total Construction Cost: $115,000,000 or $3,195 per square metre of GLA (Source: Adelaide City Council)

THE CAREFUL MANAGEMENT OF THE DEVELOPMENT HAS RESULTED IN 60% OF THE CONSTRUCTION WASTE BEING DIVERTED FROM LAND FILL.

Methods of Valuation

Income Capitalisation Approach

The primary approach to the valuation was the Income Capitalisation approach. Estimated Initial Yield Adopted: 7.60%

Purchase Price: $142,000,000

Discounted Cash Flow

The valuer has used DCF as a supplementary approach to the Income Capitalisation method.

The key DCF assumptions were as follows:

Net Lettable Area: 31,292 square metres

Car Spaces: 165 Spaces

Terminal Yield: 8.00%

Discount Rate: 9.50%

The property was purchased off plan by the Commonwealth Property Office Fund in late 2004. The deal was made with the Caversham Property Group with an income guarantee.

Sales Comparison

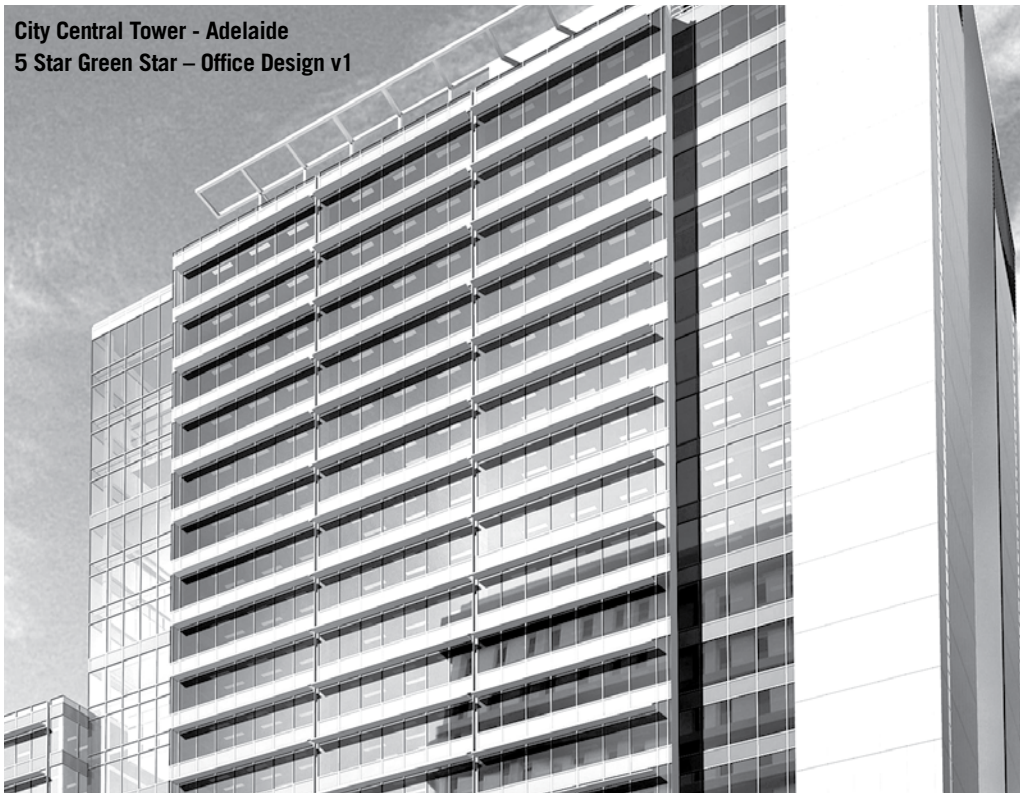
The valuer used sales comparison via a rate per square metre as a check method.

In determining a rate per square metre the valuer has relied upon comparable sales throughout Adelaide. The comparable utilised were primarily A-grade properties in the local market, although there was one older Premium grade sale. A Grade and Premium Grade sales in other capital cities were also considered. Allowances were made for the fact that the property is one of the first Green Star premises in South Australia.

Can such barriers facing valuers be removed or altered?

Valuers need to continue to educate themselves. This is not only in regard to understanding the intricacies of Green Star buildings but also in terms of the marketplace. In an ideal world the Green Star rating would be as important as the Property Council of Australia's building rating. The recent inclusion of Green Star in the PCA's rating tool will assist in influencing barriers.

"Education is critical…… the Australian marketplace is becoming national…… Commercial yields across States have merged and are more in line with one another…… this indicates buyers are focused on returns associated with cash flows rather than risks associated with real estate." – project participant.



City Central Tower - Adelaide
5 Star Green Star – Office Design v1

Flinders Link – 5 Star Green Star – Office Design v1

FLINDERS LINK CASE STUDY

Flinders Link, Flinders Street, Adelaide, South Australia

Address	70-80 Flinders Street, Adelaide, South Australia
Gross Building Area	14,700 square metres
Net Lettable Area	12,100 square metres
Site Area	3,800 square metres
Completion	July 2006
Owner/Developer /Construction Manager	Flinders Link Pty Limited
Book Value (Range)	$50,000,000
Book Date	December 2004
Construction Costs	$50,000,000 or $3,401 per square meter of GLA
Date of Interview(s)	3rd August 2006
Interviewer	John Wills, Director, The Property Lab
Interviewee(s)	George Ochota, Business Development Manager, Hindmarsh Group
Interviewer	Morry Canala, Manager, Hindmarsh Group
Interviewee(s)	John Dillon – Senior Portfolio Manager, Property and Alternative Investments, Colonial First State Greg Johnson – Manager, Corporate Sustainability, Colonial First State Alex Smithson – Director, Knight Frank Valuations Che Wall – Joint Managing Director, Lincolne Scott

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

IAG consider themselves to be at the forefront of sustainability. As such they had specific requirements for their space and various guidelines to ensure that the desired 'green' culture is achieved. Flinders Link applied the guidelines, which included achieving a Green Star Rating.

The implementation team

Owner	Flinders Link Pty Limted
Financier	Bank of South Australia
Developer	Flinders Link Pty Limted
Construction Manager /General Contractor	Hindmarsh
Development Consultants	Realty Solutions
Architects	Hassell
Engineering Consultants	Bestec
Structural Engineers	Wallbridge and Gilbert
Environmental Engineers	Sustainable Built Environments
Surveyor	Henning and Company
Acoustics	Vipac
Sustainability Consultant	Cundall
Quantity Surveyor	Curry and Brown
Planner	Hassell Planning
Landscape	Hassell
Legal	Thampson & Playford
Tenants	Insurance Australia Group

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

IAG consider themselves to be at the forefront of sustainability. As such they had specific requirements for their space and various guidelines to ensure that the desired 'green' culture is achieved. Flinders Link applied the guidelines, which included achieving a Green Star Rating.

Green Recognition

Flinders Link was the first 5 Green Star development completed and occupied in Adelaide. The current occupant has also applied for Green Star recognition for the adopted fit-out.

INHERENT PROPERTY DETAILS

Site/Location

The property is situated on the northern side of Flinders Street, on the corner of Freeman's Lane, directly opposite Divot Place. This location is in the core of Adelaide's CBD.

Site Design

The site formerly comprised a two to three storey YMCA premises and motor sales yard.

Positioning onsite affords the building a southerly aspect. In order to gain greater efficiencies in floor plate usage the development incorporates the use of community title over part of the adjoining allotment, for the upper two floors. This not only allows the floor plate area to be extended from approximately 1,500 sqm to 3,500 but also allows the incorporation of terrace areas to make better use of natural light, ventilation and aspect.

BUILDING DESIGN

Building Envelope and Structural Design

One of the key features of the building is its steel-framed high tensile structure, which not only reduced costs, but allowed an effective design on a difficult site. The steel frame structure is further augmented with concrete filled circular columns to allow for further strength.

The internal support walls are concrete sheer walls again to allow for strength. The external walls are aluminium-glazed units with hard-court Pilkington evergreen glazing (a high performance glass). The car park has lateral bracing.

Strength considerations in the development were crucial as Adelaide is required to allow capacity for seismic loads.

Materials and Resources

In the initial demolition a recycling rate of 97% was achieved. Much thought was given to the selection of materials, with maximum recycled content and minimum VOCs used.

Mechanical Systems

Mechanical systems for cooling and heating are standard. However the developer sought a fire-engineered solution. An analytical study was carried out by the Victorian University of Technology that resulted in the use of steel. The property is fully sprinklered, with two separate supplies of water and no fire tanks on the roof.

Plumbing and Water

Four water-saving and cleaning systems were incorporated into Flinders Link:

- Waterless urinals;
- Flow restrictors;
- Ionic roof drainage; and
- The filtering of all water prior to release into the storm water system.

Heating and Cooling

Gas fire boilers are used for heating, and solar power energy is supplied for domestic hot water use. The air conditioning system is zoned to allow for individual tenant control.

Ventilation and Air Quality

The development exceeds requirements of the BCA in regard to air quality.

The building is monitored constantly for CO2 levels and regulated by fresh air inputs controlled by the building management system.

The upper two levels of the building open onto northerly facing balconies, which allows the air-conditioning system to be augmented with natural air flow.

Lighting and Daylight

With the main aspect of the building facing south, the ability to incorporate natural light was limited. The exception was the upper two floors, which extend over a larger area and allowed the incorporation of balconies, affording significant use of natural light.

Throughout the remainder of the building, carefully placed T5 fluorescent light reduce energy use. The building management system also allows for tenant by tenant control.

Solar Design

While the building has a southerly aspect it has been designed to maximise the daylight and increase solar gain in winter.

Waste Management

The owners of the building have developed a waste management plan that incorporates floor-by-floor recycling facilities, with a large ground floor collection area. The removal of recycled materials has been outsourced to a waste management company.

FINISHES

Finishes and Furnishings

The use of polyvinyl chloride (PVC) pipes was kept to a minimum.

Water-based paints with a 1-hour fire rating, were sprayed on site to minimise risks from VOCs. VOC-free adhesives and paints are used throughout the building.

Equipment and Appliances

The tenant is providing fit-out, which will be guided by IAG's desire to reduce electricity demand and minimise the use of toxic materials.

OCCUPANT CONSIDERATIONS

Transportation

Employees at IAG are actively encouraged to use public transport and bicycles, both to reduce harmful emissions and to lower operating costs by reducing reliance on parking. Ample bicycle parking is provided.

Occupant Health

Unfortunately the developer does not have access to the records held by IAG, however the feedback that has been received suggests that productivity has increased.

The owners indicated that they would not be surprised if an increase in productivity of between 10% and 40% were achieved. This is based upon past experience with efficient and effective fit-outs. Such a percentage excludes additional impacts from "Green Star" rated projects.

Tenant Awareness Program

The owner has created a tenant awareness program as part of the implementation of the building management system "Grazer".

"Grazer" software allows building owners and managers to keep tight registration between source data and changes to the building. It does this by linking CAD drawings to relevant information - be it equipment, manuals, monitoring reports, etc. Grazer's interface allows managers and operational staff to 'drill down' and find appropriate construction and maintenance information.

The owners have granted tenants access to a "Building User's Guide". This explains to tenants how to alter the environment for comfort levels. It also provides links to live sites for enquirieis and troubleshooting.

VALUATION REVIEW

The property is yet to be valued independently.

Owner Type

The building is owned by the developer.

Valuation Figure & Date

Accounting Valuation:

Book Value: $50,000,000

Book Date: December 2004

Development Cost:

Total Construction Cost: $50,000,000

Practical Completion: July 2006

THE USE OF POLYVINYL CHLORIDE (PVC) PIPES WAS KEPT TO A MINIMUM.

Green Square– 5 Star Green Star – Office Design v2

GREEN SQUARE (SOUTH) CASE STUDY

Green Square (South Tower), St Pauls Terrace, Brisbane, Queensland

Address	South Tower, Corner of St Paul's Terrace and Constance Street, Brisbane, QLD
Gross Building Area	19,385 square metres
Net Lettable Area	16,477 square metres - TOTAL (South Tower)
Site Area	16,120 square metres Commercial
Completion	357 square metres Retail
Owner	6,426 square metres (Applicable to South Tower)
Valuation	August 2007
Valuation Date	ISPT
Construction Costs	$121,000,000
Date of Interview(s)	August 2007
Interviewer	$61,600,000
Interviewee(s)	16th August 2006, 16th October 2006 and 2 November 2006. John Wills, Director, The Property Lab Andrew Borger, Development Manager, Leighton Properties Tom Sherborne, Property Investment Manager, ISPT Philip Willington, Associate Director, Knight Frank Valuations

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

Brisbane City Council placed a tender for the master development of the Green Square site, which included the development of a 5 Green Star Commercial office building for occupation by Brisbane City Council.

Key issues for Council included:

- Facilities that would be in line with Councils "Vision 2010";
- Minimising the risk and cost of ownership verses leasing;
- The ability to control the administrative accommodation location;
- The ability to know with certainty (from a budget perspective) the financial implications (capital costs and long term recurrent costs);
- To ensure that any move included a smooth transition for staff, and that productivity was improved;
- That there be no reduction or improvement in the Council's credit/debt profile (Standard and Poors Rating); and

- To meet the Urban Renewal guidelines for Fortitude Valley.

Leightons were successful in complying with the tender. The Green Square master planned development incorporates five buildings on two hectares of land.
The site includes:

- Up to 19,986m² of office spaces over eleven levels, 646m² of retail space, a rooftop terrace area and basement car parks (North Tower);
- 16,980m² of office space over five levels, 360m² of retail space with adjacent plaza area and two levels of basement car parking (South Tower;
- 2,500m² high tech utility building (accommodating four Brisbane City Council departments);
- Community centre and proposed childcare facility to be managed by Brisbane City Council;
- Vacant site for future affordable housing development through Brisbane Housing Company; and
- Green 'pocket park' and retail plaza.

This case study focuses on the South Tower, which is fully let to Brisbane City Council

The implementation team

Owner	ISPT
Financier	ISPT
Developer	Leightons
Construction Manager /General Contractor	Leightons
Architects	Cox Rayner
Structural Engineers	The Robert Bird Group
Electrical Engineers	Norman Disney & Young & Lincolne Scott
Mechanical Engineers	George Floth Pty Ltd
Civil Engineers	The Robert Bird Group
Hydraulic Engineers	Bassett Consulting Engineers
Acoustics	Bassett Acoustics
Façade Technology	Meinhardt
Landscaping	Edaw Gillespies
Surveyor	Certis
Quantity Surveyor	Rider Hunt
Valuer	Knight Frank
Tenants	Brisbane City Council

Green Recognition

The Green Square development in Brisbane comprises of two commercial office towers. The south tower, the Brisbane City Council tower has received 5 Green Star for Office Design Certification. Application for assessment of the north tower has recently been applied for.

Green Square has also achieved a rating of 4.5 stars under the Australian Building Greenhouse Rating Scheme.

Barriers to Understanding Green

The main barriers to 'Green' development revolve around the building and communication processes. Environmental initiatives need to be balanced with the overall aim of the project. How decisions impact the entire team, for example contractual implications at lower levels, needs to be considered. There were also conflicts between the optimum solution and the initial brief placed forward by Brisbane City Council.

Suggestions to make it easier to understand Green

Leightons consider the Queensland market to be considerably behind that of New South Wales and Victoria when it comes to sustainable building. The development team at Leightons saw the opportunity to create a differentiator in the marketplace by adopting "Green Star" practices, using the Green Square development as the catalyst.

Leightons adopted an educational approach, taking time to inform those who had not worked in the area before.

Green Square rain water tank

HOW DECISIONS IMPACT THE ENTIRE TEAM, FOR EXAMPLE CONTRACTUAL IMPLICATIONS AT LOWER LEVELS, NEEDS TO BE CONSIDERED.

INHERENT PROPERTY DETAILS

Site/Location

Green Square is located on the corner of St Paul's Terrace and the northern side of Constance Street, in Fortitude Valley. Fortitude valley is a fringe city suburb, approximately 2 kilometres north of Brisbane's CBD.

Site Design

For almost fifteen years, Urban Renewal Brisbane has planned and facilitated development in Fortitude Valley. Green Square is a significant step forward in Brisbane City Council's ongoing implementation of its Urban Renewal Plan. The site was a 'brownfield' site. The major constraints were mainly dictated by design and included:

- Desire for a low rise development;
- Desire for a campus style development;
- Desire for maximum natural light maximum in a number of areas; and
- The desire for an "H" shaped development.

The resulting design of the "H" shaped campus style delivered floor plates in the

order of 4,500 square metres, the largest floor plates in Brisbane. The building includes 16,980m² of office space over five levels, 360m² of retail space with adjacent plaza area and two levels of basement car parking.

Due to the building's location on the city's fringe, substantial parking allowances were made, and approximately 355 car spaces are being provided.

BUILDING DESIGN

Building Envelope and Structural Design

The floor system comprises concrete slab at basement level and suspended concrete slab on the upper floors. The building frame consists of structural steel columns and beams supported on concrete bases. The building façade has been finished with 3,000mm floor to ceiling perimeter glass on all exterior surfaces to optimise natural light.

Materials and Resources

During construction approximately 60% of construction waste material, by weight recycled or reused. 100% of timber is to either be reused, recycled or from certified sustainable sources.

There will be a high use of recycled material in construction including:

- Cement replacement in concrete mixes
- 20% recycled aggregate; and
- 60% of steel with recycled content of at least 50%.

Mechanical Systems

The electrical, hydraulic and mechanical plans and equipment were specifically designed and selected in order to achieve energy, water, emissions and IEQ requirements under the Green Star Rating System.

Plumbing and Water

The project has incorporated significant initiatives to ensure predicted potable water consumption is significantly reduced through the selection of efficient fixtures/fittings and rainwater harvesting.

All fixtures and fittings have been selected with a minimum 4A water conservation rating, with many having a 5A rating.

Rainwater from the roof is harvested through syphonic drainage down to a 90,000 litre tank located underground at the car park entry. This water is then used for irrigation and toilet flushing to reduce the amount of potable water used by the building.

Water meters will be installed to monitor all major consumption. The meters will be linked to the Building Management System (BMS) to provide a leak detection system.

Landscape irrigation requirements have been kept to a minimum. Where it is required, 100% of the water required will be sourced from the rainwater collection tank.

The use of air cooled chillers in lieu of water cooled chillers further reduces potential water consumption.

A fire protection water re-use system has also been included to facilitate the collection of water from testing and maintenance drain-downs.

The above initiatives collectively are expected to save 1.7 megalitres of water each year.

Heating and Cooling

The "H" shape low rise design of the building coupled with the location of the building allows the maximisation of natural heating and cooling. This is augmented by a number of design features, for example:

- Night purge to reduce the air conditioning load;
- Separate air handling units for each façade and interior zone to eliminate reheat and maximise "economizer" operation;
- The isolation of un-occupied areas to prevent the air conditioning of these areas; and
- A dedicated tenant exhaust rise

The impacts of lighting have also been built into the buildings heating and cooling systems. Superior thermal comfort of Predicted Mean Vote within -0.5 and +0.5

Ventilation and Air Quality

The property incorporates a dedicated tenant exhaust riser coupled with constant carbon dioxide monitoring and control. This ensures the internal air quality meets Australian Standards.

Indoor air quality is further improved by the use of low-emission formaldehyde products, low-VOC finishes and zero ozone depleting refrigerants and insulants.

ALL FIXTURES AND FITTINGS HAVE BEEN SELECTED WITH A MINIMUM 4A WATER CONSERVATION RATING, WITH MANY HAVING A 5A RATING.

Lighting and Daylight

The "H" shape of the building enables a large portion of the work areas to be situated along a perimeter, thereby affording natural light.

Lighting initiatives have been incorporated, for example:

- The perimeter lighting is switched separately to take advantage of the good natural light from the façade;
- Energy efficient T5 lamps are used for the office lighting;
- Lights are installed on 3000 x 2400 grid, rather than traditional 2400 x 2400 grid, whilst providing illumination and glare control that exceed the requirements of Australian Standards;
- Electric lighting density of less than 2 W/m² per 100 lux; and
- Lighting to the amenities and the after hours car park are operated by motion sensors.

Solar Design

The shape of the building, together with its north-east to south-west orientation, maximises daylight and increases solar gain in winter for heating of the building.

Landscaping

Appropriate native plants have been selected.

Waste Management

The building has dedicated recycling areas, and the owners have incorporated a comprehensive environmental and waste management plan. These plans are estimated to ensure an 80% diversion from landfill.

FINISHES

Finishes and Furnishings

Paints, carpets and sealants were chosen to minimise risks from VOCs and improve air quality.

Equipment

Approximately 75% of the fit-out has been integrated into the development.

OCCUPANT CONSIDERATIONS

Transportation

The site is located within 250m of public transport and a public car park.

The continuation of Alfred Street provides vehicle access to the site and easy pedestrian access to Brunswick Street Railway Station and the Valley Metro Retail Centre. Access will be further enhanced by the completion of North South Bypass Tunnel.

Other provisions include parking for 355 cars, cyclist facilities (secure bicycle storage, changing rooms, showers and lockers) for staff and visitor bicycle storage

Occupant Health

The Council will be preparing a workplace and production report and will be gathering data over the ensuing 12 to 24 months post occupation.

Awareness Program

A building user's guide that covers the use of systems in the building together with expectations in regard to recycling has been provided.

VALUATION REVIEW

Owner Type

The building is owned as an investment property by Industry Superannuation Property Trust.

Valuation Firm

Knight Frank.

Valuation Figure & Date

Market Valuation

Independent Valuation:
$121,000,000

Date of Valuation:
As if complete as at August 2007

Development Cost:

Total Construction Cost:
$61,600,000 or $3,178
per square metre of GLA

The South Tower leased by Brisbane City Council is on a 20 year net lease with fixed annual rent reviews of 4% per annum.

Methods of Valuation

Discounted Cash Flow

The valuer has used DCF as the primary method. The income flows in the DCF were stable due to the fixed 4% pa market rent review structure, which extends well in excess of the Australia Property Institute's guidelines.

Income Capitalisation Approach

The Income Capitalisation method was used as a secondary approach.

Initial Yield Adopted: 6.0%

Purchase Price: $121,000,000

Income: $7,300,928

The adopted yield was obtained through analysis from comparable evidence in the market place. In this regard the valuer has relied upon sales occurring primarily in the Brisbane CBD market place.

Sales Comparison

The valuer used the sales comparison method via a rate per square metre as a check method to support the previous methods.

However, there are no comparable sales of any other properties in the Brisbane "fringe" suburbs which support the adopted value. Green Sqaure provides the first evidence of a new generation of rents for this class of property, and the long term lease to the Brisbane City Council justifies a "firmer" yield than would otherwise apply to a building in this location.

CH2 CASE STUDY

Council House 2, Little Collins Street Melbourne, Victoria

Address	CH2, Little Collins Street, Melbourne, VIC
Gross Building Area	12,536 square metres
Net Lettable Area	9,373 square metres
Completion	October 2006 (Occupied)
Owner	Melbourne City Council
Book Value (Range)	$51,045,000 (excluding fit-out)
Book Date	30 June 2006
Construction Costs	$51,045,000 equating to $4,072 per square metre of GLA
Date of Interview(s)	28th October 2006
Interviewer	John Wills, Director, The Property Lab
Interviewee(s)	Shane Power, Manager – Major Project Delivery, Melbourne City Council

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

Sustainability represents one of the core policies of Melbourne City Council.
The Melbourne 2020 program (the long term strategic plan for Melbourne) targets zero net emissions, ending the city's contribution to greenhouse gases and reducing the city's mains water consumption by 12%. It is important that those premises that are occupied by Council are working toward these outcomes, and CH2 therefore became a function of targets as set in the long term plan.

The brief to the project team encompassed the following principles:

- The asset is to reinforce the Melbourne 2020 plan;
- Movement toward being greenhouse neutral;
- The project is to be a lighthouse or demonstration project;
- The result should improve employee wellbeing; and
- Analogous solutions for industry transfer.

Melbourne City Council used the Green Building Council of Australia's benchmark tool to drive the project. The 6 Green Star asset reflects the Council's commitment to be a leader in sustainability. So strong is the belief in reaching its targets that Melbourne City Council used its own funds to finance the project. By the end of the project the estimated cost of sustainable features (extracted from the base building asset) totalled $11.3 million dollars. Based on projected savings in regard to energy, water, effectiveness and occupant wellbeing, total savings per annum were calculated at $1.45 million dollars per annum, representing a payback in the vicinity of 8 years.

The implementation team

Owner	Melbourne City Council
Financier	Melbourne City Council
Developer	Melbourne City Council
Construction Manager /General Contractor	Hansen Yuncken
Project Manager	Melbourne City Council
Architects	Mick Pearce (CoM) and DesignInc
Sustainability Advisors	Advanced Environmental Consulting (AEC)
Structural Engineers	Bonacci Group
Electrical Engineers	Lincolne Scott
Mechanical Engineers	Lincolne Scott
Civil Engineers	Bonacci Group
Hydraulic Engineers	Lincolne Scott
Commissioning Consultant	AEC
Facility Manager	Melbourne City Council
Property Manager	Melbourne City Council
Valuer	Not Applicable
Tenants	Melbourne City Council

Green Recognition

Council House 2 (CH2) has received 6 Green Star as Designed; a 'world leader' rating.

INHERENT PROPERTY DETAILS

Site/Location

Council House 2 (CH2) is located on the northern side Little Collins Street, approximately 50 metres east of its intersection with Swanston Street in Melbourne's CBD.

Site Design

CH2 is a 10 storey commercial office building that will house 540 council employees as well as incorporating retail outlets on the ground level. Prior to development the site was a car park. Besides the introduction of vegetation there is no impact on site ecology.

The focus was on maximising environmental outcomes through, for example, taking advantage of natural ventilation, using thermal stores, maximising solar access and maintaining visual connections.

"Our approach centres on how the built environment can become an extension of the natural world, rather than an adjunct to it. We don't separate good design from sustainable design. We see ourselves developing a more 'natural architecture' – we refer to it as a 'biological design process'." (Monument, 2006, p76).

BUILDING DESIGN

Building Envelope and Structural Design

The floor system comprises reinforced concrete slabs suspended to the upper levels. The ceilings comprise pre-fabricated innovative waved beams, and the building frame consists of reinforced columns and beams supported on concrete bases.

The building façade is finished in reinforced concrete, recycled timber, glazing vertical green shading and timber windows.

Materials and Resources

During construction approximately 80% of construction waste was reused or recycled.

During the construction process agreed waste and recycling targets were set and adhered to.

In this regard a careful balance was required between the use of recycled materials and Australian Standards. Recycled timber, steel and concrete were used where possible. For example, the structural concrete incorporates a minimum of 30% fly-ash content. 60% recycled steel was used for structural components (this had to be sourced from outside Australia to guarantee the recycled content). 90% of the timber used is either recycled or sustainably harvested and PVC use in hydraulics and electrical components has been eliminated.

Mechanical Systems

The mechanical systems can best be understood by looking at the following core systems:

- Cooling – (see under Heating and Cooling below).
- Energy Systems – four systems have been incorporated. These are photovoltaic cells, solar hot water panels and a gas–fired co-generated plant and wind powered turbines.
- Indoor air quality – two systems have been incorporated. These are vertical air ducts to deliver floor by floor air supply and a high level ceiling exhaust system to ensure that warm air is fully expelled from ceiling spaces.

Plumbing and Water

The water initiatives within CH2 are world leading. They include:

- A multiple water re-use system;
- Approximately 100,000 litres of black (toilet) water is extracted from the main sewer in Little Collins Street and CH2 and put through a multi water treatment plant along with any other water from the building. The treatment plant, together with rain water, will supply 100% of non-drinking water for water cooling, plant watering and toilet flushing needs;
- Sprinklered water reclaim and rainwater collection;
- AAAA rated fittings and fixtures to all taps and showers; and
- Solar hot water system for domestic services.

The result is that the CH2 will result in a 72% reduction in mains water consumption compared to the existing Council House of similar size.

Heating and Cooling

The building and its air-conditioning system are designed to store heat (for expulsion at night), so the major need for energy is for cooling. Cooling is achieved through the use of:

- Exhaust System - High level ceiling exhaust ensures complete emptying of warm air in ceiling spaces;
- Chilled Ceiling Panels - Ceilings panels overhead circulate chilled water removing heat from the floor. The naturally heated water is then stored in basement until night when it is sent to the ceiling for cooling at night;
- Shower Towers - Air and water falls to provide cool water for part of building reticulation and removal of heat;

- Thermal Mass through the use of Vaulted Ceilings - Heat build up in the concrete ceilings from the days activities is removed by the cool night air;
- Night Purge - During the night purge windows automatically open – to flush the heat out of concrete slabs;
- Vertical Planting and Shading – Provides horizontal shading from northern sun;
- Timber Shutters - Operable, vertical timber shutters provide full summer shading while still allowing filtered daylight and views;
- Summer Terrace - Edge space for thermal buffer, social interaction and vertical circulation;
- Water Pipes - Floor mounted heated water pipes draw in cool air and heat - providing rising current up face of glass. The perimeter is of the building is used control the heating and cool levels in the building. Hydraulic heating and chilled beams used to create heat gain or loss.

Ventilation and Air Quality

Instead of supplying the office spaces with the 85% re-circulated air in typical variable air volume air conditioning systems for office buildings, CH2 does not recycle any air. All the air supplied to the office spaces is 100% filtered fresh air drawn from roof level, supplied via the south ducts and exhausted via the north ducts. This is integrated with the heating and cooling features described above and includes:

- Exhaust - High level exhaust exit ensures complete emptying of warm air in ceiling spaces. The exhaust plenum is at a slightly negative pressure, induced by north flues'.
- Undulating Ceiling Line – The primary reason is to create a naturally forming duct and a greater surface area allowing a high point for windows and a temperature gradient;
- Displacement Air - Boundary layer created by displacement air supply. Occupant and equipment heat plumes;
- Floor Diffusers - Floor mounted, user controlled air diffusers with 'twist' outlets, encourages air to mix, improving circulation; and
- Healthy Air - 100% outside air supply to sealed access floor plenum. Occupants have the ability to alter such vents that can be moved to suit occupancy layout.

C02 levels are constantly monitored, and fresh air is supplied accordingly, in quantities 3 times the Australian Standard. Indoor air quality is improved through the use of low level of indoor air pollutants such as low off-gassing carpets, adhesives, sealants, and composite wood products.

Lighting and Daylight

The lower floors receive less daylight than the upper floors, so windows on the north and south facades are larger on the lower floors than the upper. Such an approach allows the total amount of glass to be minimised, which reduces energy loss while maintaining desirable natural light levels. Shading to control sun and glare were used on the north, east and west facades to allow occupants to control glare and lighting levels.

Natural daylight was augmented with the incorporation of a low energy T5 lighting system with small area zoning (no larger than 100m²). The high frequency ballasts achieve lighting power density of less than 2.5 Watts/m2 per 100 lux. Light levels are kept to 320 lux.

Solar Design

The long sides of the building are oriented to the north and south. This not only maximises the daylight as described above but also increases solar gain in winter for heating of the building.

An array of rooftop solar collectors provides heating for domestic water services. The solar panels provide 60% of the hot water supply normally supplied by the cogeneration plant.

The inclusion of photovoltaic cells also provides additional energy to. For example photovoltaic cells on the roof generate 3.5kW of energy, enough to power the wooden louvres on the western façade.

Landscaping

Breakout balconies, winter gardens and roof tops are extensively landscaped. Recycled water is used in vertical gardens running the full height of the northern façade. The vertical gardens also assist with shading and glare.

Plants are grown from recycled plastic self-watering planter boxes built into the balconies on every storey.

C02 LEVELS ARE CONSTANTLY MONITORED, AND FRESH AIR IS SUPPLIED ACCORDINGLY, IN QUANTITIES 3 TIMES THE AUSTRALIAN STANDARD.

Waste Management

An Environmental Management Plan was required at tender stage, and the contractor was required to be certified to ISO 14001 Standard. Extensive waste storage areas are provided to facilitate waste separation and recycling of office waste. A waste management program has also been incorporated into the building user's guide.

FINISHES

Finishes and Furnishings

Low VOC products are used, where possible, in paint finishes, laminates and woods to improve the air quality within the development. Refrigerants utilised have zero Ozone Depleting Potential (ODP).

The majority of the fit-out has been integrated into the base building design, which assisted in quickening the development process.

Equipment

The equipment used included desk by desk lighting control, low emission computers screens and recycled component office fit-out.

OCCUPANT CONSIDERATIONS

Transportation

The building's location in the core of Melbourne's CBD affords significant public transport access. In addition, CH2 provides bicycle parking for 10% of staff (80 storage spaces), together with shower facilities. There are also visitor bicycle parking facilities near the front entrance.

Twenty two car parking spaces have been provided in the basement area, and 25% of these spaces are allocated for small cars only.

Occupant Health

CH2 is a healthy building, with clean, fresh air and non-toxic finishes, helping staff stay healthy, alert and effective at work. Physical and visual access to nature is encouraged by providing shared edge spaces for social interaction or private escape.

The improvement of productivity and health is targeted through:

- Overall design;
- Landscape planting;
- Shared space;
- Glare control;
- Air quality; and
- The creation of micro climates.

80% of office occupants will have access to views and, based on the Council's modelling, productivity increases of around 4.9% are expected.

"The occupancy health is becoming the core the driver of green buildings over items such as energy savings…." – Shane Power, Manager Major Project Deliver, City Of Melbourne.

Awareness Program

A building user's guide has been prepared to inform occupants of the building's environmental features and to ensure achievement of the original design intent.

VALUATION REVIEW

The property is yet to be valued independently

Owner Type

The building is owner occupied.

Accounting Valuation:

Book Value: $51,045,000
Book Date: 30 June 2006

Development Cost:

Total Construction Cost: $51,045,000 or $4,072 per square metre of GLA

Practical Completion: July 2006

Bordo International
5 Star Green Star – Office Design v1

BORDO CASE STUDY

Bordo International, Lot 3 Kingston Park, Scoresby, Victoria

Address	Lot 3, Kingston Park Circuit, Scoresby, Victoria
Gross Building Area	2,696 square metres
Net Lettable Area	616 square metres office
Completion	2,080 square metres warehouse
Owner/Developer /Construction Manager	2004
Book Value	Kingston Property Construction Pty Limited
Book Date	$2,051,000
Construction Costs	30 June 2006
Date of Interview(s)	$2,051,000 equating to $760.76 per square metre
Interviewer	3rd August 2006
Interviewee(s)	John Wills, Director, The Property Lab
	Cameron Brown, Marketing Director, Bordo International Pty Limited

SUSTAINABLE MOTIVE & RECOGNITION

Rationale for Green Building

The decision to embrace sustainability was made easier by the opportunity to participate in the COBEII project (a Victorian Government funded initiative) and to gain financial support for consultant costs. The target however was a building that was better for staff and for the environment.

The implementation team

Owner	Bordo Inernational Pty Limited
Financier	ANZ
Developer	Kingston Property Construction Pty Limited
Construction Manager /General Contractor	Kingston Property Construction Pty Limited
Development Consultants	Kingston Property Construction Pty Limited
Architects	Kingston Property Construction Pty Limited
Environmental Engineers	Sustainable Built Environments
Tenants	Owner Occupied

Green Recognition

The Bordo International headquarters is the first office space in an industrial building to receive a 5 Green Star rating. The building has also received the 2004 Knox Pride Award, a local community award.

Barriers to Understanding Green

Bordo observed that the market perception persists that Green Star buildings cost more and have a long pay-back. While they expected higher costs at the start of the project, their experience was the opposite. They found that the savings and benefits far outweigh any minor cost increases. In addition careful planning and management of the project ensues that the payback period is within a short time frame.

Suggestions to make it easier to understand Green

"We were all amazed at how simple things could make a great difference to the energy usage of the building. By partnering with Sustainability Victoria and engaging consultants Sustainable Built Environments, it became apparent that there were main design elements that could be incorporated into the building design for little or no extra cost. Smart design and planning upfront was the answer. By taking advantage of the skill base within the consultant environment is regard to Green Star developers stand to gain considerable advantage for their buildings."
– project participant.

INHERENT PROPERTY DETAILS

Site/Location

Lot 3 is situated on the northern side of Kingston Park Circuit. Scoresby is primarily an industrial suburb situated in the Eastern suburbs of Melbourne.

Site Design

Prior to the development of Lot 3 the site was previously an older style industrial development.

The new building design incorporated simple and cost effective measures such as the use of good orientation and a narrow floor plate, internal thermal mass, natural light and ventilation, solar heating and rainwater collection.

The design was changed from the standard, single office/warehouse block to create two buildings. The long sides were oriented to the north and south to maximise the daylight and increase solar gain in winter. The narrow footprint allows the cross flow of natural ventilation (refer Figure 1).

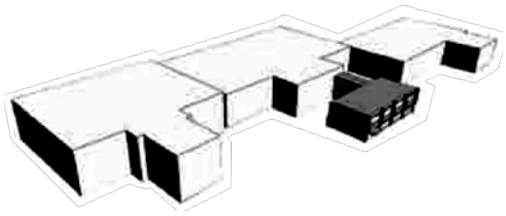


Figure 3: Bordo office separated from warehouse (centre), as opposed to adjoining properties.

BUILDING DESIGN

Building Envelope and Structural Design

The building's foundation is slab on grade and the external walls are prefabricated concrete. The solid spandrel panels below windows to the ground and first levels on the north and south façades provide considerable thermal benefit and moderate temperatures in extreme weather.

Materials and Resources

The 750 mm spandrel high panels are constructed from 6mm external glazing, 80 mm glasswool, 110 mm brickwork and 5 mm hard plaster. The appearance of the spandrels externally is consistent with the glazed façade, while the insulation and internal exposed thermal mass provides for greater thermal control.

Super-insulated ceilings with an R-value of 9.0 reduce the amount of heat penetration. This increased resistance to the flow of heat reduces the amount of room temperature rise on hot days and the rate of heat loss during the cold periods.

Mechanical Systems

A core feature of the development is the split system air conditioning. The system was imported from Malaysia, comprises 3 chillers and is run by patented non-CFC gases. There is also a standard fire system in the building, which is sprinklered throughout.

Plumbing and Water

An electric solar hot water system has been installed as there is no mains gas supply in the area. The solar system acts as a pre-heat to the electric boiler, which provides domestic hot water for the office. The system operates using a thermosiphon system that does not require any heating pump energy.

A 15,000 litre underground water tank has been incorporated that collects and stores sufficient rainwater from the roof to supply 90% of the water for landscape irrigation and toilet flushing.

Heating and Cooling

The natural ventilation system is supplemented by air-cooled reverse-cycle mini-chiller units, connected to internally located two pipe ceiling cassette units.

The mini-chillers are designed to use hydrocarbon refrigerant to heat and cool the building. This refrigerant has a 15% higher cooling efficiency than conventional HFC refrigerants. It saves approximately 6.5 tonnes of CO2 pollution annually compared to 1600–5000 for HFCs.

Ventilation and Air Quality

The narrow footprint allows the cross flow of natural ventilation. Manually opening windows are provided to the long north and south façades for cross-flow ventilation. The windows are top-hung and winder-operated, providing a good level of air flow but minimising the chance of wind disturbing the work space.

Lighting and Daylight

Carefully spaced T5 fluoro-incandescent lights with high specification diffusion units have reduced the lighting energy use of the building. Due to the increased natural lighting levels, artificial lighting is often not needed in the perimeter offices.

Solar Design

The long sides were oriented to the north and south to maximise the daylight and increase solar gain in winter.

Landscaping

A landscaped courtyard area was developed between the office and warehouse sections of the property. This area not only contributes to the aesthetics of the development but also acts as a breakout area for staff. It is constantly used for staff meetings and as an area to retreat to at lunch time. The landscape courtyard is watered with water captured onsite.

Waste Management

The owners outsourced all waste functions to an external waste management company.

FINISHES

Finishes and Furnishings

The carpets chosen were in line with the Green Building Council of Australia's guidelines, and all sealants and paints were targeted to minimise risks from VOCs. Re-cycled timber door surrounds were used to reduce the amount of MDF within the development.

OCCUPANT CONSIDERATIONS

Transportation

There are Bus Transit links in close proximity to the building, and employees are encouraged to use public transport. Bicycle racks are also provided.

Occupant Health

There has been a huge increase in productivity levels at Bordo's new headquarters. The organisation has managed to increase output whilst operating at a facility that is seven times smaller than the previous headquarters.

VALUATION REVIEW

The property is yet to be valued independently.

Owner Type

The building is owner occupied.

Valuation Figure & Date

Accounting Valuation:

Book Value: $2,000,000
Book Date: 30 June 2006

Development Cost:

Total Construction Cost: $2,051,000
Practical Completion: 2004

THERE ARE BUS TRANSIT LINKS IN CLOSE PROXIMITY TO THE BUILDING, AND EMPLOYEES ARE ENCOURAGED TO USE PUBLIC TRANSPORT.

APPENDIX 3: GREEN INITIATIVES INCORPORATED TO ACHIEVE BENEFITS

This Appendix summarises the sustainable practices and features common to the properties in the case studies as well as some of the more innovative features of some of the individual case studies.

Building Design and Envelope

The building design and envelope relates to the placement of the asset on site, core structural components and façade.

Common practices across the case study properties included:

- Use of specialised glazing in part or all of the façade in all 8 of the case studies; and
- The use of steel columns in 5 of the 8 case studies;

Innovative designs included:

- Large floor plates for a campus-style outcome;
- Light-weight hollow core pre-cast concrete panels for ventilation;
- Customized fly-roof; and
- Innovative pre-fabricated waved ceiling beams.

Materials and Resources

Materials and resources relates to the type of materials utilised in the construction of the differing assets. In this regard the findings were as follows:

- Recycled timber, certified timber and /or sustainability harvested timber was utilised in 75% of the case studies;
- Cement replacements were used in 3 out of the 8 assets;
- Recycled materials were utilised in the steel in 3 out of the 8 assets; and
- A focus on the reduction of the use of PVC piping was considered with replacement materials such as copper, steel, concrete, clay and high density polyethylene (HDPE) being utilised in 3 out of the 8 assets.

The inclusion of innovative materials and resources in regard to the various case studies includes:

- The development of sophisticated remediation methods; and
- Inclusion of super efficient insulation.

Plumbing and Water

Plumbing and water relates to the technologies, process and practices utilised within the assets that limit the use of water and/or promote recycling.

- Flow restrictors and/or efficient fixtures and fittings were in all 8 of the assets;
- Rainwater capturing for supplemental use occurs within 6 of the 8 assets;
- Waterless urinals were installed in 5 of the 8 assets; and
- Leak detection systems are installed in 4 of the 8 assets.

Plumbing and water innovation includes:

- The inclusion of rooftop gardens for the harvesting of rainwater and the creation of breakout areas;
- Ionic roof drainage;
- Filtering of all water prior to storm water drain release;
- Hands free taps;
- Multi cycle systems for cooling towers;
- Multi water treatment plant;
- Inclusion of underground water storage tanks.

Heating & Cooling

Heating and cooling includes those systems and technologies included within a property that assist in heating and cooling tenancy areas.

- Use of specialised glazing in part or all of the façade in all 8 of the case studies
- Chilled beams are used in 4 of the 8 case studies;
- External and internal shading blinds and like are utilised in 4 of the 8 case studies;
- Multi zoned tenant controlled and occupant sensor are used in 3 of the 8 case studies;
- Use of naturally occurring thermal massing objects are used in 2 of the 8 case studies;
- The inclusion of a night purge system is utilised in 2 of the 8 case studies; and
- 2 of the 8 case studies include the use of sunrooms/winter gardens.

Innovative inclusions in regard to heating and cooling are as follows:

- The use of perimeter water pipes around the asset to assist in cooling;
- Hollow core slabs for ventilation and cooling;
- Solar chimneys;
- Separate air handling units for each façade and the interior zone;
- Dedicated tenant exhaust risers;
- High level ceiling exhausts and vaulted ceilings;
- Shower towers;
- Vertical planting for shading;
- Floor mounted heated water pipes for removal of heat an assist in drawing in cool air; and

- Specialised ceiling reverse cycle mini chiller units with ceiling cassette units.

Ventilation & Air Quality

Ventilation and air quality relates specifically to the internal air environment created and maintained within the asset.

Fresh air is constantly supplied to tenancy areas in all 8 of the case studies;

- The use of materials with low volatile organic compounds were utilised in 7 of the 8 case studies; and
- CO2 levels are constantly monitored in 4 of the 8 case study properties.

Innovative inclusions in regard to ventilation and air quality are as follows:

- The inclusion of indoor plants;
- Wind turbines;
- Careful placement of balconies on appropriate levels to assist in ventilation.

Lighting & Daylight

Lighting and daylight relates to those characteristics that assist in improving internal lighting conditions for tenancy areas.

- Use of specialised glazing in part or all of the façade in all 8 of the case studies
- All 8 of the case study properties provide T5 lighting;
- 7 out of 8 assets maximize natural lighting conditions by placement of the building on site and/or design of the building on site due to constraints;
- External and internal shading blinds and like are utilised in 4 of the 8 case studies
- 2 of the 8 assets provide perimeter sensors and/or switches that allow for increased or decreased lighting;

AEI Offices – 6 Star Green Star – Office Design v2

7 OUT OF 8 ASSETS MAXIMIZE NATURAL LIGHTING CONDITIONS BY PLACEMENT OF THE BUILDING ON SITE AND/OR DESIGN OF THE BUILDING ON SITE DUE TO CONSTRAINTS.

- 2 or the 8 assets provide lighting on a large grid providing a larger lighting spread.

Innovation as far a lighting and daylight is concerned includes:

- Motion light sensor to those areas not in constant use; and
- Inclusion mixed window sizes to allow for variety of lighting conditions of various levels.

Solar Design

Solar design relates to those initiatives that utilise the sun for benefit of the asset in any form.

- Where possible all buildings were oriented on site in order to increase desired solar access;
- 7 out of 8 assets maximise natural lighting conditions by placement of the building on site and/or design of the building on site due to constraints; and
- Roof top solar panels are used in 3 or the 8 property assets.

Innovative features include the following:

- Array of photovoltaic cells; and
- Solar towers for heat extraction and drawing in fresh air.

Landscaping

Landscaping relates to any landscaping features incorporated into the property.

- 2 out of the 8 assets incorporate roof top gardens;
- 5 out of the 8 assets were restricted as to the amount of landscaping due to site constraints.

Innovation in regard to landscaping within the assets is as follows:

- The inclusion of self-watering plants for internal tenancy areas;
- Vertical planting that affords shading, wind breaks and privacy.

Waste Management

Waste management refers to the waste management practices that were utilised on site at the time of construction and that are utilised on an ongoing basis in the day to day management of the asset.

- Waste management practices adopted throughout construction in 6 of the 8 assets resulted in a range of 60% to 97% of construction waste being diverted from land fill and/or either being recycled; and
- Waste management plan and building user guides are being utilised in 7 of the 8 assets.

Innovation in regard to waste management within the assets is as follows:

- A central waste sorting facility that services 7 other buildings.

Finishes

Finishes refer to the types finishes utilised in the build of the asset together with the types of fit out incorporated into the development.

- The use of materials with low volatile organic compounds were utilised in 7 of the 8 case studies;
- The use of materials with low volatile organic compounds were utilised in 7 of the 8 case studies;
- Where possible recycled material was utilised in the construction and/or office furniture placed in the building in 6 of the 8 assets;
- 5 out of the 8 assets have enabled the fit out to be partially integrated into the asset;

Innovation in regard to finishes is as follows:

- No PVC backing on carpets.

Transport

Transport includes access to public services together with the provision of parking and cycling storage.

- 7 out of the 8 asset are in proximity to public transport services;
- 5 out of the 8 assets provide bicycle storage; and
- 3 out of the 8 assets provide a portion of parking spaces dedicated to smaller cars and/or motorcycle parking.

Occupant Health

Occupancy health relate to those practice utilised to measure health and productivity improvement.

- 3 out of the 8 assets have modeled or ascertained productivity improvement due to 'green building'; and
- 3 out of the 8 assets are currently or are in the process of data gathering for the development of measures for productivity and health monitoring through post occupancy reviews.

Awareness Program

Relates specifically to those practices adopted for the education of tenants in regard to the 'green benefits' that can be obtained through correct usage of the asset.

- Building user guides have been prepared for use in 7 of the 8 assets; and

Extensive commissioning via independents were used in 5 out of the 8 assets allowing or the upfront education of users where possible.

APPENDIX 4: FINANCING THE GREEN BUILDING INDUSTRY

Financing the Green Building Industry By John Wills AAPI MIMC AIMM

Introduction

Unsurprisingly one of the major barriers faced by 'sustainable' developers is access to financiers who not only understand sustainability but recognize the inherent value associated with such development.

In order to gain an understanding of the issues surrounding the financing of sustainable development as it relates to property, this paper will provide an overview of the operational landscape in which property developers find themselves, discuss the typical difficulties developers face when trying to obtain financing, recognizing the flaws in current practice and look at a number of areas where financiers and the sustainable property development industry can wok together in order to meet each others needs, in order to move toward a win/win outcome for the financing of 'sustainable' property assets.

The Landscape

The simplest way to understand the role and the impact financiers have in an economy is to look at a revised model of the circular flow diagram of economics. Whilst economists would typically consider the environment and externality, due to recognition of its finite state, it con no longer be considered as such.

By looking at a simplified model of an economy it is not hard to recognize the impact financiers have on same. Financiers interact with all key players within an economy.

Through allocation of funds financiers are able to encourage and create activity within a sector of the economy through the allocation of capital.

What the above table indicates however is that decisions of players within the economy have both direct an indirect impacts in regard to sustainable development practices. That is, the impact to the economy, the social framework and the environment from decisions and actions that are undertaken within the economy. Developers who have recognized the intrinsic link between their operations and sustainable development are currently operating in a void as other market players come to terms with the new economy model.

The Difficulties Faced by 'Sustainable' Developers

'Sustainable' property development provide less expensive operational assets, they provide more attractive communities, they produce healthier more productive premises, they are less expensive to build, due to upfront planning and design, and importantly, more often than not achieve a more profitable outcome. Yet the financial profile of 'sustainable' property development does not fit the criteria uniformly employed y financiers in evaluating prospective real estate development. As financiers are slow to innovate, due to resistance associated with ideas that are not well established or recognized, difficulties for 'sustainable' developers appear to fall in three broad categories: the conservative nature of the industry; experience; and the requirements of financiers.

The financial markets by design are highly conservative, whether for equity or debt.

Financier lending policies are generally very conservative, favoring high liquidity ratios and personal relationships. Financiers, where possible, concentrate the majority of efforts on financing the short-term credit needs of the economy, only dealing with long-term financing projects where risk can be alleviated

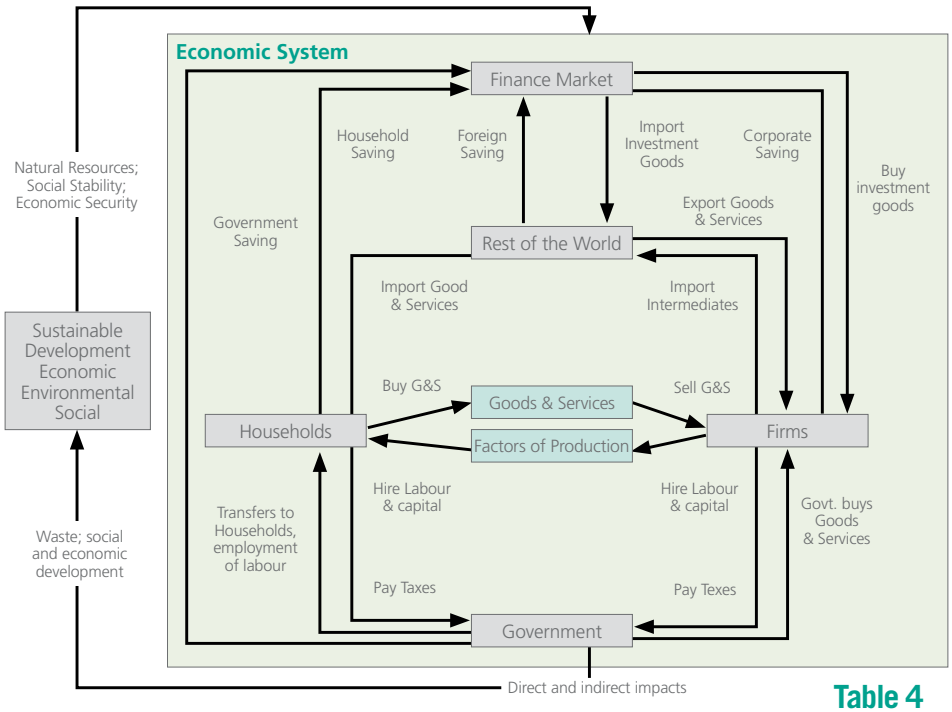


Table 4
Wills, 2006

to an acceptable level based on the understanding of the operation of that deal by the financier. 'Sustainable' property developments are fundamentally different to convention property developments. This is none more so than in the financials, the core area of focus by financiers. For example the bulk of financial returns come in the mid-term and long-term, a time period not deemed as important to nor measured by appropriately by current financial techniques (see table 2). This means that applying conventional financing techniques to 'sustainable' property development is not only difficult and costly, but has the potential to impede the aims of a project such as meeting targeted social, environmental, market, and ultimately, the financial goals. Unfortunately for sustainable property developers, due to the reliance upon existing thought processes in regard to how property development deals operate there is a disconnect. Accordingly financiers need to be educated as to how 'sustainable' property differs in order to develop appropriate practices for lending.

With a limited number of comparables in the market place there are a limited number of developers who have undertaken more than one or two 'sustainable' property developments. The lack of an extensive track record of successful projects means that virtually all 'sustainable' property developments being planned will have difficulty obtaining financing. Such difficulty translates to long approval processes, and a higher cost of capital, which reduces the feasibility of such developments. Until sufficient comparables become available there will continue to be reluctance by a conservative industry to enter the unknown.

Whilst there are no simple rules for obtaining finance developers, 'sustainable' developers will stand a better chance if clear criteria is made available. Lenders are often presented with concepts they neither understand or care about and sometimes pass on a project for lack of 'appropriate information'. Financier's core focus is the financials that is the projected cash flows, revenues and expenses. In this regard financiers need to educate themselves as to the efficiencies created by the sustainable property development process in terms of bottom line return. For example reduced operating expenses associated with 'Green Star' commercial developments affect the marketability of buildings (positively) to attract and retain tenants which in turn affects net operating income which in turn leads to increase ability to service debt levels. In regard to residential subdivision sustainable development can increase profits through reduced infrastructure costs (due to design) and achieve superior returns due to exclusivity. Financiers must therefore adopt a collaborative approach with 'sustainable' property developers in order to understand how

Table 5: EXAMPLE: COMPARISON OF CONVENTIONAL VERSES SUSTAINABLE PROPERTY DEVELOPMENT

	Initial Investment (000, 000)s																Internal Rate of Return (IRR)
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Example #1 (Short Term Investment)	(30)	0	2	3	4	6	15	80									**22.95%**
Example #2 (Medium Term Investment)	(30)	(3)	(1)	0	6	6	12	16	18	21	18	25	30	35	29	67	**22.95%**

features inherent in sustainable property development enhance financial returns.

Developers are faced with a myriad of financiers offering a vast array of products. For example on the debt side, there are banks that are looking to make construction loans for a short period of time, then there are institutions willing to make permanent loans that enable them to keep an asset in their own portfolio or sell down to the secondary loan market. On the equity side, there are joint venture partners, publicly traded real estate investment trusts, foundations, university endowments, insurance companies, and superannuation funds that have well defined, predictable, short-, mid- and long-term cash flow needs. But what is the common feature across all of these groups? Every one utilizes use the same short-term biased methodology, and the same list of "conforming" products to evaluate investments. The goal therefore becomes how can sustainable developers be better matched to the appropriate financier that not only offers the project the best outcome but also to those involved and the environment.

Flaws in Current Practice

Current economic practices simply do not consider the interwoven relationship between the economy and the environment. Current economic structures and institutions simply divorce the two and more often than not ignore environmental consideration all together. Modern practice has barely heard of the natural environment or even given thought as to how environmental concerns could be incorporated into everyday workings. As Postel (1990) states "the oversight traces back to the work of John Maynard Keynes, the father of economics, who, troubled by the great depression, focused on unemployment, inflation and other elements of the money cycle." Kaynes had no consideration to the environment what-so-ever, for natural resources appeared so plentiful the notion that they would be considered as finite was never considered nor factored into how an economy could function. This basically leads to three major issues surrounding the financing sectors consideration of sustainable property development. These are: Price setting; preference for the short term; and the focus on growth.

Market prices reflect costs and benefits as determined by any one organisation at a moment in time. Currently business decisions exclude environmental costs, they are therefore inadequate and faulty assessments. By ignoring environmental costs, market prices provide the wrong signals for resource management, which in turn leads to overuse of the environment. Put basically pollution pays. This is none more evident in the property development industry. Developers seek to meet current financial guidelines for deals by squeezing costs to a minimum through cheap builds, inadequate demolition disposal and maximizing density. Current property development practices through the drive to meet 'financial economic' indicators simply ignore environmental deterioration. As Hawkins states 'Markets are superb at setting prices, but incapable of recognising costs' (Hawken, 1993, p. 75).

The focus on short-term profitability over long term sustainability is the motivating force behind private enterprise. This is reflected none more so in the time-preference consideration of cash flow streams through econometric modeling, and the use of discount rates. Discount rates are utilised extensively in the finance arena in the determination of the present value of income streams to allow the comparison of various profit making opportunities. By denominating all investment options in terms of money and weighing future benefits much less heavily than those nearer the present the practice of discounting makes sustainable management impossible. As Colin Clarke, professor of applied mathematics at the University of British Columbia states "If dollars in banks are growing faster than a timber forest, it is more profitable (indeed, more economical) to chop the trees down and sell them and invest the proceeds somewhere else." Thus under the logic of current practices it is rational to drive resources to extinction.

The philosophy of economic growth has fashioned a society preoccupied with "economic progress", which is evident in our society in materialism. Under such a philosophy businesses operating in such an environment adopt a 'growth ethic' which dictates a path of research and technology, focused on productivity and driving target markets toward ever increasing levels of consumption in order to achieve ongoing growth. This issue is that such a philosophy simply ignores the question of sustainability. Market economies create the dynamism of ever increasing production. "Growth" as defined in today's terms is not only perpetuating environmental degradation it is exacerbating it. Such growth is rife in the finance industry especially in regard to financing property projects.

Conclusion

The initial conceptualization of sustainable property development gave little thought to how such developments could be financed. It has now become evident that if sustainable property development is to succeed at the task of changing how we build, there must be a fundamental change in how property is financed. Redesigning investment criteria to appropriately consider principles of environmental sustainability will not be an easy task. When it comes to financing the notion that a project should receive an interest rate discount purely because it is "green" is nonsense. Therefore positioning the asset appropriately with the "right" financier becomes critical.

As identified the market needs to commence by recognizing the issues surrounding the current measures and take appropriate action. The first priority is to place greater weight on future benefits rather than undervaluing them. A solution is to lower the discount rate to a level closer to the real rate of capital productivity. This will shift "short-termism" property development financing toward projects that offer a higher longer-term rate of return. The Government also needs to be involved in the process to potentially offer grants and or compensation in the form of tax breaks for sustainable property development that yield short term profits but have reduced impact on the environment and or town planning solutions. This is however just the start. The finance industry will need to work closely with the property industry to carefully consider how the gap between current and 'sustainable' practice can be narrowed.

This article raises a number of areas where the finance industry needs to carefully consider current practice in order to progress. Financiers need to recognize that the time to address the gap between the current sustainable property recognition and lending criteria and the natural environment is now. Financiers are well placed to drive the required changes through the property market and the wider economy.

Areas of Investigation

- Educational framework set up to appropriately inform those operating in the financial services sector of the process and considerations of building 'green'.

- Discuss and develop with major financial professional bodies changes in its policies that could give developers and financiers clear guidance as to how 'sustainable' property applications can be assessed appropriately, within a new framework. For example new policy frameworks that will facilitate innovation in financing for sustainable property such as differing loan to value ratios and or reduced financing costs (lower basis points).
- In collaboration with professional investment organizations, support development of valuation techniques that incorporate the financial consequences of environmental factors.
- Develop and maintain environmental outlook reports for each sector of the property industry that highlight the major environmental property trends and regulatory issues.
- Expand the range as well as the accuracy and timeliness of 'sustainable' property information and make available to the financial services sector in order to allow them access to comparable information, when and where available.
- Consider how to best identify the most suitable and equitable financing instruments in the market. Consideration of the development of possible secondary market for sustainable property loans, borrowing concept from the commercial mortgage backed securities industry that is sell various "pieces" of the debt of an individual project, "tranches," according to the risk associated with each of them. Green building commercial mortgage securities could be of high interest as they would receive a higher credit rating than conventional mortgage backed securities.

- Develop quantitative recognition of current qualitative features through the development of financing rating tool (eg. through analysis of revenues, rental growth, opex, capex, depreciation, and risk)

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THE FIRST PRIORITY IS TO PLACE GREATER WEIGHT ON FUTURE BENEFITS RATHER THAN UNDERVALUING THEM.

APPENDIX 5: PRODUCTIVITY AND GREEN BUILDINGS

Productivity and Green Buildings

By John Wills AAPI MIMC AIMM

Introduction

One of the key arguments of sustainable building practitioners is the increase in productivity in the workplace through better lighting, enhanced design and improved indoor air quality. But what does that actually mean? What is productivity? How can productivity be measured? What are the potential benefits of measuring productivity? It is the aim of this section of the paper to address each of these issues together with investigating as to how such a concept could incorporated into current property practices in order to attribute value to an asset that provides benefit to occupants.

What is Productivity?

With the emergence of "green" buildings there has been an awakening in the interest of productivity. The first issue surrounding productivity however is the inability of sustainable building advocates to accurately define productivity.

The term "productivity" is often confused with the term "production". Whilst there is more often than not a close relationship, production is concerned with the activity of producing goods or services while productivity relates to the efficient utilization of inputs in producing prescribed outputs of goods or services. But how does this relate to "service" industry or "knowledge" workers?

Service industry workers tasks are typically flexible, have no production standard times, and can be performed any number of ways by a variety of workers. As a consequence, more often than not, there is no correlation between units of labor and units of output (Gordon, 1997). The nature of knowledge work is more complex, and therefore more difficult to evaluate. This is the issue faced by those arguing productivity improvement associated with "sustainable" assets. There is at this stage insufficient evidence in the Australian marketplace to adequately determine and or measure productivity increases due to the lack of data and a common methodology. This is a situation that will need to be rectified if the green building industry wishes to continue such arguments.

How can Productivity be measured?

Productivity differs from most economic variables in that it is invisible. Workers may know the type of work they are undertaking but are unawares as to the exact relationship between their actions, the efficiency of the process and the impact of the surrounding environment upon the entire process. It is the impact of the surrounding environment upon the production process that "sustainable" advocates are interested in. Current thought in measuring productivity gains, as they relate to "sustainable" assets evolves around the use of post occupancy evaluation ('POE').

Zimring and Reizenstein (1980) define POE as "examinations of the effectiveness for human users of occupied design environments". Zimmerman and Martin (2001) claim that POE typically focuses on assessment of client satisfaction and functional "fit" with a specific space. POE is therefore the systematic evaluation of opinion about a buildings use from an occupant's perspective. Whilst such evaluations identify ways to improve building design and building performance, they alsocan provide data specific to functional performance which can be directly correlated to occupant's productivity levels.

There are three basic types of POEs: Indicative; Investigative and Diagnostic, each differing in complexity and use.

Indicative POEs typically involve simple surveys of the occupants or a simple walk around and are utilised to establish the perceived success of the project outcome and or review of the project process.

Investigative POEs are utilised for critical analysis of a project outcome and project process. Investigative POE's are formal, are structured and unambiguous, require considerable time and can be quantitative and carried out via questionarries and face to face interviews.

Last but not least there are diagnostic POEs. Diagnostic POEs are more detailed than indicative or investigative POEs. Diagnostic POEs are comprehensive and generally initiated for large-scale project reviews. Diagnostic Post-occupancy Reviews require expert advice and management.

It must be noted that whilst general frameworks exist for POEs, each project requires its own specific scope in order to encompass the targeted areas of measures, this includes the establishment of baseline statistics. That is one size does not fit all.

Measures are specific to each projects requirement and unique for each user. In this regard it therefore makes comparing results difficult. Specifically in regard to productivity there are a variety of measures that can be utilised in the POE. For example Stainer (1997) considers the use

of total measures as a 'strategic guide' for differing industries. These include:

INDUSTRY	MEASURE OF OUTPUT
Airline	Tonnes-kilometres
University	High-calibre students
Department store	Inventory-adjusted sales
Undergound coalmine	Gigajoules of saleable coal
Hospital	Patients treated
Farming	Tonnes of saleable crop
Catering	Meals served
Refuse collection	Tonnes of waste

Whilst such an approach benefits due to a total cost approach, it suffers from being able to accurately quantify inputs to the process. This is further compounded by the movement of the economy toward the 'service' sector which inherently comprises intangible features.

The most insightful work in regard to productivity in the services industry is that of Carl Thor. Thor (1993) rightly states that there is a tendency to search for single answer models for measuring productivity, quality, market penetration or financial return when in fact an organsiation needs to monitor all areas to remain competitive. Within any one organization each business unit or section has a multifaceted managerial requirement and within that unit the individual often has an ambiguous situation in which two or more "desirables" conflict. Thus the creation of a measurement system can not be simply a modeling exercise but be created by investigation of principles of corporate and departmental strategic thinking. From such investigations approach groups or "families" of measures can be established in regard to productivity. Whilst Thor (1993) provides an example of labor productivity (labor hours per physical unit of measured output) consideration is also given to a variety of other measures. These include: cost of service measures (the sum or variable costs associated with the service delivery) for example variable cost per client enquiry; client satisfaction survey results; average cycle time of important projects; cost per routine project; turnover rate; average revenue per employee; number of sick days; staff turnover.

By adopting a POE organizations will not gain a better understanding of the effects of the external environment upon productivity but also be afforded the opportunity to adopt continual improvement practices. The results from investigations can therefore allow an organization to further improve productivity. For example studies by Cole and Lorch (2002) and Bordass and Leaman (2001) identify that occupants are most satisfied and productive when:

- thermal conditions are perceived as comfortable and relatively stable;
- there is rapid response when things go wrong (e.g. thermal conditions, speed and effectiveness of the help desk, or the usability of ventilation/ lighting controls);
- shallower plan forms and depths of space are provided;
- cellularisation of space is offered;
- the building fabric offers thermal mass;
- there is controlled background ventilation without unwanted air infiltration; and
- there are openable windows and views out of the building.

It must be noted that sustainable assets by design incorporate such features, therefore creating the critical link as advocated.

The question then becomes would productivity improve to a similar degree on a refurbished space targeting similar features? And in addition, if such refurbishment was carried what benefits are obtainable?

Benefits

Benefits from the establishment of measures for productivity or any organization occur across three specific time periods being the short, medium and long terms.

Short-term benefits include user feedback on internal work processes within context of the new working environ and identification of appropriate solutions. Medium-term benefits include feed forward of the positive and negative lessons of work practices within context of the working environment. Long-term benefits are aimed at the creation of databases and the generation of planning and design criteria for specific business unit types. Database development assumes a critical role in linking POE programming.

The direct link of such benefits purely to sustainable buildings is the burning question.

Conclusion

As competition increases and margins decrease companies are often unable to recover the rising cost of materials, labor, and other resources by simply raising prices (Picard, 1998). By being able to accurately measure productivity management is able to focus on creating efficiencies to recoup

and or improve such cost burdens. Such an approach also allows and organsiation to focus on continual improvement. What must be noted however is that POE concerns analysis of individual buildings or cases, which can only be effectively benchmarked and compared if reliable and rigorous "methodical" approaches have been utilised to collect data.

Whilst data between the association of increased productivity and sustainable buildings is limited, there appears to be growing evidence to support the positive correlation of the surrounding environments on productivity. It will only be with common measures that the sustainable building industry will be able to support claims linking increased productivity to "green" assets. Faced with the conundrum of establishing common measures against the unique needs of differing organizations the task will certainly be challenging.

Areas of Future Investigation

- Investigation into the establishment of a base standardized framework that can be established for the measurement of productivity levels that can be attributed to buildings
- Creation of positive productivity measures to determine increased output rather then traditional negative measures
- Create examples productivity measures of existing sustainable assets and educate market
- Create database of core examples in order to create medium and long term results that can be monitored.
- Develop post occupancy evaluation process guidelines for sustainable assets

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