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# NATURE SMART SUBURBS

an important step towards sustainable urban development

Executive Summary

PREPARED FOR  
Environmental Planning Section, Environment & Parks Branch, Urban Management Division  
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NOT BCC POLICY



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## INTRODUCTION

This report presents the findings of a research project examining the economic impact and benefits arising from the use of biodiversity-friendly measures in the construction of new subdivisions. This research is part of ongoing work being conducted by the Environment and Parks Branch (EPB) of the Brisbane City Council (BCC) to identify new cost effective ways of maintaining and enhancing biodiversity on private land.

This research project is also the first outcome of a partnership between the Brisbane City Council, peak bodies of the urban development and construction sector, and councils within South East Queensland (SEQ). The aim of this partnership is to promote and facilitate sustainable, biodiversity-friendly urban development, and environmental protection within SEQ.

## Objectives of research

The research presented in this report has three main objectives:

1. determine and document the benefits to all stakeholders of biodiversity-friendly urban development (BFUD)
2. answer the following three broad research questions -
  - is BFUD profitable?
  - is BFUD at least as profitable as conventional urban development?
  - does BFUD place onerous or prohibitive economic costs on developers or home owners?
3. identify any drivers and barriers to BFUD.

## Rationale

This research rests on four important concepts.

### 1. Protecting the Public Conservation Estate is important

Since 1990 the BCC has spent around \$127 million acquiring land for conservation purposes, and managing it to protect or enhance biodiversity and other environmental values. The BCC is also working with and assisting a small number of landholders to manage their land to enhance and protect the biodiversity found on these properties. Collectively, this publicly owned land and private land managed in partnership with Council forms the Public Conservation Estate (PCE).

Recent and projected population growth in South East Queensland (SEQ), and concomitant land clearing and urban expansion, is threatening the viability of the biodiversity in held within the PCE. Widespread urban expansion in SEQ is expected to fragment and isolate large parts of the PCE, and in so doing undermine its ecological viability.

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Two options are available to governments seeking to protect biodiversity in SEQ:

- acquire significantly more land for environmental and biodiversity purposes, or
- develop partnerships with land owners and the development industry to ensure that environmentally significant private land is either protected and managed, or developed to support and enhance the PCE.

The first option is too expensive to be practical. The second is the focus of this report. Thus, BFUD in SEQ can be considered to be the provision of housing that supports the viability (or at least does not threaten it) of the PCE.

## **2 Ecosystem Services: the Public Conservation Estate is an economically important asset**

The PCE, undeveloped private land, and vegetation on developed private public land all provide a range of services to the City and SEQ generally. These ecosystem services are provided free, or at least at the cost of managing land and waterways for environmental and biodiversity purposes: yet the economic value of these services is comparatively very high.

There are three general types of ecosystem services (Cork and Shelton, 2000):

- production goods – food, pharmaceuticals, durable materials, energy, industrial products, genetic resources, etc
- regeneration processes – purification of air and water, detoxification and decomposition of wastes, renewal of soil fertility, dispersal of seeds for regeneration, pollination of crops, etc
- stabilization processes – coastal and river channel stability, moderation of weather extremes, partial stabilisation of climate; regulation of the hydrological cycle, compensation and substitution of one species for another when environments vary, control of the majority of potential pest species, etc.

In rural areas such ecosystem services are often provided by nature at zero cost to the economy. However, as land is developed the supply of free ecosystem services is normally reduced. Traditionally, urban development has reduced the supply of most ecosystem services to below that demanded by society. As a result, society must pay to implement substitutes: eg dams and weirs for flood control; water purification plants; shelters and shade cloth to protect from wind and sun; air conditioners to lower temperatures; etc. Because of the large public good aspect of ecosystem services the burden of supplying substitutes for them normally falls on government, particularly local councils.

Hence, the PCE performs important economic functions that would otherwise need to be replaced and paid for by government: it is an important economic asset.

In general, the more intact an ecosystem the more likely it is that it will continue to supply services. This has important implications for biodiversity. It

implies that by minimising the loss of biodiversity society can maximise the supply of ecosystem services.

This view of things implies that sustainable urban development will minimise the loss of ecosystem services and maximise the retention of local and regional biodiversity. Thus, in locations where biodiversity issues and/or the supply of ecosystem services are a concern, urban development is unlikely to be sustainable unless it is also biodiversity-friendly. This is most likely to be in emerging communities in newly urbanising regions, not in older established urban areas.

### **3 Urban ecology**

Urban ecology treats the urban form as a habitat for both humans and other organisms. It views human settlements as mix of:

- infrastructure – houses, roads, drains, power poles, detention basins, sewers, sewage treatment facilities, nesting boxes, etc.
- eco-structure – indigenous food trees and understorey plants, tree holes, hollow logs, indigenous trees needed for nesting by birds, waterways, wetlands, etc.

The final mix of infrastructure and ecostructure in an urban development results from choices made by: planners, engineers, landscape architects, and builders. Such choices and the management practices of home-owners determine the level of biodiversity in our suburbs. These choices also affect biodiversity in surrounding areas, and hence can help support and enhance the PCE.

### **4. Urban design practices for biodiversity-friendly urban development**

Urban ecology indicates that biodiversity in urban areas and neighbouring reserves and corridors is dependent on the design and management of urban developments. Consequently, BFUD is essentially a planning and engineering issue. There are a number of practices associated with urban development that favour biodiversity. These include but are not limited to the use of:

- water sensitive urban design (WSUD) for managing storm water
- selective and minimal clearing of the site
- building location envelopes on each parcel of land
- reserves created for significant species
- native vegetation used in all landscaping
- covenants, body corporate structures, and tree preservation orders
- pet controls

For the purposes of this report, the more an urban development makes use of these practices the more biodiversity-friendly it is considered to be. These practices can be considered proxy measures of the biodiversity-friendliness of urban development.

## Methods

This report is based on research conducted into the experiences of four recently completed urban subdivisions in SEQ that extensively used biodiversity-friendly measures. It is also based on an extensive review of the literature regarding:

- factors affecting urban biodiversity
- the benefits of vegetation in urban areas
- the benefits of employing water sensitive urban design measures.

The four developments examined were:

- Ridgewood Downs, located in the Redlands Shire
- Woodcrest, located in Brisbane City
- Northwood, located in Caboolture Shire
- Edenbrooke, located in Brisbane City.

These four estates span a number of housing block sizes and business models, ranging from family owned businesses, a major construction corporation, and a consortium of investors. All four of these estates extensively used the urban design practices identified as maximising on-site and off-site biodiversity.

The first three of these four estates are rural residential developments. While Northwood is technically a rural residential estate the average block size is small for such a development. At both Ridgewood and Woodcrest average block sizes are range between 4,000-5,000 m<sup>2</sup>. The area available for construction is limited to around half the block. In contrast, at Northwood the average block size is 2,200 m<sup>2</sup> and only 50% can be cleared for development. This means that the area available for use by home-owners is about 1,200 m<sup>2</sup>. At Edenbrooke block sizes range from 450 m<sup>2</sup> to about 1,500 m<sup>2</sup>. All of the area of each block is available to home-owners at Edenbrooke. This means that the estates represent a continuum of from small to large block size.

An attempt was made to include a biodiversity-friendly low cost housing development in the study. While such a development was identified, the developer responsible for it could not be contacted in time. It is known that this development was profitable. It is unknown whether it was more or less profitable for the industry at the time it was constructed and released.

Three types of data were collected:

1. the views of each developer regarding -
  - their motivations for creating BFUDS
  - market demand and acceptance of BFUD
  - the drivers for and obstacles to industry and consumer acceptance of BFUD
2. the degree to which the biodiversity-friendly urban design practices were utilised on site, the level of retention of indigenous flora and fauna, and the level of connectivity of onsite reserves and connection with offsite reserves
3. the economics of the project (return to capital) and the costs of using biodiversity-friendly urban design practices.

The data regarding the extent to which biodiversity-friendly urban design practices were utilised, the level of retention of indigenous flora and fauna, and connectivity was used to assess the relative biodiversity-friendliness of each estate with respect

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to the others. The Analytical Hierarchy Process\* (AHP) was used to combine this data.

The data on return to capital was combined with the results of the AHP to determine if there was a relationship between return to capital and the relative level of biodiversity-friendliness.

### **Limits of this study**

It should be recognized that this study is based on a small sample size. This is a common feature of exploratory research such as this. Considerable effort was expended to find BFUDs of comparable nature to conventional urban developments. Unfortunately, there are still very few examples of such BFUDs in SEQ. This constraint has had certain limiting affects on the statistical robustness and generality of the data collected.

The small sample size meant that:

- standard errors associated with the analysis of quantitative data were not calculated — they are naturally large in this case
- it was not possible to employ a fully randomised, comparative experimental method or use concomitant statistical techniques on the data collected.

In order to obtain strong statistical rigour it would have been necessary to:

- have very used many more examples of BFUDs — possibly more than currently exist
- compare such examples to an equally large number of conventional urban developments — logistically this was beyond the capabilities of this project.

Similar caveats apply to the qualitative data collected. It is a risk with any qualitative research that the opinions expressed by the respondents may not be representative of their peers — the smaller the sample the greater the risk. Only further research can determine if the responses obtained are representative. However, as is explained below the responses obtained were so closely aligned that it more likely that they are representative of their peers.

While the results of this study must be treated with some care, they are considered robust enough to guide policy and further research.

### **Report Findings**

This report presents evidence that BFUD is not only feasible, but also profitable. All four estates studied in this project were very profitable. All developers reported that they were able to charge a premium for land in their estates, and that people are willing to pay it.

The analysis of the empirical data supports their perceptions. The analysis indicated that return to capital is positively correlated with the degree to which urban developments were biodiversity-friendly. This suggests that the more

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\* The AHP is a technique for combining the judgments and opinions of managers, stakeholders and technical experts with objective data. It is used to prioritise or rank: criteria, options and projects. Overseas, it is widely used in both the private and public sector for strategic and operational planning.

developers invest in making developments sustainable and biodiversity-friendly the higher will be their return.

This is an important finding.

The developers involved in this project span the range of urban development enterprises: from a family business to major construction and urban development firms. Yet all are so convinced that BFUD is inherently profitable that they are specialising in providing it from now on. Indeed, a number have been specialising in this form of urban development for many years.

All firms and individuals who participated in this project are committed to innovation and quality. They see their corporate and individual commitment to ESD and BFUD as part of their commitment to innovation and quality. In short, these firms and individuals are industry innovators. This indicates that BFUD is not just an environmental issue it is also one of industry innovation.

The developers see themselves as innovators and industry leaders; consequently they are embracing wider concerns of corporate responsibility. They see BFUD as part of their corporate commitment to delivering wider social and environmental outcomes. They believe that:

- major financial institutions are already committing to achieving social and environment outcomes, in addition to traditional economic ones
- this means that eventually developers who are not both socially and environmentally responsible will increasingly find it hard to obtain investment funds or insurance.

Most of the developers reported some additional costs associated with creating these estates, although these were often minimal. All were able to pass any additional costs on to costumers, plus a premium on top of that. All the developers made above industry average returns on the capital they invested. Consumer demand was also high, with sale rates on the high side, even before the boom.

One interesting side effect of the boom is that as land values are rising faster than inflation, the additional costs of building BFUDs as a percentage of the sale price of land should fall rapidly. This should encourage other developers to enter this market.

Consumer satisfaction with each of the estates is very high. Very few residents have chosen to exploit the current land boom and sell their property to enjoy a handsome capital gain. Also a small number have sold their land to fund the purchase of other more prestigious blocks within the same estate. This has had the effect of driving up land values within these estates even further. Land in these biodiversity-friendly estates has proved to be a good investment for the residents, as well as the developers. This implies that demand for such developments is likely to rise, as increasingly home-buyers perceive them to be good investments.

All the developers interviewed felt that the current development approvals process, makes it harder for them to pursue innovation and create a quality product. All believed that Queensland's land use planning and Integrated Development Approvals System (IDAS) are based on out of date notions regarding the process of,

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and techniques used to create best practice urban developments. They reported that in their view:

- IPA embodies the thinking and concerns of the 1980s
- IDAS suppresses industry innovation.

All the interviewees stated that they wished it was possible to work more collaboratively with local government. They want to be seen as responsible partners in the economic and social development of the community, not cowboys requiring regulation and policing by local government.

The developers either proposed or supported the concept of a “broker”. This person would be employed by local government and:

- would understand the issues associated with newer, more innovative green developments
- would act as a single point of contact for developers
- have real power to make decisions
- could negotiate deals between developers and sections in council to ensure that innovative ideas and practical solutions were incorporated into the final proposal
- could shepherd innovative, beyond best practice or biodiversity-friendly proposals through council assessment and approvals processes.

This is very similar to a process being trailed by Queensland’s Environmental Protection Authority (EPA). The EPA has recently introduced “project managers” to assist and shepherd project proponents through assessment and approval processes.

Significantly, the local governments participating in this study all agreed that the biodiversity benefits arising from the BFUDs examined here were worth any additional effort to: plan, approve and maintain them. All reported that there were some ongoing management and maintenance issues but that these were in large part minor. Unfortunately, it is still too early to determine the long-term impacts that these developments are likely to have on council maintenance budgets.

The literature review supported the findings of the interviews and the selection of the proxy measures of biodiversity-friendliness used to select and assess the estates. It also indicated that BFUDs are likely to be good for the environment, government finances, and the community in general.

Fiscally governments should benefit mainly from the WSUD component of BFUDs. The literature review cited evidence that WSUD measures should:

- preserve or improve the quality of riparian areas, waterways and wetlands, reducing expenditure on future restoration and maintenance programs
- minimise future investments in water purification, reticulation, drainage and storage infrastructure.

The community stands to gain as well. The literature review cited evidence that vegetation supplies numerous benefits that not only save people money but also make the urban environment more pleasant and healthy.

Overall, this implies that:

- traditional modes of urban development are economically inefficient and place an unnecessary burden on government finances
- by promoting BFUDs governments would be improving regional economic efficiency.

Finally, this report demonstrates that sustainable, BFUD is economically rational, profitable and possible. Currently, such developments represent beyond best practice efforts. The industry's attempts to supply more of these developments are being inhibited by a range of structural, and legal obstacles. These obstacles are outlined and discussed in the report. Overcoming these obstacles in the long term will require:

- local government, developers and industry groups
  - building an open dialogue based on mutual respect and trust
  - working collaboratively in mutually-beneficial partnerships to ensure the sustainable development of the communities they serve
- reform of the current planning and approvals process to ensure that it:
  - does not embody outmoded ideas regarding urban design and fiscal costs to government
  - facilitates and promotes
    - innovation in the urban development industry
    - economically efficient, socially responsible, sustainable and biodiversity-friendly urban development.

## Conclusions and Recommendations

This report concludes that:

- the additional costs of employing biodiversity-friendly measures are minimal
- biodiversity-friendly urban development is very profitable for developers
- customer satisfaction is very high in biodiversity-friendly subdivisions
- buying land in a biodiversity-friendly subdivision is a good investment for property buyers
- biodiversity-friendly urban subdivisions yield many direct and indirect benefits to the environment, residents, economy, and government
- there are no economic impediments inhibiting the creation of biodiversity-friendly urban subdivisions, but there are a number of structural and legal impediments to the creation of these subdivisions.

This report makes seven recommendations for future action by the BCC in partnership with peak industry bodies and other councils in SEQ.

1. BCC and other SEQ Councils initiate a dialogue process with the urban development sector to address relationship issues identified in this report, and build an effective alliance with industry to promote and supply BFUD.
2. That the councils within SEQ should develop systems and processes that identify biodiversity-friendly and beyond best practice urban developments – we note that the BCC has already begun this process.

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3. BCC, the members of the Partnership Committee, and other SEQ Councils lobby the State government to adopt an overarching sustainability policy that is truly binding on all stakeholders of the State's economic and urban development. At the very least this would require amending IPA to give real effect to the sustainability objective of the Act.
4. BCC and other SEQ Councils should work with peak industry bodies and educational institutions to provide training concerning biodiversity-friendly urban development to trades people, engineers, architects, and planners within both the private and public sectors.
5. BCC and other SEQ Councils should work with the member organizations of the Partnership Committee to develop a program similar to the HIA *Green Smart* Program. This program should be administered by one of the bodies represented at the Partnership Committee. This program would provide readily accessible information to property buyers and people in the industry about:
  - what are the factors that make an urban development sustainable and biodiversity-friendly
  - the benefits of biodiversity-friendly urban developments.

This program should include training courses similar in structure to *Green Smart*. It is proposed that this program be called "Nature Smart".

6. The BCC and other SEQ councils should investigate the logistics and practicalities associated with using a "broker" or a "project manager" to:
  - negotiate with biodiversity-friendly developers and shepherd them through the approvals process
  - liaise with developers, and quickly negotiate and approve any variations to approved proposals when needed.
7. BCC in conjunction with the member organizations of the Partnership Committee should develop and implement an education/extension program to publicise the:
  - key findings of this report regarding the profitability and benefits of BFUD
  - structural and legal issues and challenges that are inhibiting
    - innovation and quality within the urban development and construction sector
    - the provision of BFUD by the urban development industry and local government in their pursuit of innovation, quality, and social and environmental responsibility.

This program should seek to produce at least two products:

- in depth case studies for the four sites to be made available to the general public
  - as pamphlets
  - on the web
- a public seminar to
  - show case the case studies and any other relevant estates
  - discuss how local governments could assist and promote BFUD
  - discuss the performance of Queensland's planning and development and approvals process.

8. Further research into the economics and utility of biodiversity should be conducted. This research should aim to do two things. First, it should document the progress of a large number of biodiversity-friendly developments. The sample size in this project was small due to budgetary and logistical constraints. Similarly, it was not possible to conduct a longitudinal study of relevant developments. At present there are a number of biodiversity-friendly developments being planned for SEQ and other parts of the country. Documenting their progress from the outset to final completion would provide useful information to the industry, investors, policy makers, and the community.

Second, this research should investigate the success of BFUDs in maintaining biodiversity. It should do this in such a way that it can yield appropriate advice to the industry and policy makers.

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