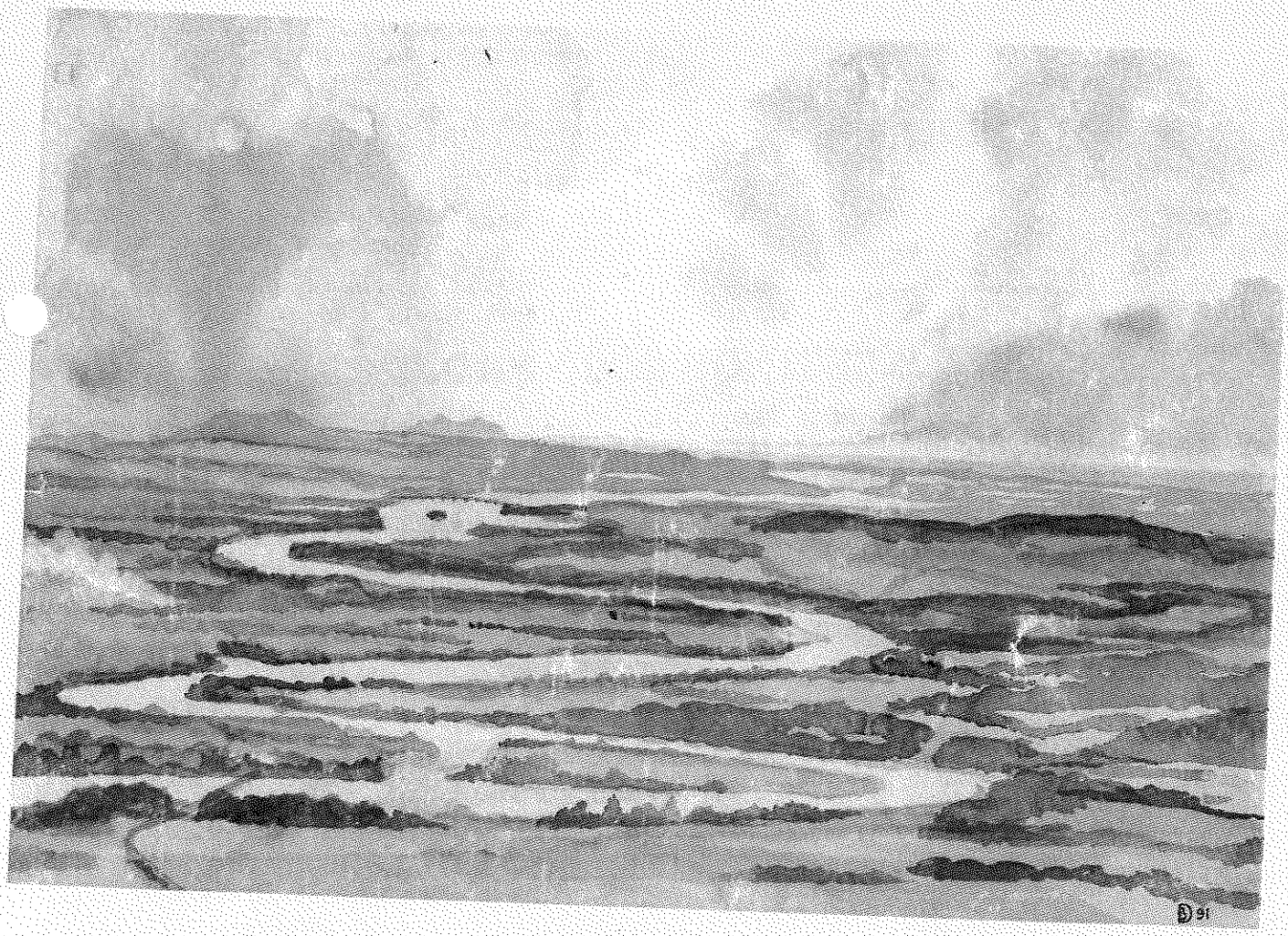
HASTINGS
2000

URBAN LIVING IN A NATURAL ENVIRONMENT



THE

HASTINGS 2000

PROJECT

Submission to the

NEW SOUTH WALES STATE GOVERNMENT

by

THE HASTINGS 2000 PROJECT

STEERING COMMITTEE

June 1991

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Numerous individuals, public sector bodies and private sector organisations under the Chairmanship of Dr. N.K. Boardman FRS, FAA, FTS have contributed to the development of the Hastings 2000 Project.

The following individuals and organisations have made major and specific contributions to the development of this submission to the New South Wales State Government.

HASTINGS 2000 STEERING COMMITTEE

Dr Keith Boardman:	Chairman of Committee, Chancellor–Elect Hastings International University, Former Chairman and Chief Executive, CSIRO.
Claude Cassegrain:	Company Secretary, Gerard Cassegrain & Company Pty. Ltd., Originator of the Hastings 2000 philosophy and financial model.
Bryan Dowling:	Bryan R Dowling & Associates Pty Ltd, Architects and Planners Development of the Hastings 2000 Physical Plan.
Dr Gus Hooke:	Former Research Director, National Farmers Federation Development Vice–Chancellor, Hastings International University Establishment of the Hastings International University.
Dr David James:	Director Ecoservices Pty. Ltd., Special Commissioner, Resource Assessment Commission, Development of the economic and environmental strategies.
Dr Don MacRae:	CSIRO Corporate Planner Development of the economic, industry cluster and environmental strategies.

CONSULTANTS

A.T. Cocks & Partners:	Compilation of this submission and development of the management strategy and the financial model.
Deloitte Ross & Tohmatsu:	Development of financial model.
Gutteridge Haskins & Davey:	Development of technology and engineering strategies.
Allen, Allen and Hemsley:	Legal advice.
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Centre of Policy Studies Monash University:	Professor Peter Dixon, Director, adviser on macro–economic impact of multiple Hastings 2000 developments.

Aerial photograph showing the Hastings 2000 zone and Port Macquarie (photo by courtesy of B.H.P. Engineering)

Aerial photograph of Port Macquarie
(photo by courtesy of B.H.P Engineering
and with kind permission of Hastings Municipal Council)

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What is Hastings 2000?

Hastings 2000 (H2000) is an innovative social, economic and ecological project in the Hastings Valley adjacent to and to be integrated with the township of Port Macquarie. It aims to accommodate an additional 70,000 people on an available site over a period of 15 to 20 years. It is a private sector initiative which will create an estimated 16,500 jobs in technologically advanced industries.

Why should the Government be interested?

People are demanding a viable alternative to capital city sprawl which has created social injustices, environmental degradation, declining productivity, and deteriorating quality of life.

Governments are facing burgeoning expenditures on urban infrastructure and environmental protection. Solutions to the problem should be aimed at minimising any further fragmentation of rural land and coastal ribbon development.

H2000 provides a holistic approach to urban settlement that promotes sustainable economic development of coastal regions and contributes to the establishment of export competitive industries.

The project marries jobs to higher densities in a quality living environment. It is largely self-financing and requires a comparatively small "up-front" capital outlay.

What stage has the project reached?

H2000 has secured a site of outstanding natural amenity on an east-west axis strategically placed at the intersection of the Pacific and Oxley Highways. It is serviced by the Sydney-Brisbane optic fibre link, water supply, power lines, state rail line and an existing airport. Extensive nature reserves and state forests surround the site.

Planning has taken place over the last ten years, leading to the formation of an integrated concept plan. Other support documents include: feasibility studies for specific industries, institutions and support facilities, a financial and business plan, an indicative physical land use plan and a framework for a socio-economic and ecological resources survey.

Some existing industries and R&D activities are an integral part of the project. H2000 planning has involved detailed consideration by leading business enterprises, government agencies, prominent community representatives, consulting firms and eminent Australians. International linkages have been established. The project is receiving broad community support and a mechanism for continuing involvement has been developed.

How does the project work?

H2000 is controlled by an integrated regional investment and development plan based on three principles:

- *The internalisation of increased land and property values to support development of preferred industries and site enhancement.*
- *The selection of industries which build on the natural resources of the region or contribute to a synergy of activities which increase productivity or improve competitiveness.*
- *The co-ordination of community and economic development, environmental management, structure planning and architecture into an overall management strategy.*

The estimated construction cost of the project is $6.7 billion with an assessed internal rate of return of 32%. Approximately $2.6 billion will be made available through the internalisation mechanism.

Who is responsible for management of the project?

The planning phase will be managed by the H2000 Steering Committee. The executive decision making body for the project will be the Hastings Development Trust. Board members of the Trust will be drawn from national, state and local communities. Implementation will be managed by the Hastings Development Corporation.

That part of the Regional Development Plan which affects areas outside the H2000 zone will be administered by the usual state and local government authorities.

How can the government help?

The Steering Committee seeks the following support from the New South Wales Government:

- *promote public acceptance and recognition of H2000 philosophies;*
- *designate the H2000 zone as a declared "Economic Development Zone" with the introduction of appropriate incentives;*
- *identify any constraints in the current planning legislation; and*
- *request government agencies to include H2000 in the formulation of their strategic plans.*

1. THE HASTINGS 2000 PROJECT

1.1 Overview

Hastings 2000 (H2000) is a $7 billion construction project offering an alternative to traditional patterns of urban expansion in Australia. It is an innovative decentralisation project which proposes, in the first instance, a new solution to the problem of coastal development in New South Wales.

H2000 will focus on the Port Macquarie hinterland for its development and maturation. Map 4 provides a Structural Plan of the development. This submission to the New South Wales State Government is concerned with the realisation of the Hastings 2000 Project. However, H2000 has been conceived as a project, which once successfully initiated in its first location, will provide a blueprint for sustainable, decentralised urban expansion throughout other areas of New South Wales and indeed Australia.

The pattern proposed by H2000 is to create new, focused and self–contained small cities evolving in harmony with the surrounding natural environmental and taking advantage of the many technological advances now available to help facilitate such a development. The Hastings 2000 Project, once implemented as a series of self contained cities throughout New South Wales and elsewhere, offers the solution to the unresolved problem of capital city expansion, with its declining quality of life and rising economic and social costs.

1.2 Stages

The development of H2000 at Port Macquarie is to occur through a three stage evolutionary process:

- **Feasibility Study Stage**: land pooling and feasibility stage – completed.
- **Inception Study Stage**: detailed environmental impact study and regional development and investment studies, resulting in completion of the planning phase of H2000.
- **Implemention Stage**: promotion and implementation stage.

The functions and activities involved in the second and third stages are illustrated in Figure 1.

This documentation represents the completion of the feasibility stage. It now requires political support and private sector financial participation to proceed through its inception study stage to complete the planning phase of the project. Chapter 10 of this submission outlines the requirements of this support and the details of the investigation to be conducted. Appendix 3 lists the participants who have provided input into assessing the feasibility of the project to date.

1.3 Planning Basis

Hastings 2000 is, in part, a Regional Development Plan for the Port Macquarie area. The existing Port Macquarie area has a population of approximately 27,000 people on a land area of 2,100 hectares. The Hastings 2000 Project proposes to utilise an additional 1,750 hectare of land immediately to the west of the existing township for an additional 70,000 persons over the next 15 to 20 year period. It will, in that time frame, create approximately 16,500 permanent wealth creating jobs and an additional 18,800 permanent support jobs in the Hastings region. It will establish in the region an economically sustainable total population of 100,000 persons.

The Plan, in its totality, embodies:

- An economic strategy
- A financial strategy
- An environmental land use strategy
- A social strategy
- A management strategy

Each of these strategies are separately detailed within this submission.

The Hastings 2000 Project is however much more than a number of strategies. It is a practical vision which attempts to accommodate and reflect the concerns of an Australia which now acknowledges that it must adapt to a changing international environment, if it is to sustain and improve its standard of living into the 21st century.

Hastings 2000 Project

Planning Stage, Implementation Stage and Ongoing

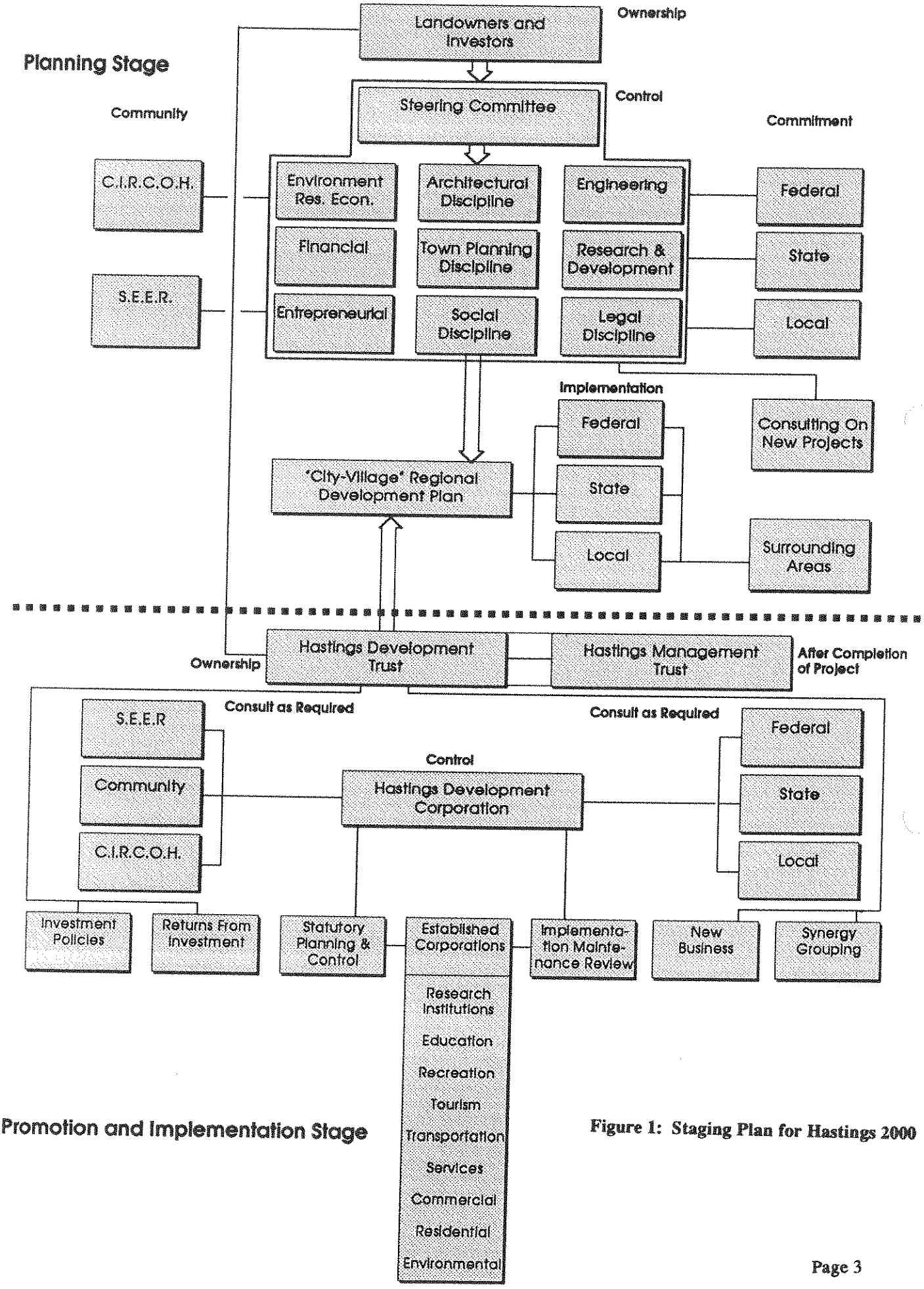

Figure 1: Staging Plan for Hastings 2000

1.4 Attractions

The project offers the following:

- A city/village environment which will counteract urban sprawl and rural land fragmentation.
- The creation of an area–specific synergy of industries and activities producing high value added domestic and overseas export products.
- An innovative funding mechanism to support self sustaining development.
- An ideal living environment which provides, from the outset, high quality residential and recreational facilities.
- Sustainable use of the region's resources in a manner which safeguards the areas natural environment.
- A strategy for active community involvement in the realisation of the project.

H2000 proposes initiatives for revitalising New South Wales's economic base in a manner which will facilitate ecologically sustainable development. It is a vision which promises change. Its success requires a willingness to accommodate that change.

2. RATIONALE OF THE H2000 PROJECT

2.1 The State and National Need for Innovation

The need for innovation within an Australian living and working context is now accepted on numerous fronts.[1]

We need:

- *Economic Innovation* – In particular, it is now accepted that we must develop internationally competitive, export–oriented industries producing high value added goods and services.

- *Social Innovation* – Much needed improvements in productivity growth cannot be separated from cultural, lifestyle and equitable redistribution issues.

- *Environmental Innovation* – Unless we change our practices, we will leave future generations a legacy of squandered non–renewable resources, degraded farmland and polluted air and water.

Both New South Wales and Victoria now acknowledge the need to provide an alternative living and working environment to indefinite capital city expansion. We need to develop an ecologically sustainable future. Both governments have acknowledged that the provision of public sector infrastructure services for land development is a key issue. It is a key issue because, for a number of reasons, diseconomies of scale are associated with the current method of urban infrastructure provision. The larger the population the greater the per capita cost of total infrastructure provision.

H2000 offers the opportunity to confront the challenge of innovation in all of the above aspects in a practical and realisable way. It does not, however, profess at this feasibility stage to provide all of the answers.

H2000 is not simply a variation of any existing or previously proposed physical coastal land use planning exercise – utilising known approaches and systems and creating the same inevitable results. It deliberately incorporates novel economic, social and physical mechanisms designed to create a new approach to urban co–existence.

It is only by taking H2000 through to the inception study and implementation stages that new solutions to well known problems will be proven.

2.2 The Need for Innovation Along the East Coast of New South Wales, Particularly Port Macquarie

The Hastings Valley has approximately 6,400 hectares available for urban living without the loss of prime rural land or the utilisation of environmentally sensitive areas. Approximately 3,400 ha has already been taken up.[2] The total area is capable of accommodating a population of some 81,000 at current urban density and is expected to be completely taken up by 2016 on the most likely growth rate of 4.5 percent pa.

The ability to change the current urban density is not possible without changing the current economic mix. The major contributor to the living standard of the Hastings is the servicing of the growth resulting from the retirement industry. Tourism, whilst being the major cash turnover industry contributes little retained wealth to the area, it being a marginally profitable industry. Agricultural and secondary industries have gradually diminished in their relative importance over the years.

The nature of the existing tourist and retirement industries conflict with an increase in urban density, offering no alternative but the continuation of land fragmentation thereby having a predictable finite life due to the non–availability of suitable land.

The maintenance of Port Macquarie's existing relatively low standard of living, with its attendant high social vulnerability,[3] is dependent upon a growth rate of about 4.5

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1 Urban and Regional Trends and Issues, January 1991, Economic Planning Advisory Council (EPAC) – Paper No. 46.

2 The Port Macquarie Hastings Coastal Development Strategy 1990.

3 "An analysis of Regional Diversity, Vulnerability and Resilience." A technical paper from the Office of Local Government, 1989, Department of Immigration. – An analysis of social vulnerability of 94 regions across Australia revealed that Port Macquarie has the fourth highest level of vulnerability of all regions.

percent – well above the national average. The exponential growth of the cost of supplying public sector infrastructure is in itself limiting the expansion of the existing two major industries.

Whether the demand for tourism and retirement decreases before the year 2016 or simply cannot be further accommodated after that time, the consequences are potentially disastrous. There will exist a very large, socially vulnerable population in an acutely degraded environment with no economic means of supporting itself.

The myth of infinite urban expansion carries with it very high future costs for both government and local communities.

The ability to avoid the inevitable social economic and environmental collapse becomes more difficult and costly with the passage of time. The opportunity presented by H2000 cannot be ignored. The project has a life span which roughly equates with the projected finite life of available land. Its implementation has now become an urgent necessity. On the other hand the successful implementation of H2000 ensures a socially, economically and environmentally sustainable district for many future generations.

3. THE HASTINGS 2000 SOLUTION

3.1 Creating Industries Based on Identifiable Natural Resource Advantages

The natural advantages of the Hastings Valley are its attractive environment and climate for human habitat. Particular aspects are coastal and rural scenery and access to beaches, rivers and mountains for recreation.

The natural disadvantages are its fragile environment and lack of a natural deepwater harbour and mineral deposits. As a conclusion the district is unsuitable for heavy industries but ideal for industries, producing high value, low mass products (white collar industries).

3.2 Use of Increased Land Values to Subsidise Desirable Industries

One of the innovative aspects of the project is the voluntary capturing of the increased value of land resulting from planned growth for investment in the industries responsible for the growth. This mechanism provides the controlling body with a "financial" market tool to realise the planned growth.

3.3 To Reach the Balanced Critical Population Employment Mix in the Shortest Possible Time

The critical mass of approximately 100,000 persons (which is not dissimilar to the conclusion arrived at in the Multi Function Polis (MFP) feasibility study) is calculated as being the population size with the proposed economic mix that will allow the Hastings eco–socio–economic structure to be sustainable in the long term.

Accordingly, subsequent growth after achievement of critical mass is proposed to be not greater than the net natural birth rate.

3.4 The Use of Total Environmental and Master Architectural and Engineering Plans.

The Hastings 2000 Project allows for a population density of 40 persons per hectare which compares with an average existing density in the urban area of 13 persons per hectare. Forty percent of the total land, excluding road, buildings, car parking, industrial, commercial and private court yards, is to be used for the living environment including recreational lakes, community facilities and nature corridors (excluding state forests and national parks). The increased density results in lower infrastructure installation and maintenance costs, justification for community transport and the preservation of land for future generations.

The total detailed environmental study completed as a pre–requisite to the adopted Structure Plan will allow for the efficient construction of the project. The master architectural and engineering plans will allow for the efficient construction of the new town and a low recurrent maintenance and infrastructure service cost. The optimisation of all internal transport facilities (freight, personal and electronic communication) will be possible.

A comparison of projected growth within the Port Macquarie area, with and without the Hastings 2000 Project is illustrated in Table 1.

Table 1: Projected Growth Comparisons for the Port Macquarie Area

End Year	With Hastings 2000 Project		Without Hastings 2000 Project	
	Ha	Pop,n	Ha	Pop,n
1993*	2,275	29,576	2,268	29,485
1995	2,434	35,937	2,476	32,198
2000	3,068	61,307	3,086	40,125
2005	3,835	91,994	3,846	50,000
2008+	4,132	103,814	4,389	57,061
2010	4,184	105,931	4,793	62,312
2015	4,347	122,448	5,973	77,652
2020	4,490	118,184	7,443	96,769
2025	4,461	124,212	9,276	120,591
2030	4,800	130,549	11,560	150,279

* Start of project.
\+ End of Project. Growth after this point to occur at the net reproductive rate.

4. THE EXISTING BASIS FOR HASTINGS 2000

4.1 Background

In 1975, Gerard Cassegrain & Co Pty Ltd (G.C. & Co) were offered assistance by the then Department of Decentralisation and Development to expand their manufacturing activities. During the course of investigating methods of assistance, it became clear to Claude Cassegrain that the Hastings Valley had fundamental economic problems which were not being effectively addressed. The problems were subsequently to be aggravated due to the polarisation of sectional interest. Developers versus conservationists, bureaucracy versus private enterprise, and the growth of conflicting industries.

In 1979 the Port Macquarie Council was informed of the need to encourage the re–direction of the economic base of the Hastings. In 1980 the Cassegrains convened an informal private group consisting of local professional leaders to prepare a sustainable land use plan, limited to the Cassegrain land holding. The group received input from national and international town planning organisations. The result of this work identified the need to aggregate a larger land holding and the requirements of substantial funds to carry out the detailed studies. 1987 saw the first stage and practical application of the H2000 ideology, the building of Le Clos Sancrox – a clos is a system of sub–division of rural land into small individual farms which presents a contiguous area, allowing them to be developed and managed effectively as one farm. Le Clos Sancrox received a National 1988 Bi–Centennial Heritage Award.

1988 saw the formation of Cassiro Pty Ltd. as a joint venture company equally owned by the G.C. & Co and CSIRO. Cassiro's mission is to commercialise Australian research and development. It is developing not only novel research, but novel procedures for the development and subsequent commercialis–ation of the research. The company has established solid ground work for international collaboration. It is seen as the catalyst for the initial core research and development industries to form part of H2000. Appendix 1 details two examples of Cassiro's experience in technology development and commercialisation.

1988 also saw the start of a series of workshops being convened to study in detail the various aspects of the H2000. These workshops were attended by relevant government departments and statutory bodies, Hastings and Macleay council representatives, eminent Australians, members of parliament, professionals from many disciplines, large corporations and community leaders. All contributed in various ways to the crystallisation of the philosophies, logic and the strategic plan for the implementation of H2000.

1989 saw the formation of the Hastings International University (HIU) Steering Committee. Separate feasibility study reports, a financial plan and an architectural concept plan for HIU have also been prepared.

The basis of this submission is the culmination of several person years of thorough analysis and international comparison of the originality and form of the project.

4.2 The Land Holding

It has taken the G.C. & Co. 20 years to aggregate the numerous fragmented parcels of land into a contiguous holding of some 1,500 ha. 400 of the hectares have subsequently been developed, forming part of the basis of Hastings 2000.

An additional 700 hectares owned by other individuals, are available to be voluntarily pooled into the project subject to necessary political and financial backing.

The availability of such a strategically placed parcel of land of this size is an absolute pre–requisite to the implementation of the first H2000–type project in New South Wales.

When proving a new concept, it is necessary to have every natural advantage possible. Port Macquarie satisfies this requirement in a variety of ways. Natural advantages forming the base of H2000 include:

- the availability of a contiguous parcel of land
- the availability of existing infrastructure:–
  - **Roads** – at the intersection of two of the state's major north/south (Pacific) and east/west (Oxley) highways.
  - **Water reticulation** – existing and strategy in place for its augmentation.
  - **Telecommunication** – Land is bisected

by the new optic fibre link between Sydney and Brisbane.

- **Power** – a major power sub–station is situated in the centre of the land fed from northern and southern grids.

- **Airport** – existing airport forms the eastern and northern boundary of the subject land and is available to be included in the land pool. Additional land for a subsequent regional jet and international freight airport forms part of the project.

- **Rail** – at Wauchope some 3kms from the western boundary of the subject land.

- **Natural amenity** – substantial nature reserves and state forests surround the land.

- **Other support infrastructure** – Port Macquarie being a growth town has existing strategies to allow for the initial implementation of H2000.

- The subject land offers all of the advantages of a green field site without the corresponding costs: an attribute difficult, if not impossible, to find anywhere else in the State. The implementation of H2000 incurs no up front infrastructure costs other than that normally applicable to any land development adjacent to a town.

- Strategic planning for the project has been under way for the last two years by the Hastings 2000 Project Steering Committee. This committee and participants in feasibility study stage is comprised of representatives from the business community, CSIRO, academe, private consultants and eminent individuals – see Appendix 3.

- The project has already been exposed and received input from the local community, local interest groups such as conservationists, research organisations, and federal, state and local government representatives. It has community support.

- Of the 1,750 hectares of land proposed for the project, 1,033 hectares (59%) of that area is owned by G.C. & Co and is immediately available as part of the equity investment of the project. An additional 640 hectares of land earmarked for the future regional airport (outside of the 1,750 hectare area) is also owned by G.C. & Co.

- The land is in a strategic coastal location between the nation's largest and third largest cities, Sydney and Brisbane. Previous attempts in Australia to decentralise have involved inland locations. They have required significant financial incentives to counter people's natural preference of living in a coastal location.

  Of all the locational criteria identified as being relevant to the success of new town proposals, both in Australia and overseas, environmental attractiveness of the proposed location is acknowledged as the most important factor. People will readily move to the Hastings region if jobs are available.

- The region already has a viable source of rural based industries. Established and emerging industries include:

  - an integrated wine industry, including Clos farm vineyards (which are already being used extensively in agronomic research) and the Hastings Valley Winery;

  - dairy industry, including plans for greatly enhanced production via Clos farming, and a regional milk processing plant;

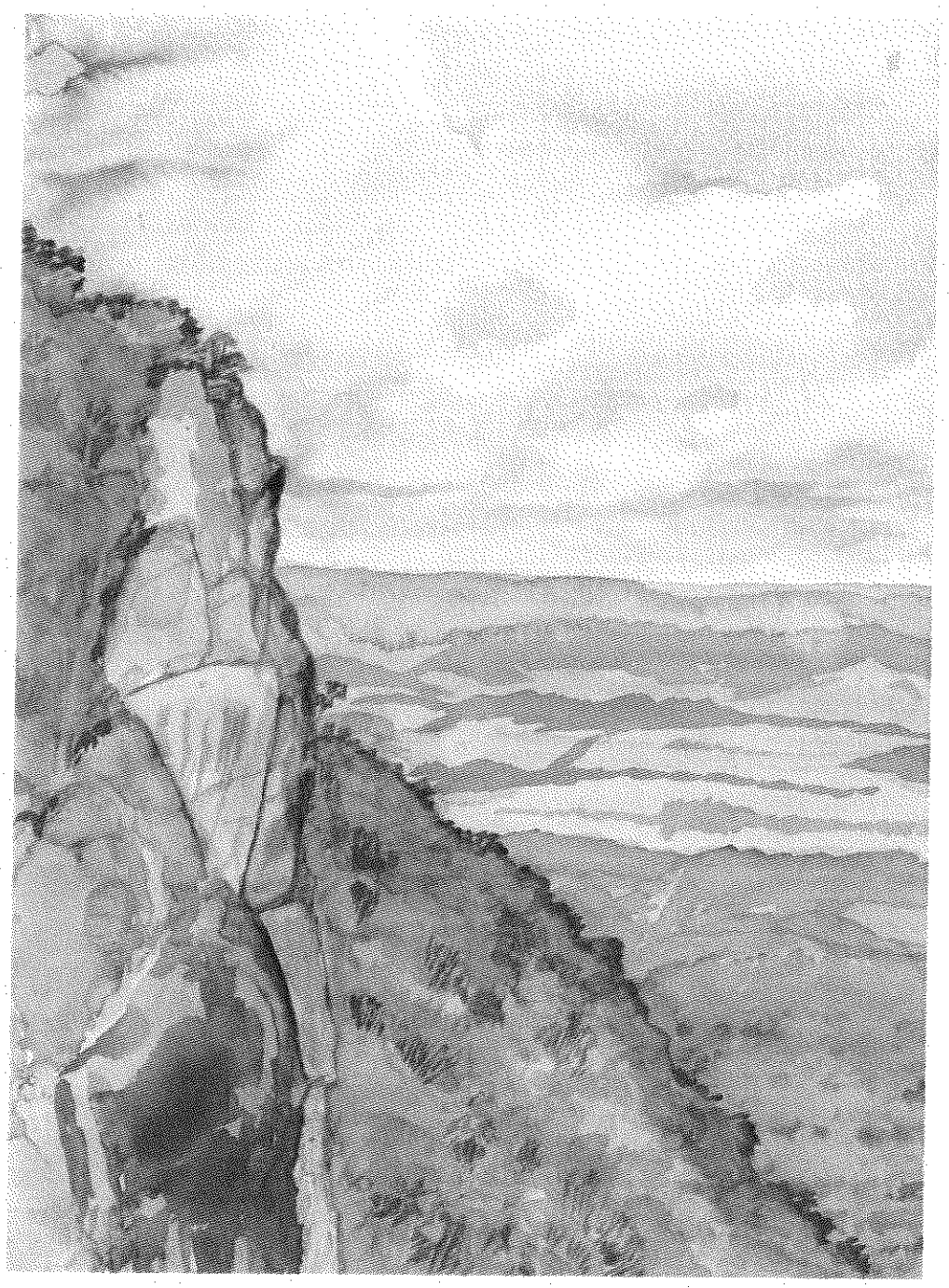
  - the Cassegrain Tradition Pty Ltd's food processing plant;

  - forestry and forest products with close proximity to a wide variety of forest types (including rainforests);

  - fishing, mariculture and aquaculture, including freshwater crayfish and oyster farming.

Planning is underway for this core of existing rural–based activity to be diversified through the large–scale production of Asian vegetables for export, a state–of–the–art regional abattoir with on–processing facilities, prawn and sea urchin processing, and cognac and bourbon production.

Hastings 2000, perhaps more than the Multifunction Polis idea, is a project which is compelling, viable and implementable. It has emerged and developed from a recognition of future local and community need. It is built on local strengths.



View of Bago Bluff looking west across the hinterland
Watercolour by Bryan Dowling

5. THE ECONOMIC BASIS OF HASTINGS 2000

5.1 The Challenge

The concept of ecologically sustainable development demands a re–assessment of the basis of economic growth and how that growth is initiated, supported and recognised. The winners of the 1990's will be those companies who recognise the social, technological, environmental and economic changes now occurring and capitalise on the opportunities resulting from that change.

H2000 developed out of the realisation of available future opportunities. It is, above all, an integrated plan to capitalise on the challenge of change in a way which will benefit its participants, the region within which it is based and the Australian economy.

The economic basis of H2000 incorporates the following features.

- Science and technology innovation as the basis of international competitiveness.
- Establishment of a social and economic framework which will ensure commercialisation and utilisation of that innovation.
- Focusing industries on the specific attributes, strengths and resources of the local region.
- Minimising infrastructure costs by controlling both the rate and type of activities which develop in the region.
- Linking population growth to projected patterns of employment.

The economic basis of H2000 is built on two concepts.

- The Cluster Concept.
- An Activities Concept.

Each of these concepts are detailed below.

5.2 The Cluster Concept

The concept of clusters or networks of companies and institutions with overlapping interests has been central to the achievement of international competitiveness by leading edge companies in many OECD countries. Professor Porter of Harvard has pointed to the synergy and competition generated in such clusters as being instrumental in gaining and maintaining competitive leadership in world markets.[4] The best example is perhaps Silicon Valley in California. South Korea and Taiwan are also now actively pursuing this approach.

A recent TASC report on new policies for the 1990's prepared by DITAC, points to the system of innovation in Australia as being weak and fragmented with few strong industry clusters and little evidence of networks which facilitate innovation and diffusion. There is a need for a mechanism to implement and facilitate the development of research/ technology/industry clusters and the diffusion of technology through industry.

The cornerstone of Hastings 2000 is the provision of structures to develop clusters which provide new opportunities for existing businesses and new businesses through innovation. There is a widely held view that Australia is not short of ideas; rather, it lacks the capacity to turn those ideas into dollars. H2000 will provide its core industries with two key advantages in overcoming this hurdle:

- a focus on areas where Australia has strengths and where the uniqueness of the local environment provides a "built–in" competitive advantage; and
- an integrated structure of research, technology development and new business set ups containing all the elements for commercial success.

It will provide all the necessary support and infrastructure to create an ethos of:

- turning research and technology developments into successful business; and
- harnessing research and technology development expertise to meet existing business needs.

The development will be built around four interrelated and interdependent clusters:

1. **Hastings Research Park, Hastings Technology Development Park, and**

[4] Michael Porter. The Competitive Advantage of Nations. Free Press, 1990.

Hastings Business Park – an integrated cluster of three sub–clusters collectively operating to produce new businesses driven by advances in research and technology development;

2. **Hastings Education Park** – a cluster of several world–class educational institutions helping to internationalise education;

3. **Hastings Life Park** – a medical, sports and fitness services cluster, comprising enterprises seeking to enhance the life–long health and fitness of H2000 residents and visitors through advanced health care services and world–class sports and fitness facilities; and

4. **Hastings Tele–Services Park** – a cluster of "tele–services" enterprises advancing the telecommunications reach of H2000 enterprises beyond state of the art capacities.

Figure 2 provides an overview of the technology "push" and "pull" relationships between these clusters.

In many cases enterprises working within the various parks will operate as research companies or technology development companies *per se* or as businesses which conduct their own research and/or technology development activities in–house.

Hastings Research, Technology Development and Business Parks

Hastings Research Park will attract research–based enterprises, funded by industry and government, in the business of developing "research packages"; ie, completed research projects having substantial and well conceived commercial development prospects.

Hastings Technology Development Park will be an aggregation of technology development and support companies, the former largely involved in taking up "research packages" and undertaking the necessary development work to produce "technology packages", ie. fully tested prototypes and limited demonstrations of technologies with significant prospects of establishing improved or competitive new industries.

Hastings Business Park will contain enterprises capable of taking "technology packages" through to "business packages", ie. viable businesses exploiting commercial opportunities presented by each technology package.

H2000 will provide an integrated research, technology development and business environment which will allow innovations to be taken from research results having commercial potential, through to proven technology and beyond, to new businesses and full scale enterprises. Some of these will remain in the region, others will be progressively sold as patents, technology packages and start–up businesses.

The relationship between these sub–clusters for the development of a particular technology for sewage recycling and resource recovery is shown in Figure 3. A further account of this Cassiro technology "push" activity is provided in a case study report in Appendix 1. An accompanying case study provides an account of another technology development activity by Cassiro to develop the machinery required to improve greatly the productivity of sodic soils for wide ranging horticultural purposes.

An H2000 feasibility study report entitled *Building Businesses for Sustainable Development* provides case study reports on two areas of technology development central to the H2000 philosophy:

- an existing technology commercialisation activity by Cassegrain Tradition Pty Ltd designed to "revolutionise" the quality of food processing for Australian and export markets; and

- a proposed technology commercialisation activity in solar power generation and co–generation for greenhouse–based horticulture.

Hastings Education Park

This cluster will contain institutions working at the primary, secondary and tertiary levels of education. Four examples of institutions envisaged within this cluster are outlined below:

- A proposal to establish **Hastings International University** (HIU) is already well advanced. HIU will provide courses to students from Australia, Asia, Europe and North America. Programs will be established initially in Business and Humanities followed by Resource and Environmental Management and Modern Engineering. The University will be financially independent and funded from student fees and other funding support made available through the Hastings Development Trust. An Interim Board of Governors and the Development Vice–Chancellor of HIU have been appointed and business and financial plans have been prepared. The first intake of students is expected in 1993.

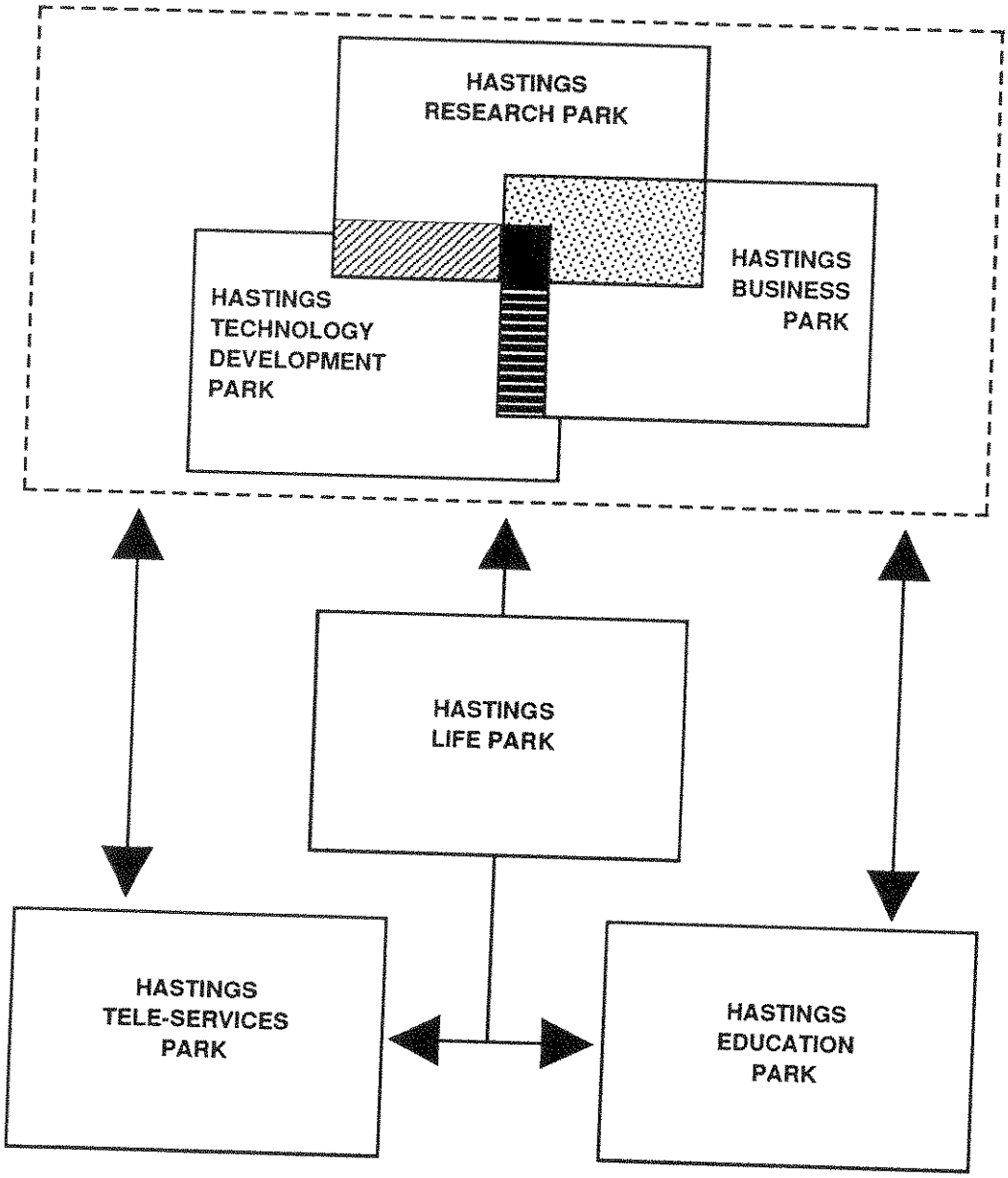


Figure 2: Hastings 2000 Industry Clusters

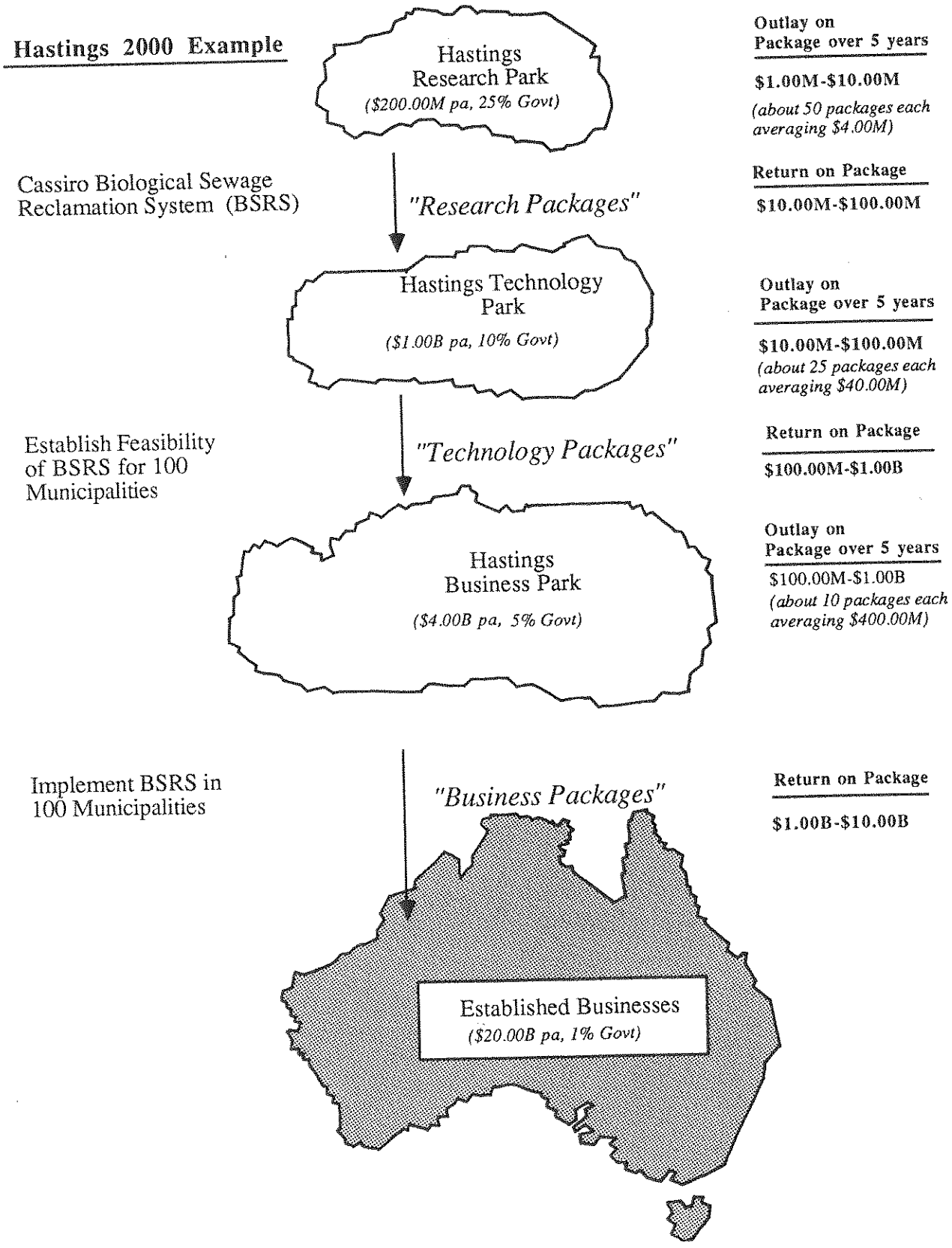


Figure 3: Research, Technology and Business Development Phases

- The **International Centre for Resource Economics Services and Training** (ICREST) which will be a specialist United Nations agency working in close collaboration with other agencies in the UN system. The Centre will also operate a network of proposed United Nations University Chairs in Resource Economics in several Australian universities, as well as the Hastings International University and the International Agribusiness University (see below). The main areas of interest are drylands, coastal zones and tropical agriculture including forestry.

- The **International Agribusiness University** (IAU) which will seek to develop a "value–adding" culture within Australia's agricultural industries. IAU will have close links with overseas universities and research institutions including the Montpellier "Agropolis" and University complex in France.

- The **Hastings School Park** which will include an International Baccalaureate School, a "multiple choice second language" Primary School, a College of Hotel Management and Tourism, a Language Institute, and a Secretarial College for foreign students.

Hastings Life Park

This cluster will be an integrated complex of medical, sports and fitness institutions directed towards the development of technologies, products and health care for all ages. Institutions envisaged include:

- The **Hastings Clinic** (styled on Mayo Clinic lines) to provide an extensive range of sophisticated medical services to Australian and Asian populations on–site and at a distance, through advances in telecommunications to extend the reach of medical technologies and services.

- A major research and technology development centre for gerontology.

- Extensive rehabilitation accommodation for recovering patients, accommodation for relatives and friends of patients and close links with H2000 educational facilities for patients.

- A centre for advising on and delivering fitness programs for a wide range of activities tailoured to the varying needs of those over 40, over 60 and over 80 years of age.

- The **Hastings Institute of Sport** serving as a private sector version of the Australian Institute of Sport.

- A world–class rowing course and regatta facilities shared with a world–class equestrian course.

- A major tennis complex and golf course.

Hastings Tele–Services Park

At its core, this cluster will operate as an office complex offering first–class accommodation for business and commercial services for H2000 enterprises and corporations locating their headquarters, regional offices or decentralised office functions in H2000. Rapid advances in modern telecommunications will soon provide alternative localities, like Port Macquarie, the opportunity to develop in this way. However, to achieve growth in the delivery of enabling "tele–services", key enterprises will need to be established. Consideration is being given to the establishment of a Hastings information technology corporation, hereafter referred to as Hitec. This corporation will:

- sustain a major R&D effort in software engineering and product development of decision support and expert systems essential to delivering a competitive advantage to all H2000 organisations, including state–of–the–art advances in software controlled telecommunications;

- aggressively commercialise and export software products created in collaboration with the widely varied organisations of H2000; and

- franchise Hitec's experience to provide the infotech support for other Australian urban areas developing along similar lines to H2000.

Leading enterprises which will be developed from and contribute to the synergy of H2000 through close collaboration with Hitec include:

- A technology linkage and trading corporation, referred to hereafter as Teklink providing H2000 and Australian clients with a complete technology advisory service ranging across:–

  - access to strategic information by technology–based companies seeking to establish markets in Australia and overseas;

- assistance to companies seeking to identify where technology might improve existing operations or new business opportunities which build on their strengths; and

- legal services involved in commercialising new technologies.

A "translation services" company and a "cultural interpretation services" company operating through the latest advances in telecommunications to assist H2000 and Australian companies win new export markets.

In addition to the tele–medical links serving the Hastings Life Park, it is envisaged that telecommunications could be used to expand HIU into campuses located in other H2000 type developments around Australia. Formal integration of such a network of campuses, in both private and public universities, as the Australian International University (at Hastings, at Manning, etc) would enhance the international marketing of the Australian tertiary education sector.

An overview of the interrelationship between the research, technology development and the new business sub–cluster and the Hitec and Teklink services is depicted in Figure 4.

5.3 The Activities Concept

The Hastings 2000 Project relies heavily on the **"planned"** establishment of leading core activities, with infrastructure support, to drive development in the region. Other core activities, service organisations and infrastructure that follow will be closely monitored.

Activities in the project fall under four major categories.

1. Leading core enterprises
2. Leading support activities
3. Following core enterprises
4. Following support activities

Core enterprises consist of those which primarily export goods and services from the Hastings region to other regions in Australia and overseas. "Leading core" enterprises act as catalysts for other core enterprises to follow.

Support enterprises are those whose goods and services are primarily consumed within the Hastings region. "Leading support" enterprises are essential for the establishment of core enterprises, for example a proposed regional and international freight airport.

Products to be packaged for airfreight and sea transport include food prepared by the sophisticated "sous–vide" or vacuum–packed method of cooking (already extensively trialed by the Cassegrain Tradition Pty Ltd), drawing in part from the resources of the region: namely, existing dairy products, wines, crayfish and oysters and projected inputs from Asian vegetable growing, mariculture and aquaculture operations, a regional abattoir using the most advanced robot technology in the world and a cognac and bourbon distillery.

"Following support" enterprises emerge as a consequence of the market created by general development, for example department stores. Some of these enterprises could locate outside the H2000 zone.

The "activities concept" encapsulates the manner by which the type of activities and their rate of growth will be controlled within the project. The control of core industry is an integral part of controlling and directing H2000. Core industry will be controlled by ensuring all the land associated with the project is within a land trust known as the Hastings Development Trust. Section 9.4 details the function and structure of this Trust.

As indicated previously, population growth will be closely correlated with the projected pattern of employment. In the inception stage, Year –1 (1992), a small group is required to commission and carry out the inception studies. The work force will expand rapidly in the first year of the implementation stage of the project as a consequence of construction workers moving into the area and the establishment of leading support industries. Core enterprises will be established from the second year.

Projected employment patterns are detailed in the two following tables.

Table 2 outlines the extent and timing of construction jobs associated with H2000. Note that growth will be managed to ensure that construction activity diminishes in the later years of the project to eliminate construction worker unemployment at the completion of the project.

Table 3 the extent and timing of permanent jobs created each year by Hastings 2000.

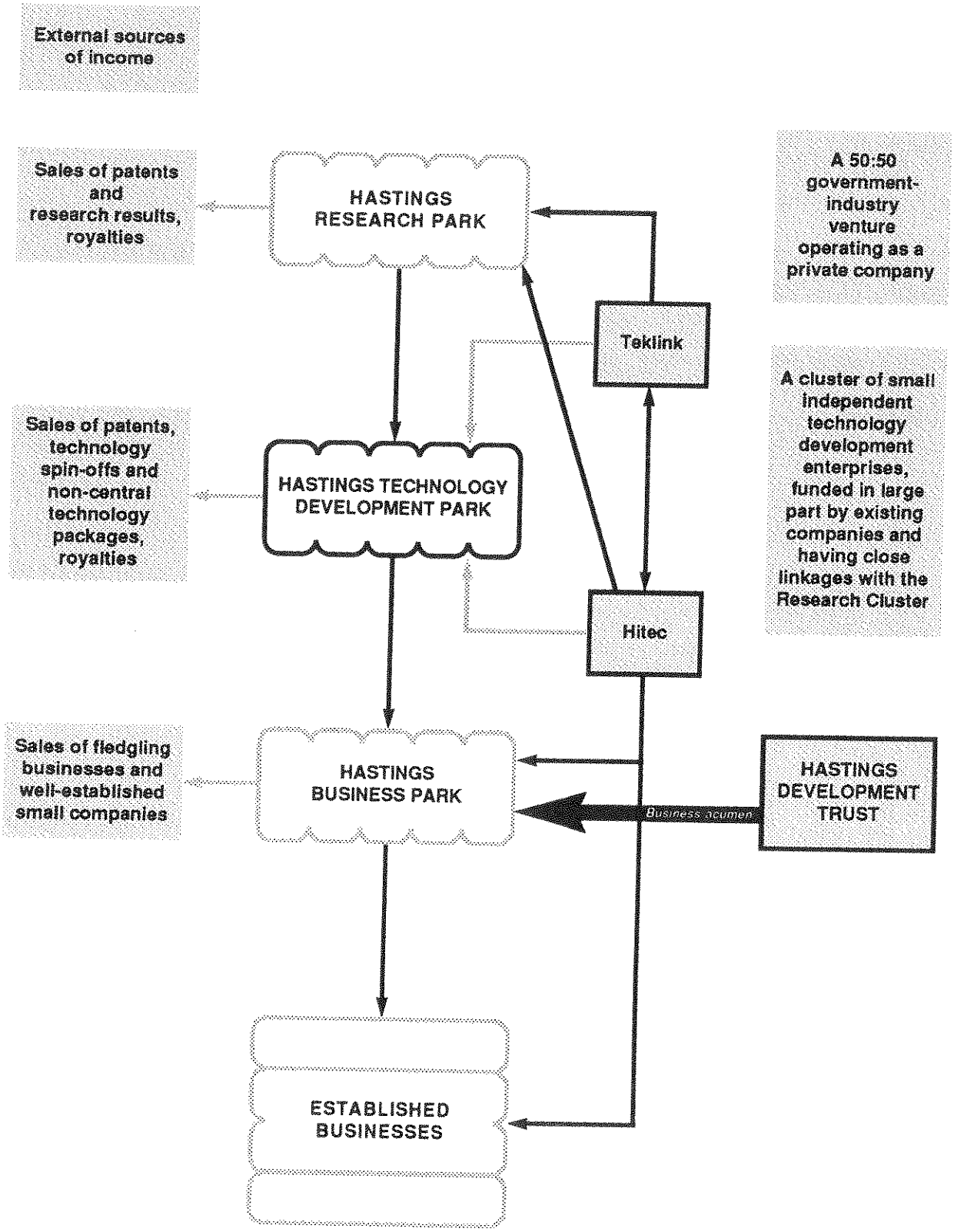


Figure 4: Technology Development Linkages

Table 2: Hastings 2000 Construction Job Requirements

YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	TOTAL
Construction Jobs to Build Core Industry Requirements	0	0	0	413	138	172	172	69	34	34	103	69	-34	0	-69	-172	-103	-172	653
Construction Jobs to Build Support Industry Requirements	0	0	0	395	132	165	165	66	33	33	99	66	-33	0	-66	-165	-99	-165	625
Construction Jobs to Build Total Residential Requirements	0	388	3	395	17	168	356	96	48	48	143	96	-46	1	-94	-235	-141	-235	1009
PRIMARY CONSTRUCTION JOBS	0	388	3	1202	287	505	693	230	116	116	345	230	-114	1	-228	-572	-343	-572	2287
SECONDARY CONSTRUCTION JOBS	0	103	1	319	76	134	184	61	31	31	91	61	-30	0	-61	-152	-91	-152	607
TOTAL INCREMENTAL CONSTRUCTION JOBS PER YEAR	0	491	4	1521	363	639	877	291	146	146	436	291	-144	1	-289	-724	-434	-724	2894
Jobs Taken by Existing Construction Workers	0	491																	491
NEW CONSTRUCTION JOBS	0	0	4	1521	363	639	877	291	146	146	436	291	-144	1	-289	-724	-434	-724	2403

Table 3: Hastings 2000 Permanent Job Requirements

YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	TOTAL
Core Industry Jobs	0	0	0	495	660	866	1073	1155	1196	1238	1361	1444	1403	1403	1320	1114	990	784	16500
Support Industry Jobs	0	0	0	564	752	988	1223	1317	1364	1411	1552	1646	1599	1599	1505	1270	1129	893	18810
Feasibility Study, Planning & Administration Workers		25																	25
TOTAL PERMANENT JOBS CREATED BY H2000 PER YEAR	0	25	0	1059	1412	1854	2295	2472	2560	2648	2913	3090	3001	3001	2825	2383	2119	1677	35335
CUMULATIVE TOTAL PERMANENT JOBS CREATED BY H2000	0	25	25	1084	2497	4350	6646	9117	11677	14326	17239	20328	23330	26331	29156	31539	33658	35335	

"Leading core" enterprises and organisations include the four clusters. "Leading support" enterprises and opportunities already exist in the region and are being further developed.

A major spare parts and heavy equipment company exists in the region, capable of servicing construction machinery required for the project. A quarry is also in operation, which can supply crushed rock to be used as construction material. Land has been acquired and designated as the best site for the regional and international airport. There is sufficient area to superimpose the two runways at Kingsford Smith Airport on the site. The airport will provide a rapid freight service to domestic and international markets for value–added products supplied by the Hastings 2000 Project.

Preliminary investigations have been made into the feasibility of establishing a service corridor linking the Hastings Valley with Sydney and Brisbane. Such a corridor would accommodate road, rapid rail, power and telecommunications facilities. Intra–regional rapid transit systems are also under consideration. These investigations will be pursued during the inception study stage of the project.

An investigation has been made into the possible re–diversion of the Hastings River to the sea, following the course of the original river bed. The main objective is flood mitigation, but an added benefit is the creation of a safe harbour which would act as a haven for boats and provide a base for the following proposals:

- A container handling port facility for high speed shipping using Australian built high speed, low draft ships to transport high value, low mass products from Port Macquarie's limited harbour facility to Asian posts only able to be reached by this type of shipping.

- The Hastings Tallships Academy comprising 20 tallships from 20 countries and serving as a world–class outward bound facility closely integrated with the international education program of the Hastings Education Park.

A valuable strip of coastal land would also be created that could be used for a world–class internationally administered Climate and Marine Centre and a major hotel resort.

The river diversion investigation has included a preliminary environmental study recommending management plans for the local estuarine environment. This has been supplied to the Hastings Municipal Council, National Parks and Wildlife and conservation groups.

Various "following core" industries have been identified for inception studies. Some, such as the Hastings Milk Co–operative and oyster and crayfish farms, already exist in the region. Proposed activities in the Hastings Valley include a large–scale technologically advanced regional abattoir with on–processing facilities and a plant for processing prawns and sea urchin processing. The existing Hastings Enterprise Centre has been investigating the prospects for introducing Asian vegetable growing and cognac and bourbon distilleries.

"Following support" activities include a Regional Hospital that would work in close association with the Hastings Life Park.

The San Crox vineyards and west to the ranges
Watercolour by Bryan Dowling

6. THE FINANCIAL BASIS OF HASTINGS 2000

6.1 Financial Plan Modelling

The Hastings 2000 Project is modelled in economic and financial terms by means of cash flow analysis using internal rate of return (IRR) and net present value (NPV) measures.

The modelling is carried out on a real cost basis in which costs and prices in 1990/91 values are used over the 17 year development period. Inflation has been ignored, real growth in costs and prices are included and the results are real rates of return. Capitalisation rates commonly used in the valuation and analysis of real property are real rates of return. The alternative is to apply forecast rates of inflation to the costs and prices with the results being money rates of return comparable to returns from fixed interest securities, bonds, the money market and so on.

The model comprises forecast receipts and expenditures set out as annual cash flows.

Receipts are:

- sale of residential lots;
- sale of residential buildings;
- sale of industrial (and other non residential) land;
- sale of franchises; and
- administration and maintenance fee income.

Expenditures are:

- value of raw land;
- inception study costs;
- residential land subdivision costs;
- living environment construction costs;
- industrial land subdivision costs; and
- administration and maintenance costs.

The net cash flows, receipts less expenditures are then invested in core and support industries to generate their own return (see below).

Whilst the data used in the model have been researched in part, many are based upon assumptions and upon empirical calculations. Most of the assumptions are conservative; all of the assumptions are tested for their sensitivity on the project's calculated IRR and particular attention is paid to the more critical ones. One of the purposes of the inception study stage of the project is to research and test in detail the assumptions utilised in this feasibility financial analysis.

6.2 Receipts (refer Table 4)

Total revenue over the life of the project is calculated at $6.325 billion, derived in the following manner:

- **Sale of residential entitlement (RE) land and residential buildings**

  Annual sales comprises RE land supplied by the Hastings Development Trust (HDT) together with residential buildings constructed by HDT on 75% of the entitlements. Average residential building prices are $150,000 per dwelling. Average RE prices are $75,000 each taking into account multi–level, multi–unit lots on the one hand and single–level, single–unit lots on the other. The average lot comprises land sufficient for a three–level building containing a single residence of 140 m^2 on each level together with a single covered car space for each residential unit and access thereto (46.67 m^2 per unit) and private open space for each residence of 46.67 m^2 per unit. Thus the per residence average net land requirement is 140 m^2.

  Lot prices are forecast to increase in real terms at 5% per annum in years 2–4, 10% p.a. in years 5–8, 3% p.a. in years 9–10 and 1% p.a. thereafter.

  The annual numbers of lots projected to be supplied by HDT are calculated as follows (all cash flows are based on the assumption that the residential equivalent lot sales occur in the year after their production):

  to housing requirements for permanent jobs created at 0.7143 households per job (60% single income, 40% double income)

  add

  growth of household numbers in Port Macquarie at 4.5% p.a. initially and reducing to a conservative 1% p.a. (commencing with 10,000 existing households)

  add

  construction workers land only and house/land packages

Table 4: Hastings 2000 Cash Flow Receipts

Year Ending December 31	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Totals
PROJECTED RESIDENTIAL SALES BY HDT																			
Projected Land Value (per Residence)				75000	78750	82688	86822	95504	105054	115560	127116	130929	134857	138903	140292	141695	143112	144543	
Projected Residential Land Sales ($million)	0.00	0.00	0.00	0.00	9.33	25.25	35.24	40.88	45.19	47.80	58.67	64.00	61.63	61.53	54.78	42.37	36.01	24.39	607.07
Projected Residential Land/Building Package ($million)	0.00	0.00	0.00	0.00	81.29	213.15	288.37	315.24	329.16	329.56	383.71	411.95	390.52	383.90	340.07	261.65	221.29	149.11	4098.99
Gross Sales – Residential ($million)	0.00	0.00	0.00	0.00	90.62	238.40	323.61	356.12	374.36	377.37	442.38	475.95	452.15	445.43	394.85	304.02	257.30	173.51	4706.06
PROJECTED CORE & SUPPORT INDUSTRIAL LAND SALES																			
Industrial Land Value (per Job)				3750	3938	4134	4341	4775	5253	5778	6356	6546	6743	6945	7015	7085	7156	7227	
Gross Sales Industrial Land ($million)	0.00	0.00	0.00	3.97	5.56	7.66	9.96	11.80	13.45	15.30	18.51	20.23	20.24	20.84	19.81	16.89	15.16	12.12	211.52
SALES VALUE OF FRANCHISES																			
Sale of Rights to Supply Construction Services & Material ($million)				167.76															167.76
Sale of Financial Services Rights ($million)				69.51															69.51
Sale of Options on Commercial Sites ($million)					128.61														128.61
	0.00	0.00	0.00	237.27	128.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	365.88
ADMINISTRATION & MAINTENANCE INCOME																			
Community Administration Fee Income ($million)	0.00	0.00	0.00	0.00	0.47	1.70	3.32	5.03	6.75	8.41	10.25	12.21	14.04	15.81	17.37	18.57	19.57	20.25	153.73
	0.00	0.00	0.00	0.00	0.47	1.70	3.32	5.03	6.75	8.41	10.25	12.21	14.04	15.81	17.37	18.57	19.57	20.25	153.73
HDT GROSS REVENUE	0.00	0.00	0.00	241.24	225.26	247.76	336.89	372.96	394.55	401.08	471.15	508.39	486.42	482.08	432.03	339.47	292.04	205.87	5437.19

less

Hastings 2000 workers resident outside the area (10%)

less

existing residences currently accommodating unemployed persons who take work in Hastings 2000 (23% of 4,000 unemployed over the first three years

less

Hastings 2000 workers resident in Port Macquarie (a 15% leakage factor has been allowed for increases in residential densities in existing residential areas of Port Macquarie over the life of the project)

less

existing developed but vacant lots in Port Macquarie (600 lots taken up first)

less

existing zoned but residentially undeveloped lots (1,716 taken up before HDT lots sold. It is assumed that no further residential zoning is to take place in Port Macquarie).

The sale of residential lots outside of the Hastings 2000 zone, either through the expansion of existing residential zones in Port Macquarie or elsewhere, or by increasing residential densities in existing zones, will be catering for a demand created by the Hastings 2000 Project.

The control of these leakages is vital for the internalisation of value and financial viability of the project. Furthermore, if such a process were allowed to occur, it would defeat one of the purposes of H2000 – ie. the elimination of coastal degradation and rural land fragmentation caused by the present urban expansion process.

Some allowance for leakages, as outlined above, is made. The mechanism which will control the extent of that leakage is discussed in further detail in Section 9.1.

- **Sale of Industrial land**

Annual sales comprise land area to be released by HDT. Prices commence at $\$50/m^2$ ($3,750 per job where each job requires an average of 75 m^2 of land including land covered by buildings, car parks, open space, roads and drains) and which increase in real terms as for residential land.

The sales receipts are calculated as the product of annual jobs created and the sale price per job. (Again, it is assumed that industrial lots are consumed in the year after their production).

- **Sale of Franchises**

It is considered that three possible franchise areas offer means of additional income and these have been included as cash receipts:

- Rights to supply construction services and material (under pre–determined negotiated conditions) at 2.5% of total construction cost.
- Rights to supply financial services (housing finance, industry finance, superannuation, savings deposits) at 1.0% of turnover.
- Sale of options on commercial sites for the ongoing supply of personal and industry consumables at 1.0% of value of the business during the development phase.

The preparation of franchise sales contracts are to be formulated as part of the detailed engineering and architectural studies.

The average salary assumed at $45,000 per annum increasing in real terms at the same rate as residential and industrial land prices. This salary is above national average because of the type of industry and the flow–on expectation resulting from the increased productivity of the environment.

The incidence of Federal and State taxation is calculated and Hastings 2000 will provide in excess of $1 billion annually (in 1991 dollars). A substantial proportion (around 30%) is likely to be a net increase to the National Account.

- **Administration and Maintenance Fee Income**

Each residence is rated at $1,000 per annum. The initial corresponding costs are the administration costs associated with the early construction stages of the

project gradually being replaced by infrastructure service maintenance. The community titles legislation is used to facilitate the bulk of the physical and social infrastructure services being supplied by private enterprise under competitive conditions.

6.3 Expenditures (Table 5)

Total expenditure over the life of the project is calculated at $5.504 billion. It is derived as follows:

- The value of raw land includes the 1,033.45 contiguous hectares currently owned by G.C. & Co which is valued at $30 million. The total land required is 1,750 hectares which gives a total value of $50.8 million pro rata. This valuation includes an additional 650 hectares of land 14 kilometres to the north of the H2000 area owned by G.C. & Co and set aside for a regional jet and international freight airport.

- Intellectual property costs, including all feasibility studies and plans completed to date are estimated at $10 million with an additional $10 million to be spent on detailed implementation studies and promotion over the next two years.

- RE subdivision costs are calculated at $25,000 per average residence. Initial headworks are assumed to be covered by excess capacity of Port Macquarie headworks, so that large scale expenditure is not required in the early years. Initial headwork augmentation costs to council are included in the above costs. Subsequent infrastructure costs form part of the support industry investment requirements. These investments are calculated to give an adequate commercial return through the sale of the services, eg sewerage, water, road rates, school and university fees, library dues.

- Living environment construction costs are $10,000 per R.E. lot, giving approximately $280,000 per hectare for building golf courses, bicycle and horse riding tracks through nature reserves, playing fields, lakes, club houses, community centres, places of worship, child care centres, marinas, nature corridor bridges, landscaping and picnic areas.

- Residential building costs are averaged at $125,000 per residence.

- Industrial land subdivision costs are $1,875 per job including core and support jobs. This equates to $25/m^2 in conventional development terms.

- Administration and local infrastructure maintenance costs are $5 million per annum fixed costs ($400 per residential lot) plus $600 per lot variable costs.

- Interest at 10% real rate (15% money market rate) on initial development funds required (both debt and equity). In fact, only minimal working capital is required for development costs, because of the postponement of headworks and the early receipt of cash flow through sales of franchises.

6.4 Investment in Core and Support Industries (Table 5)

HDT have determined that they will reinvest positive annual cash flows (less $10 million retained for working capital), in core and support industries for which they are prepared to accept an average real return of 5% per annum.

Total funds available for investment in industry by HDT over the life of the project are $2.589 billion.

The financing of a substantial proportion of industry investment costs, at an average rental return of 5% pa, is effectively a subsidy allowance built into the model to assist in attracting targeted industries to the project.

One of the objectives of the promotional stage of the detailed study will be to test whether this subsidy allowance, together with all the other features of the Hastings 2000 Project, will provide sufficient relocation and start up incentives for industries. The attraction of industry drives the Hastings 2000 Project. Leading core and support industries are expected to require greater subsidy than following core and support industries. Some following core and support industries investment will be without subsidy.

The total investment in industry by HDT has a reversionary value equivalent to the income received (the 5% return) in the last year, which has been capitalised at 5%. This, in effect, becomes one of the major assets of HDT at the end of the project (Refer Table 12). For purposes of quantifying the financial returns, it is assumed that subsidies will cease at this time.

Table 5: Hastings 2000 Cash Flow Expenditures

Year Ending December 31	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Totals
HDT GROSS REVENUE	0.00	0.00	0.00	241.24	225.26	247.76	336.89	372.96	394.55	401.08	471.15	508.39	486.42	482.08	432.03	339.47	292.04	205.87	5437.19
DEVELOPMENT EXPENDITURE																			
Residential Land Subdivision ($million)	0.00	0.00	0.00	11.85	30.54	40.59	42.80	43.02	41.37	46.16	48.88	45.70	44.29	39.05	29.90	25.17	16.88	0.00	506.17
Living Environment Construction ($million)	0.00	0.00	0.00	4.74	12.21	16.24	17.12	17.21	16.55	18.46	19.55	18.28	17.72	15.62	11.96	10.07	6.75	0.00	202.47
Residential Building Construction ($million)	0.00	0.00	0.00	44.42	114.51	152.21	160.51	161.32	155.13	173.08	183.30	171.37	166.10	146.43	112.12	94.37	63.28	0.00	1898.15
Industrial Land Subdivision ($million)	0.00	0.00	1.99	2.65	3.48	4.30	4.63	4.80	4.97	5.46	5.79	5.63	5.63	5.30	4.47	3.97	3.14	0.00	66.21
Administration Costs ($million)	0.00	0.00	0.00	5.00	5.28	6.02	6.99	8.02	9.05	10.04	11.15	12.32	13.42	14.48	15.42	16.14	16.74	17.15	167.24
Land ($million)	30.00	0.00	10.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.61
Feasibility Study Costs ($million)	10.00	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
HDT TOTAL DEVELOPMENT COSTS	40.00	5.00	17.60	68.65	166.02	219.35	232.06	234.36	227.06	253.21	268.68	253.30	247.17	220.88	173.87	149.71	106.79	17.15	2900.85
HDT NET CASH FLOW BEFORE INTEREST	−40.00	−5.00	−17.60	172.59	59.25	28.41	104.83	138.59	167.50	147.87	202.48	255.09	239.26	261.20	258.16	189.75	185.24	188.73	2536.34
Cumulative Cash Flow	−40.00	−45.00	−62.60	109.99	169.24	197.65	302.48	441.08	608.57	756.44	958.92	1214.01	1453.26	1714.46	1972.62	2162.37	2347.61	2536.34	
Interest on debit balance ($million)	4.00	4.50	6.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.76
HDT NET CASH FLOW WITH INTEREST	−44.00	−9.50	−23.86	172.59	59.25	28.41	104.83	138.59	167.50	147.87	202.48	255.09	239.26	261.20	258.16	189.75	185.24	188.73	
Working Capital Retained	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Funds Available for Investment	0.00	0.00	0.00	162.59	59.25	28.41	104.83	138.59	167.50	147.87	202.48	255.09	239.26	261.20	258.16	189.75	185.24	188.73	2588.94
HDT INVESTMENT IN INDUSTRY																			
Investment of Funds by HDT in Industries ($million)	0.00	0.00	0.00	162.59	59.25	28.41	104.83	138.59	167.50	147.87	202.48	255.09	239.26	261.20	258.16	189.75	185.24	188.73	2588.94
Cumulative Investment ($million)	0.00	0.00	0.00	162.59	221.84	250.25	355.08	493.67	661.17	809.04	1011.51	1266.60	1505.86	1767.06	2025.22	2214.97	2400.21	2588.94	
Return on Investment (@ 5%) ($million)	0.00	0.00	0.00	8.13	11.09	12.51	17.75	24.68	33.06	40.45	50.58	63.33	75.29	88.35	101.26	110.75	120.01	129.45	886.70
Reversionary Value of Industrial Property ($million)																		2588.94	2588.94
FINANCIAL RESULTS																			
HDT NET CASH FLOW	−44.00	−9.50	−23.86	18.13	11.09	12.51	17.75	24.68	33.06	40.45	50.58	63.33	75.29	88.35	101.26	110.75	120.01	2718.39	

INTERNAL RATE OF RETURN	32.79%		
NET PRESENT VALUE	£65.71	millions	@25.00%
PRESENT VALUE	£132.57	millions	@25.00%

6.5 Results and Sensitivity Analysis

An analysis of the net cash flows results in:

- Internal rate of return (real) 32.79%
- Net present value (based on a conventional nominal property profit and risk allowance of 25% real rate, plus inflation) $65.71M
- Present value (of cash inflows as at 1991) $132.57M

Alternative analyses have been carried out with amended values for all input variables in order to test the sensitivity of the variables on the results. In the event, most of the variables do not substantially affect the results when treated in isolation. The following are the key sensitivity variables.

- The financial analysis is driven in the first instance by the number of core jobs created which, by means of a multiplier (1.14) for support jobs arrives at total jobs and, in turn as discussed above, amount of development.
- The effect of a reduced number of core jobs is tested in Table 6. It shows that for every 1,000 core jobs which are not achieved, the IRR falls by 0.5 to 1.0 percentage points.
- The rate of growth of core jobs is also a key variable. It is assumed that all 16,500 core jobs are created in a 15 year period. An increase in this period is tested in Table 7. This shows that for every increase of five years, the IRR decreases by 2 to 3 percentage points.
- The average residential entitlement (RE) land price is assumed to be $75,000. Standard lots in Port Macquarie are currently selling at around $50,000. It is argued that the higher quality of the Hastings 2000 environment, with its substantial living environment area, including private club–like access to several recreational facilities and the almost tripling of the regional average income will lead to higher prices. In Table 8, the effect of achieving lower RE land prices is tested. For every shortfall of $10,000 per RE land overall, the IRR falls by 1 to 2 percentage points.
- As discussed previously, a major incentive to assist in the creation of Hastings 2000 is the planned investment by HDT in core and support industry with a required real rate of return of 5%. In other words, HDT will own the real estate component of approximately two thirds of industries ($2.589 billion of a total industry investment of $4.038 billion) which will pay rental of 5% of value, a substantial saving to those industries. Thus, a major component of investment returns is affected by the provision of this incentive.
- Lower rates of return are tested in Table 9. This shows that for each of the first two percentage points by which the real return is reduced, the IRR is reduced by approximately 3 percentage points and with further falls in real return, the fall in IRR increases dramatically. In other words, the IRR is sensitive to increasing subsidy incentives through a further lowering of rental returns.
- Real growth rates have been applied to land values and to incomes (see above). If these do not eventuate, and there is no real growth, the IRR falls by almost 5 percentage points.
- The sale of franchises in the early years of Hastings 2000 has a two–fold beneficial effect on the results. First, it provides a large cash inflow early in the project. Second, it obviates the need to raise finance for working capital beyond the initial equity capital. The effect of reduced franchise values is shown in Table 10. A reduction of up to 50% of franchise value has a relatively marginal reduction in results and no requirement for extra working capital. Whereas a reduction well in excess of 50% of franchise value provides a substantially reduced result and a significant requirement for working capital.

A profit and loss statement covering the whole development period is illustrated in Table 11. This demonstrates a gross trading profit in the order of $821 million. Equivalent residential land sales would have to fall to an average price of $35,000 to reduce profit to zero.

A balance sheet is prepared at the end of the development period (Table 12).

Table 6: Sensitivity Analysis: Number of Core Job

Jobs	IRR (%)	NPV ($M)	PV ($M)
16,500	32.8	65.7	123.6
15,000	31.6	53.2	120.0
13,500	30.3	40.7	107.4
12,000	28.9	28.3	94.7
10,000	26.7	11.6	77.9

Table 7: Sensitivity Analysis: Rate of Growth

Years	IRR (%)	NPV ($M)	PV ($M)
15	32.8	65.7	132.6
20	29.3	31.4	97.9
25	26.6	10.8	77.1
30	24.5	(3.0)	63.2

Note: This study shows rate of growth and ignores continued growth beyond 15 years. For example, the 30 year period is equivalent to an assessment of 8,250 jobs created over 15 years.

Table 8: Sensitivity Analysis: Land Sale Price Per Lot

Price	IRR (%)	NPV ($M)	PV ($M)
75,000	32.8	65.7	132.6
65,000	31.4	50.4	117.3
50,000	28.9	27.5	94.4
40,000	26.9	12.2	79.1

Table 9: Sensitivity Analysis: Investment in Industry

Real Rate of Return	IRR (%)	NPV ($M)	PV ($M)
5%	32.8	65.7	132.6
4%	30.2	40.2	107.1
3%	27.2	14.7	81.6
2%	23.2	(10.8)	56.1
1%	17.0	(36.3)	30.6
0%	NIL	(61.8)	5.1

Table 10: Sensitivity Analysis: Sale of Franchises

Proportion of Total Franchises Sold	IRR (%)	NPV ($M)	PV ($M)	Working Capital Required ($M)
100%	32.8	65.7	132.6	62.6
75%	31.3	53.2	120.0	62.6
50%	29.5	38.5	105.4	62.6
25%	25.6	5.5	72.3	105.2
0%	21.1	(46.3)	20.6	196.6

Table 11: Hastings 2000 End Project Profit and Loss

Receipts	**$ Millions**
Residential Sales	4,706
Industrial Land Sales	212
Franchises	366
Administrative Income	154
Return on Investment in Industry	887
Total	**6,325**
Expenditure	
Land and Feasibility	61
Residential Subdivision	506
Living Environment	202
Residential Construction	1,898
Industrial Subdivision	66
Administration	167
Investment in Industry	2,589
Interest	15
Total	**5,504**
Gross Operating Profit Before Tax	821

Table 12: Hastings 2000 End Project Balance Sheet

Assets		**Equities**	
– Cash	$ 821 million	– Liabilities	Nil
– Industrial Property (Yr 15 rental value capitalised at 5%)	$2,589 million	– Retained profits	$821 million
		– Shareholders Equity	$2,589 million
	$3,410 million		$3,410 million

7.1 Physical Description of the Area

The physical plan for Hastings 2000 is based around the goals of:

1. preservation of the extremely attractive coast and hinterland of the Hastings Valley;

2. absorbing the proposed additional population with minimum disruption to the existing eco–systems; and

3. developing new ways of putting together tried concepts which remain acceptable in an Australian real estate context.

The principles of environmental soundness will permeate all aspects of the H2000 development, while at the same time creating an extremely attractive climate for business development.

The site area for H2000 is approximately 10km long in the east–west direction and from 4.5 to 6.5km wide in the north–south direction. It straddles the area across the Pacific Highway from Rawdon Island to the existing Airport and the western extremities of the Port Macquarie township.

It takes in a range of landscape types including wetlands, fed from the Hastings River, low lying flood prone land currently used for farming, open savanna woodlands, Clos farming, Wineries and wooded hilly areas, leading to bushland ridges and areas of State forest.

Map 1 illustrates the various landscapes of the Hastings 2000 zone.

Most of the land has been surveyed at contour intervals of 0.5 metres and the information stored in the BHP Engineering computer. This information will provide the basis for a geographic information system to support resource assessment and planning.

The landscape planning determinants of the Hastings 2000 area can be categorised into a number of site forms:

. The bush ridge behind Le Clos Sancrox.

This is generally an area of second growth forest with some original primary growth. It will be excellent for bushland living, and, sensitively done, can be suitable for medium density housing which will also enjoy the magnificent views to the ocean and the hinterland. There are some good examples of melding suburbs into the bush in both Melbourne and Sydney suburban areas including Woodridge near Eltham, areas of Montmorency, and especially Castlecrag and Eaglemont.

The main problems will be the areas taken up for roads and parking, and this would be a useful segment in which to consider other forms of personal transportation and also solve the multi level circulation requirements for residents.

. The area south–west of the Airport.

This area is gently undulating, with pockets of melaleuca swamp, and extensive ring–barked trees. The site has interesting contours, and with sensitive landscaping is excellent for residential village accommodation or a full range of other uses.

. The University site.

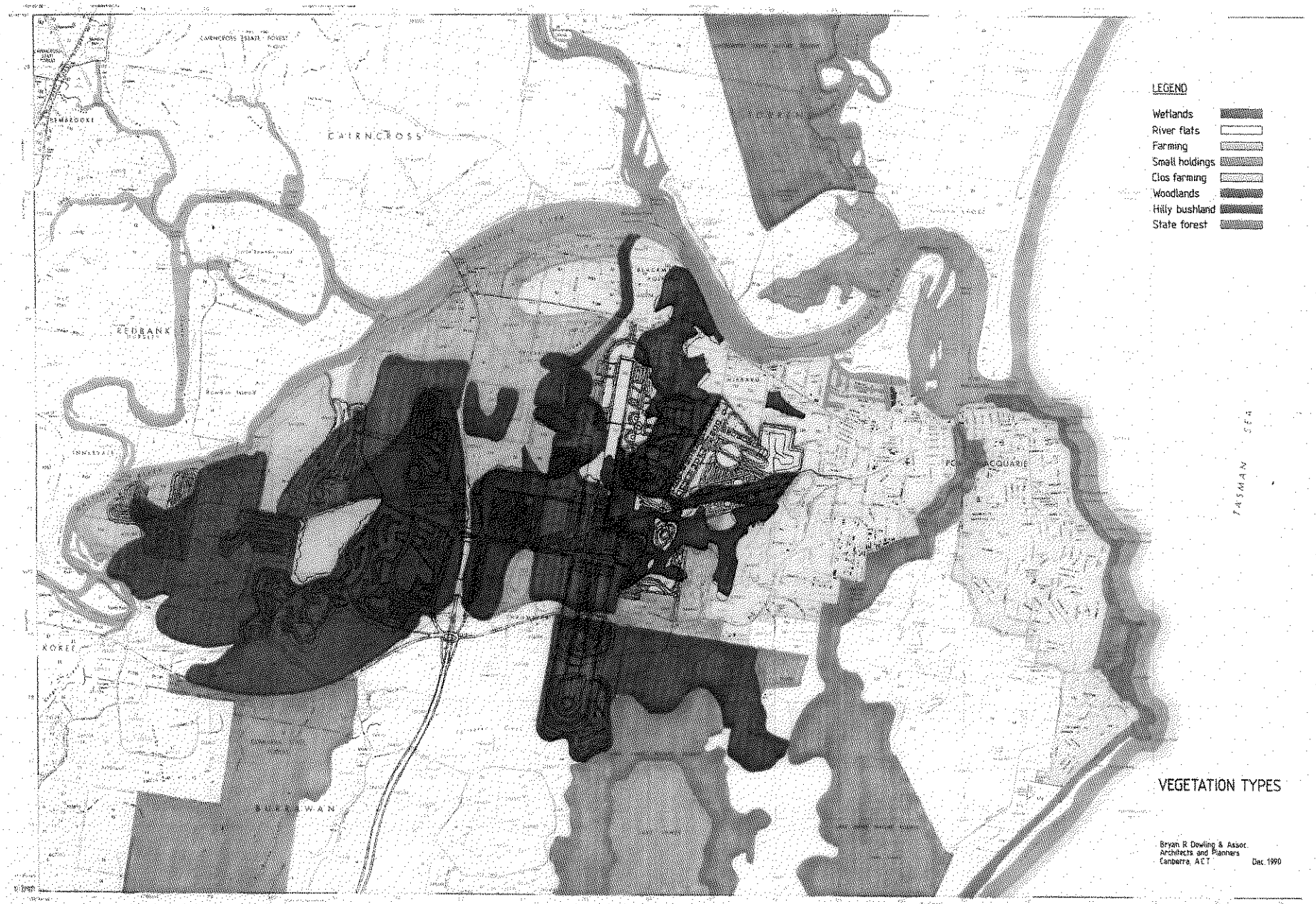
A range of sandy soil with clays on the hillier areas, a great deal of casuarina forest, but with a range of forest, woodland and savanna environments. Interesting contours that can be used to advantage with views across the wetlands. A surprising intimacy to the landscape.

. The Rowing Course site.

The flood plain, with its areas of peat, drainage systems and surrounding forest land is a particularly attractive area, perhaps a little reminiscent of the Loire Valley or the Camargue to provide the background for an exercise in French Classical landscape.

. Existing Airport and surrounding flat sandy areas.

Principally with low casuarina growth and with some areas flood prone, if below the 4 metre contour (this figure generally allows for increased levels due to the greenhouse effect). This land is generally suitable for development subject to more detailed analysis of sub–soil conditions and flood mitigation controls.



Map 1: Hastings 2000 Landscape Vegetation Types

- The River Flats

  This area is particularly attractive, especially towards the western portion of the Hastings 2000 site. Parts are suitable for farming and dairying, and the visual amenity and ecology of these areas must be preserved to the maximum extent.

- The Wetlands

  The extent of wetlands in the area has already been studied by the New South Wales Government and the concept plan recognises the place of the wetlands in the creation of the layout. The detailed interface with the treatment of these areas will be an essential part of proposed Socio–Economic and Ecological Resources (SEER) Survey (refer Section 10.3).

7.2 Area, Density and Population Growth Details

The breakdown of the anticipated 1,750 hectare of land which will be committed for the realisation of the Hastings 2000 Project is as follows:

- 1,033 hectare is owned by Gerard Cassegrain & Co. Pty. Ltd. This land is deliberately being withheld from the land fragmentation subdivision process.

- Some 400 hectares of land is owned by landowners who have expressed their willingness to pool their land in the project. These landowners have not as yet formally committed their land to the project, waiting for the government response to this submission and the raising of the $10 million required to complete the detailed study and promotion. They are however, likely to do so as equity investors if the project passes its next stage.

- Some 300 hectares of land within the area is owned by Hastings Council and currently being utilised as the Airport. This land would be available to the project once the new regional airport north of the Hasting River is established.

- An additional 300 to 400 hectares of suitable land in the project's area exists. This land is owned by many owners who at this stage have not been approached. It is anticipated that some of this land could be acquired for the project if the landowners did not wish to participate in a pooling arrangement.

Of the 1,750 hectares of land, some 400 hectares of land is unsuitable for building due to flood storage requirements and wetland areas. This land, however, still forms an important part of the project for such uses as open space, sporting and recreational amenities and nature conservation.

The projected residential requirement for the additional 70,000 persons in Port Macquarie over the 15 year life of the project is 26,545 dwellings. While this growth is driven almost totally by employment opportunities within H2000 dwellings (i.e. it is envisaged that economic growth will virtually replace existing retirement driven growth), allowance is made for various leakages – for example, some people working within H2000 will reside outside of it at Port Macquarie and elsewhere. The leakages have been fully detailed in Section 6.2. Accordingly, the anticipated project dwelling requirement is 20,247 residences.

Table 13 (outlines the projected timing for the provision of these residential rights.

The projected growth rate of 70,000 persons over a 15 year period equates to 4,666 persons per year. It is of interest to note that Professor Yenken in his report on the MFP reached the conclusion that an average population increment of about 5,000 per year is the maximum tolerable in new town developments. Hastings 2000, even with its deliberate philosophy of massive growth in the shortest possible time, remains within these limits.

It is also possible to compare the Hastings 2000 projected growth rate with the rates of growth experienced by various British new towns. This is outlined in Table 14. While some British new towns are acknowledged as being far more successful than others, the above comparison does indicate that the rate of growth envisaged for H2000 is plausible.

7.3 Structure Plan Concept

The initial structure plan was prepared to test the practicalities and constraints of locating the H2000 on the available land. The plan follows the broad outlines already determined by the Hastings Shire in their outline zoning plan titled Hastings Coastal Development Structure Plan 1990.

Table 13: Hastings 2000 Projected Dwelling Provision

YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	TOTAL
A. PERMANENT RESIDENCES REQUIREMENTS FOR PORT MACQUARIE AND H2000 PER YEAR																			
Housing Requirements for Permanent Jobs	0	18	0	757	1009	1324	1639	1766	1829	1892	2081	2207	2144	2144	2018	1702	1513	1198	25240
Add Growth of Port Macq excluding H2000	0	450	470	491	342	117	119	120	121	122	123	125	126	127	128	130	131	132	3375
Less Residences outside Port Macq accommodating H2000 workers	0	2	0	76	101	132	164	177	183	189	208	221	214	214	202	170	151	120	2524
Less existing residences accommodating unemployed taking work in H2000				229	286	143													657
	0	466	470	943	964	1166	1594	1709	1767	1825	1996	2111	2055	2057	1944	1662	1493	1211	25433
B. ACCOMMODATION REQUIREMENT FOR CONSTRUCTION WORKERS																			
Total Accommodation Requirements	0	0	4	1412	337	593	814	270	136	136	405	270	−133	1	−268	−672	−403	−672	2232
Less Existing Residences Accommodating unemployed taking on construction work				571	286	286													1143
	0	0	4	841	51	307	814	270	136	136	405	270	−133	1	−268	−672	−403	−672	1089
TYPE OF ACCOMMODATION																			
Budget Accommodation (Flats/Caravans)		0	3	588	(133)	37	498	(35)	(122)	14	229	81	−228	−27	−161	−417	−94	−255	−23
Purchases House/Land Package		0	1	169	95	235	204	197	217	95	122	122	81	41	−80	−161	−201	−309	826
Vacant Land (Owner Builder)		0	0	85	89	36	112	108	41	27	54	68	14	−13	−27	−94	−107	−107	285
	0	0	4	841	51	307	814	270	136	136	405	270	−133	1	−268	−672	−403	−672	1089
C. LAND & BUILDING PACKAGES & VACANT LOTS PROJECTED TO BE SUPPLIED BY HDT																			
House & Building Package plus Vacant Lots	0	466	471	1197	1149	1437	1910	2014	2024	1947	2172	2300	2150	2084	1838	1407	1184	794	26545
Less Increased Population Density of existing Township of Port Macq	0	70	71	179	172	216	287	302	304	292	326	345	323	313	276	211	178	119	3982
Less Existing Vacant Lots	0	396	204																600
Less Undeveloped Residential Lots Outside of H2000		0	196	1017	503														1716
PROJECTED EQUIVALENT RESIDENTIAL RIGHTS SOLD	0	0	0	0	474	1221	1624	1712	1721	1655	1846	1955	1828	1772	1562	1196	1007	675	20247

Table 14: Comparison of Hastings 2000 Growth Rate with the British New Town Experience

New Town	Original	at 31/12/74	Projection Period	Annual Growth Rate (%)
Hemel Hempstead	21,000	73,000	27	7.6
Peterleigh	200	26,500	26	21.2
Corby	15,700	53,750	24	5.3
Cumbernauld	3,000	38,500	19	14.4
Runcorn	28,500	48,200	10	6.9
Milton Keynes	40,000	64,000	7	6.9
	Original	**Proposed**		
Hastings 2000	27,000	102,200	15	9.3
	27,000	102,000	20	6.9
	27,000	102,000	25	5.5

Source: Town and Country Planning in Britain, J.B. Cullingworth, 6th Edition.

The Structure Plan Concept for H2000 is outlined in three plans.

Concept Plan. This shows the proposed indicative layout of H2000 – Map 2.

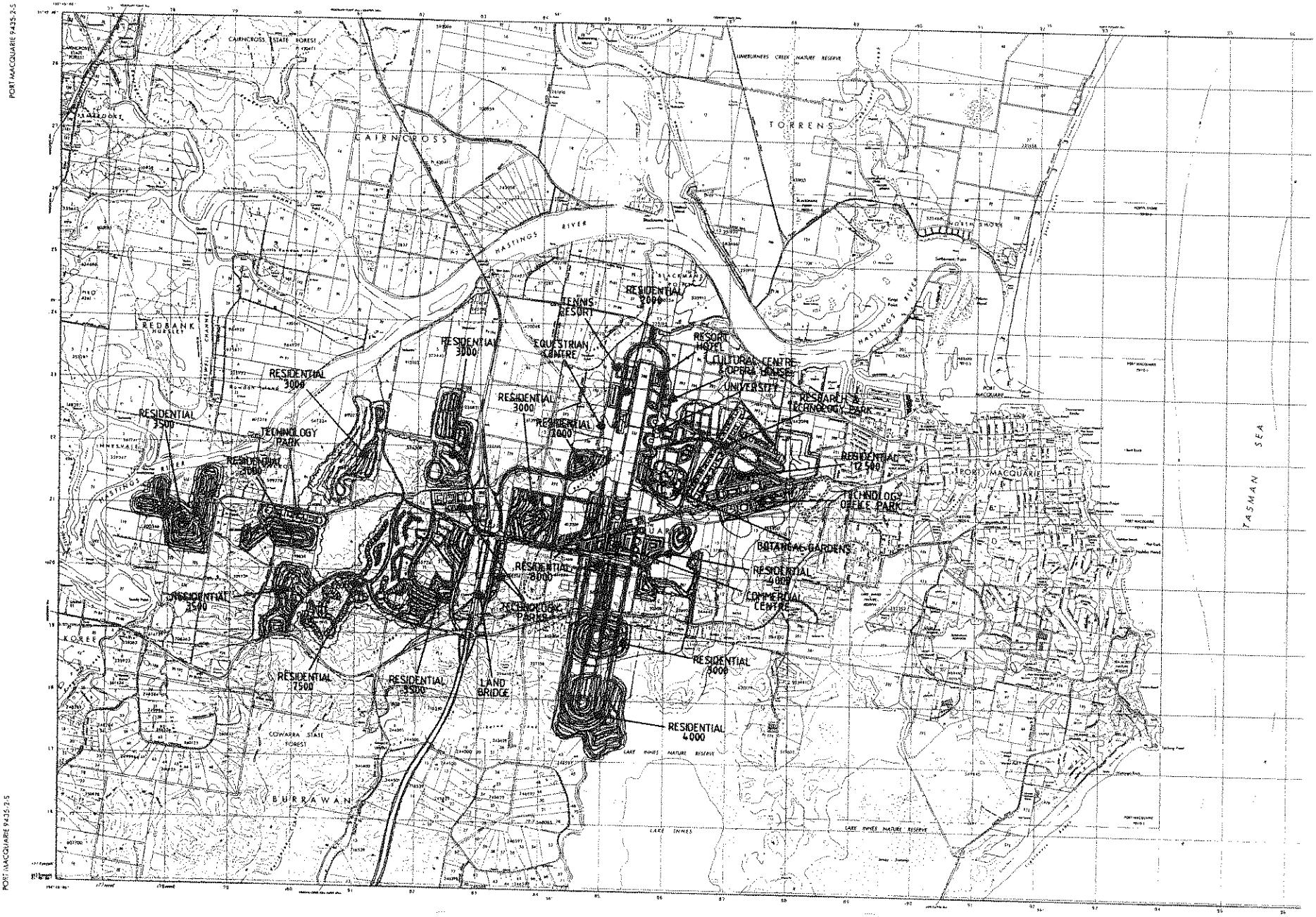
Components Plan which outlines the various residential neighbourhood population and the location of specific components of H2000. This is essentially an accompanying plan providing greater definition to the Concept Plan – Map 3.

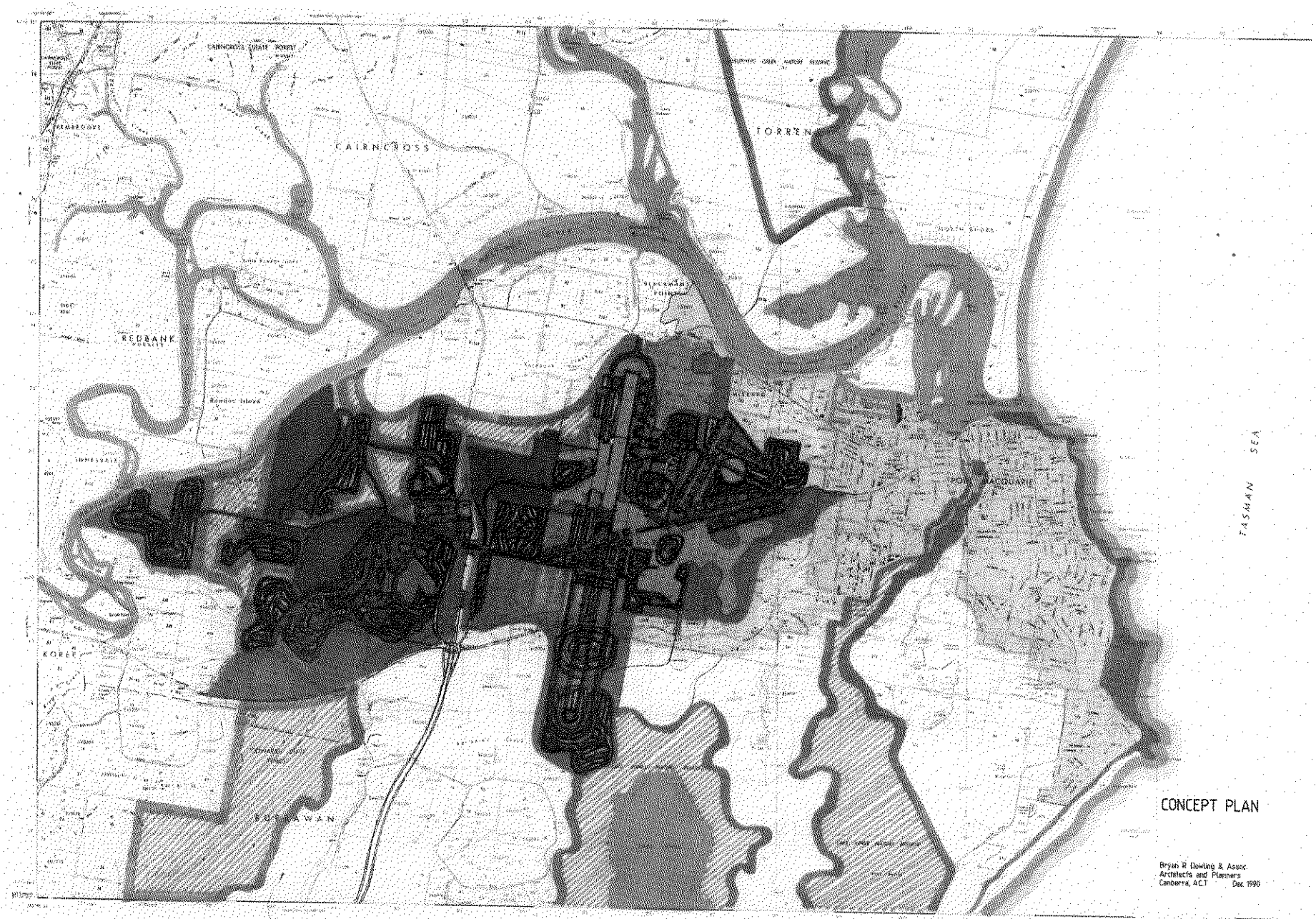
The central vertical feature in the Concept Plan is the International Rowing Course. It extends southwards across the Oxley Highway onto the Charley's land in the form of two village clusters. Central to this vertical axis is the commercial core of H2000. This lies at the intersection with the east–west axis linking Port Macquarie through the centre spine of H2000. To the east of the rowing course is the University and the various research and industry clusters taking up and extending beyond the site of the existing airport. The research, technology and business parks straddle the main entrance axis into H2000 from Port Macquarie. To the west of the main vertical axis and extending to the western extremity of the site are various residential areas shown either as village clusters or as bushland medium density housing areas. The existing Clos Farms are also illustrated.

Structure Plan (refer Map 4). This plan outlines the linkages between H2000 components. It indicates the structure of roads and the transportation network interlaced with the nature corridors. To the north, the road and guided vehicle route leads to the new regional jetport. To the west adjacent to the Hastings River, the two routes lead to Wauchope and the proposed service corridor and possible VFT station. To the east, the two routes lead into the heart of Port Macquarie. A land bridge across the Pacific Highway is proposed to link the nature corridors and a tunnel under the Oxley Highway will link the Cowarra State Forest to the south west of the site.

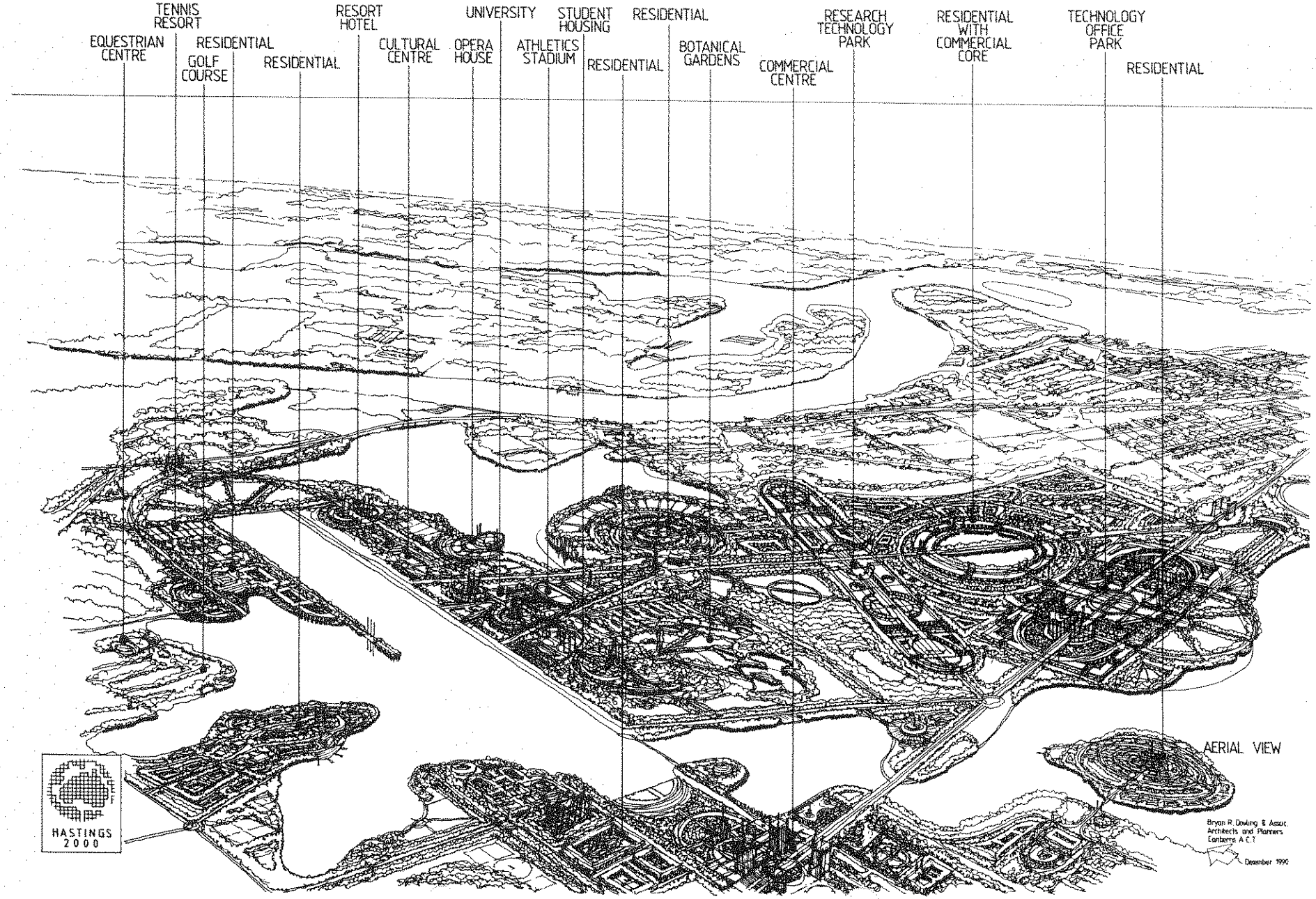
The residential areas are designed with varying formats in mind ranging from high density through medium density to normal residential sub–division. A module of approximately 50 hectares will be used as a basis for a Village concept in order that residents will be encouraged to walk within their own Village area. The residential areas associated with the University and Technology Parks will include medium and high density living. The hilly bush land areas will also be considered for selected pockets of medium and high density tucked into the forest in order that ground area usage may be minimised and in selected areas the magnificent views of the coast and hinterland can be enjoyed.

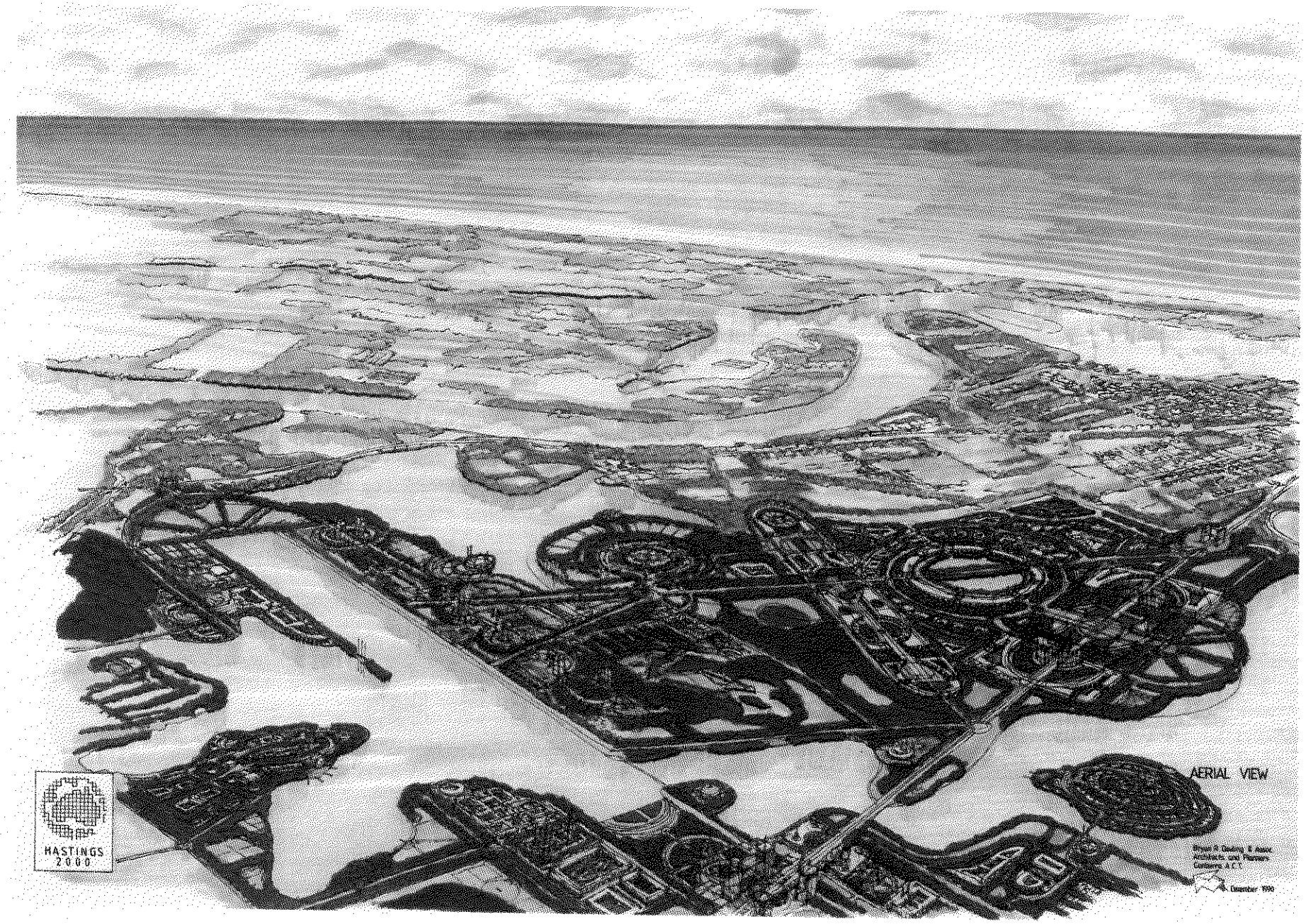
Integral to the Hastings 2000 Project is the internal efficiency and pleasant quality of personal transportation. In its completed form, Hastings 2000 will be complete with


PORT MACQUARIE 9435-2-S
CAIRNCROSS STATE FOREST
CAIRNCROSS
TORRENS
HASTINGS RIVER
REDBANK HOMSLEY
RESIDENTIAL 3000
TENNIS RESORT
EQUESTRIAN CENTRE
RESORT HOTEL
CULTURAL CENTRE OPERA HOUSE
UNIVERSITY
RESEARCH & TECHNOLOGY PARK
RESIDENTIAL 3500
TECHNOLOGY PARK
RESIDENTIAL 12 500
PORT MACQUARIE
TECHNOLOGY OFFICE PARK
BOTANICAL GARDENS
RESIDENTIAL 4000
COMMERCIAL CENTRE
RESIDENTIAL 7500
LAND BRIDGE
COWARRA STATE FOREST
BURRAWAN
LAKE INNES NATURE RESERVE
TASMAN SEA

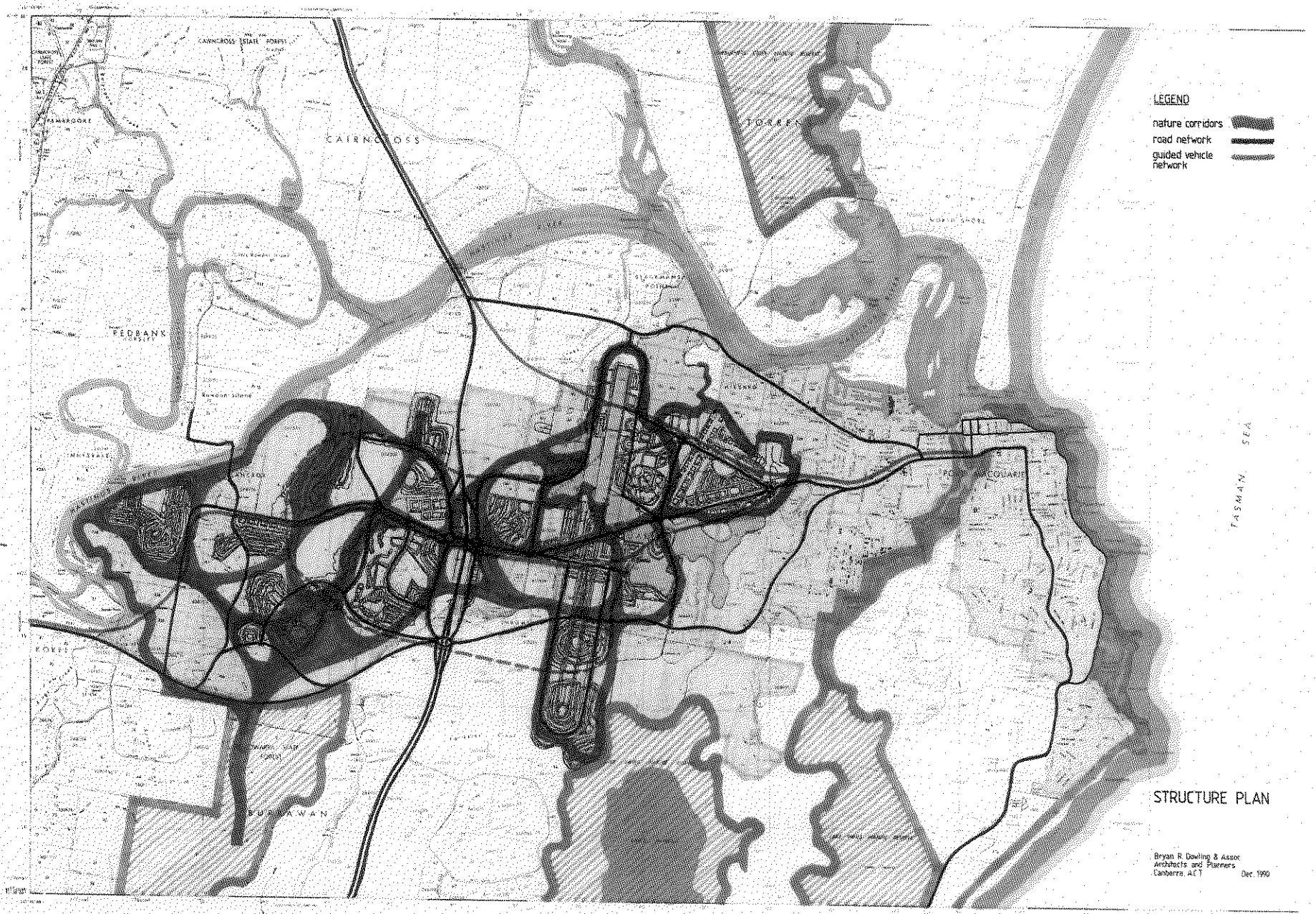


Map 2: Hastings 2000 Concept Plan


EQUESTRIAN CENTRE
TENNIS RESORT
GOLF COURSE
RESIDENTIAL
RESIDENTIAL
RESORT HOTEL
CULTURAL CENTRE
OPERA HOUSE
UNIVERSITY
ATHLETICS STADIUM
STUDENT HOUSING
RESIDENTIAL
RESIDENTIAL
BOTANICAL GARDENS
COMMERCIAL CENTRE
RESEARCH TECHNOLOGY PARK
RESIDENTIAL WITH COMMERCIAL CORE
TECHNOLOGY OFFICE PARK
RESIDENTIAL
HASTINGS 2000
AERIAL VIEW
Bryan R. Dowling & Assoc.
Architects and Planners
Canberra A.C.T.
December 1990



Map 3: Hastings 2000 Components Plan



Map 4: Hastings 2000 Structure Plan

people–movers, a greatly reduced population of cars, and an emphasis again on walking and cycling due to the practicality of reduced distances and the beautiful natural environment. A green web of nature corridors will link all the areas of natural bushland to facilitate this emphasis. The green web will also be utilised for the preservation of fauna communities.

Eventually, external travel will be greatly enhanced by a new regional jetport, improved train services, an upgraded highway system and a proposed service corridor incorporating a VFT station, possibly located along the existing Sydney–Brisbane train line passing through Wauchope.

For a new development such as the H2000 it is essential to have a remarkable style and quality rising from the excellence of its architectural design, infrastructure and landscaping. For the central area lying principally in the flatter areas west of Port Macquarie, an expression of classical geometry has been chosen in order to reflect the profound intellectual basis of this new urban concept and make a strong statement of man's position in the landscape. The use of the Golden Mean as the basis of proportion of the layout and buildings is intended to permeate the whole design philosophy of Hastings 2000. This formal classicism is softened by an intensity of natural landscape that will create a parkland and bushland setting for all areas of this portion of the "City–Village" concept of H2000. As the development moves west into its bushland setting, the planning will become more organic and subservient to the quality of its natural landscape.

The rationale and inspiration for such a concept within an Australian setting can harken back to the classical forms of the early Georgian architecture as exemplified by the works by Francis Greenway where his Church is the most important element in the architectural heritage of Port Macquarie.

The approach for the more formal areas is softened in the bushland setting following the precepts establishing the organic tradition in Australia exemplified by the work of Walter Burley Griffin in his Castlecrag development in Sydney, Eaglemont in Melbourne and his original planning in Canberra which was carried out in plan form but not in accordance with the precepts of his architectural design philosophy.

In fact it is worth saying that had Burley Griffin's architectural designs been fully adopted for Canberra it would now be unique in terms of World Heritage. In his understanding of the environmental aspects of design he was in fact three generations ahead of his time.

The underlying discipline of these two approaches, classical geometry and organic architecture will form the basis of all environmental design within the Hastings 2000 zone.

Hastings International University

The University has been sited to the west of the Port Macquarie Airport and adjacent to the proposed International Rowing Course.

The International Rowing Course is the central landscape feature of the educational, cultural, research and commercial heart of Hastings 2000. The University is located centrally on this strong landscape feature which is designed to be part of the classical geometrical layout of the heart of Hastings 2000.

The University lies on the axis linking the Rowing Course and the research, technology development and business parks. The latter utilises the existing airport runway for access and parking and its classical form uses the existing orientation of the airport as its axis.

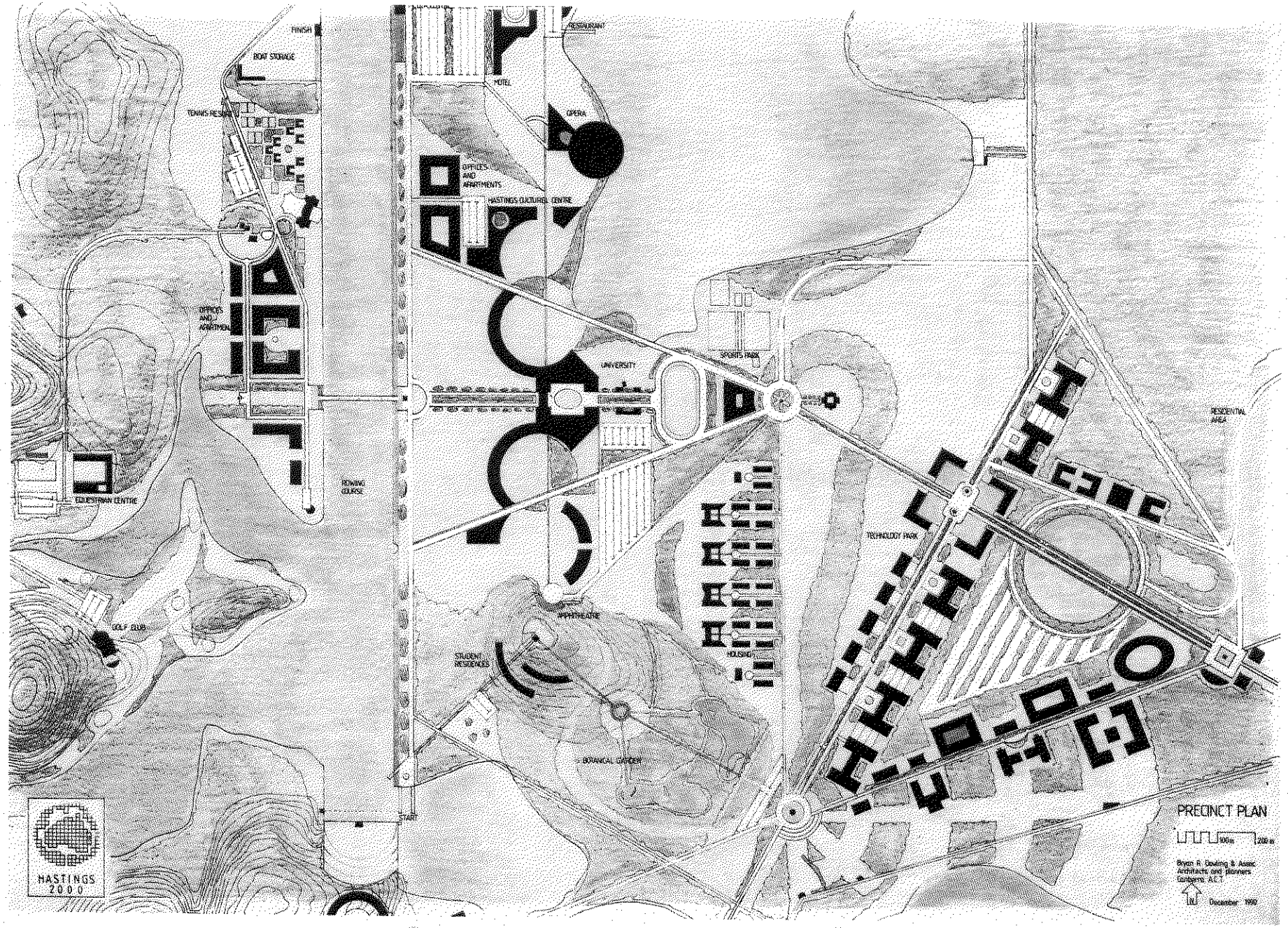
The University layout is chosen also as simple and classical in form initially consisting of two contrapuntal semi–circles linked by the central building which straddles the axis – Map 5. The University buildings are modular in format and follow the precepts for construction of Hastings 2000. The modules will be simple in construction utilising minimum energy materials and laid out in such a way as to be energy efficient in their usage.

The plan allows for additions to the inner circumference of the pederstrian circulation route as well as possible tower developments or specialist buildings at the centre of each circle and further semicircles may be added as links in the chain – Map 6.

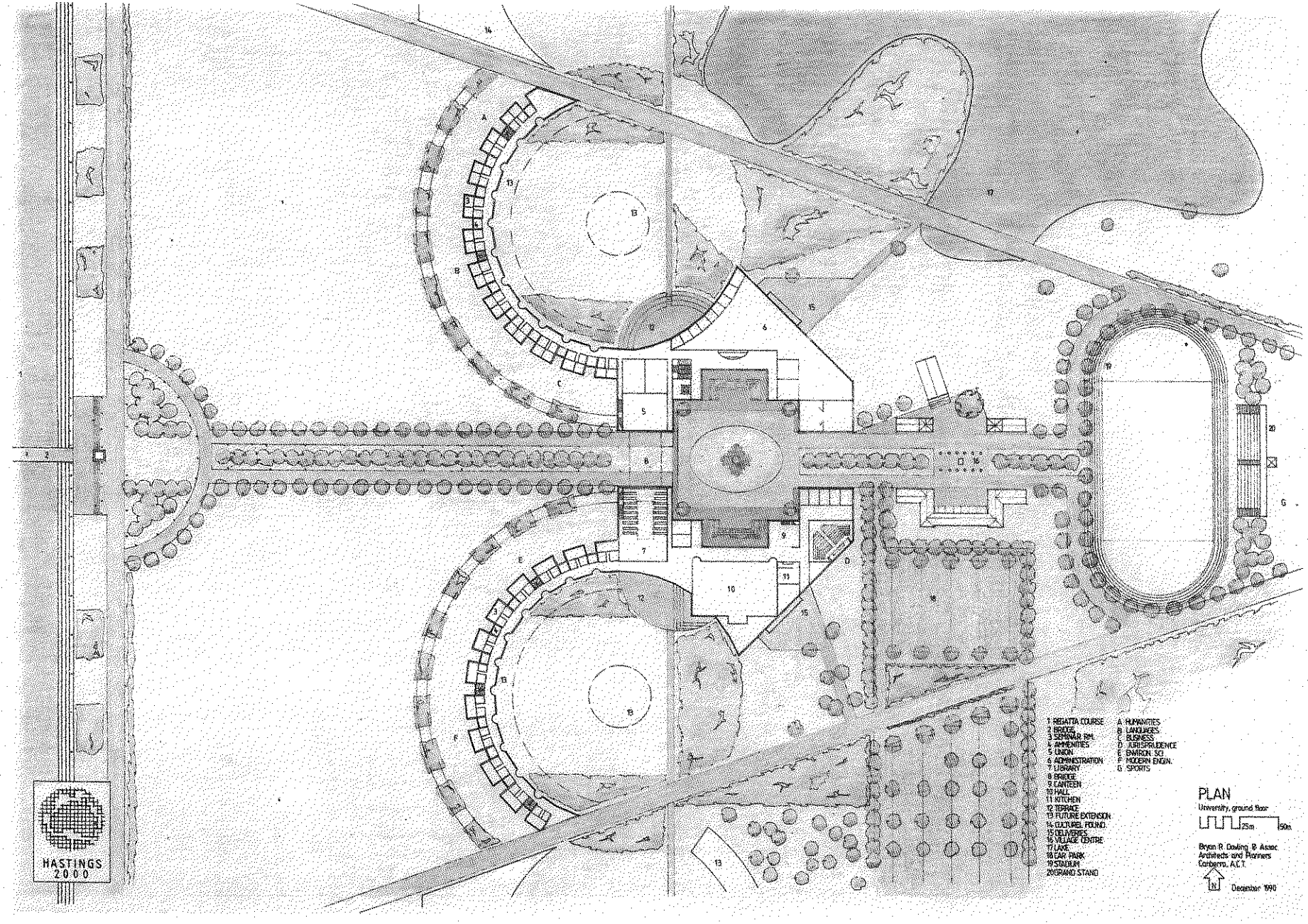
The layout of the buildings is designed to suit the logical arrangement of departments and facilities. To the north of the University there is a proposed cultural centre. This links to the Humanities based disciplines through Language to Business in the northern circle and thence into the central building complex housing the student union, administration, library and central services. To the west of the central building is the village centre for the University community consisting of shops,

banks, restaurants etc. with their own internal and external gathering spaces. The southern circle running down from the central building is currently allocated for Resource and Environmental Management and Modern Engineering with future engineering and science based disciplines with an environmental emphasis linking to the proposed botanical gardens site. To the west of the village centre is sited a full Olympic scale athletics facility and to the west again is the physical education and indoor sports complex. These facilities have been located as close as possible to the academic buildings.

Student housing will be located to the south and south–east of the campus utilising the hilly rise and located adjacent to the proposed botanical gardens.



Map 5: Hastings International University: Precinct Plan



Map . Hastings International University: Central .. .a Plan

8. THE SOCIAL BASIS OF HASTINGS 2000

8.1 General

The relationship between social justice and equity issues and patterns of urban form and development has received wide recognition over the last decade. Chapter 2 provides an appraisal of the existing form and function of non capital city coastal urban development and the interrelated characteristics of low average income, a narrow industrial base, high unemployment and restricted job opportunities. Despite wide recognition of these characteristics, it can be said that planning for social development in new Australian suburbs and cities has not been successful.

Urban form itself is not a primary factor of social well being. However the processes and implications of urban form do impact on social development considerations. One of the reasons why social planning has to date been so relatively unsuccessful is that it has always been seen as an "additional" rather than as an "integral" matter for consideration. Social planning mechanisms are not linked to the resource allocation process. Social justice and equity issues are essentially perceived as net costs to a development exercise.

8.2 Hastings 2000 Responses

The social basis of H2000 specifically addresses these issues. It does so by its very nature in the following ways.

- It proposes to break the nexus between coastal growth and its dependence upon real estate development and the retirement industry.

- It provides a mechanism for ensuring that growth is matched to employment opportunities. The land trust mechanism will control both the rate and type of core industry growth and the supply of residential land. Population growth will be inextricably linked via this means with economic development.

- It provides through the internalisation of the capital benefits of growth, a mechanism to link infrastructure provision to population growth.

- It proposes from the outset a community consultation, involvement and support mechanism which will have the dual roles of:

  - involving the existing local community in the development process; and

  - ensuring the newly arrived population has immediate access to information and support.

- By directly linking the supply of housing with known generated demand, through employment growth, H2000 will be more likely to consider in physical form such current social trends as:

  - increasing single parent families;

  - the increasing level of women in the workplace; and

  - emerging leisure and recreation preferences.

8.3 Population Growth

One of the key determinants of the economic viability of the H2000 is the rate of population growth associated with the project. Rate of population growth is also seen by many as one of the key determinants of social viability. Expressed in simplistic terms, it is often implied that there is an inverse relationship between the degree of "social belonging" and rate of population growth. The need to maintain that social viability ultimately determines therefore the maximum population growth rates that an area can sustain.

H2000 population growth rates remain within conventionally acceptable parameters. However, these parameters are based on the conventional way of dealing with "social belonging" issues. There is no intrinsic reason why a more integrated approach to social development matters will not sustain greater population growth rates. If this is the case, the "economic pay-off" of addressing such matters in an integrated upfront manner will be clearly evident. Such a result would ultimately benefit both the development of industry and the Australian economy in general and establishing communities in particular.

View across the dairy farm to Broken Bago in cloud
Watercolour by Bryan Dowling

9. THE MANAGEMENT BASIS OF HASTINGS 2000

9.1 The Regional Development Plan

One of the major products to emerge from the inception study stage of the project will be the Hastings 2000 Regional Development Plan (RDP). The RDP will serve the same sort of function as the 1988 North Coast Regional Environmental Plan.

However, it is intended that the RDP will go beyond the currently utilised physical land use purpose of existing regional environmental plans. The RDP will be the prime instrument governing the economic and physical implementation of Hastings 2000.

The components of the RDP will control the growth of core industry within the region and provide guidelines for physical and social infrastructure and support industries. It will address environmental opportunities and constraints and include community consultative mechanisms and comprehensive development objectives and regulations.

It is envisaged the RDP will encompass the Hastings Municipality. It will, however, provide different levels of control depending upon whether it is addressing development issues within the 1,750 hectares of the H2000 zone or development issues in the rest of the municipality.

Two essential requirements for the financial viability and ultimately the success of the H2000 are:

- The internalisation of created value to self fund the project; and
- The need to eliminate development approval delays so that development can occur at projected rates of growth.

Each of these requirements must be reflected in the nature of the RDP. They serve to explain the two levels of control envisaged in the Plan.

The financial viability of H2000 is driven firstly, by creating land value in the project area through both employment growth (demand) and the environmental manner in which that demand is accommodated and secondly, by being able to capitalise on that created value through the sale of residential lots. That will only occur if land owners and speculators outside the H2000 zone, who do not contribute to the creation of value, are prevented from participating in the gains through their own land sales.

The RDP will control that process by totally controlling the provision of residentially zoned land and the densities of existing residential land throughout the whole municipality.

Administration of those controls as they pertain to the municipality, excluding the H2000 zone, would be administered by the Hastings Municipal Council in the same manner and with the same statutory mechanisms as exist now.

However, within the H2000 area the RDP will specifically address all economic and land use issues. It will also detail the approval mechanism associated with development within the project area. The level of detail built into the RDP as it affects the actual Hastings 2000 project will accordingly be far greater than for the remainder of the region.

Administration of the RDP within the H2000 zone will be exercised by a Hastings Development Corporation (HDC). This is essential if the development of economic opportunities is to be successfully co–ordinated with funding considerations and the provision of residential land, an ecologically sensitive built form environment and full infrastructure services. The financial viability and the philosophy of H2000 will be severely threatened if its physical realisation is controlled by outside bodies which are not fully conversant with and focused specifically on the project.

HDC will be responsible to the Hastings Development Trust (HDT) which will be the ownership mechanism for H2000. This structure will separate the ownership and implementation aspects of the project.

Preparation of the RDP will be a joint consultative effort between the Department of Environment and Planning, Hastings Municipal Council and HDC.

Before further discussing the structure of the functions of HDT, it is appropriate to discuss the context within which the proposed management basis of H2000 has been developed.

9.2 New Town Development Lessons

There are numerous examples of new town developments in Britain, the United States, France and Australia. In fact, practical examples of the implementation of aspects of H2000 can be seen from the decentralisation of Sophia Antipolis and the synergy of industries created in Montpellier in France.

Appraisal of past new town examples establishes the following lessons.

- The new town movement whether in the USA or Britain is acknowledged to have been successful in both physical land use planning terms and in ensuring that development was completed in a way which harmonised with and enhanced natural land features.

- New towns have often not been as successful in establishing the employment opportunities that they set out to achieve.

- New towns have often been unsuccessful in pioneering lifestyle innovation. New town developments have had much less impact on social perceptions and participation than many planners had expected. Residents of new towns, for example, are only marginally less likely to use their cars than residents of conventional communities. This is often despite the very considerable efforts that have been made within the towns to encourage more alternative public modes of travel.

- The new town movement has proved that it is extraordinarily difficult, particularly in the short term, to be a self–funding project; requiring either a high level of financial commitment from government eg. Canberra, Albury –Wodonga, or from a private sector source with long term investment strategies eg. Colombia, USA.

- The ability to "contingency plan" – ie. to respond to unforseen developments as they eventuate – while remaining within a master plan framework is essential, particularly in the short term, for the viability of the growth area.

- Creating a climate for growth as distinct from creating a plan for growth is seen to be a key for not only bringing together public sector and development interests, but also providing the impetus for development. The London Docklands project is seen as a good example of a successful project (in financial terms anyway) which was able to create a climate for growth.

In summary therefore, it is suggested that the physical planning aspect of creating a new town is the easy part of the process. Implementing social and economic programs, encouraging innovation, maintaining some flexibility throughout the whole process and above all, avoiding financial constraints, involve far greater challenges.

9.3 Characteristics of the New South Wales Land Use Planning Process

It is accepted that the H2000 must accommodate in some form, the New South Wales statutory land use planning system and statutory Federal, State and Local Government relationships. However, one of the key factors which will influence the ultimate success of H2000 will be the "nature" of that accommodation.

The New South Wales statutory planning system, like all such systems throughout Australia and Britain, is acknowledged to have strengths and weaknesses. The following brief comments are made on the system because of their perceived relevance to the H2000.

- The New South Wales planning system both establishes and perpetuates an essentially *ad hoc*, project oriented planning basis. The goals and intent of the system are more process oriented. However, the results do not often reflect that intent.

- It creates a fairly inflexible regulatory mechanism and set of steps through which all proposals must work before approvals can be granted.

- The Statutory Planning System is about land. The system is not a system for planning everything. In other words, the New South Wales Planning System inevitably focuses on physical land use issues. It accommodates with great difficulty, social, economic and financial considerations.

- The planning system purports to be a system for the co–ordination of government activity. In reality, the statutory authorities and public works organisations pursue their own agendas and are only happily co–ordinated by the planning system when the goals of the planning system and these organisations are aligned.

- The planning system encourages prolonged negotiation. While the need for community participation, particularly for a project of this scale, is very important, a major consequence of the negotiation process as encouraged by the present system is that it often facilitates badly compromised solutions.

- It is a system which by its very nature does not accommodate innovation. It is a system designed to establish controls and rules and implement them in a manner which establishes some certainty to the overall process. It will tend to straight–jacket innovation and innovative processes within its framework of predicability.

The planning system, in pursuing the desirable goal of creating certainty, is in effect, a reactive and reactionary system. It poses a very real threat to the H2000 in that the vision fed into the system will not be the product at the end of the process.

The Environmental Planning and Assessment Act is essentially a land use control mechanism. H2000 requires a management and economic mechanism which utilises land as part of the realisation process. The present system will successfully produce a conventional land use plan. However, it will leave largely unresolved infrastructure co–ordination, social and economic considerations. Also, it will not successfully create an integrated socio–economic and environmental decentralisation plan.

It is envisaged that H2000 will be essentially realised under the Community Titles Legislation. This is existing legislation. However, the manner in which that legislation is utilised and the way in which the legislation fits in with the Environmental Planning and Assessment Act is a matter for further discussion.

One of the aims of the inception study stage of the project will be to develop in conjunction with State and Local Government, a Regional Development Plan, a Development Trust, and a Development Corporation framework which accommodates the needs of H2000 and the existing statutory planning system.

9.4 The Functions and Structure of the Hastings Development Trust

HDT will be the ownership mechanism for the H2000. All land titles and ownership rights associated with H2000 will be transfered to HDT. The consortium of equity partners, consisting of those investors who have contributed either land or cash to the project, will acquire shares in the company.

It will be a private company governed by a Board. The Board of HDT will consist of a wide range of representatives of industry, government and community organisations. A more detailed description of the composition of the Board and the responsibilities of HDT is outlined in Appendix 2.

HDT will co–ordinate activities in the project and general planning directions. It will decide on the sequencing of development, the priorities for the establishment of activities and the allocation of funds within the project.

It will be responsible for the financing and policy decisions of development. Funds will be used for the provision of recreational and other public amenities, supporting infrastructure, certain forms of capital construction, subsidisation of some core activities such as educational institutions, and the creation of financial incentives to attract core activities to the project.

HDT will also be responsible for the sale of technology packages, R&D based enterprises, products and services to national and international markets, and the transfer of the planning and management experience from the Hastings 2000 Project to new developments elsewhere in Australia and overseas.

The internalisation of capital gains will be handled by the Trust.

The innovative financial, economic, social and physical mechanisms which together constitute H2000 necessitate an innovative management structure and process to co–ordinate them. The Regional Development Plan, the Hastings Development Corporation and the Hastings Development Trust represent that management basis.

Flynn's Beach
Watercolour by Bryan Dowling

10. THE NEXT STEP

10.1 The Need for Political Support

The challenge of devising ecologically sustainable development is first and foremost a challenge to:

- initiate research and development, with a view to creating innovation; and
- invest in research and development products, with a view to ascertaining their feasibility.

H2000 is an innovative proposal of ecologically sustainable development. As noted in Chapter 5, the system of innovation in Australia is weak. The willingness of the Australian community to invest in innovative products is almost negligible. Despite two years of research and development, community input and a very substantial private sector investment, the Hastings 2000 Project could very easily, like very many Australian born R & D ideas, not proceed any further. The project now requires strong and sustained political investment if it is to proceed to its inception study stage of development.

There are two basic reasons why the H2000 now requires political investment.

The first reason is that any innovative project, if it is to be realised, requires "champions". The role of champions has been well canvassed in the MFP feasibility study. It applies equally to Hastings 2000. Champions are required at several levels for the ultimate success of the project. Champions at the community level, within the private sector and at institutional level are starting to appear. Participants in the feasibility study stage of H2000 listed in Appendix 3 provide examples of some of those champions.

The success of Hastings 2000 will depend upon strong and pervasive public and private institutional support. State Government commitment to the further development of the project and the dissemination of information associated with H2000 is essential to obtaining that institutional support.

The second reason for political investment is a more immediate and pragmatic one. H2000 is almost totally reliant on private sector involvement for its realisation. Finalisation of the feasibility stage is marked by two actions:

- This Submission to State Government; and
- The preparation and marketing of a Business Plan for the Hastings 2000 Project.

The feasibility study stage will be complete when sufficient equity capital is obtained to undertake the inception study stage. The extent of investor support will obviously be influenced by the quality of the Business Plan. However, at this stage of its development investor support for H2000 will also be greatly influenced by the extent of political support for the project.

10.2 The Nature of the Political Support

The realisation of any innovation requires:

- an acceptance of the inherent risk involved; and
- funding.

The private sector will assume responsibility for both these aspects in the further development of H2000. $10 million will be required to pursue the inception study stage. Participating land holders in the project will be required to carry the opportunity cost of foregoing land subdivision while the inception studies are being conducted.

Four specific commitments or actions are now sought from the New South Wales State Government to balance the risk and cost acceptance of pursuing the inception study stage of the project by the private sector.

First, take on the role of a champion by promoting public acceptance and recognition of H2000 philosophies. Co-ordinate public sector input into the various studies. Commit the Government to the inception study stage of the project. Assist in eliciting private sector support.

In short, contribute to creating a suitable climate for an objective evaluation of the merits of the Hastings 2000 Project.

Second, designate the H2000 zone as a declared "Economic Development Zone". The purposes of this designation would be to –

- establish development control over all land uses within the zone during the inception study stage of the project;

- clearly indicate to potential equity investors the extent of political support for the project; an

- provide some guarantee to equity investors that subject to successful completion of the inception study stage, the implementation stage of the project will proceed.

There are a number of possible ways that the above goals could be realised. The approaches outlined below are not seen as being mutually exclusive. It is understood that some of the approaches require the support of Local Government. It is also possible that other mechanisms may exist to achieve the environment necessary for equity investors to commit the very substantial investment required for the next stage of the project.

- Introduce via the Local Environmental Planning (LEP) process, a "Hastings 2000 Future Urban Zone", with appropriate land use tables across all land to be the subject of the inception studies.

- Introduce via the Regional Environmental Planning (REP) process, a Hastings 2000 Development Zone. It is envisaged that the REP would specify the following:

  - That the development potential of the Zone is subject to the Hastings 2000 inception study.

  - That any realisation of development, upon the successful completion of the inception studies, will only occur under the aegis of the appointed body established to implement the project. (In other words, negate the possibility of individual land owners capitalising on speculative land value increases or attempting to initiate their own residential or industrial development not in accordance with the Hastings 2000 Project).

  - That development approval is required for all land use activities that could pre–empt the H2000.

  - That Council shall not consent to a development application unless it has first considered the likely impact of the proposed development on the realisation of the H2000.

  - Establish some provision for the investment consortium to participate in the decision making process. Designated development status could, for example, be established for all land use proposals within the REP over a certain scale or construction value.

  - That upon the successful completion of the feasibility study process (which incorporates extensive community consultation as part of the process), the Hastings 2000 Project will proceed to its implementation.

- Some of the above steps may also be achieved via the SEPP or ministerial direction mechanisms of the Environmental Planning & Assessment Act, 1979.

The above commitment will, it is considered, very considerably strengthen the investment attractiveness of the project to potential equity participants.

Third, identify any constraints in current planning and other legislation which will prevent the realisation of the project and its philosophies. The importance of this commitment cannot be overstated. The nature of the work associated with this task has been outlined in Chapter 9. It is envisaged that this process would be conducted in conjunction with the Steering Committee and its consultant representatives.

Fourth, adopt as State Government policy that all its departments and statutory authorities be required to specifically consider the implications of their development decisions on the Hastings 2000 Project. If it is established that a particular development decision would contribute to the realisation of the project at no additional cost to the public sector, then public sector action would be required to be directed towards the H2000.

This policy commitment represents a variation on the approach utilised by the public sector in supporting, through incentives and priority allocation, decentralised industry and attracting other targeted specific industry types to New South Wales. It is therefore a mechanism of support which is understood by the public sector. The means for implementing the mechanism should already be in place within each Department and Authority.

It is proposed that this fourth commitment

remains in place until the "leading core" and "leading support" enterprises have been established.

Agreement to the above commitments is the only form of government security being requested by the Hastings 2000 Project Steering Committee on behalf of equity participants in the project. It compares very favourably with the government guarantees sought by the MFP Consortium during their site selection process.

It is vital that the Government and its Departments remain open minded about the innovativeness of the project. The essence of Hastings 2000 is the formulation of an economic, physical and social framework which proposes a new approach to urban co–existence. However, its very innovativeness will threaten its own viability.

It is neither appropriate nor possible to "pick" at the ideas which together create the Hastings 2000 Project – to run with some of them and discard others. Hastings 2000 is an ecological, social and economic package. The nature and content of this package will continue to evolve. However, it will only evolve if not prematurely discarded.

It is only with Government and public sector support and commitment in the manner outlined above that the necessary inception studies can be viably conducted.

10.3 The Inception Study Stage

The inception studies are expected to take up to 2 years and will complete the planning phase of H2000. As outlined in Chapter 9, it is envisaged that a major product of this stage of the project will be the Hastings 2000 Regional Development Plan.

The work proposed to be undertaken during this stage of the project will encompass studies in seven areas:

1. A **Socio–Economic and Ecological Resources Survey** of the region – the SEER Survey.

   The environmental ramifications of the Hastings 2000 Project extend beyond its zone. Since the project relies on inputs from primary industries such as agriculture, grazing, dairying, viticulture, aquaculture, mariculture, forestry and vegetable growing, it will be essential to ensure that natural resources are used in a sustainable manner. It will also be imperative to protect local plant and animal communities, and preserve the functioning of representative ecosystems. Adverse effects on regional hydrology, as well as pollution of air, water and soil, must be prevented.

   The social and economic impacts of the project will have regional and interregional implications. A significant impetus will be provided to industry in surrounding areas. If, as is proposed, the Hastings region is linked to Sydney and Brisbane via a service corridor and Very Fast Train connection, the project will affect urban patterns, commercial development and occupational choice in a number of locations along the coastal strip of Northern New South Wales and South–East Queensland.

   Planning for H2000 will clearly require a careful assessment of socio–economic and physical environmental factors ranging from the zone itself to an extensive sweep of the seaboard of Eastern Australia. The project involves resource assessment and planning at three interconnected scales:

   - Overall assessment of the economic and ecological sustainability of the East Coast ecumene, including analysis of interactions among regions;
   - Assessment for regional development, resource use and conservation;
   - Assessment for local, site–specific development.

   It is proposed that the SEER Survey will be conducted by a consortium of government research establishments, including several Divisions of CSIRO, Universities, consulting groups and individuals.

   A separate document is available on the proposed organisation and operation of the SEER Survey.

2. Development of a consultative mechanism which will facilitate community participation in the formulation of the Regional Development Plan.

   The organisation proposed to meet this objective is the **Community Information and Resources Centre of the Hastings** (CIRCOH). CIRCOH's aims will be to provide an information exchange mechanism between the Hastings 2000

Project and the local community and to create opportunities for the local community to participate actively in the planning process.

It is proposed that CIRCOH will be administered by a body with representatives of the local community, known as the Hastings Community Co–operative (HCC). To cover a broad spectrum of community interests, HCC will have representatives of different organisations and groups. Citizens will also have opportunities to contribute to decisions through direct access to what will eventually become a multi–disciplinary CIRCOH staff.

In the initial stages, CIRCOH will direct most of its effort to overseeing SEER and facilitating the planning process. As the Hastings 2000 Project gets under way, CIRCOH will focus more on monitoring the project and its relationship with the local community.

A separate document is available on the proposed organisation and operation of CIRCOH.

3. **Inception studies of the industry cluster concept.** All four proposed industry clusters:

   . the research to business cluster

   . the education industry cluster

   . the medical, sports and fitness industry cluster

   . the tele–services cluster

   will be developed in detail.

   It is also feasible that one or more of these clusters may be, on the basis of findings, either altered or discarded in favour of other industry clusters.

   Work associated with this aspect of the inception study stage involves a lot more than just refinement of the cluster concepts and the identification of specific industries appropriate for each cluster. It will also involve the actual marketing of the Hastings 2000 Project to identified business and all activities associated with arranging for the relocation of those industries and their staff to the area.

   If Hastings 2000 is to be operational by the end of 1994, with some of the targeted industries established in this year, a large amount of work will be required in this area. Accordingly, a very large part of the inception study stage budget will be allocated to this area.

4. Development of an appropriate **implementation mechanism** as currently proposed by the Hastings Development Trust and Hastings Development Corporation.

5. An examination of appropriate **statutory planning mechanisms** to control the physical development of the Hastings 2000 Project.

6. **Physical Planning of the Development**: physical planning studies will encompass an examination into a number of areas which ultimately contribute to the development and refinement of the way people live within the Hastings 2000 area. It will involve such things as:

   . Refinement of the Structure Plan.

   . Investigation into alternative infrastructure provision, eg., transportation and communication possibilities, renewable energy opportunities, waste management systems.

   . Development of residential and other physical form parameters.

7. A study of the **funding mechanism** which will drive H2000. In particular, appropriate mechanisms must necessarily be developed to ensure the internalisation of future land values and building profits.

The inception study stage will effectively create the mechanism for the required input of various interests, such as:

. Government

. Business

. The Environment

. The Community

It is the completion of the inception study stage which will turn the H2000 into a reality.

11. HASTINGS 2000 DOCUMENTS

1. *Hastings 2000 Project: A Community for the Future*, Strategic Plan, 7 pages, February 1990.
2. *Framework for Assessing Technologically and Environmentally Driven Structural Change*, EPAC Seminar, Regional Policies: Future Directions, 6 pages, March 1990.
3. *Hastings 2000 Project: Toward a Business Plan.* Prepared for a community briefing involving 120 invited representatives throughout the Hastings Shire, 39 pages, July 1990.
4. *Hastings 2000: What the People Think*, Results of survey of participants in a community briefing, 53 pages, August 1990.
5. *Hastings 2000 Project Submission to the Coastal Development Inquiry of the New South Wales Standing Committee on State Development*, Hastings 2000 Project, 19 pages, September 1990.
6. *Hastings 2000: Architectural Concept Plan*, December 1990.
7. *Building Businesses for Sustainable Development*, 24 pages, December 1990.
8. *Preliminary Analysis of Macro–Economic Impact of 25 Hastings 2000 Developments*, December 1990.
9. *Proposal to Establish an United Nations Agency: The International Centre for Resource Economics Services and Training (ICREST)*, 15 pages, March 1990.
10. *Socio–Economic and Ecological Resources (SEER) Survey, Proposal for Design and Implementation*, 15 pages, May 1991.
11. *Community Information and Resources Centre of the Hastings (CIRCOH)*, 4 pages, May 1991.
12. *Hastings 2000 Project Financial Plan*, May 1991.

Hastings International University

13. *Hastings International University: Architectural Concept Plan*, December 1990.
14. *Council Chambers: Plans for Renovation*, November 1990.
15. *Hastings International University: Financial Plans for City Campus and Fernbank Creek Campus*, May 1991.
16. *Hastings International University: Information Memorandum*, 14 pages, May 1991.
17. *Hastings International University: Business Plan*, June, 1991.

Working papers and consultants' reports on many facets of the project have also been prepared.

Sandbanks: Where the Maria River flows into the Hastings
Watercolour by Bryan Dowling

APPENDIX 1. TECHNOLOGY COMMERCIALISATION CASE STUDIES

A. Soil Slotting Technology

Extensive tracts of subsoil acidification and compaction exist in Australia and there is increasing concern that current agricultural practices are further acidifying vast tracts of land, (see Figure 5). The result is low and declining productivity in large areas of Australia because typically the topsoil in these areas is shallow and able to support only low profit activity, largely based on pasture and native forest. Without amelioration of these problems, even high value intensive production activities such as viticulture, vegetable growing and orchards suffer significant productivity losses.

The traditional solutions of lime or gypsum application, and deep ripping have been largely unsuccessful because of inadequate mixing of the ameliorant and the problem soil.

Land degradation is a major economic and environmental problem in Australia. It has been estimated that production losses exceed $600M per annum (DPIE, 1987). Apart from the soil problem, the rainfall and temperature pattern which characterise the affected areas indicate that a level of productivity in rural production could be achieved which would enable rural producers in these areas to compete in world markets. Soil is the limiting factor. Acidification, or compaction causing waterlogging and poor drainage, prevents or limits root growth and earthworm activity. This applies to pastures as well as intensively produced plants in horticulture and market gardens.

The CSIRO Division of Water Resources at Griffith began soil slotting experiments in early 1980; slotting is a method of digging a narrow trench and backfilling it with soil which has been thoroughly mixed with ameliorants. Slotting machines, either tractor powered or self powered slice slots in the soil of a nominal width of 150mm, and up to a 1,000mm depth. Slotting enables plants to access subsoil water and nutrients, and will enable most of Australia's east coast to become productive even though only some 10% to 30% of the soil surface is disturbed.

Continuing experiments have shown that slotting improves growth of wheat and grapes by overcoming the soil problems associated with compaction, acidity, sodicity and mineral deficiencies. Slots are protected from recompaction and the ameliorants are thoroughly mixed to depth with increased earthworm activity.

The first application of slotting to acid soils on the North Coast of NSW was for high value vineyard crops and spectacular success led to development of a joint company, Cassiro by CSIRO and Gerard Cassegrain and Company to commercialise the slotting technique.

A number of prototype slotting machines have been built by the Cassegrain Company, Expressway Spares, which services the heavy machinery sector including earth moving, construction and mining. It is anticipated that commercial production of slotting machines is a further two generations of machine away from the current version.

Numerous inquiries have been received from commercial firms in a range of industries, both rural and non rural, and in addition to preparation and submission of funding proposals to relevant agencies to extend R&D into these areas, demonstration trials are actively being established as follows.

- dairy farming (Norco, Dorrigo/Lismore);
- mine site rehabilitation (Pasminco; CSIRO Division of Soils);
- turf farms (W. Sydney);
- viticulture (Hunter Valley–Eden Valley);
- sugar production (SRC, Grafton); and
- sewage disposal (SWB, Sydney).

Inquiries have also been received from golf clubs and macadamia nut and potato producers.

Each of these production or service activities represents a potential new business opportunity based on the slotting technique. Cassiro is currently developing a business strategy for exploiting these profit opportunities and it is anticipated that a number of spin off companies will result.

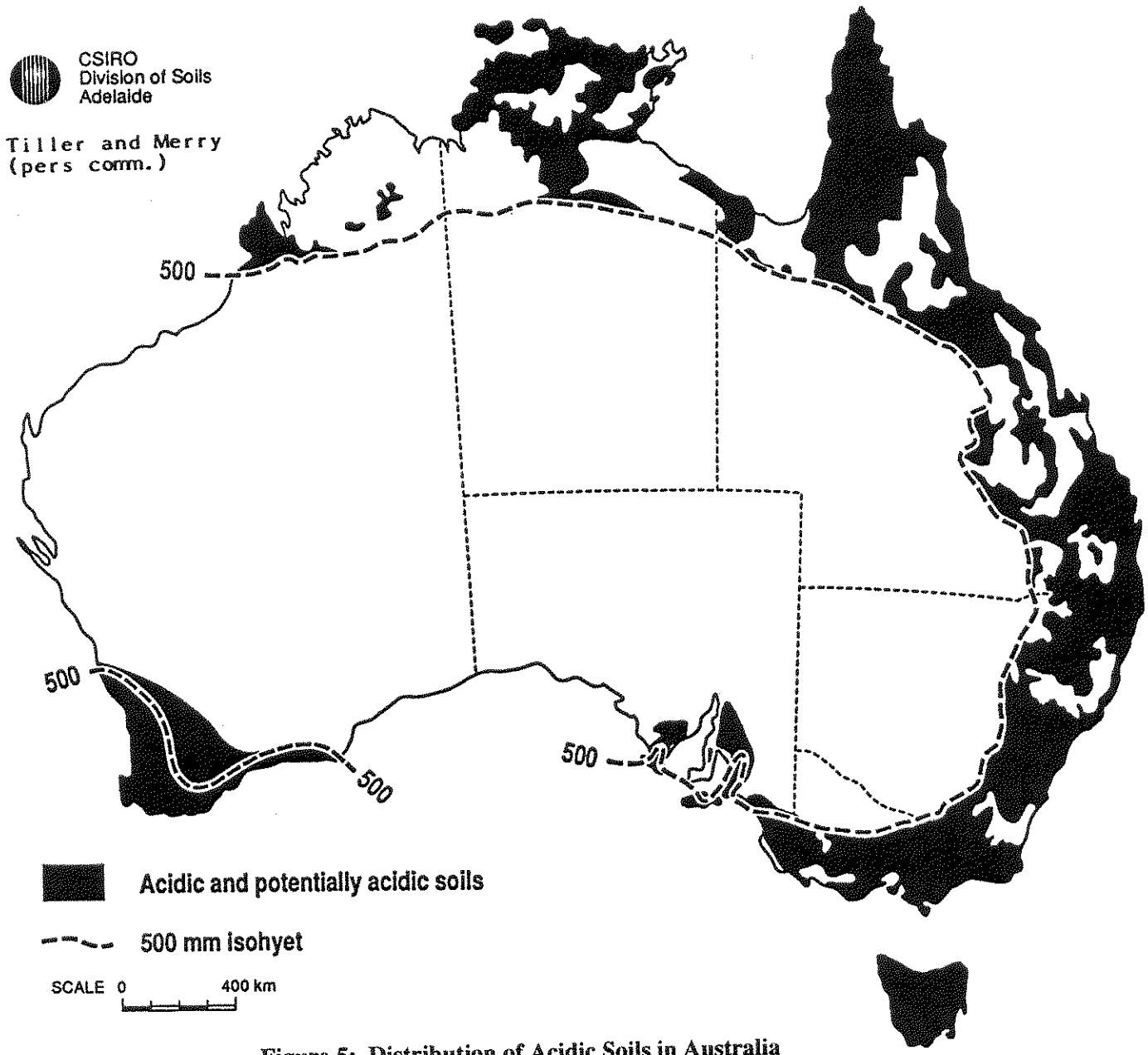


Figure 5: Distribution of Acidic Soils in Australia

New business activities will encompass:

- manufacture of slotting machine;
- slotting service for rural producers and landowners; and
- support services including soil diagnostic services, ameliorant supplies; maintenance, and spare parts for slotting machines.

The linkages between them, which are of the type generally underpinning the Hastings 2000 research, technology and businesses cluster concept, have provided the opportunity to turn strategic agronomic research into new businesses in agricultural services and manufacturing. The Clos farming system gives to Cassiro the proving ground for the necessary machinery development prior to commercialisation. The substantial sums of money involved in this development work are already assured of recovery through the enhancement in Clos farm values arising from productivity improvement brought about by slotting.

The most immediate business prospects are in consulting and slotting services. These are likely to be limited principally by the capacity to manufacture slotting machinery. Existing designs have already proved themselves efficient enough to make amelioration of significant coastal areas used for high value horticultural crops economically attractive.

Further development work is being undertaken to increase the viability of slotting for use on inland areas used for cereal growing and other lower value purposes. Cassiro has also been approached by growers from the Murrumbidgee Irrigation Area to undertake slotting trials in conjunction with high value row crops.

While it is principally a research commercialisation organisation, there are advantages in Cassiro retaining a close control over the use of the early generation of slotting machines. This enables it to be in a position to update the patent with the anticipated technical improvements that will become apparent during initial use under a variety of conditions. It also enables farmers to test the benefits without obligating them to purchase a relatively unproven piece of high capital cost equipment.

To provide an indicative business planning financial analysis, the following preliminary estimates have been prepared.

Table A1: Indicative Estimates of Selected End User Benefits and Costs Per Hectare Land Use

	Dairy	Viticulture
Ann. Yield Increase	280 kg b/fat	5t
Value of Ann. Benefit	$ 1,520	$ 1,750
PV for 10 yrs (10% discount rate)	$ 9,339	$10,753
Slotting cost (incl ameliorants)	$ 2,600	$ 3,500

The estimates in Table 1 show quite convincingly that for the conservative ten year life of a slotting application the per hectare benefits to end users in viticulture and dairying will substantially exceed the anticipated costs of providing a slotting service.

The strategy being adopted by Cassiro for commercialisation of the slotting technology package includes:

- development of third and fourth generation slotting machines
- establishment of demonstration trials in key end user locations
- targetting of mine rehabilitation and sewage disposal opportunities

The adoption of new technology by rural producers is typically a slow process, relying on demonstration of effectiveness by leading farmers before widespread uptake occurs. In addition the current depressed economic situation of many rural industries is likely to inhibit adoption of new technology. For these reasons commercialisation strategy will initially target the more immediately pressing problems being faced by mining companies for mine rehabilitation, and by major water boards for sewage disposal. Nevertheless, the estimates in Table A1 suggest that the slotting technology may be instrumental in revitalising the rural economy in eastern Australia as dramatic increases in yield are achieved on the extensive areas of currently low productivity soils.

B. Waste–Water Treatment Technology

A wastewater treatment technology developed by CSIRO and being commercialised by Cassiro has just the right ingredients for the 1990s and beyond. It is ecologically sound and it is low cost.

The Vertical Flow Wetland (VFW) technology package is tailormade for the thousands of small communities and households throughout Australia who are struggling to treat sewage and other wastewater in a way which avoids an explosion in their rates and also meets the increasingly stringent environmental standards for effluent disposal now being adopted. In addition there are millions of people in small communities around the world which could benefit from this technology.

The Vertical–Flow design of constructed wetland differs from the more well–known trench flow–through type of wetlands developed in Europe, the USA, New Zealand and Australia, by its significantly enhanced capability of removing both nitrogen and phosphorus nutrient compounds from primary treated sewage effluent. The inability of successfully removing these nutrients, especially phosphorus, is a serious limitation of horizontal–flow trench type wetlands and most conventional treatment systems. These require additional capital and operational costs to achieve effective nutrient removal similar to the performance of experimental VFW Systems. The use of concentrated chemicals presents an additional threat to natural waterways. The inability of current systems to effectively treat and dispose of sewage effluent presents a major problem in the pollution of waterways, irreversible damage to aquatic ecosystems and an increasing hazard to human health from toxic blue–green algae blooms.

The VFW system is an artificially constructed wetland, with an innovative vertical–flow hydraulic format, using a gravel substrate and aquatic emergent macrophyte plants. The adoption of the vertical–flow format in experimental systems significantly enhanced the rate of nutrient removal from primary treated sewage effluent and resulted in the production of an exceptionally high quality water. The VFW system thus provides potential as a single–stage, low–cost and effective sewerage system which could replace conventional secondary and tertiary treatment methods.

After extensive research involving scores of experiments and field trials, a VFW system has been designed for testing at municipal sewage treatment works. In addition a number of household units are being tested in the treatment of septic tank effluent and field trials are being conducted for the treatment of effluent from intensive agricultural enterprises such as feedlots and piggeries.

It is envisaged that VFW systems will be put to use throughout Australia and eventually worldwide as its applicability and benefits to sewage treatment and effluent disposal, and thus improved aquatic environments, become proven and more widely accepted. This will result in the development of a substantial industry based in Australia to undertake and direct the required feasibility studies, design and supervise construction, propagate established plants in the required medium and continue with system monitoring, processing of results and maintenance procedures for the management of operational systems. Associated research facilities will also be established to continually upgrade and improve system performance, and to develop plant products for marketing.

Development is currently underway to enable the transfer of the technology from a successful experimental phase to operational environments. These include a range of household, community and municipal sewerage works, abattoirs, agricultural feedlots and other industries which discharge large volumes of wastewaters. This new constructed wetland technology is regarded as a potential replacement for secondary and tertiary treatment or in some cases as a supplementary process to existing sewerage works. The effective reduction of nutrients by the VFW system at a low cost from sewage and similar effluent offers significant potential for the widespread improvement in quality of natural and urban waterways. Ineffective treatment of waste–waters before discharge causes eutrophication and increased toxicity in receiving waters, invasion by exotic fauna and flora and degeneration of aquatic environments and water supplies.

The experimental results obtained from the Vertical–Flow Wetland System have demonstrated exceptionally high rates of nutrient removal which appear to be within acceptable standards for both release into the hydrological system and recycling for domestic consumption (see Table B1).

There are potentially many additional environmental benefits of the VFW system:

- More effective removal of both phosphorus and nitrogen nutrients from sewage effluent is achieved with no power consumption and without the use of costly chemicals, which present related adverse impacts on local aquatic environments.

- The system may be installed in a range of land types including parks, recreational areas, low–lying flood–prone areas. Flooding waters would not interact with untreated water in the basal layers of the system.

- There is no surface water in this system and hence it would not be a breeding ground for insects nor present other related health risks. The treated water is removed from outlets located below surface after passing through the plant root system.

- There is no unpleasant odour associated with the system as treatment takes place underground.

- The system has been shown to be tolerant to shock loads of effluent and extreme nutrient loadings, a range of climatic conditions and the use of several types of native and/or naturalised aquatic plants without adverse effects on performance. This indicates that the system may be applied in a broad range of operating environments.

- The attractive appearance of stands of aquatic plants which utilise natural processes in a wetland system are fully compatible with aquatic environments and would not resemble conventional sewerage treatment works.

The cost advantages of the artificial wetland system (VFW) over competing systems (see Table B2) are clearly preferred in feasible situations, given the detrimental impact on the environment of other competing systems.

Major benefits of the VFW system include its environmental compatibility and social acceptability, simple installation, no power requirements, low cost and simple maintenance requirements, effectiveness in treating sewage effluent and similar wastewaters and its attractive appearance. The installation of an operating system may be in modular form on a staged basis concurrent with urban expansion and therefore overcomes the need for a large initial infrastructure to service projected future sewerage requirements. This could provide significant cost savings to existing populations for sewerage services.

The commercial availability of the VFW system is subject to results of large scale field trials currently underway and feasibility studies on the applicability of the system to the local environment where services are to be provided. Earlier use of the system in fully functional installations may be achieved by the early commencement of feasibility studies to be carried out concurrently with the field trials programme.

In terms of market potential in Australia, a recent survey of major water boards representing over 80% of the Australian population indicated that projected expenditure on sewerage systems, over the period 1990–2000 will amount to $5.5 billion. Of that total, $1.2 billion was accounted for by sewerage treatment plants and outfalls. These projections were made prior to the decision that Sydney would cease ocean disposal of sewerage in 1992 and hence significantly understate current projections.

A further indicator of market potential is that there are 154 thousand people lacking a reticulated water system in Australia. Assuming 2.8 people per household then an additional potential market of some 50,000 homes exists for VFW home unit systems. At $1,000 per home unit, the total potential market amounts to $50M.

It seems clear that a substantial market for VFW will be available for exploitation over the next decade. A very modest target of 10% would amount to a combined total of $125M. The overseas market potential is very much larger.

Cassiro is currently developing a technology package for commercialisation of VFW. The experimental development phase will be completed in two years with conclusion of community scale field trials at Coffs Harbour and Kapooka Barracks (Wagga Wagga), and a number of household unit trials of varying sizes. The strategy being developed by Cassiro for commercialisation anticipates three interrelated strands:

Table B1: Typical System Performance of the Experimental Vertical–Flow Wetland

Variable	VFW Influent Conc. mg/1	VFW Effluent Conc. mg/	VFW % Load Reduction	Tertiary Treated Discharge mg/1
Total Phosphorus	6.79 (2.84)	0.35 (0.07)	96.1	5.52 (1.45)
Total Nitrogen	40.10 (17.09)	2.13 (0.47)	95.6	7.62 (4.34)
Ch.Oxygen Demand	208.66 (83.76)	52.33 (12.47)	80.9	
Suspended Solids	33.38 (10.50)	21.29 (13.14)	52.0	

Plant Species : Schoenoplectus validus
Influent source : Primary settled domestic sewage (Griffith)
Retention time : 5 days
Data Period : 3 years, variable seasons
Standard deviation in brackets

Table B2: Comparative Costs of Various Sewage Treatment Systems ($/EP) (from CSIRO Corporate Planning Office)

System	Construction Cost	Annual Op.Cost	Present Value	Total Cost
Artificial Wetland	207	2.6	36.6	243.6
Oxidation Ditches	224	16.0	225.5	449.5
Package Plants	276	16.0	225.5	501.5
Lagoons	138	2.6	36.6	174.6
Ocean Discharge (short)	214	5.2	73.3	287.3
Ocean Discharge (long)	372	5.2	73.3	445.3
Fully Reticulated	538	6.6	93.0	631.0

Notes:

. EP – equivalent person

. The present value of annual operating expenses is over 25 years with an assumed rate of discount of 5%.

. The above costs do not include the installation of primary treatment systems.

. No consideration is made towards the additional indirect costs of environmental damage caused by inadequate treatment of sewage, which may be significant.

- establish demonstration sites at around six strategic locations characterised by varying climatic and elevation regions in cooperation with local councils

- market feasibility studies to a substantial number of local councils on a similar basis to that recently contracted with the Hastings Municipal Council.

  - on a basis of $4 per equivalent person, the aim is to generate some $10 million to support further R&D and related technology development

  - advantages to clients are priority access to design and avoidance of license fee.

- establishment of new business, with biological expertise being supplied by Cassiro and engineering and other expertise supplied by partner.

New business prospects encompass design and construction; consulting services; and nurseries for plant selection and propagation.

APPENDIX 2. THE HASTINGS DEVELOPMENT TRUST

Purpose

The main purposes of the Hastings Develoipment Trust (HDT) are:

- to set general directions for the Hastings 2000 Project and manage development in accordance with the Hastings Regional Development Plan;
- to decide on the sequencing of development, the priorities for the establishment of activities and the allocation of funds within the project;
- to assist in the sale of R&D–based enterprises as required, and to transfer the planning and management experience from the project to new development elsewhere in Australia and overseas; and
- to finance and manage funds for
  - the provision of recreational and other public amenites
  - supporting infrastructure
  - certain forms of capital construction
  - subsidisation of some core activities such as educational institutions
  - creation of financial incentives to attract activities to the project.

Structure

The Hastings Development Trust is to be a private company governed by a Board overseeing four divisions established to:

- implement the Business Plan for the Hastings 2000 Project;
- implement the Hastings Regional Development Plan;
- administer the financial functions of the Hastings 2000 Project; and
- transfer the experience of the Hastings 2000 Project.

It is proposed that membership of the Board of HDT (and conceivably corporations established for similar purposes elsewhere in Australia) will comprise the local Mayor to represent the local community and representatives of:

- CSIRO to maintain the focus that Australia's future lies in value–added exports through the commercialisation of Australian technology.
- Federal Government nominated by the Prime Minister to cover national welfare and infrastructure issues;
- State Government nominated by the Premier to cover State planning and infrastructure issues;
- Australian Council of Churches to ensure moral and spiritual values of Hastings 2000 enterprises;
- ACTU to protect welfare of employees;
- "Core industries" to maintain the focus on the drive to increase Australia's exports of goods and services and rational responses to tariff issues;
- "Support industries" to miniinise bottlenecks in the implementation of the development;
- Educational, training and related service enterprises;
- ACF to ensure adherence to the principles of sustainable development; and
- Equity partners and land holders.

An eminent Australian will be asked to chair the Board. Nominations for Chairperson will be made by the Board. The equity partners and land holders will make the final decision on this nomination and the foregoing nominated representatives.

Financial Functions of HDT

HDT will be responsible for financing and management of development. Funds will be used for the provision of recreational and other public amenities, supporting infrastructure, certain forms of capital construction, subsidisation, and the creation of financial incentives to attract core activities to the project.

The financial functions of HDT are:

- to manage development in accordance with the regional plan;
- to manage land and buildings for leading core and support industries, stimulating the demand for following residential and commercial building and land;
- to develop and sell residential land and housing packages;
- to develop commercial land and buildings for sale or lease;
- to distribute to the landowners and equity consortium a percentage of land sales as dividends as they are generated; and
- to invest all receipts after all operating expenses, liquidity requirements and the dividend payments to equity holders, in the Hastings 2000 Project.

APPENDIX 3. LIST OF PARTICIPANTS IN THE FEASIBILITY STUDY STAGE OF THE HASTINGS 2000 PROJECT

1. HASTINGS 2000 PROJECT STEERING COMMITTEE

. Dr Keith Boardman	:	Chairman of Committee Chancellor–Elect Hastings International University Former Chairman and Chief Executive, CSIRO
. Claude Cassegrain	:	Company Secretary, Gerard Cassegrain & Co Pty Ltd
. Bryan Dowling	:	Bryan R Dowling & Associates Pty Ltd, Architects & Planners
. Dr Gus Hooke	:	Development Vice–Chancellor, Hastings International University
. Dr David James	:	Director, Ecoservices Pty Ltd Special Commissioner, Resource Assessment Commission
. Dr Don MacRae	:	CSIRO Corporate Planner

2. DIRECT INPUT INTO THE PROJECT HAS COME FROM:

. Alderman Bob Woodlands, Mayor, Hastings Municipality
. Allen, Allen & Hemsley, Solicitors
. A.T. Cocks & Partners, Valuers, Planners and Land Economists
. Mr Glen Atkinson, Soil Conservation Service, New South Wales
. Mr Eric Bedford, Former NSW Minister for Environment and Planning
. BHP Engineering
. Mr John Blackwell, Chief Executive, Cassiro Pty Ltd
. CSIRO Corporate Planning Office
. CSIRO Institute of Natural Resources and Environment
. Deloitte Ross Tohmatsu, Chartered Accountants
. Department of Geography, University of New South Wales
. Professor Peter Dixon, Director, Centre of Policy Studies, Monash University
. Griffith Sallaway Pty, Chartered Accountants
. Mr Anthony Hartnell, Solicitor, current Chairman of Australian Securities Commission
. Mr Steve Garlick, Office of Local Government, Federal Government
. Gutteridge Haskins & Davey Pty Ltd, Consulting Engineers
. Ms Lisa Intemann, Secretary, Port Macquarie Conservation Society
. Professors Seigi and Yorika Iwata, President and Chair resp., Institute for Behavioural Science, Kyoto, Japan
. Professor Stephen Kaneff and Dr Keith Garzoli, Australian National University
. Professor Dame Leonie Kramer, Chancellor, Sydney University
. Mr Peter Long, Executive Director, Australian Finance Conference
. Dr D Mitchell, Chairman, Cassiro Pty Ltd
. Mr Jeremy Morris, Gerard Cassegrain & Co Pty Ltd
. Professor Warren Musgrave, University of New England
. Dr Alan Rundle, Consulting Ecologist, Lismore, New South Wales
. Soil Conservation Service, New South Wales
. Dr Richard Smart, Consulting Viticulturalist, Cassiro Pty Ltd
. Mr Peter Waterman, Director, Environmental Management Service, ACT
. Mr Graham Wickham, Soil Conservation Service, New South Wales
. Professor Sir Bruce Williams, Educationist, former Vice–Chancellor, Sydney University
. Many other individuals and organisations all of whom, to a varying extent, have had influence in the development of the project.

APPENDIX 4. HASTINGS 2000 ASSUMPTIONS

DEFINITIONS

COPYRIGHT

CORE JOBS – Goods and Services exported or consumed outside of H2000. eg., Jobs to satisfy University students coming from outside H2000.
SUPPORT JOBS – Goods and Services consumed within H2000. eg., Supply of public infrastrucuture and social services.
$ = DOLLAR AS AT 30/12/1990
THE H2000 ECONOMIC MIX WILL ALLOW FOR A SUSTAINED SOCIAL ENVIRONMENT AND ECONOMIC BALANCE TO OCCUR AT A POPULATION SIZE OF APPROXIMATELY 100,000.
TRAFFIC DESIGN PLAN CRITERIA Maximum time to travel from any two points at peak hour within Port Macq is not to exceed 15 minutes.
BUILDING & HOUSING DESIGNS TO INCORPORATE STATE OF THE ART ENERGY EFFICIENCIES
MAXIMUM EFFORT TO CONVERT WHAT IS CURRENTLY CONSIDERED AS WASTE TO BECOME RAW MATERIALS (including waste water, household garbage and industrial waste).
THE MODEL OF HASTINGS 2000 IS ASSUMED TO BE TRANSFERABLE TO 25 ADDITIONAL SUITABLE SITES THROUGHOUT THE NATION.
THE HASTINGS DEVELOPMENT TRUST (HDT) CONSISTS OF APPOINTEES OF THE FOLLOWING –
THE PRIME MINISTER, THE PREMIER, THE AUSTRALIAN COUNCIL OF CHURCHES, THE AUSTRALIAN COUNCIL OF TRADE UNIONS, CORE INDUSTRIES, SUPPORT INDUSTRIES, MAYOR/SHIRE PRESIDENT, LAND OWNERS CONTRIBUTING TO POOL, CSIRO, CHAIRED BY A PRE–EMINENT AUSTRALIAN
AVERAGE WORKING WEEK 44 HOURS (INCLUDING OVERTIME)
CONSORTIUM OF EQUITY INVESTORS TO PURCHASE 50% INTEREST IN GC & CO H2000 LAND HOLDINGS, H2000 FEASIBILITY STUDY: $25M.

REFER PORT MACQ MUNICIPAL COUNCIL COASTAL STRUCTURE PLAN 1990
REFER TO RAWLINSONS AUSTRALIAN CONSTRUCTION HANDBOOK 1990

THE PROJECT IS DEVELOPED UNDER THE COMMUNITY TITLE LEGISLATION. HDT RESPONSIBLE FOR INFRASTRUCUTURE MAINTENANCE.

THE H2000 URBAN PLAN INCREASES THE EFFICIENCY OF LIVING/PRODUCTIVITY OF URBAN DEVELOPMENT BY 30% (THIS HAS BEEN SUBSTANTIATED BY SOPHIA ANTIPOLIS, FRANCE).

LAND AREA CALCULATIONS

TOTAL LAND AREA OF HASTINGS 2000	1750 HA
AVERAGE SIZE OF DWELLING	140.00 M2
AVERAGE BUILDING 3 STORIES HIGH, THUS LAND PER DWELLING	46.67 M2

LAND FOR PRIVATE COURTYARD		46.67	M2
LAND FOR CARPARKING AND ACCESS		46.67	M2
TOTAL LAND REQUIRED PER DWELLING		140.00	M2
TOTAL NO OF RESIDENCES IN HASTINGS 2000		20,247	
LAND REQUIRED FOR ALL HASTINGS 2000 RESIDENCES		283.46	HA
	SAY	300	HA
TOTAL NEIGHBOURHOOD ROAD AREA REQUIRED PER DWELLING		95	M2
TOTAL NEIGHBOURHOOD ROAD AREA FOR HASTINGS 2000		192.35	HA
	SAY	200	HA
TOTAL COLLECTOR ROADS 15% OF TOTAL LAND AREA		262.50	HA
	SAY	275	HA
TOTAL RESIDENCE AND ROAD REQIRED		775	HA
TOTAL JOBS CREATED BY HASTINGS 2000		35310	
COMMERCIAL AND INDUSTRIAL AREA REQUIRED AT 75 M2 PER JOB		264.83	HA
	SAY	275	HA
AREA AVAILABLE FOR LIVING ENVIRONMENT (lakes, nature reserves, recreation & community facilities excluding State forests, National Parks)		710.175	HA
LIVING ENVIRONMENT PER RESIDENCE		350.76	M2
	SAY	350	M2

FINANCIAL AND POPULATION DATA

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TARGET CORE JOBS		16,500	

PROJECT LIFE

3 YEARS PLANNING
(continued)

PERCENT CORE JOBS PER YEAR OF PROJECT: Year Ending Dec 31	1991	1992	1993	1994	1995 *
% complete	0.0%	0.0%	0.0%	3.00%	4.00%

SUPPORT JOBS WITHIN PORT MACQ PER CORE JOB 1.14

AVERAGE LAND & BUILDING COST PER CORE JOB $ 125,000

AVERAGE LAND & BUILDING COST PER SUPPORT JOB $ 105,000

AVERAGE ANNUAL VALUE OF CONSTRUCTION PER CONST. WORKER $ 150,000

ACCOMMODATION REQUIREMENT FOR CONSTRUCTION WORKERS

	YEAR ARRIVAL	YEAR AFTER ARRIVAL	3RD YEAR AFTER ARRIVAL	THERE AFTER
Budget Accommodation – Flat/Caravan	70%	–20%	–20%	30%
Purchases Houses	20%	10%	20%	50%
Purchase Land – Owner/Builder	10%	10%	0%	20%
	100%	0%	0%	100%

SUPPORT JOBS WITHIN PORT MACQ PER CONSTRUCTION JOB 0.3

HOUSEHOLDS PER JOB
(60% of households 1 income, 40% of households 2 income) 0.7143

POPULATION OF PORT MACQ YR –2 27,000

PERCENTAGE POPULATION OF PORT MACQ RETIREES YEAR –2 40%

AVERAGE No OF RETIREES PER RETIREES HOUSEHOLD 2

YEARS CONSTRUCTION

* 1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	TOTAL
5.25%	6.50%	7.00%	7.25%	7.50%	8.25%	8.75%	8.50%	8.50%	8.00%	6.75%	6.00%	4.75%	100.00%

AVERAGE No OF NON RETIREES PER HOUSEHOLD	3.17		
POPULATION GROWTH YEAR −2 TO YEAR 0 INCLUSIVE (refer HMC & DEP projections)	4.5% pa		
POPULATION GROWTH RATE EXCLUDING THAT GROWTH CONTRIBUTED BY H2000			
YEAR 1	3% pa		
YEAR 2 TO 15	1%		
POPULATION GROWTH RATE AFTER COMPLETION OF H2000 (on completion of project the Hastings has achieved an economic, ecological and social balance. Living standard can be maintained without unnatural growth. Growth at a faster rate puts this balance at risk. Growth is controlled by planning laws)	1% pa		
EXISTING VACANT LOTS PORT MACQ AT START YEAR −2	600		
ZONED UNDEVELOPED RESIDENTIAL LOTS AT START YEAR −2	1,716		
EXISTING UNEMPLOYED IN PORT MACQ AT START YEAR −2	4,000		
EXISTING UNEMPLOYED WHO TAKE UP PERMANENT POSITION WITH H2000	YR1	YR2	YR3
	8%	10%	5%
EXISTING UNEMPLOYED WHO TAKE UP CONSTRUCTION JOBS ON H2000	YR−1	YR1	YR2
	20%	10%	10%
H2000 JOBS TAKEN BY RESIDENTS LIVING OUTSIDE OF PORT MACQ & H 2000	10%		
H2000 JOBS TAKEN BY RESIDENTS ACCOMMODATED IN PORT MACQ BY INCREASING DENSITY AS AT YEAR −2	15%		
POPULATION DENSITY OF PORT MACQ YEAR −2	13 per ha		

POPULATION DENSITY OF H2000 (including industry and living environment land)		40 per ha
AVERAGE COST TO DEVELOP LAND PER H2000 RESIDENCE (including augmentation of local infrastructure)	$	25,000
AVERAGE COST TO DEVELOP H2000 LIVING ENVIRONMENT PER RESIDENCE (lakes, nature reserves, recreation, community facilities)	$	10,000
AVERAGE COST TO BUILD A H2000 RESIDENCE	$	125,000
AVERAGE SELLING PRICE OF LAND PER RESIDENCE		
START YEAR 1	$	75,000
START YEAR 2 TO 4	+	5% pa
START YEAR 5 TO 8	+	10% pa
START YEAR 9 TO 11	+	3% pa
START YEAR 12 TO 15	+	1% pa
AVERAGE SELLING PRICE OF BUILDING (including flats and units excluding land value)	$	150,000
PERCENTAGE OF EQUIVALENT RESIDENTIAL LOTS SOLD AS LAND AND BUILDING PACKAGE BY H2000 HIDC		75%
LAND REQUIRED PER JOB (allowing for multi-storey, set-backs, parking, roads and drainage)		75 sq.mtrs
AVERAGE SELLING PRICE OF INDUSTRY LAND PER JOB (core and support)		
START YEAR 1	$	3,750
START YEAR 2 TO 4	+	5% pa
START YEAR 5 TO 8	+	10% pa
START YEAR 9 TO 11	+	3% pa
START YEAR 12 TO 15	+	1% pa

AVERAGE DEVELOPMENT COST OF INDUSTRY LAND PER JOB (core and support)	$	1,875	
AVERAGE TAXABLE INCOME PER JOB IN H2000			
START YEAR 1	$	45,000	
START YEAR 2 TO 4	+	5%	
START YEAR 5 TO 8	+	10%	
START YEAR 9 TO 11	+	3%	
START YEAR 12 TO 15	+	1%	
AVERAGE COST FOR PROJECT ADMINISTRATION WORKERS (including feasibility study) SALARY PLUS ONCOST	$	200,000	per worker per annum start year –1
ADMINISTRATION ONCOST	=	2 times salary	
FIXED COST PA FOR FEASIBILITY STUDY AND ON–GOING ADMINISTRATION	$	5,000,000	
H2000 RESIDENTIAL CONTRIBUTION FOR ADMINISTRATION	$	1,000	per annum
VARIABLE COST FOR ONGOING ADMINISTRATION & MAINTENANCE AS A % OF RESIDENTIAL CONTRIBUTION		60%	
INVESTMENTS IN CORE & SUPPORT INDUSTRIES EARN REAL (AFTER ALLOWING FOR INFLATION), NET (AFTER ALLOWING FOR DEPRECIATION) RETURN OF		5%	pa
AVERAGE RESIDENTIAL LOTS SALES VALUE PORT MACQ WITHOUT H2000		$ 50,000	
AVERAGE COST OF DEVELOPMENT		$ 22,500	
MARKETING COSTS AND SALES COMMISSION		7.5%	
INTEREST (lots held average 1 year)		17.5%	
AVERAGE RESIDENTS PER HOUSEHOLD EXCLUDING H2000		2.75	

AVERAGE RESIDENTS PER HOUSEHOLD INCLUDING H2000	3
VALUE OF WORK TO DATE ON H2000	$ 10,000,000
VALUE OF GC & CO LAND EXCLUDING H2000	$ 30,000,000
LAND + H2000 PROJECT (incl airport, excl HIU)	$ 50,000,000
PROPORTION OF GC & CO LAND OF H2000	59.05%
TOTAL RAW LAND VALUE REQUIRED FOR H2000	$ 50,800,716
TOTAL HA OF CASSEGRAIN (not including 640 ha. for Regional Airport)	1033.45 ha
INTEREST PAYABLE BY HDT	10% Real
PURCHASERS OF RESIDENTIAL LAND & BUILDING FROM HDT REQUIRE	60% Finance
BUILDING CONSTRUCTION CAPITAL FOR COMPANIES, CORPORATIONS, TRADERS, PROFESSIONALS, UTILITIES etc REQUIRE OVER & ABOVE HDT FINANCE AN ADDITIONAL	25% Finance
WORKING CAPITAL (machinery, stock etc.) FOR INDUSTRIES IS EQUAL TO	75% of Building Construction Cost
WORKING CAPITAL LEVERAGE	25% of Value
SUPERANNUATION CONTRIBUTIONS FROM COMPANIES & EMPLOYEES	5% of Gross Salary
PERSONAL SAVINGS FOR INVESTMENT =	7.5% of Gross Salary
CONSUMABLES – FOOD, DEPARTMENT STORE SUPPLIES, HOUSEHOLD GOODS, TRAVEL, EDUCATION, ENTERTAINMENT etc	22.5% of Gross Salary
INDUSTRY TURNOVER EQUALS	3 times salary
INDUSTRY CONSUMABLES SUPPLIED LOCALLY	22.8%

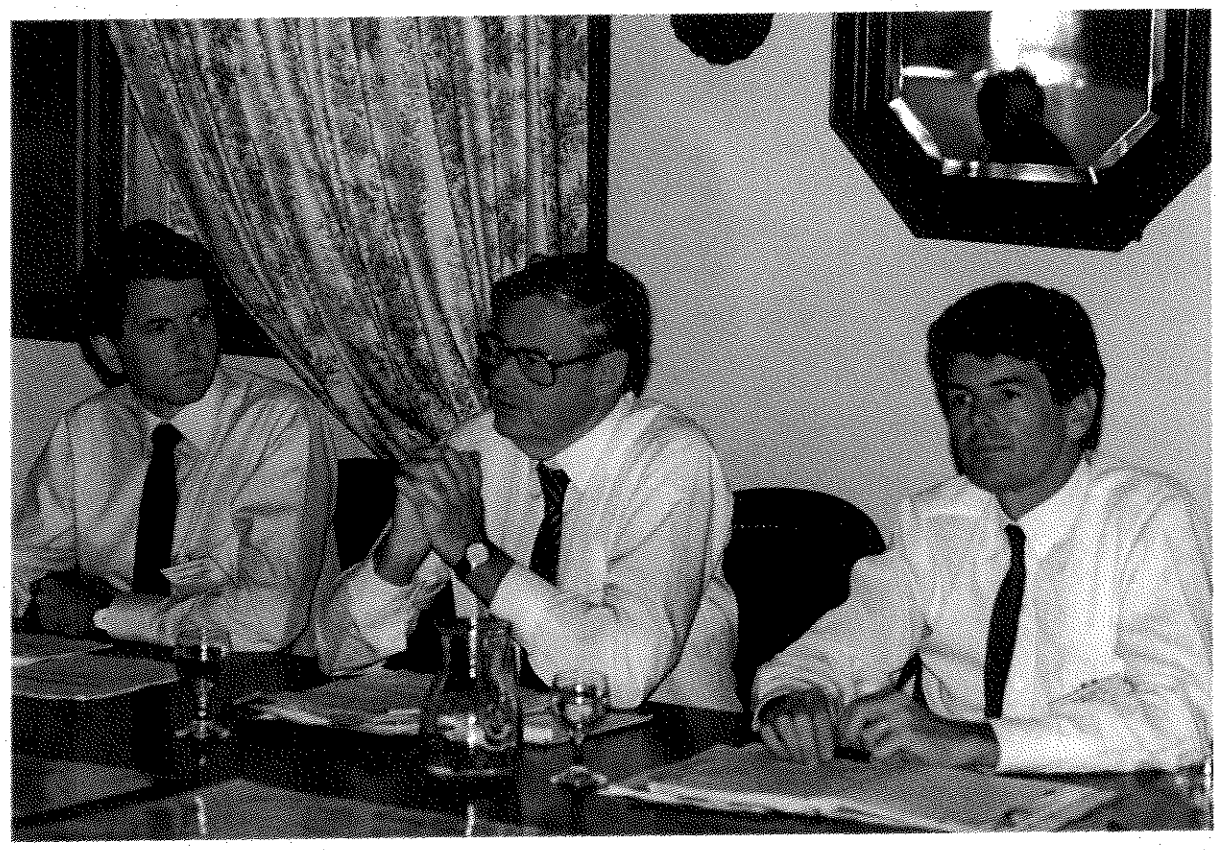
INCREASE IN EFFICIENCY IN HASTINGS 2000	30%	of gross salary
AVERAGE PERSONAL INCOME TAX	30%	of gross salary
PAYROLL TAX	5%	of gross salary
SALES TAX	20%	of personal consumables
COMPANIES PROFIT (NEW BUSINESS)	10%	of turnover
COMPANY TAX	39%	
INFRASTRUCTURE, UTILITIES, MAINTENANCE & COMMUNITY SERVICES (approximately 25% of support industry jobs)	12.5%	of total employment
DISCOUNTS NORMALLY EXPECTED TO BE NEGOTIATED FOR THE SUPPLY OF CONSTRUCTION SERVICES AND MATERIALS FOR A PROJECT OF THIS SIZE =	10%	
This discount can be sold for an upfront fee of x% of total value	2.5%	
THE OPTION FOR THE PROVISION OF FINANCIAL SERVICES PRESOLD AT	1%	of projected business value
OPTIONS FOR THE PURCHASE OF COMMERCIAL LOCATIONS PRESOLD AT	1%	of gross business value

FEDERAL GOVERNMENT Accepts to Treat Moneys Controlled by Trust for Internment as Capital & not Taxable. Tax Applicable on Income Earned from Moneys Interned as Capital Investment in Industry.

CAPITAL COST OF SUPPLYING PUBLIC INFRASTRUCTURE & SOCIAL SERVICES ARE INCLUDED IN THE SUPPORT INDUSTRY AND CONSTRUCTION COSTS. IT IS ASSUMED THAT THE RELEVANT GOVERNMENT AUTHORITIES WILL FUND THEM OUTSIDE OF THIS MODEL THE RETURN FOR WHICH THEY RECEIVE THE PROJECTED TAXATION REVENUE.

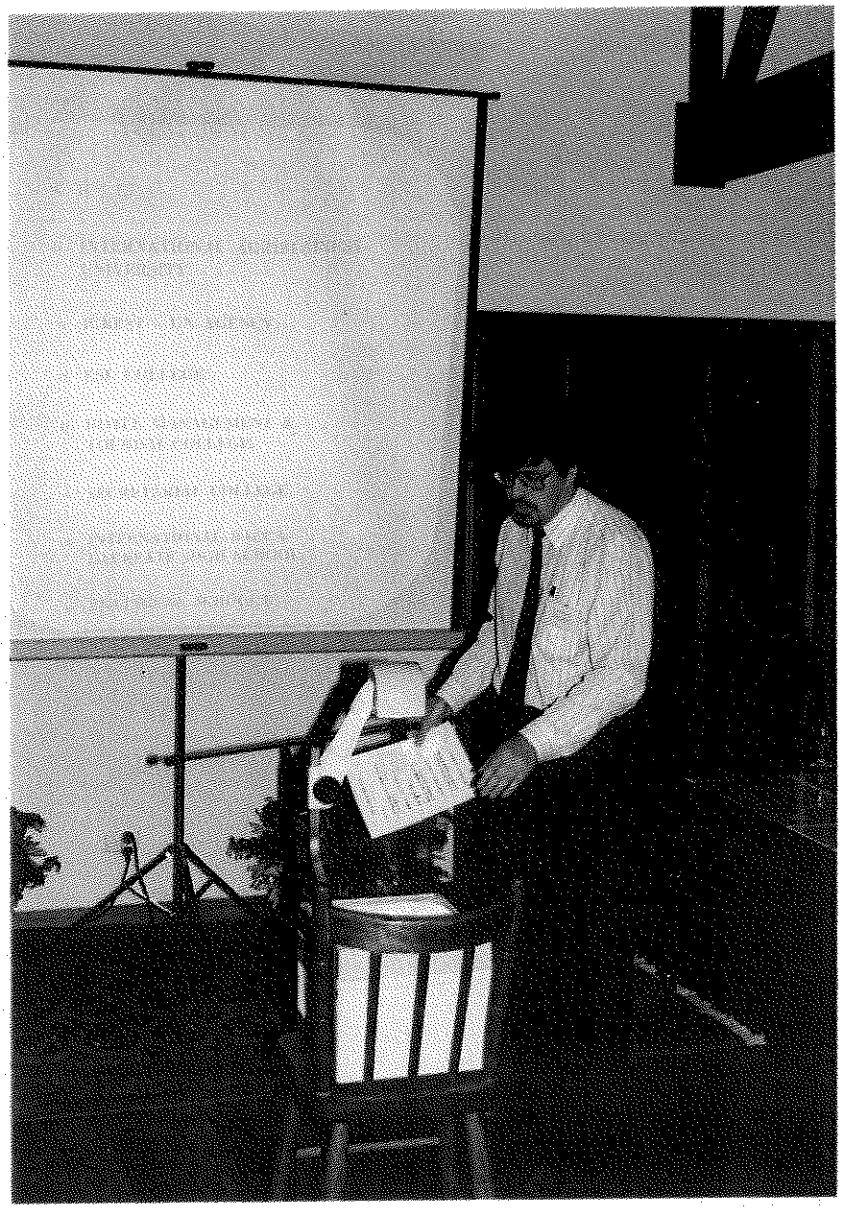
APPENDIX 5. A PICTORIAL RECORD OF HASTINGS 2000 WORKSHOP, PORT MACQUARIE, DECEMBER 1990

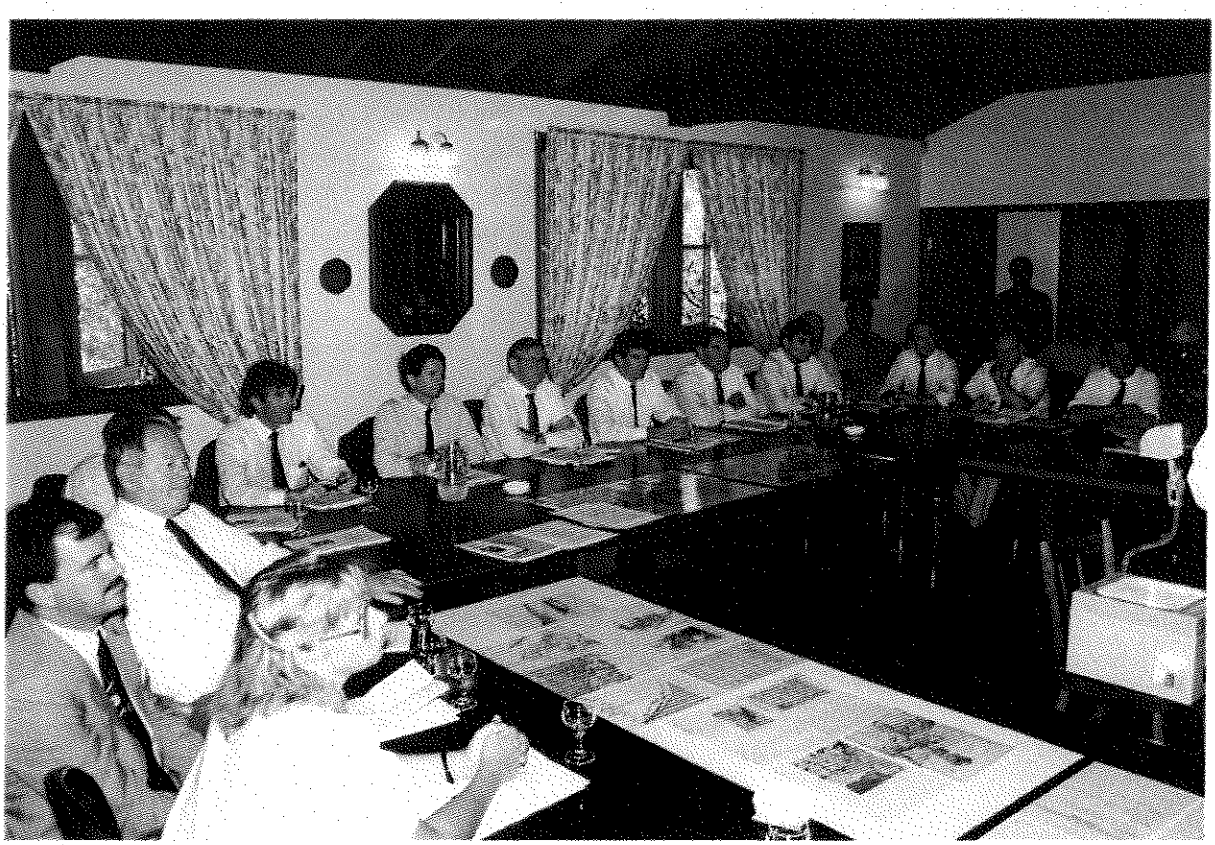
CASSEGRAINS HASTINGS VALLEY WINERY



"Let's get serious" – Meeting called to order
(Middle) Dr Keith Boardman, Chairman, (Left) Dr John Stocker
(Right) Dr Terry Metherell

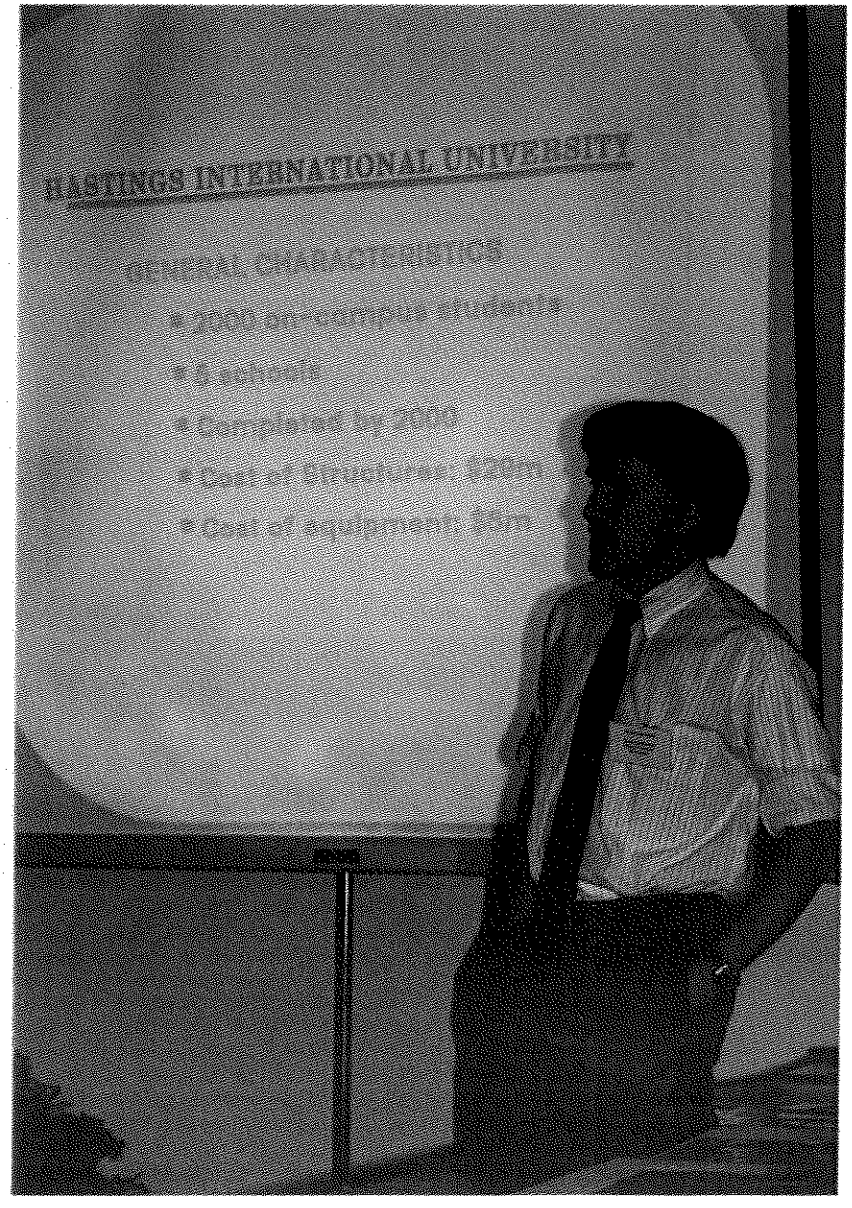
"Kick Start"
Dr Don MacRae

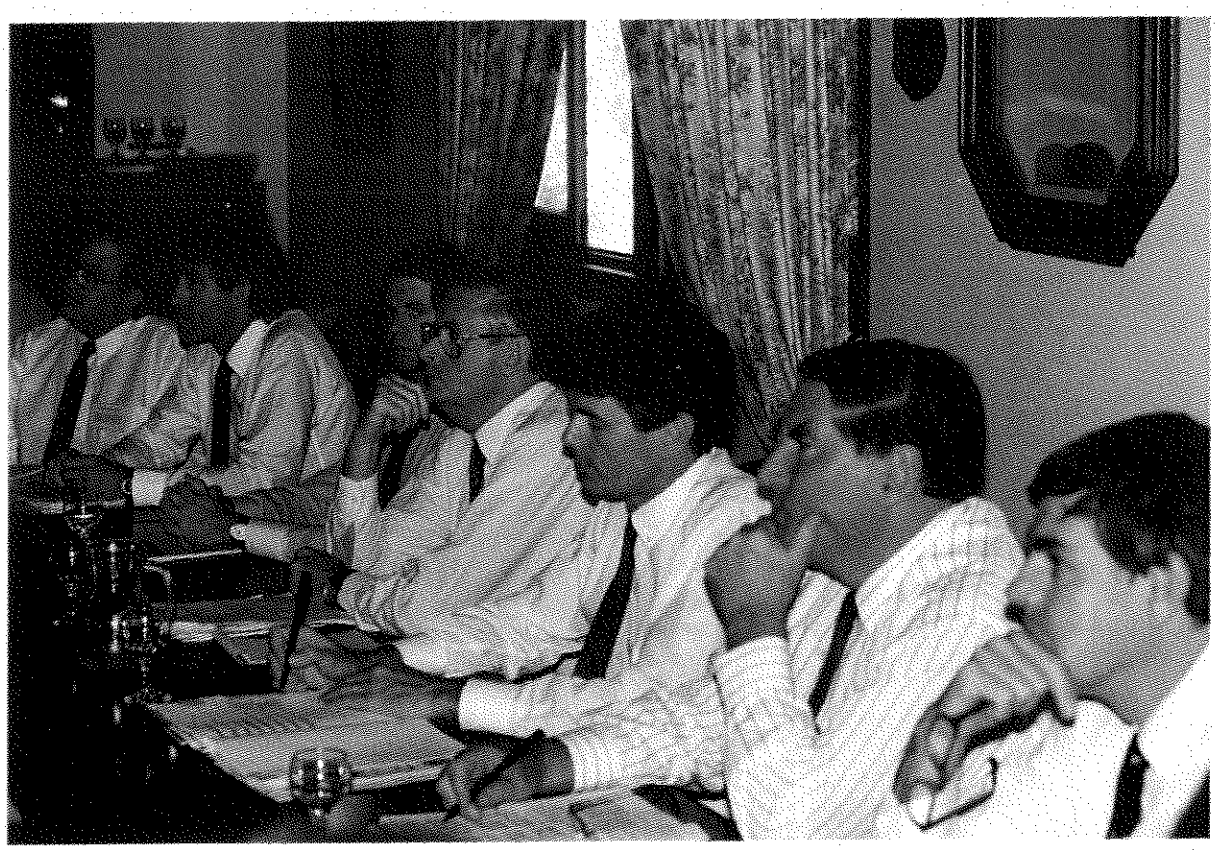




"He has everyone's attention"
(From left) Lisa Intemann, Professor Peter Dixon, Alderman Ray Cooper, (obscured)
Dr David Mitchell, Dr David James, Dr John Stocker, Dr Keith Boardman, Dr Terry Metherell,
John Jobling, Bruce Jeffrey, Graeme Wickham, Dr Allan Donald, Professor Warren Musgrave

Followed by Dr Gus Hooke

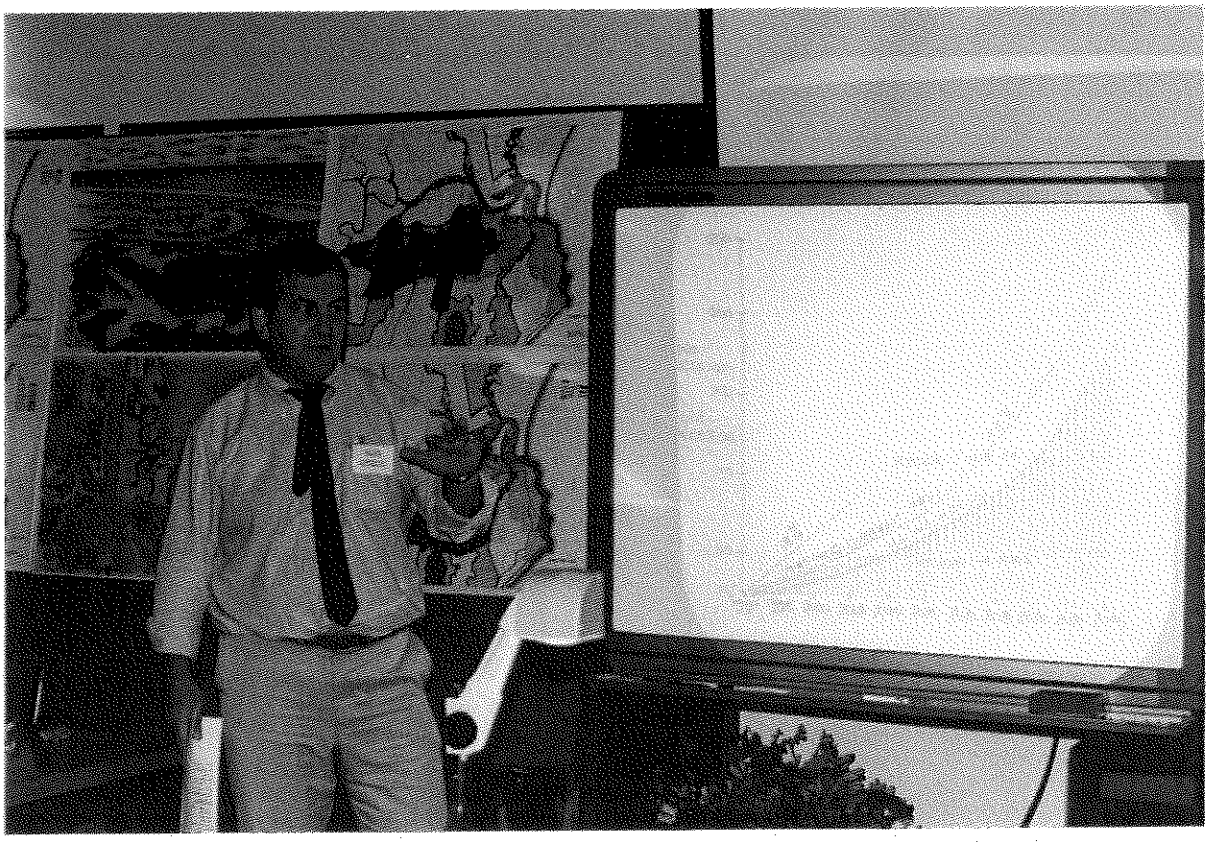




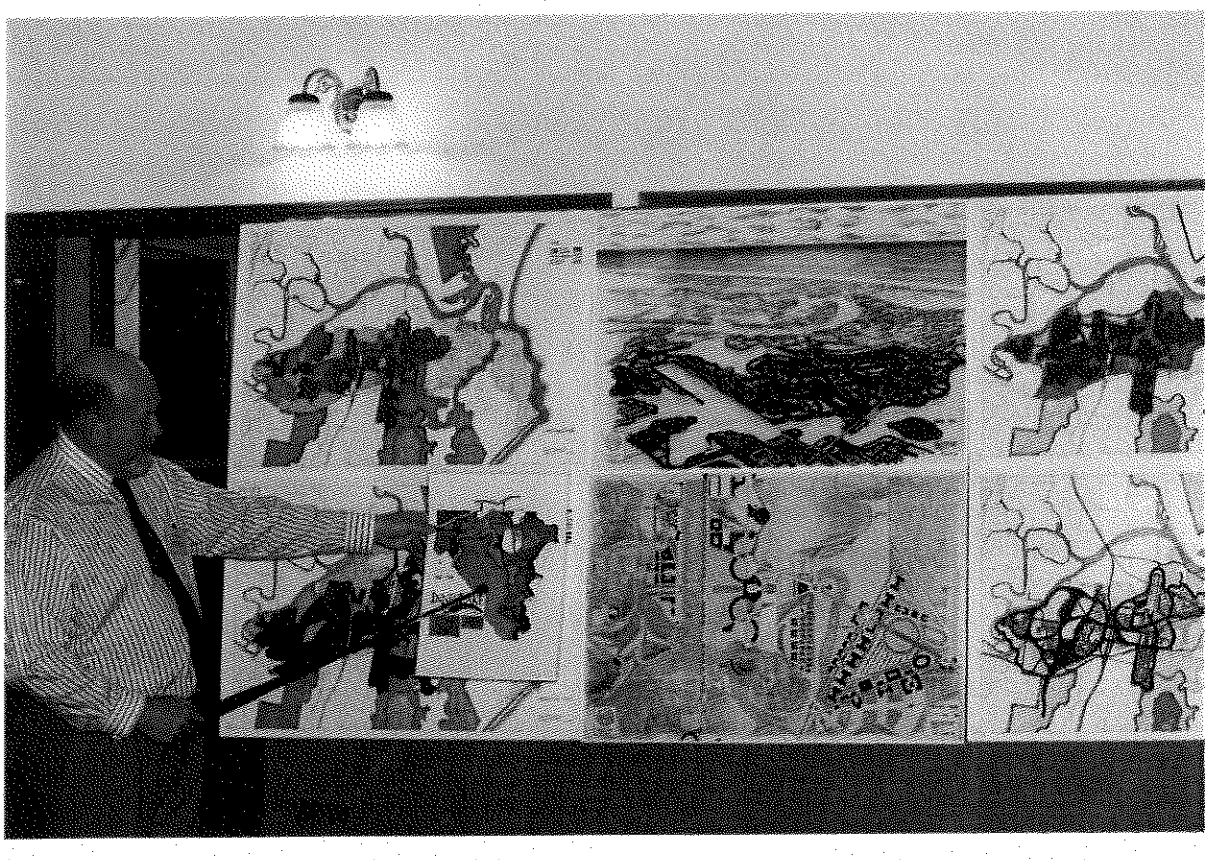
"Getting Deeper"
(From left) Dr David Mitchell, Dr David James, Dr John Stocker,
Dr Keith Boardman, Dr Terry Metherell, John Jobling, Bruce Jeffrey

Midway – Dr David James

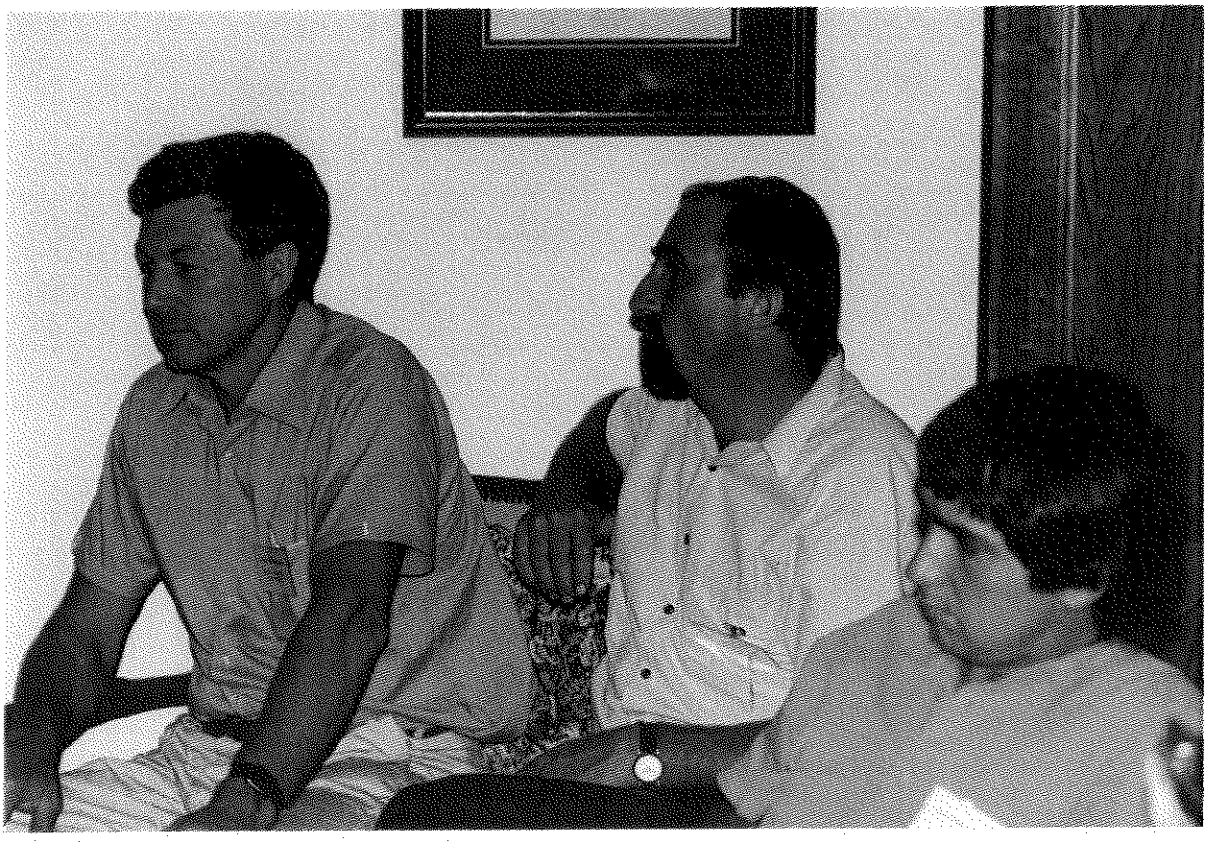
"He's got us thinking"
Peter Long, Chris Photakis, Lisa Intemann, Bob Charley, Claude Cassegrain,
Professor Peter Dixon, Claud Griffith, Alderman Ray Cooper



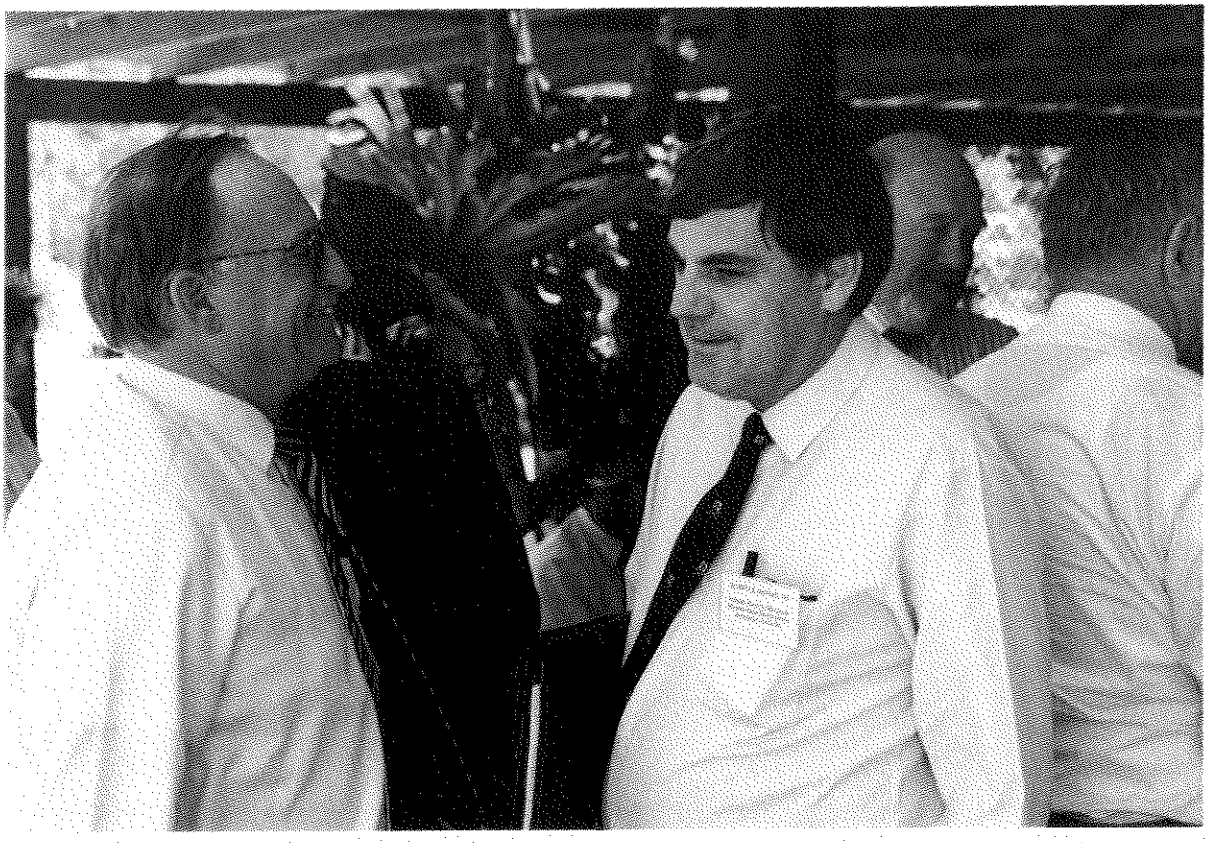
"The Crunch of the Matter"
Claude Cassegrain



"The Total Picture"
Bryan Dowling



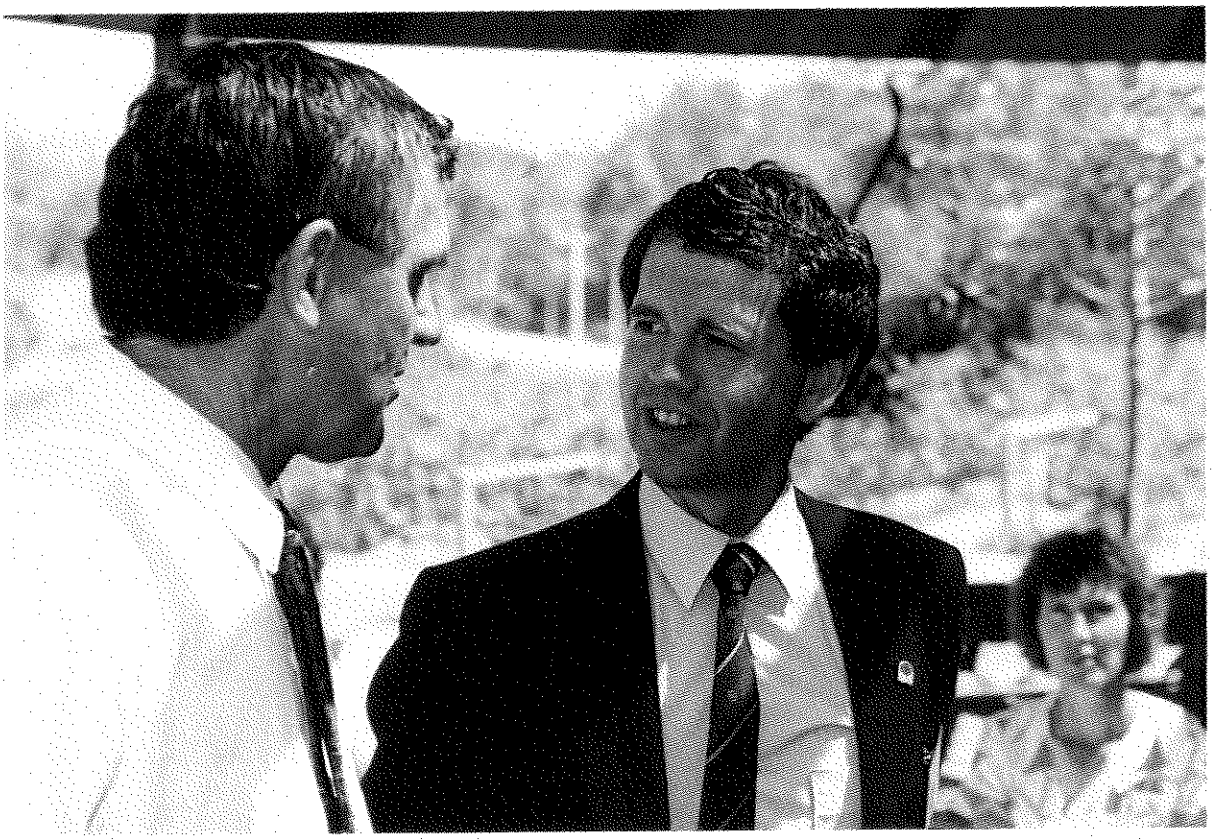
"We've heard it all before"
John Blackwell, Ludwig Mueller, Gunnar Kirchhof



"It's apolitical"
Eric Bedford, former Labour Minister, Bruce Jeffery, Liberal MP

"It's the way to go"
John Magann, Alderman Peter King, Claude Cassegrain, Derek Roche

"I'm Happy"
Alderman Ray Cooper, Dr Don MacRae, Dr David Mitchell



"We need each other"
Mayor Bob Woodlands, Dr John Stocker

"Where do we go from here"
Dr Terry Metherell, Claude Cassegrain

HASTINGS 2000

Hastings 2000 will offer urban living in a natural environment. It is located west of Port Macquarie in the heart of the Hastings Valley on a consolidated parcel of 1750 hectares of land. Over a 15 year programme it will provide living space for 75,000 residents and 16,500 wealth-creating jobs.

This project will revitalise the region that currently contains the lowest per capita income in the country.

Hastings 2000 has grown out of local community and business needs. The area is gradually slipping in economic well-being despite an annual population growth rate of 4.5 per cent. The current principal activities are tourism and retirement.

Hastings 2000 will provide an attractive alternative in this beautiful coastal region for those seeking to escape the problems of urban sprawl in the major cities. By so doing it could be the first of many similar developments which collectively will provide opportunities to revitalise the major cities.

There is an opportunity now to create viable, export-oriented business enterprises based on modern technology, located away from the major cities but with links to them through advanced telecommunications networks.

The financial feasibility for this project indicates an overall construction cost of $7 billion with an internal rate of return of 32%.

The project has strategic and business plans, a social philosophy and a greenfields site giving a clean and fresh start.

Detailed planning for the project will take full account of the magnificent natural environment of the Hastings Valley and will ensure quality sustainable living in an ecologically sensitive and economically viable community.

Hastings 2000 aims to create a way for Australians to live sustainably in the 21st century.