PLANNING MALAYSIA

Journal of the Malaysian Institute of Planners

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"Whoever travels in search of knowledge is on Jihād until he returns"
(transmitted by Tirmidhi & Darimi)
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MESSAGE FROM THE PRESIDENT

Dear Readers,

The publication of this journal is one of the many activities undertaken by the Malaysian Institute of Planners to disseminate knowledge and information pertaining to town and country planning to its members as well as to the public. This Journal also acts as a medium for MIP members and others to engage in research and writing articles that could contribute to the advancement of the theory and practice of town and country planning. Undertaking research and writing articles to be published in this Journal is one of the means for MIP members to fulfill their Continuing Professional Development (CPD) Programs requirement.

Topics which are covered and discussed in this Journal would definitely promote better understanding on current issues, new ideas and concepts, and latest technology that affecting the practice and profession of town planning in this country. Experiences and suggestions put forward by the authors in this Journal could be used or adopted into practice by MIP members in carrying out their professional role. Congratulation to the authors for their excellent effort and materials published in this Journal.

The publication of this journal would not be possible without the commitment and tedious works of the editorial team lead by Associate Prof. Dr Alias Abdullah. On behalf of the council I would like to thank the editors. I would like to urge members of MIP and others to make full use of this Journal.

Thank you.

Mohamad Nazri b. Jaafar
PRESIDENT
(2003-2005)

PLANNING EDUCATION, ACCREDITATION AND INTER-PROFESSIONAL LINKS

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Abstract

Planning education is changing with the changing vision on the needs of society for the 21st century. The core ideas of planning centres on: (a) spatial – the management of competing uses of land and the making of places; (b) sustainable – that meets the needs of the present without compromising the ability of future generations to meet their own needs; (c) integrative – that takes account of the wider set of issues plus bringing together a range of professional skills and disciplines to influence spatial planning delivery mechanisms; and (d) inclusive – that recognises a wide range of people and opinions that shape planning. Planning is also value driven and action oriented. Professional status of planners comes through providing critical thinking that aims at achieving outcomes and not just procedures, emphasising locational relationships and inter-relationships of the sectoral on the spatial and focusing on what could and should be done based on ethics, values and facts. Based on this the paper outlines the proposed content of planning education. Accreditations of planning schools are then discussed based on the new RTPI recommendation of partnership agreements that are less regulatory and more constructive. Under this topic the qualities possessed by effective planning schools are discussed. Good examples of inter-professional links are then examined with a view towards encouraging similar programs in other Commonwealth countries.

Keywords: Education, Accreditation, Skill, Knowledge, Planning Schools

INTRODUCTION

The Commonwealth's 1.7 billion people account for 30 per cent of the world's population distributed among 54 member countries of whom 50 are developing countries and 32 are small states each with less than 1.5 million people. More than half of the Commonwealth's 1.7 billion people are under 25 years of age. So trying to present a paper relevant to the planning education, accreditation and inter-professional links relevant to a mosaic of nations with different levels of economic development and cultures is very challenging. Against this canvas

we see the planning profession itself undergoing tremendous changes according to the level of economic development in each country.

The RTPI, with membership of 14,500, residing and working in over 90 countries, and probably the oldest of the professional planning bodies in the Commonwealth, has undertaken a large scale review of the planning profession to gear it for the tasks of the 21st Century which sees the planning profession changing perceptively from a government initiated regulatory infrastructure to that of a consultative process that is more integrative and inclusive. Extensive reference is made to the various reports that set out the new ideas on planning education and accreditation.

PLANNING EDUCATION

The Field and Nature of Town Planning

Town Planning embraces all forms of development and land use activities. It operates in all social strata and on several inter-related spatial levels – local, rural, urban metropolitan, regional, national and international. It is **concerned with the promotion, guidance, enhancement and control of development in the constantly changing physical environment in the interest of the common good but respecting the rights of the individual.**

It makes provision for the future; helps reconcile conflicts of interest; projects physical and social change; facilitates the harmonious evolution of communities; and initiates action for the optimum use of resources. It is both a management and creative activity. It is catalyst in conserving and developing the present and future structure and form of urban and rural areas. It contributes to the creation of the present and the future character of social, physical, economic, organization and environmental quality.

Town Planning is rarely an independent process; it must take account of external decisions. It works through and negotiates with the decision making mechanisms of society's political institutions and public and private sectors. Public participation is an indispensable element in the process. By virtue of its direct involvement with people and their day to day activities, Town Planning inevitably has strong political overtones[1].

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[1] Extract from appendix A of the European Council of Town Planners Charter (1988), as quoted in "The Education of Planners – Policy Statement and General Guidance for Academic Institutions offering Initial Professional Education in Planning", RTPI, March, 2001

This may be summarized as:

> *"Planning contributes to the management of change in the built environment. Effective planning may take many forms, but requires knowledge about urban and regional change, the physical and natural environment, and the social and economic environment, combined understanding and skill in applying this knowledge to policy formulation, implementation and project development in complex political/institutional contexts."*[2]

The role of planning is therefore to **improve people's quality of life** be it in the context of rural, metropolitan, regional, national or international levels. In developing countries, in the race to catch up with developed countries, **change** in the built environment is a permanent feature of any management. Planning education therefore has to identify the WHAT, HOW & WHY of CHANGE in the following:

- Geographical levels of development—rural, urban, regional etc.
- Physical & natural environment
- Socio-economic development
- Skills in the application of knowledge in these fields to policy formulation & implementation
- Techniques of project development and management
- Obtaining political approval, support and resources in the political and institutional contexts

A New Vision for Planning

In June 2001 the RTPI published a paper entitled "**A New Vision for Planning: Delivering Sustainable Communities, Settlements and Places – The Need for Action**" that sets the "context for a dialogue with …members and others about the way planning should evolve". The New Vision is built around the core ideas of planning, that is:

- **Spatial** – the management of the competing uses for space & the making of places that are valued & have identity.
- **Sustainable**[3] – addresses how planning can mediate between the short term economic and financial benefits, and the medium and long term, social and environmental implications.

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[2] RTPI March 2001: The Education of Planners p.2
[3] Defined as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs"

- **Integrative** – take account of a wider set of issues, full range of public, corporate and community strategies and initiatives, bringing together wider range of professional skills and disciplines to influence spatial planning and delivery mechanisms.
- **Inclusive** – recognizing the wide range of people involved in planning by respecting differences of opinion, recognizing social and spatial inequalities, withstand independent scrutiny and negotiate through a process of arbitration resulting in shared commitment.

In all the above matters Planning is:

- Value driven – identifies, understands & mediates conflicting sets of values.
- Action oriented – driven by the twin activities of mediating space & making of place.

Based on this *New Vision for Planning* **RTPI Education Commission** published a lengthy Report[4] in January 2003 that sets out clearly and with well reasoned confidence the field of planning that gives us the right to claim professional status. The key elements of their observations are:

- ✓ Critical thinking aimed at **achieving outcomes not just procedures.**
- ✓ Space emphasizing **locational relationships** & the impacts and **interrelationships of the sectoral on the spatial** and vice versa.
- ✓ Place – a **focus on outcomes, quality, form and identity** as experienced by occupants.
- ✓ Action or intervention – a deliberative process **focusing on what could and should be done based on ethics, values and facts.** Requires management skills appropriate to securing outcomes.

It does **not** view planning as a governmental activity whose legitimacy depends on statute or regulation, nor in-built economic, social or environmental privilege; but sees planning as necessary and inevitable within any society with aspirations beyond subsistence. Because of its richness and complexity, it calls for **a cadre of people with knowledge, skills and competence to facilitate it.** Therefore the Commission's report insists that the "idea of spatial planning needs to be at the centre of RTPI's requirements for the education of the professional planner, and its thinking about the education of non-professionals who as users of space and place are all active participants in the field of planning".[5]

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[4] RTPI Education Commission – Final Report, January, 2003
[5] RTPI Education Commission, January 2003, p.3

To achieve these key observations it sets out the future educational, qualifications and training policies of RTPI:

- To specify and validate an educational, training and qualifications framework
- To ensure that such framework reflects growing global and international context for planning
- To create conditions for professional planners trained elsewhere to validate their competence in the UK context
- To provide an educational continuum that allows access to & supports progression from different joining levels for planning interested manpower
- To continue to sponsor & enhance the support for planning education at generic, undergraduate & postgraduate levels
- To ensure that the educational framework has minimum barriers to entry for those who start without a firm commitment to planning; and that it attracts mid-carrier entrants to promote maximum inclusivity, opportunity and flexibility
- To ensure that RTPI's policies support and validate the development of the skills, knowledge and competencies of practitioners throughout their working lives

The other points made by the Report are:

- ❖ For initial planning education RTPI should provide **indicative guidance than prescriptive course content criteria.**
- ❖ **Shift education policy** from specifying **input requirements towards stressing the outputs;** the outputs expressed in the form of competencies that should be developed through a structured programme of acquiring theoretical and practical knowledge.
- ❖ Assessment of Professional Competence **(APC) should be managed by the planning schools** under guidelines & standards specified by RTPI.

Planning Content

Against the backdrop of the Vision statement RTPI has stated that the education of a Town Planner must consist of four components:

- A. **Knowledge** about the various elements that a planner should know.
- B. **Competency** in a range of skills to form relationships across these areas of knowledge.
- C. **Value dimensions** of planning work & ethical responsibilities of the planner.

D. **Specialised studies**.

A) The **knowledge** required relates to:

- The nature, purpose and methods of planning (theories of planning; historical thoughts in planning; planning methods; roles & relationship of planner).
- Environment and development (forms of natural environment; forms of built environment; the development process; how to manage the natural and built environment).
- The political, institutional and legal context of planning practice (planning systems; law, procedures, organization and governance of planning practice; related areas of policy).
- Specialized areas in the planning field (knowledge in depth in chosen areas of planning).

B) The **competency** required refers to:

- **Planning related skills** to:
    - i.   Produce strategies, policies & plans for sustaining and shaping physical environment and the activities it supports.
    - ii. Manage change in the spatial & physical environment and its component activities & facilitate the implementation of development.
    - iii. Communicate spatial & planning related information.

- **Planning related transferable skills** in:
    - i.   Problem definition.
    - ii.   Data collection, investigation & research.
    - iii. Quantitative & qualitative analysis & appraisal.
    - iv.   Aesthetic and design awareness & critique.
    - v.   Postulating & evaluation of alternative futures.
    - vi.   Collaborative & multidisciplinary working.
    - vii. Weighing evidence, problem solving & decision making.
    - viii. Negotiation, mediation & advocacy.

- **Generic transferable skills** in:
    - i.   project & resource management
    - ii.   people & organization management & leadership
    - iii. creativity
    - iv.   flexibility & adaptability

    v.   written, oral, graphic & multi-media communication
    vi.   using information technology

C) Awareness of **value dimensions** of planning work & ethical responsibility. Appreciation & respect for:

    i.   Issues of equal opportunity (with respect to race, gender & disability), social justice, economic welfare & efficiency the use of resources;

    ii.   Issues of sustainability & sustainable development in protecting & exploiting natural & human resources;

    iii.   the role of government & public participation in a democratic society & the balancing of the individual & collective rights and interests ;

    iv.   The diversity of cultures, views and ideologies, including respect for the diversity of different values and perspectives, and acknowledgement of their importance in decision making;

    v.   Significance of social & cultural heritages;

    vi.   The ethics of professional practice & behavior, including the relationship to clients (including politicians), other professionals and the public; use of the Code of Professional Conduct;

    vii. The interconnected social, economic and political dimension.

D) **Specialised studies** refer to:

- An area of planning or related "knowledge in depth" building on the core studies of the course
- Development of appreciation of what "knowledge in depth" means & developing skills in addressing & using knowledge at this level
- Specialized studies enable joint routes to planning & other professional qualifications e.g. Architecture & Planning, Planning & Landscape Architecture, Planning & Environmental Management

The course form, length and mode of study distinguish "**first cycle**" undergraduate programmes and "**second cycle**" graduate programmes. The undergraduate program may extend over four academic years resulting in the award of a Bachelor's degree at Honours level or equivalent. Half of this time should be devoted to 'spatial planning' element and one quarter of time to the 'specialist element' (that includes some element of individual investigative work resulting in the submission of a dissertation or major project equivalent .A variation of undergraduate programme is the three year undergraduate degree

covering only the 'spatial element' but those desiring to become Chartered Town Planners must complete the 'specialist element' at graduate level in the same planning school or at another planning school.

The graduate programme must complete both the spatial and specialist elements possibly in **one calendar year or alternately complete each element in a year taking a total of two academic years.**

After completion of the accredited academic qualification two years' practical experience leading to an Assessment of Professional Competence (APC) is required to become a Chartered Town Planner.

Dual professional routes are increasingly being offered by universities with emphasis on cross-disciplinary or multi-disciplinary studies (e.g. dual routes in Architecture and Planning).This is to be welcome provided the curriculum covers all the three planning elements.

ACCREDITATION

The role of national professional planning bodies is to provide guidelines on the content and competency development of that profession and to regulate the professional conduct and practice of various levels of manpower involved in the practice of that profession. Accreditation generally refers to the professional recognition of education providers with their courses, facilities and the staff engaged in the delivery of the programmes based on established standards and levels of provision. The content, competency standards and provision levels of planning education are not intended to be static but in a rapidly changing society, dynamic professional demands, changing technology and international outlook in a globalised world planning education should adapt to changes in the operating context of planning. Therefore new concepts of accreditation are evolving in each Commonwealth country to suit the local requirements.

- In the UK the RTPI Education Commission has recommended **partnership agreements** be established to manage relations between the Institute and the planning schools based on the mutual understanding and trust that has been established over the years. It seeks to make the **accreditation process less regulatory and more constructive**. The partnership is a form of agreement between the planning schools, the RTPI, and possibly representatives of employers with the following condition s included:

- ✓ 5 years' duration, with provision to roll forward annually;
- ✓ a clear statement of the planning school's education focus, its strategy for development and investment to be made in that research undertakings, capability and expected outputs, development of teaching methods and engagement with professional practice;
- ✓ support to students through student membership of RTPI and preparation for the Assessment of Professional Competence (APC)[6];
- ✓ the planning schools' commitment to support continuing professional development and provision of modules for advanced certificates[7];
- ✓ an outline of the planning school's marketing strategy and the commitment made by RTPI to support general marketing; and
- ✓ each agreement to be administered by a panel or board on which RTPI, the planning school & the employers are represented—their task to oversee the contract terms are being kept and that the planning school is achieving satisfactory standards in terms of student performance to be presented for Assessment of Professional Competence (APC).

The **agreement would relate to the planning school and not the course**. Therefore any new or revised course developed by the planning school covering the 3 basic elements of planning education[8] would qualify from the outset. This increases the flexibility of the planning school to respond to changing market conditions.

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[6] Lead responsibility for APC rests with the planning school & RTPI to be closely involved in the transition to this approach. Consists of 2 years' of structured programme (to be agreed with the employer) of active spatial planning work, programme of life long learning & CPD, with minimal administrative tasks. After 2 years' experience candidate to prepare report on how the candidate has developed his knowledge & skills and submitted to the planning school. This is part of the RTPI accreditation procedures.

[7] RTPI is required to introduce 'advanced certificates' that declare the holder to be a person with special knowledge and expertise in a recognized field of spatial planning: e.g. urban design, regeneration practices, community planning development management, development economics, land-use transport planning, strategic planning, planning research, management etc.

[8] Elements of planning education consists of (1) an understanding of what spatial planning is & the skills which underpin it, (2) an in-depth understanding of an area of specialize within spatial planning, and (3) an assessment of professional competence (i.e. fitness to practice).

The advantages of the new approach over the old are summarized as:

- offers the planning school and their students greater certainty about the continuity of accreditation;
- improves the planning school's investment in staffing and research;
- improves the basis of student support through to qualification;
- increases flexibility in the development of courses;
- gives 'end users' (employers) a larger role & greater confidence in the accreditation process; and
- reduce the administrative effort in the long run from both RTPI and the planning school.

For new planning schools the accreditation is proposed to be based on specific courses, as being done at present. But, RTPI is urged to "partner" the planning school from the outset to help develop the frameworks that enables full partnership agreements.

There are also proposals prepared for international accreditation of planning schools by the University of the Witwatersrand, Johannesburg in May 2002 on behalf of the Commonwealth Association of Planners.[9] The writer is not aware of the outcome of the proposals.

QUALITIES OF AN EFFECTIVE PLANNING SCHOOL

Relevant to the accreditation process are qualities that go towards making an effective planning school.

a) School Organisation.
b) Academic & Research Strengths in Defined Fields of Planning.
c) Links between the School & Planning Practice.
d) Professional Involvement.
e) Resources.

a) School Organisation:

- The organization of the school must have management and monitoring procedures to review the needs, effectiveness and development of the course.

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[9] See Appendix 2: A Proposal for International Accreditation of Planning Schools by the Commonwealth Association of Planners (CAP), Prepared by the University of Witwatersrand, Johannesburg, South Africa, May 2002.

- Effective consultation with student opinion.
- Planned staff development policies.
- Strong relationship with planning practice.

Indicators: *Manual of management and monitoring procedures; mechanism for student consultation; staff development plan; and written plan for relationships with planning practice.*

b) Academic & Research Strengths in Defined Fields of Planning:

- Provides challenge to staff and students in their specialist studies.
- Staff composition can be planned on a mix of defined fields.
- Sets appropriate performance expectations for students.

Indicators: *Staff qualifications; publications; research income; research rankings; research council recognition for courses and research students; and staff development policy.*

c) Links between School & Planning Practice:

- Provides focus to planning knowledge.
- Leads to appreciation of skills.

Indicators: *Staff qualifications and experience; relevant staff research (on planning methods); staff consultancy/involvement in planning aid; involvement of practitioners in teaching; role of practitioners in advising school; and sandwich and other placements.*

d) Professional Involvement:

- School to be concerned about the profession and its development.
- Majority of the staff should become MIP members.
- Head of Department should be an MIP member or fellow.
- At least one External Examiner should be an MIP member.
- School must have links to local branches of MIP, if there is one.
- Encourage student involvement in branch affairs through student membership of MIP.
- School should provide guidance on career development within the profession.

> ***Indicators:*** *Calendar of professional seminars in school; strategic plan to open / maintain a local chapter of MIP; Plan to involve students in local branch activities*

e) Resources:

- **Academic Staff:** Staff-student ratios to reflect importance of skill development and project work
- **Support Staff:** Technical, clerical, administrative staff needed for document management, information technology, graphics, photography and use of AVA equipment.
- **Library and Document Collection:** Access to a broad range of material in design, social, natural, engineering and management sciences. Access to collections of specialist material produced by practicing agencies & allied professions.
- **Computing and IT Equipment:** Access to computing facilities enables report production, data-management, statistical analysis, spatial analysis of data sets, GIS manipulation, map-based work and CAD.
- **Other Equipment:** Facilities for graphic work, video use and production, and photography.
- **Accommodation:** Space for project work, for design teaching and IT computing work.

Inter-Professional Link

Professional bodies represented in the Built Environment fold are **architecture, urban planning, building, housing, surveying and landscape.** All of these professional fields aim at creating a living environment that seeks to promote a better quality of life. Since their intention is the same there is a need to establish links among the professional bodies to better appreciate each other's profession, network among their members to organize continuous professional development programmes and also to serve the clients, be it public or private in a more 'holistic' manner. This way they can provide better value for the money rather than lowest cost.

Inter-Professional Links in the Malaysian environment is limited to the representatives of the various professional bodies serving in the numerous Federal, State or Municipal government organized committees and advisory bodies where the professionals offer their comments and advice to third parties but do not themselves work together to enhance their professions as is being done elsewhere. Therefore we need to look at some overseas examples to

provide indicators for the promotion of inter-professional co-operation locally and other commonwealth countries.

Better Together Project

A key recommendation of the United Kingdom Urban Task Force Report[10] (1999) was the establishment of: *"joint working between professional institutions, education providers and employers to develop a plan of action for improving the skills-base in urban development over the next five to seven years"*.

In response to this a project was mooted by the Fund for the Development of Teaching and Learning (FDTL) from the Higher Education Funding Council for England (HEFCE) and the Department for Higher and Further Education and Employment. Project bids were invited from higher education institutions that demonstrated high quality in their educational provision, as judged by the teaching quality assessment exercise. Among the bids Sheffield Hallam University, Kingston University and Oxford Brookes University have been chosen to work collaboratively with **RICS, RTPI, CIH, CIOB** and **RIBA** represented on the project's steering committee. The project aims to explore how inter-professional collaboration in the built environment can be fostered and reflected in the built environment curriculum. Their *working definition* of inter-professional education is *'a learning process in which different professionals learn from and about each other in order to develop collaborative practice'*. It is commonly known as 'Better Together' project.[11] See Appendix 1 for details of this project flow.

The key beneficiaries of the output of this project will be all built environment schools and their students, the professional institutes, employers and wider community groups

Project LINK

Linking Teaching with Research and Consultancy in the Disciplines of Planning, Land and Property Management, and Building[12] (or **'LINK'** for short) is a project being undertaken by Oxford Brookes University, The University of the West of England, University of Westminster and Sheffield Hallam University, into the what, where and how of Linking Teaching with Research and Consultancy in the three disciplines. It began in **September 2000**

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[10] See the Report in http://www.odpm.gov.uk/stellent/groups/odpm
[11] See http://www.bettertogether.ac.uk/background.cfm
[12] See http://www.brookes.ac.uk/schools/planning/LTRC/about.htm

and is due to be completed by **September 2003**. From October 2003 the project enters a new phase of transferability where it will work with one other discipline in each of the institutions to embed the findings of the project in those disciplines. Linking teaching to research and consultancy **enriches** students' knowledge of their subject. Linking teaching to research and consultancy **embeds** skills and capabilities which enhance graduate employability.

The project is funded by the Higher Education Funding Council for England and the Department for Higher and Further Education, Training and Employment under the Fund for the Development of Teaching and Learning.

The Centre for Education in the Built Environment (CEBE)[13]

CEBE aims to assist the whole UK Higher Education Built Environment community to further improve educational quality to ensure that the UK continues to remain innovative in the provision of education and training nationally and internationally.

CEBE is one of 24 Subject Centres which comprise part of the Higher Education Academy[14]. The primary purpose of CEBE is to provide discipline based support for learning and teaching in the built environment subject communities of Architecture, Landscape, Urban Planning, Housing and Transport, Construction and Real Estate. The Centre aims to:

- Support built environment academics in maintaining and enhancing the quality and effectiveness of their teaching.
- Facilitate knowledge brokerage through the identification, analysis and dissemination of information on good educational practices.
- Stimulate and facilitate a culture of communication and dialogue on innovative teaching between built environment educators.
- Provide opportunities for staff development.
- Review and encourage discipline based research on learning and teaching.

For teachers in any of the built environment subject areas, the Centre can provide:

- Resource materials and current information on developments in built environment education.

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[13] See The Centre for Education in the Built Environment (CEBE) in
http://www.cebe.ltsn.ac.uk/index.html
[14] See Learning and Teaching Support Network (LTSN) :The Higher Education
Academy in http://www.ltsn.ac.uk/

- Contact with other colleagues with similar interests through networks, discussion and focus groups.
- Registers of identified experts and expertise.
- Up-to-date approaches to learning and teaching (including the use of C&IT).
- Advice to enable teachers to design and develop ideas for learning, teaching and assessing.
- Arrange visits, demonstrations and workshops to aid staff development.
- Publish regular newsletters

The Australian Council of Building Design Professionals (BDP)

This is an organization of professional associations united to achieve better practices, policies, legislation and regulation for the design of the built environment. The professions represented here belong to the Architects, Engineers, Quantity Surveyors, Landscape Architects and Planners. Member organizations retain their individual identities, policies and positions but are able to promote a unified position through BDP that exerts a powerful influence for the design professions.

Continuing Professional Education conducted by BDP member organizations are open to the other association members to ensure that building and urban design practitioners participate in an ongoing program of self-education and improvement.

The above examples shows that the professionals in the built environment education sector needs to collaborate to explore solutions to common problems, seek solutions and share one's own teaching success with others in the profession to elevate the whole field to new levels of achievement in a competitive world.

Appendix 1: Project Timetable: Better Together

Links	Item	Details	Date
Project background	Project start date		15 November 2000
Resources			July 2001
	Milestone 1	Report on External Users' Priorities in Inter-Professional Education.	
			February 2002
	Interim Milestone	Initial collection of materials from partner institutions.	
	Milestone 2	1st set of working examples of inter-professional teaching materials.	June 2002
	Milestone 3	2nd set of working examples of inter-professional teaching materials.	October 2002
	Milestone 4	On-Line guide to inter-professional education.	October 2003
	Milestone 5	Report on the professional accreditation of inter-professional education.	October 2003 (deferred to 2004)
	Milestone 6	Final project report.	November 2003
	Original Project end date		14 November 2003
	Final Project end date		31 March 2004

Source: http://www.bettertogether.ac.uk/background.cfm

Appendix 2: 1st Proposal

A Proposal for International Accreditation of Planning Schools by the Commonwealth Association of Planners (CAP)

Towards a New Vision for Planning Education in the Commonwealth

Commonwealth countries share certain commonalities in terms of history and language, but, many countries also share similar development challenges that relate to issues such as accelerated urbanization, poverty, informality, lack of adequate services, skewed patterns of land ownership, institutional constraints, and environmental degradation. In terms of planning, many of the laws, procedures and systems, and much of the substantive content, have been derived from Great Britain. This is an important heritage that provides some commonality between countries, but it is also a limitation in terms of the particular issues and contexts that planning must respond to in many Commonwealth countries. There is an urgent need for planning education in the Commonwealth to be more contextually responsive at the same time it draws strength from its historical roots. Any system of international accreditation for Planning Schools should recognize and support the evolving nature of planning in post-colonial Commonwealth.

The Need for International Accreditation of Planning Schools

The internationalization of professional activity, and of academic endeavour, is an important trend that should be actively supported by an organization such as the Commonwealth association of Planners (CAP).The mobility of professionals, academics, and students, and the transferability of skills across national boundaries, needs to happen within a framework that provides for negotiated norms regarding the standards and content of training. The intention should not be to promote uniformity but rather to ensure that, within the context of diversity, there is sufficient agreement and understanding to allow movement and exchange to take place.

Within the Commonwealth there are member countries that have mechanisms in place for the setting of standards and the accreditation of academic institutions and programmes. In general, these are based on the British model, although there are important variations. Cross borer accreditation and recognition is however only limited to the agreements between the Royal Town Planning Institute (RTPI) and professional bodies in countries including Canada and Australia. There is a need for a far wider multi-lateral agreement between Commonwealth members for the mutual recognition of educational and training processes, and the registration of planning professionals. This agreement should

take account of the diverse contexts of the Commonwealth countries, and of the different forms in which planning happens within these countries. The simple extension of an existing system to other countries will not necessarily provide the most appropriate mechanism for accreditation.

Principles of Accreditation

The objectives of a system of accreditation should be to:

- ❑ Provide a basis for expanding international collaboration involving professionals and academics;
- ❑ Provide a framework for the cross border transferability of professional skills, and,
- ❑ Provide a mechanism to promote the upgrading and maintenance of academic and professional standards.

The following principles should inform the development of a system of accreditation:

- ❑ The accreditation process should be based on an agreed set of norms and standards that should be consistently and rigorously applied;
- ❑ There should however be proper recognition of the contextuality of planning and planning education, and the accreditation process should therefore not attempt to impose a common view of planning across the Commonwealth.
- ❑ Where possible, the Commonwealth accreditation process should link with and support national accreditation processes; and,
- ❑ The accreditation process should be as uncomplicated as possible, and should take account of the resource constraints of the international body and of local institutions.

Proposed Process for Accreditation

The following process is proposed:

i. An International accreditation Panel (IAP) be elected at the next meeting of the commonwealth Association of Planners. This panel should have fair representation from across the Commonwealth. The function of this Panel should be to:

- ▪ Set policy and standards regarding the accreditation of planning programmes in tertiary educational institutions;
- ▪ Draw up guidelines for conducting accreditation visits;

- Compile and maintain a list of persons eligible for appointment to Accreditation Committees, and of institutions and associations that may compile and maintain local lists;
- Appoint members of Accreditation Committees
- Provide the Chairpersons from amongst its membership for local Accreditation Committees;
- Confirm and formalize the granting and withdrawal of accreditation to planning programmes; and,
- Issue annually a list of programmes that are accredited by CAP

ii. Planning Schools/Programmes should be invited to apply for accreditation on a form that would provide the IAP with introductory information about the School/Programme.

iii. The IAP should appoint one local representative and one international representative to make a Preliminary Visit to School to assess readiness for a full accreditation visit, and to provide guidance to the School in preparing for such a visit. That should happen within six months of the initial application.

iv. The IAP should select a Local Accreditation Panel for the visit ensuring:

- A mix of practicing and academic members (with the possible inclusion of laypersons representing employers and other interest);
- That at least one third of members are international;
- The Chairperson is a member of IAP; and
- Where possible the CAP accreditation visit is linked to a national accreditation process.

v. Within six months after a Preliminary Visit the School should provide the IAP with full documentation following the required format

vi. Within three months after the receipt of this documentation the School should be visited by the Local Accreditation Panel, which should spend at least three days at the School.

vii. The Local accreditation Panel should be empowered to disclose to the School a preliminary recommendation on accreditation to the School (although a recommendation may be deferred in unusual instances).

viii. The recommendation should be confirmed by IAP.

ix. The School should be re-visited by a Local Accreditation Panel within five years of the initial visit to confirm the extension of international accreditation.

x. Schools should be provided flexibility to adjust and adapt their programmes between accreditation visits, but substantial changes should be reported to the IAP.

Categories of Accreditation

The following categories are recommended:

> **Full Accreditation** – This is awarded for a period of five years, although it may be extended on an annual basis if there are no evident factors that may affect accreditation.

> **Provisional accreditation** – This will be awarded when a programme is considered to have inadequacies that affect the quality of the degree, but that may realistically be remedied within a reasonable period of time. Provisional accreditation may be awarded for a period of one or two years, and may be converted to a full accreditation after a re-evaluation visit by a full panel or a reduced number of members drawn from the original panel. It may also be awarded to a new programme within an accredited School, subject to review at the next accreditation visit.

If the decision is **not to award accreditation**, or to **withdraw accreditation**, on the basis of inadequacies that cannot be rectified within reasonable period of time, there needs to be clear statement as to what is required to attain accreditation in the future, and CAP should provide support to the School to achieve the necessary standards.

Validation Criteria

Major validation criteria relate to:

- Content of the Academic Programme,
- Quality Assurance, and
- School Equipment and Resources

Content of the Academic Programme

It is important that there is flexibility in determining appropriate content, and that there is adequate recognition to local content and approaches. However, there are areas of content that are widely accepted in the Commonwealth and elsewhere as fundamental to planning education, and that are necessary for international transferability of qualifications. In evaluating the academic content the Panel should consider the following questions:

    i.   Is there an adequate intellectual; and theoretical basis for the planning that is taught in the school? (i.e., Are the major historical traditions, debates, and approaches in the area of planning theory adequately covered? Is this theory properly related to local context? Is there adequate integration between the teaching of theory and practice?

ii.   Is there an adequate coverage of technologies, techniques, and methodologies used in planning?

iii.   Is there an adequate legal and institutional knowledge? (Note that whilst the focus is on local planning law and institutions, the programme should provide an adequate understanding of general principle, and of different international example/approaches/debates to allow for transferability)

iv.   Is there an adequate understanding of professional practice and of planning ethics?

v.   Does the programme give sufficient attention to the development of analytical, communication, presentation and other generic skills?

vi.   Does the programme promote creative, strategic and integrative thinking?

vii.   Does the programme include an adequate practical and studio-based component?

viii. Does the programme include the opportunity for independent research?

ix.   Is there sufficient linkage with related disciplines including, for example, sociology, economics, geography, architecture, and civil engineering?

x.   Is the pedagogical approach appropriate? (i.e. Is there a proper progression from a simple to a more complex understanding of planning, and is there adequate support to students from disadvantaged backgrounds?)

xi.   Is there an adequate balance between attention to local content, and attention to debates and ideas of global concern?

xii.   Does the programme cover scales of planning from local to regional, and preferably to national and international, and does it provide an adequate comparative understanding of planning systems internationally?

xiii. Is there sufficient attention to the developmental issues faced by most Commonwealth countries?

Quality Assurance

Key questions that need to be asked include:

i.   Are admission criteria of a sufficient high standard?

ii.   What is the quality of teaching, research, leadership, and management within the School?

iii.   Does the learning process include a sufficient diversity of teaching methods?

iv.   Are marking standards consistent with accepted norms?

    v.   Are methods of assessment adequate?

    vi.   Is there sufficiently rigorous process of external examination?

School Equipment and Resources

The key questions here include:

    i.   Is there a sufficient number of adequately qualified staff to support the student numbers?

    ii.   Is the bulk of the programme taught by full-time staff members who are accessible to students?

    iii. Are members of staff sufficiently involved in research and professional activities?

    iv. Is there adequate quality space for lecturing, studios, seminars, and for administration and research?

    v.   Do staff and students have adequate access to computers and appropriate software?

    vi. Do staff and students have adequate access to library resources?

    vii. Is the School sufficiently provided for in terms of finance?

    viii. Is the university supportive of the school, and where is the School placed in terms of the academic planning of the institution?

The IAC should be tasked with negotiating and developing appropriate norms for each of the above. In addition to the issues above, which could be measured against reasonably objective validation criteria, the panel should also consider questions that address the ethos and morale of the School.

Conclusion

Finally, it should be noted that there are critical issues that have not been addressed in this proposal. The most important of these is the financing of the accreditation process. It is a common practice in some countries for the School under consideration to bear costs; however, many Schools in the Commonwealth have very limited financial resources.

Draft Proposal Prepared at the University of Witwatersrand, Johannesburg, in May, 2002

<u>**Appendix 2:**</u> **2nd Proposal**

Discussion Draft – GLOBAL PLANNING EDUCATION ASSOCIATION NETWORK (GPEAN)

AN INTERNATIONAL SYSTEM OF RECOGNITION OF PLANNING SCHOOLS AND/OR STUDENTS:

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MOTIVATION AND A WAY FORWARD

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Paper prepared by Vanessa Watson, Bruce Stiftel and Roberto Rodriguez for GPEAN.

Background

The Global Planning Education Association Network (GPEAN), a nine member network representing planning schools in most parts of the world, discussed international credentialing of planning education at its 2003 annual meeting in Belo Horizonte, Brazil, and decided to initiate a multi-year process of discussion on the issue. This document sets out a motivation for international credentialing and discusses some possible ways in which such a system could be established. Finally a programme of action for member planning school associations, intended to lead to possible actions on international credentialing, is laid out.

Motivation

Many countries and regions have their own systems of accrediting planning schools, but increasingly planning schools from various parts of the world are seeking accreditation by one of the main country-based accrediting bodies, the Royal Town Planning Institute (RTPI) and the US Planning Accreditation Board (PAB), in order to gain a degree of international recognition. Such requests can place accreditation bodies in a difficult position as the basis for evaluation is often unclear, contexts differ significantly, and applicant schools are faced with the heavy cost of travel and subsistence for the accrediting team. These requests are occurring, on the one hand, as a result of the increasing international mobility of planning graduates who wish to work in various parts of the world; and on the other hand, as a result of the lack of accreditation systems in certain countries where planning schools nonetheless see the value of accreditation both to themselves and their students.

Some system of international consultation and/or evaluation could help to improve the quality of planning education in those parts of the world where no

system of accreditation is currently in place, and would offer important quality assurance to potential employers of planning graduates in all parts of the world. Such a system could be preferable to the present ad hoc one, which in any event may perpetuate a one-way relationship between 'first world' accrediting bodies and planners from elsewhere, and perhaps bias planning education towards the concerns of countries in the North. International consultation and/or evaluation would offer the opportunity to consider criteria for planning education from a truly international and multi-cultural perspective.

It is also of significance that other related professions, such as engineering, have taken the decision to establish an international accreditation system. It appears to be an issue that planners will have to confront at some stage.

Possible approaches to international consultation and/or evaluation

There are many possible "models" of international consultation and/or evaluation. Among these are:

- Some form of international accreditation based on international (or regional) criteria and employing visits to schools/departments by an international team. A key issue here is how the cost of travel and subsistence is funded, particularly in poorer countries.
- International determinations of Substantial Equivalency undertaken by one or more existing accrediting organizations.
- Curriculum-wide international (or regional) consultation leading to advice to be considered by institutions under review. This might include site visits.
- International approval of certain specific 'conversion' courses (referring to a unit of instruction and not a full programme leading to a degree), offered to planning graduates and examined at a particular centre within a country. The RTPI is currently considering this option for commonwealth countries. The RTPI would approve the content and examination of two courses offered locally to planning graduates, would require two years of structured practical experience (in their local context), and would subject the applicant to an Assessment of Professional Competence. This approach could offer a model to be followed by an international accrediting agency.
- Development of distance learning methodologies to deliver course content electronically to applicants and to conduct an examination in their home countries. Such content would have to be developed in discussions with local associations and existing accreditation bodies.

Any system of international accreditation would have to be sensitive to the vast differences in resources and contexts across the globe, along with possible fears by planning schools in poorer countries that they would be subjected to unachievable 'first world' standards. Key issues for planners and planning educators in countries of the South are very different to those in the North, and this understanding would need to be accommodated in the establishment of performance criteria. Resource constraints and inequalities also mean that an accreditation programme would need to be accompanied by a developmental programme which offered guidance (and possibly practical help and resources) to planning schools seeking accreditation. Without this, the divide between better-off planning schools able to secure accreditation and those unable to do so, would simply increase.

The way forward

The full support of the existing country-based accreditation bodies (and particularly the RTPI and PAB), which have a wealth of experience in accreditation matters, is crucial to this initiative. Also crucial is support from planning schools and their associations – both from those countries with accreditation systems and those without. But first thorough consultation needs to take place around the form of an international capacity and the various models of consultation.

It is suggested here that GPEAN could play a role in initiating discussion on this issue, first within planning school associations, and then in conjunction with existing accrediting bodies. Both the RTPI and the Commonwealth Association of Planners have given some thought to the question of accreditation of schools outside of the UK, and this will provide a useful input to the debate. *As a practical first step it is suggested that future planning school congresses arrange panel discussions on the issue of international evaluation and consultation, and invite speakers from existing professional and accrediting bodies to contribute to these.* GPEAN representatives would be asked to feed back on these debates to the GPEAN co-ordinating committee, which could act as a point of co-ordination and dissemination for these debates. The next World Planning Schools Congress in 2006 would provide a good opportunity to assess the extent to which consensus has emerged on this issue.

This document is therefore being sent to planning school association representatives on GPEAN, with a request to raise the issue where appropriate in your association, and to put forward proposals for panel discussions in up-coming congresses.

Angus Witherby
(GPEAN chair)
August, 2003

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ELECTRONIC LOCAL AUTHORITY MANAGEMENT SYSTEM

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MUNICIPAL COUNCIL OF PENANG ISLAND

Abstract

One of the most important functions of a local authority in Malaysia is development control under the Town and Country Planning Act, 1976 (Act 172) and the Street, Drainage and Building Act, 1974 (Act 133). With the powers under these acts, the local authority is responsible to ensure that any activity of development is carried out in an orderly manner so as not to cause immediate as well as long-term undesirable impacts on the neighbours, the surroundings and the environment. To do this the law requires that any person intending to carry out any development will need a planning permission and a building plan approval from the local authority. In giving such an approval the local authority has to check and ensure that the developer can and will carry out the development properly and according to a good set of by-laws, standards, regulations and guidelines drawn up to protect the safety, health and amenity of the people in the local authority area. However most local authorities, due to numerous valid reasons, have problems carrying out this task and are often accused of causing delays to the development process and hence to the economic progress of the country. Often, justly or unjustly, local authority officers and decision-makers have been branded as not transparent and corrupt for taking such a confusing and lengthy process in considering applications for development approval. Local authorities have hence an almost impossible task of protecting the environment and ensuring sustainable development and at the same time promoting further development and timely economic growth. In an attempt to overcome this problem the Municipal Council of Penang Island (MCPI), with grants from the Development Application Grant Scheme (DAGS) of the National IT Council (NITC) of Malaysia, embarked on a project to develop an Electronic Local Authority Management System, or "eLAMS". This will assist in the day-to-day functions of processing and considering of applications for planning permission, building plans and earthworks plans, in accordance with a good quality management and environmental management system.

This paper examines the problems of the development control process for sustainable development and the problems of adopting and adapting the electronic system faced by local authorities in Malaysia in general and the Municipal Council of Penang Island in particular. This paper will also outline the proposals to overcome these problems with eLAMS.

Keywords: eLAMS, GIS, CAD, DAGS, Development Control, PEGIS

INTRODUCTION

The government's task of protecting the environment, abating nuisance and hazardous situations, and ensuring sanitary conditions has been inherent since the formulation of the health and housing laws of England. There were later adopted and adapted for the running of the local government areas of Malaysia (then Malaya), in the form of the earlier Municipal Ordinances and the Town Boards Enactments. In later years, these ordinance and enactments were replaced by the Local Government Act (1971), The Street, Drainage and Building Act (1974), and the Town and Country Planning Act (1976), which together, provided local governments of Malaysia the powers and responsibilities to ensure a safe, healthy and enjoyable environment for the people. The task is made more crucial with Malaysia's commitment in the global thrust towards sustainable development. The local authority has an important role to play in ensuring sustainable development in its area. Under these acts, it is the key player in the planning and control of development by private individuals carrying out activities that may have immediate as well as long-term impacts on the neighbours and the environment. Be it the construction of a house, the felling of trees, the cutting of hills, or the operation of a polluting industry. Under the Town and Country Planning Act (1976), any person who intends to carry out any form of development has to obtain approval in the form of a planning permission from the local authority. The Act's definition of "development" is very wide and covers the erection or demolition of a building or structure, cutting of land, and change of land or building use. The Act even requires approval for the felling of trees. Under the Street, Drainage and Building Act (1974), approval of the local authority is required for the erection of buildings, the construction of streets and drains, and carrying out of earthworks, while under the Local Government Act (1971), the local authority controls and supervises, by licensing, the carrying out of any trades, businesses or industries, that can be a source of nuisance.

Although the local authorities have adequate powers under Malaysian laws to ensure good and sustainable development through the development control process, the task is not an easy one. There are numerous valid reasons for this and the process is filled with inherent problems, ranging from the tediousness of the process, which is worsened by the perennial shortage of manpower situation, to the difficulties of rejecting applications, which is worsened by the political factor in a democratic society.

Malaysia has embarked on the path towards computerization a long time ago. However, the central government's thrust into the ICT world was launched with the formation of the National IT Council (NITC) and the establishment of the

Multimedia Super Corridor (MSC) with the smart cities of Putrajaya and Cyberjaya. This thrust is filtered to the states with Penang formulating its Penang K-ICT Blueprint. As expressed in the National IT Agenda launched by the NITC in 1996, this is to provide "the foundation and framework for the utilization of information and communication technology to transform Malaysia into a developed nation in our own mould consistent with vision 2020" and "to transform all Malaysian society into an information society, then to a knowledge society and finally to a values-based knowledge society".

It is with this premise and with the hypothesis that with ICT, some, if not most, of the inherent problems in utilizing development control to achieve sustainable development can be overcome, that a grant was successfully applied for by the Municipal Council of Penang Island as promoter and YES Enviro Management Sdn Bhd as the technology partner, from NITC under their Demonstration Application Grant Scheme (DAGS) programme. This grant is to undertake a pilot Electronic Local Authority Management System, or eLAMS for short.

SUSTAINABLE DEVELOPMENT AND THE LOCAL AUTHORITY'S ROLE

The intentions of the laws empowering the local authority to regulate and control development are based on the possibility that the process of development and use of land by an individual, especially in an urbanized setting, will more often than not result in some form of negative impact on and loss of amenity in the immediate surroundings. These impacts may accumulate to cause major environmental, as well as social and economic, damages in a larger area in the long term. The local authority, being the government authority closest to the ground and closest to the people is hence given the responsibility of controlling such activities so that such negative impacts are prevented or at least reduced to an acceptable level. The concept of "acceptable levels" however is still very subjective and various concerned bodies and agencies are hard at work in coming up with suitable and appropriate standards, indicators, targets, objectives and goals for acceptable conditions of living for the people.

The concept of sustainable development has been around for decades and Malaysia has been committed to its achievement since the Rio Summit. Basically, it is the idea of ensuring a better life for everyone, now and for generations to come. A widely used international definition is "development which meets the needs of the present without compromising the ability of future generations to meet their own needs". Among the common objectives of sustainable development are effective protection of the environment, prudent

use of natural resources, social progress which recognizes the needs of everyone, and maintenance of a high and stable levels of economic growth and employment. The guiding principles to the achievement of these objectives include:

- Putting people at the centre
- Taking a long term perspective
- Taking account of costs and benefits
- Creating an open and supportive economic system
- Combating poverty and social exclusion
- Respecting environmental limits
- Observing the precautionary principle
- Using scientific knowledge
- Transparency, information, participation and access to justice
- Making the polluter pay

(Sustainable Development, the UK Approach)

Land development is an essential strategy to achieve the economic, social and some of the environmental objectives of sustainable development. The participation of private individuals and developers in land development is just as crucial as that of the public sector and is to be encouraged and facilitated. On the other hand, without any form of control, the activities of land development can cause environmental pollution, nuisance, wasting of resources and irreparable damage to the surrounding areas. Traffic congestion, air, noise and water pollution, flooding, land slides, loss of open spaces and green areas, and damage to natural and cultural heritage are some of the complaints often heard. Development control is hence an important and crucial means of achieving sustainable development. However, development control, or any form of government control, restricts the aspirations of the individual in his economic pursuits. The private sector will only be involved in land development if it sees it as economically viable. The imposition of requirements and conditions on development activities will mean that the developer has to incur more costs, which may discourage him from undertaking the development project. The local authority in its consideration of applications for development has to play a difficult balancing act, between important of guidelines and conditions, and encouraging development.

THE DEVELOPMENT CONTROL SYSTEM IN MALAYSIA

Part VI of the Town and Country Planning Act 1976, (TCPA), which applies to all the states and local authorities of Peninsula Malaysia, (except the City of

Kuala Lumpur and all the other Federal territories), states that "*no person, other than a local authority, shall commence, undertake or carry out any development unless planning permission in respect of the development has been granted to him*". The act further states that the application for planning permission in respect of any development is to be made to the local planning authority (i.e. the local authority) who shall, after consideration of the application for proposed development, grant, with conditions if necessary, or refuse to grant planning permission. "Development" is defined under the TCPA as "*the carrying out of any building, engineering, mining, industrial, or other similar operation in, on, over, or under land, the making of any material change in the use of any land or building or any part thereof, or the subdivision or amalgamation of lands*". Hence, it can be seen that the definition of "development" is very wide.

Building control is further covered under the Street, Drainage and Building Act 1974, (SDBA). Section 70(1) of the SDBA states that "*No person shall erect any building without the prior written permission of the local authority*". A person in his application for approval for the erection of a building has to submit a detailed building plan to the local authority for approval and the main matters that are controlled and regulated are matters ensuring safety of foundation and structures, standards of size and space, health and sanitation, as well as building set-back, height, class, type and design.

Under section 70A (1) of the SDBA, "*No person shall commence or carry out or permit to be commenced or carried out any earthworks without having first submitted to the local authority, plans and specifications in respect of the earthworks, and obtained the approval of the local authority thereto*" and section 70 A(5) furthers states that "*In granting the approval under section (1) the local authority may impose such conditions as it deems fit*". Section 70(18) defines "earthworks" to include "*any act of excavation, leveling, filling with any material, piling, the construction of foundations, or felling of trees, on any land, or any act of dealing with or disturbing any land*". Earthworks can cause immeasurable and irreparable environmental disasters if not controlled properly and this provision gives the power and responsibility to the local authority to control and regulate all earthworks activities in its area.

The procedures and format for the submission and processing of applications for planning permission, building and earthworks plans approval are guided by the requirements of the Acts, the planning control rules, the building by-law, the earthworks by-laws, and guidelines and policies adopted by the local authority. Although the main procedures are similar amongst the various local authorities in the country, there are certain steps that may differ due to historical or cultural differences or different interpretation of the laws. A clear understanding of these

procedures and their problems is necessary in examining whether computerization can be effective in overcoming these problems.

In general, the steps toward obtaining planning permission are as follows:

i) The application in the prescribed form is submitted by the applicant through an agent who is "qualified person accompanied by several documents. These include the layout plan of the proposed development (up to as many as 15 copies maybe required), and the "Development Proposal Report". For major developments, a traffic impact assessment report and an environment impact assessment report are also required to be submitted.   For developments in environmentally sensitive areas, e.g., on hill lands and reclaimed lands, a geotechnical report will be   required as well.

ii) The layout plan is referred to several technical departments for checking, which usually include the town planning, building, engineering, health and licensing departments of the local authority, the state public works department, drainage   department, the utility departments such as the electricity supply department, the water supply department, the telecoms   company and the sewerage management   agency, and the department of the environment. Other departments, such as the education department and the police department may be referred where relevant. These departments will have their standard requirements and guidelines, which will be imposed on the proposed development.

iii) The agent will then have to amend the layout plan or change the development proposal to comply with the technical requirements and comments and to resubmit the layout plan.

iv) The amended plan will be referred to the technical departments again for a second round checking.

v) A notice is sent to neighbouring landowners informing them of the proposed development and to give them an opportunity to object, if they think necessary. If written objections are received then the objectors are invited to be heard by a committee of the local authority.

vi) The application for the proposed development will then be tabled to the relevant committee of the local authority, together with the objections for approval or rejection.

vii) The Act also has provision for the applicant, whose application for planning permission has been rejected by the local authority, to   appeal

> to an Appeal Board, whose chairman and members are appointed by the State Authority.

Some major local authorities have obtained the ISO 9002 certification for these procedures and format, as well as those for approving of building plans and earthwork plans.

The day-to-day processing of the applications by the various technical departments is aided by policies, plans, manuals and guidelines that each department has compiled through the years. Local authorities are also required, under the Town and Country Planning Act (1976), to prepare Structure Plans and Local Plans. (Under a recent amendment to the act (Act 1129), State Structure Plans are now prepared by the Director of the State Town and Country Planning Department). In the consideration of applications for development, the local authority has to make sure that the proposed development will comply with the structure and local plans. Structure plans are policy plans and its proposals are broad and general and hence do not offer a clear or precise guidance. Local plans are map based and more detailed and are used to regulate and guide development in the consideration for planning permission. This is especially in terms of whether the proposed development and land use can be allowed or not in that area. If allowed, to what extent and scale in terms of density or plot ratio, height, setback, type and design of buildings, drainage and street layout, extent of land cutting and tree felling, provision of open space, community facilities, car parking, landscaping and even provision of low cost housing for the poor.

In the absence of local plans, as is the case in many local authority areas, the local authorities will have to rely on a series of guide plans and guidelines that have been formulated in various other ways. Some of these are plans that were adopted under the Town Boards Enactment, which is now superceded by the TCPA, while some have been prepared and used by the local authorities administratively as and when required throughout the years. A common guide plan is what is often called the land use zoning plan, which shows the type or class of land use that can be allowed in the different zones of the plan area. This is with the assumption, which may or may not be correct, that development or activities of the same class in the same area, (what is called compatible uses), will not cause nuisance or intolerable environmental pollution in the area. The preparation and use of these guide plans are sometimes not in accordance with the provisions of law and are often challenged by developers. This is especially so when their applications have been turned down based on these guide plans and they appeal to the Appeal Board.

The present system of development control has been much criticized by all concerned. The most vocal of these are, of course, the developers who cannot tolerate the slowness of the process. Being business people, to them time is money. They are not happy with the uncertainty and inconsistency of the requirements, the procedure and the long period. It is a common practice for developers to lobby officers in order for their applications to be processed faster (a maneuver called "plan chasing") and to lobby the councilors and other political decision-makers so that their applications are considered more favourably.

The agents and consultants find the requirements of the procedures and guidelines confusing and time consuming and sometimes conflicting, especially when there are so many departments involved. There are too many copies of the layout plans, (from 8 to 15 copies), building plans and reports to submit. The procedures and requirements are often different from state to state and for one local authority to another, and often change with time and personnel. The consultants find great difficulty in advising their developer clients correctly. The adoption of ISO 9002 was to document, clarify and make consistent all the steps in the process, but it has led to more red tape and inflexibility.

The officers of the local authorities and the other government departments find the process tedious. There are too much paper work, such as letters to draft, type and send, too many thick reports and bulky plans to read, papers and reports to prepare, type, print and circulate. The plans are bulky and heavy, and difficult to carry around, and occupy a lot of space on the desks and shelves. Even folding the large plans takes up much time and effort. There are too many departments to deal with and many meetings to attend, and communication with the applicant, the agent, the departments and the objectors through the mail or by hand are time consuming and uncertain. This is being aided with informal telephone calls and faxes, although officially all correspondences are to be by hand, or by mail or registered mail. Data sharing among departments are difficult and uncommon, and each department, and even each unit within the same department, has to compile its own records of applications for its own use. These issues are not insurmountable in the old days as the number of applications submitted was not large. Even then, the manual procedure is so dependent on the handful of long serving staff and their power of memory in order to remember where the files are and how to retrieve them. Crisis situations have arisen when the staff are on leave, or worse, resigned or retired or are transferred. However, the number of applications for development approval has been increasing throughout the years, especially in the more urbanized local authority areas. This has occurred without the corresponding increase of staff and office space and the problems have multiplied.

The councilors and other decision makers have a difficult time reading, understanding and evaluating the development proposals and the control guidelines, guide plans, layout plans and reports, and often decisions are made without understanding the implication and impact of the proposed development.

Last but not least, the neighbours, the public at large, as well as the people who will be occupying the development and those who will be affected by it are often not aware of the proposed development and the full implication of its impact until after the fact. The law requires that only the immediate neighbours are informed of the proposed development by the approving authority and given the opportunity to object, notwithstanding the fact that the impact of any development may affect the inhabitants of a much larger area.

Besides the logistics of the situation and the inefficiency of the process, a more important question is whether the procedures practiced by the local authorities in carrying out their development control functions are effective in controlling environmental degradation and achieving sustainable development, as well as creating a safe, healthy and enjoyable environment for the people. As mentioned earlier; local authorities are more concerned on achieving a shorter time frame for the processing and approval of applications for planning permission, building plans, earthwork plans and releasing of certificate of fitness, then on ensuring that the development will not have any damaging impact on the environment. Nor are local authorities concerned whether the guiding principles of sustainable development can and will be followed. It is doubtful whether the present development control guidelines adopted by local authorities such as the zoning plans and even the local plans can achieve effectively all the objectives of sustainable development even if the development proposals can "comply" with these guide plans and approval is given. There are many cases where development is approved based on its compliance with the zoning plan, guidelines, by-laws and the requirements of the geotechnical report, and all other technical requirements. Still complaints and objections are raised by the surrounding residents to the noise, nuisance, inconvenience, and fear of land instability created during construction. The municipal council is hard pressed to settle the problem. For one, the people have always claimed, quite rightly, that the principle of transparency and information participation is missing, or insufficient in the approval process.

The main problem lies in the subjectiveness and the difficulty in evaluating and assessing the attributes, criteria, standards or indicators of a "good development". This is against those of a "bad development". These are never clearly spelt out precisely and comprehensively in the "guidelines". Adding to the complexity, criteria and standards are different under different situations, amongst different parties and in different times. The formulation of a good set,

or sets, of standards, criteria, or indicators will be essential to guide the developers in planning and preparing their development plans, the consultants to advise the developers, the public to assess the development and the officers and decision makers in local authorities and other government departments to process, evaluate, recommend and approve or reject development applications.

THE USE OF ICT IN DEVELOPMENT CONTROL AND PLANNING IN LOCAL AUTHORTIES & OTHER GOVERNMENT DEPARTMENTS

Many local authorities and other government departments in Malaysia, especially the larger ones, have been using computers for a long time in many areas of its work, particularly in pay roll, financial accounting, and personnel records. Other main areas include property records and filing records. More recently, some of the local authorities and other government departments and consultants have gone into using computers to aid in the preparation and printing of plans and drawings using computer aided design (CAD) software and now most layout plans, building plans and earthworks plans submitted to the local authorities are electronically drawn. Where it took weeks to prepare and amend plans before, now it only take days and even hours. Besides CAD, some local authorities, including Penang Island Municipal Council, are using Geographical Information System (GIS) software to draw, reproduce, and store plans and to manage their map-based information and records. The Town Planning Department of the Penang Island Municipal Council has replaced the hand painted land use-zoning plan with a digital version. The old paper-based land use-zoning plan covers the whole island of Penang and at a scale of 1 inch to 8 chains (1 chain is 66 feet), takes up a space of 12 feet by 15 feet, and it took 4 draughts men more than a month to reproduce a copy of the plan by hand and for each copy to be checked thoroughly. Even then, only 2 copies could be produced as there were so many mistakes in the third copy that it could not be used. For the digital version the cadastral base-map of Penang Island were digitized from the 1 inch to 4 chain cadastral sheets available. (Now the Department of Survey and Mapping of Penang has a digital version of the cadastral map of Penang Island using coordinates). This work was outsourced in a pilot GIS project in 1996 to the School of Housing, Building and Planning, of the University of Science Malaysia in Penang, which was at that time setting up its GIS centre. Besides the cadastral map, which shows the lot boundaries (with lot numbers) and the coloured land use zones, the pilot GIS project has completed the digitization of rivers, roads (with road names), existing land uses, building footprints (with address numbers), and an inventory of heritage buildings (with photos and other information) for Penang Island.

Of greater importance, the technicians of the department have been adequately trained to carry on with the digitizing work and to continuously update the cadastral maps and other data as well as to input other information such as the development pressure map, which shows the layout and data of all development applied for and approved. This information is at the moment separately stored in the PC's but the department has bought the server software to link and share these GIS information internally and later on externally via the internet. The department is also now developing a second prototype of a planning permission application processing system to electronically register, monitor, prepare and send standard letters, vet the application, prepare the papers for the planning committee, compile and analyze data on development proposals and approvals, etc. The first prototype was not very user friendly and difficult to use and was abandoned. The system is at the moment developed internally using Microsoft Access as this is easier for the department's officers, this can be changed to bigger database management system such as Oracle when the time comes.

Other departments and local authorities are also in the various phases of ICT and GIS development and are having various degrees of success. The Penang State Government has successfully set up the Penang GIS, or PEGIS, with map based data compiled from various departments and is in the initial stage of dissipating data among the departments and to the public via its website. The State of Selangor has a similar system called SGIS, which involves the computerization of land administration data of the land office. Besides the Federal and State Land and Mining Departments and the Survey and Mapping Department which have embarked on a nation wide effort to computerize their procedures and data recording and mapping systems, the Federal Department of Town and Country Planning is encouraging and facilitating their state and regional offices to computerize as well. The Town and Country Planning Department of Selangor has started on SEPAS (Selangor Electronic Planning Approval System). The Perak Town and Country Planning Department is spearheading the Perak state government's ICT programme, and other state and region Town and Country Planning Departments are using ICT and GIS in their local plan preparation work. Perbadanan Putrajaya is using a system called SUMBER-PUTRA, short for *"Sistem Pengurusan Berkomputer Pembangunan Bandar Putrajaya"* or *"Putrajaya Computerized Urban Development Management System"* including an e-submission system for planning application. The Malaysian Centre for Geospatial Data Infrastructure, (MacGDI), under the Ministry of Land and Co-operative Development of Malaysia has set up the Malaysian Geospatial Data Infrastructure (MyGDI) (formerly called the National Infrastructure for Land Information System, or NaLIS) to provide access to geospatial data through sharing among participating government agencies for more improved planning and development of land

resources. Its main objective is to enable online access to geospatial information, to avoid duplication of effort in data collection and to ensure accuracy, timeliness, correctness and consistency of data used in planning, development and management of land resources. In Malaysia, several universities are also involved in teaching, research and carrying out of projects in computerized land planning and management systems, the main players being Universiti Teknologi Malaysia (UTM), Universiti Sains Malaysia (USM), Universiti Technologi MARA (UiTM), International Islamic University Malaysia (IIUM) and Universiti Putra Malaysia (UPM).

The progress in ICT development in land use planning and management in the government agencies is not without difficulties and problems. Many pilot projects have failed, some at tremendous costs. Those that have achieved some form of success are still at various stages of completion. The reasons for the failures are many and some have been discussed by Lee, and others (1996).

A major problem in computerizing the manual development control procedures being practiced in local authorities is that the present practices and formats are not clear or systematic and are sometimes outdated. Some of the formats have been inherited from the days of the Municipal Ordinance, the Town Boards Enactment and the old by-laws and have been adopted throughout the years on an ad hoc basis. They do not reflect the present requirements but have been carried on for fear of change on the part of the present officers. The fear of change has often been cited as an obstacle to ICT development in government departments. Some officers were even reluctant to change to the electronic typewriter, not to mention the word processor or personal computer, after having used the "reliable" manual typewriter for so long. Apart from, and related to, this, some officers at the various levels are unfamiliar with the electronic technology and hence are unable to see how it can help in their work or how to state clearly and precisely to IT consultants and vendors the nature of their needs.

The IT consultants on the other hand are unable to understand completely the formats and procedures of the development control process as practiced by the local authorities or as required, and are hence, unable to obtain and develop the appropriate IT system for their day-to-day work. To make the task more difficult, the development of an IT system for development control and land use planning is not similar to the computerization of other straight-forward procedures that most IT consultants and vendors are familiar with, or have experience in, like those for financial accounting, personnel records, supermarket entries, banking systems, etc.

The development control process is definitely more complicated. For one, there is an element of decision making at various stages in the process of development control, be it at the town planning assistants' level, checking the development application to make sure it is in order and can comply with the technical and other requirements, at the level of the town planning officers, who have to evaluate the proposed development to ensure that it will not be a cause of environmental and other problems and to make appropriate recommendations to the planning committee, and at the committee level which makes the final decision on whether the application can and should be approved or not, taking into consideration political factors besides the technical factors.

Shortage of funds to buy hardware and software are often cited as a cause for the failure of government agencies to computerize. However, in many cases, it is the impatient and imprudent jumping into the ICT bandwagon without adequate and in depth understanding and planning that has caused the failures. With the directive by the federal government and the eagerness on the part of the top management to computerize, departments are often tempted to take up whatever are offered by IT consultants and vendors at whatever costs without first studying whether or not the systems are appropriate, workable, or necessary.

Development control information and records are related to spatial attributes or land. Consultants, who are well versed in the existing land documentation and management systems of the land office and the Survey and Mapping Department as well as in GIS, are necessary if the system is to be complete.

eLAMS

The Penang Island Municipal Council's proposed Electronic Local Authority Management System or eLAMS for short, will consist of various computer modules that will be developed progressively to replace the existing manual, paper-based formats in the Council's departments for the processing of applications for planning permission, building plans, earthworks plans, and later on, licenses. Each department will be in charge of the relevant module, e.g. the Town Planning Department will be in charge and responsible to develop and maintain the Planning permission module, the Building Department, the building plan module, the Engineering Department, the earthworks plan module, and the Licensing Department, the licensing module. Each department will be the custodian of its records and data that are compiled in the day-to-day processing of applications, but a centralized data bank will be installed where

all the relevant geospatial information that are common among all departments are stored and shared.

Each module will eventually replace the existing manual paper-based system to:

- receive, check and register each application,
- evaluate the proposed development applied for,
- prepare, print and sent out standard letters,
- prepare the working paper and recommendation for committee meeting,
- make presentation at the committee meeting,
- prepare the minutes of decision,
- prepare, print and send out the certificates of approval or rejection,
- monitor and track the status of the application,
- compile, analyze and prepare reports on the development data and store in the department's data bank to be used later, and in the Council's central data bank to be shared with other departments.

For each stage, a series of checklists of predetermined items will be prepared to guide the processing of the application. A checklist of prerequisites will be used to check the application as soon as it is submitted to make sure it is in order and is accompanied by all the required plans and documents, before the application is accepted and registered. In fact, with the checklist the applicant or agent will be able to ensure that the application will be in order. eLAMS will also have an inbuilt electronic system for e-submission or submission of the plans and documents for the application via the internet. However, this can only be fully implemented when the law allows digital plans and documents to be used for applications and approvals. Until then hard copies of the plans and documents will have to be duly submitted. A situation is envisaged where only one official hard copy need be submitted and the digital plans and documents can be used for circulation and checking by the relevant departments via the electronic net.

To achieve the objectives of sustainable development, a list of criteria and indicators of sustainable development will be needed to aid the officers in the evaluation of the proposed development. The eLAMS pilot project will include the formulation of a suitable and appropriate set of criteria for sustainable development. This will be integrated into an overall environmental management system which will enable the local authority to achieve ISO 14001 certification for its development control function.

The formulation of indicators will rely on the large amount of work that has been done in developing sustainable development indicators by Federal and State government agencies such as the Economic Planning Unit, the Department of Environment and the Town and Country Planning Department; think-tank organizations such as the Institute for Environment and Development of the Universiti Kebangsaan Malaysia (LESTARI) and the Socio-economic and Environment Research Institute of Penang (SERI), and non-government organizations such as the Environmental Protection Society of Malaysia (EPSM) (M. Nordin and A. Hezri). The list of environmental sustainability indicators and criteria is not only to measure and monitor the status of sustainable development in the area, but more importantly, to serve the purpose of ensuring that proposed developments can and will comply with requirements for sustainable development during and after construction. The list will hence include criteria to ensure that the impacts of the various aspects of the proposed development not cause deterioration and damage, and will improve safety and land stability, excessive water runoff and flooding, air and water pollution, traffic impact, noise and other disturbances, flora and fauna, sanitation and utilities, open space, and community facilities, natural and cultural heritage, and aesthetic, landscape and urban form. Based on the electronic system of criteria and indicators, environmental impact and traffic impact assessments can be carried out by the applicant and his consultants themselves even when they are preparing the plans, and by the officers in the local authority, when they are checking the plans. The proposed development can be evaluated more thoroughly before a decision is made on the application, and the development can then be monitored during and after construction to ensure that it achieves the objectives of sustainable development.

A comprehensive format for the development proposals report, the environmental impact assessment report and the traffic impact assessment report will be drawn up and used for submission of applications which are to be checked in accordance with the government's environmental policies and in accordance with ISO 14000 requirements. This will include a system of continuous environmental auditing and reporting on the impacts of the development and operation activities. These reports can be published in the local authority's website to enable the public to evaluate the social commitments undertaken by the developer. The proposed environment accounting will ensure not only greater awareness but also the development of responsible attitude among chief executives. (Lee L.T. 2002).

With eLAMS, information such as names, addresses and other particulars of applicants, agents and landowners, and details of the proposed development are entered only once, that is at the point of registration of the application, and are then stored in the central registry. In fact, this information and the layout plan

can be supplied by the applicant or the agent in a digital copy or via the internet. This information can then be automatically extracted and used by every department when necessary such as when printing and sending out letters or preparing the papers and reports. This saves time and duplication of work. The central data bank will store all information related to proposed, approved and completed developments. These may be analyzed to provide data on the housing and real estate industry in the local authority area. This information can be supplied to PEGIS, MyGDI and the National Property Information Centre (NAPIC), which has been set up by the Valuation and Property Services Department under the Ministry of Finance Malaysia, to collect and collate information related to the property industry from various agencies.

The system also enables the applicants, the agents and the departmental managers to keep track of the status of the applications and monitor them via the internet and intranet, and hence to reduce accusations of delays, uncertainties and inconsistencies in the development control procedure in local authorities. Development information can also be made available to the public via the website.

eLAMS is also to facilitate local authorities to obtain certifications for ISO 14000 for environmental management as well as ISO 9001:2000 for quality management, not only for the development control process, but with later modules for other functions and services as well, such as licensing, project management, property management, and property assessment.

The eLAMS pilot project has been mooted with the conviction that ICT can be an invaluable tool to improve the efficiency of local authorities in its difficult task of development control as well as in other functions. The digital system requires less paper and paperwork, less working and storage space, easier reproducing and printing of papers and plans, easier retrieval and sharing of files and information, easier data calculation and analysis and preparation of reports, no duplication of data recording and compilation, easier communication and sending of letters, files and plans, and time saving processes. With the clear guidelines and format, the applicants and agents can help in the work by being made responsible to enter the data properly and provide all the relevant information for faster processing of the applications. There is more consistency and greater transparency and the applicants, developers and consultants as well as officers and management can monitor the progress of the applications.

The system is also to enable the officers and councilors of the local authority, as well as the developer, the consultants and the public, to evaluate and monitor the proposed development in a more effective, clear and responsible manner,

and to ensure that the environmental policy and the principles of sustainable development can and will be complied with.

It will also gradually and progressively build up a comprehensive data bank of geospatial data of the local authority area, which will be invaluable in the evaluation of its environmental quality and service quality and for its future planning.

However, it is still a long way before the eLAMS is successfully and effectively set up for the Penang Island Municipal Council. Work has started with the grant from NITC under its DAGS scheme, by the technology partner, YES Enviro Management Sdn. Bhd, who is responsible for the ICT support system, and the content partner, Institute Alam Sekitar Malaysia, who is formulating the quality and environmental management systems. An in-house team of relevant officers from the town planning, building, engineering and IT departments of the municipal council will have to work hand-in-hand with the consultants. The officers will provide input as to the desired working procedures and other needs of the departments. It is fortunate that the council has documented its development control procedures and obtained ISO 9002:1994 certification. This will ease the documentation process of the pilot project, but ISO 9002:1994 has been discontinued.

The pilot project aims to achieve the new ISO 9001:2000 certification for the council. The team has to evaluate the available software to ensure that the selected software is suitable and workable for its long-term needs. Many ICT pilot projects have failed due to the use of unsuitable software that were promoted by consultants or vendors. The team can learn from the experiences, good or bad, of other government agencies that have gone down this path before and should not work in isolation. There is still a long learning process, but the selected officers have to have high enthusiasm, motivation, and conviction. Education, skills and experience have to be obtained by continuous self-learning, training and practice. The setting up and training of the in-house team for the pilot project is crucial for the long term success of the project as the team of officers will have to continue to maintain and develop the system and to train other staff to run the system after the pilot project. With a long term, comprehensive ICT system in mind, eLAMS can be developed module by module, sub module by sub module, in a gradual, incremental, step-by-step approach. With commitment from top management and appropriate motivation, incentives and training given to the heads of department, mid level and lower level officers, the local authority can gradually acquire the necessary skills and experiences for its own staff to carry on with the day-to-day maintenance of the system and also to regularly develop the system further with the help of external consultants only when and where necessary.

Before such an electronic system can be fully functional and adopted, however, all the bugs frequently related to computer systems have to be ironed out as far as possible during the pilot project period. These are not only related to the problems of viruses, but also problems related to security, custodianship of information, mode of payment, and other house keeping problems like ensuring that colours and inks of the hard copies of reports and plans are water proof and long lasting and will not fade with time. We are all still used to the past system where drawings and plans were hand drawn and painted with Indian ink and town planning colours, which have lasted for over a hundred years. It will be disastrous if the hard copies of plans and the digital copies in the hard discs and CD's are destroyed with viruses and fungus.

CONCLUSION

Local authorities play an important role in the development control process. They are responsible to ensure that developers can and will carry out their development in an orderly and responsible manner so that "*it meets the needs of the present without compromising the ability of the future generations to meet their own needs.*" At the same time, local authorities must not be seen to be obstacles to economic growth by delaying the approval process. They have also to keep up their image of caring for the people and be transparent in their procedures. The Penang Island Municipal Council's proposed eLAMS pilot project aims to set up an ICT system which will increase the efficiency of the day-to-day work of the local authority in the processing of applications for planning permission, building plans and earthworks plans. The progressive system provides for subsequent modules to be developed and incorporated, such as for the processing of applications of licensing, property management, project management and property assessment.

A centralized data bank of geospatial information will be part of the system, which will be made available via the net to relevant departments, developers, consultants and the public. ELAMS incorporates an environmental management system as well as a quality management system in accordance with ISO 14000 and ISO 9001:2000 requirements, which will include a procedure for environmental impact assessment, auditing and reporting. It is hoped that these efforts will not only promote the development of a "values-based knowledge society" with greater awareness and participation, but also develop greater responsibility and accountability among developers, entrepreneurs, professionals and the public in protecting the environment.

The Penang Island Municipal Council can benefit tremendously by learning from the experiences of the many departments and agencies that have gone into computerization of their land management, planning and development procedures. It has to build up its own core of motivated and well-trained officers for the job and not to rely entirely on external consultants and vendors.

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A STUDY ON THE DEMAND OF SPATIAL PLANNING AND DECISION SUPPORT SYSTEM IN MALAYSIA

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Abstract

This paper examines the demand and interest for SPDSS (Spatial Planning and Decision Support System) among town planners in Malaysia. A survey was conducted among town planners registered with the Malaysian Institute of Planners (MIP) and among local planning authorities. Based on the survey and analysis, it was revealed that many town planners in Malaysia are still unfamiliar with SPDSS, particularly the concept and its applications. Nevertheless, they have expressed interest to know more about SPDSS as well as to include SPDSS in their professional works.

Keywords: SPDSS, GIS, MCE, Urban Planning

INTRODUCTION

SPDSS is an interactive, computer-based system designed to support a user or group of users in achieving a higher effectiveness of decision making while solving a semi-structured spatial decision problem. As such, it is a useful tool that can help to expedite planning process, as well as help to make decision-making exercises in the process more structured, transparent and accountable.

Despite its proven benefits in overseas planning scenes, SPDSS is still relatively new in Malaysian. At the moment, only a handful of Malaysian planning exercises utilise SPDSS in generating alternatives and assisting decision-making. The application of Multi-Criteria Evaluation (MCE) for the Klang Valley Integrated Transport and Land Use Study and the preparation of National Physical Plan are some examples of SPDSS. At the same time, there have also been researches initiatives conducted, especially by academicians, in trying to integrate SPDSS in planning exercises (Alias Abdullah et-al, 2004).
The Federal Department of Town and Country Planning Peninsular Malaysia (FDTCP), being a federal government department responsible towards the betterment of town planning practice in Malaysia, have been, in recent years,

injected some form of SPDSS into Malaysian town planning practice. However, this has been piece-meal in nature. As a result, the true benefit of SPDSS application in Malaysian town planning practices is yet to be reaped.

FDTCP also sees SPDSS as one of the major planning tools that can contribute towards achieving the Department's goals of Information System Planning (ISP). Thus, the Department has been actively upgrading their staff knowledge relating to SPDSS. Programmes such as 'Geo-technical Spatial Analysis Research and Development' (GSARD) were set up and staff were sent for training, both local and overseas.

One area in Malaysian town planning practice which is seen as having the most immediate potential for SPDSS application is the preparation of development plans[1]. However, observers argued that any move to integrate SPDSS in development plan preparation now might prove to be a little too soon since the level of awareness and knowledge of SPDSS amongst professional town planners in Malaysia may not befit such a move. This is true since the preparation of development plans in Malaysia is conducted on a privatization basis where FDTCP and the local planning authorities[2] will appoint professional town planners as consultants to prepare such plans. The observers argued that a concrete SPDSS knowledge foundation must first be installed among professional town planners before SPDSS can be successfully integrated into development plan preparation.

This argument by the observers is easy to understand, even more when FDTCP had made a similar move previously with regard to the integration of Geographical Information System (GIS) into development plan preparation. In mid-1990s, FDTCP decided to require GIS to be used in the preparation of development plans. Nevertheless, due to limited understanding of GIS among the professional town planners who were appointed to prepare those plans, the move was not a big success. Even today, although GIS is being used in development plans preparation, this mostly being limited to mapping and plan production with very little exploits on its spatial analysis capabilities (Mansur Ibrahim, et-al, 2004).

Taking cue from the GIS episode, the researchers have conducted a survey among town planners and local planning authority officers in Malaysia to

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[1] Malaysian development plan system is a three-tier system comprising National Physical Plan, State Structure Plan and District Local Plan /Special Area Plan.
[2] Development plans in Malaysia are usually being prepared by the state/local planning authorities with support from FDTCP.

determine their level of awareness, knowledge and interest on SPDSS. This paper discusses some of the main findings of the survey.

THE SPDSS SURVEY RESULTS

A total of 388 questionnaires were sent out to respondents who are town planners registered with the Malaysian Institute of Planners (MIP) and town planners working at local planning authorities. At the end of the survey period, 81 respondents (21%) participated in the survey by returning completed questionnaire to the researchers. From these 81 respondents, 58 were town planners registered with MIP and 23 were officers from local planning authorities. Out of the 58 registered town planners, half was corporate members and the other half was graduate members (refer Figure 1).
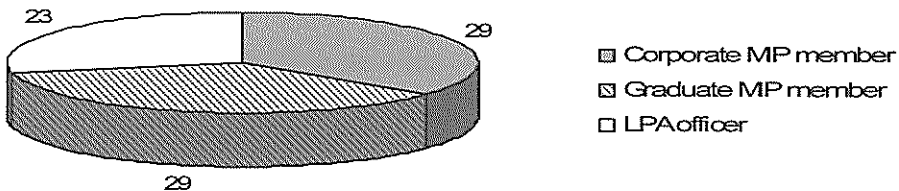
Figure 1: Categories of respondent

Several questions were devised in the questionnaire to help researchers determine the level of SPDSS understanding among respondents. In terms of familiarity to SPDSS, 68% of the respondents answered they were not familiar with SPDSS (refer Figure 2).

Respondents were also asked on how they would define SPDSS. A set of answers (multiple-response) were provided. The result shows that 'Computer-assisted Planning' and 'Geographical Information System' received the highest response (refer Table 1).
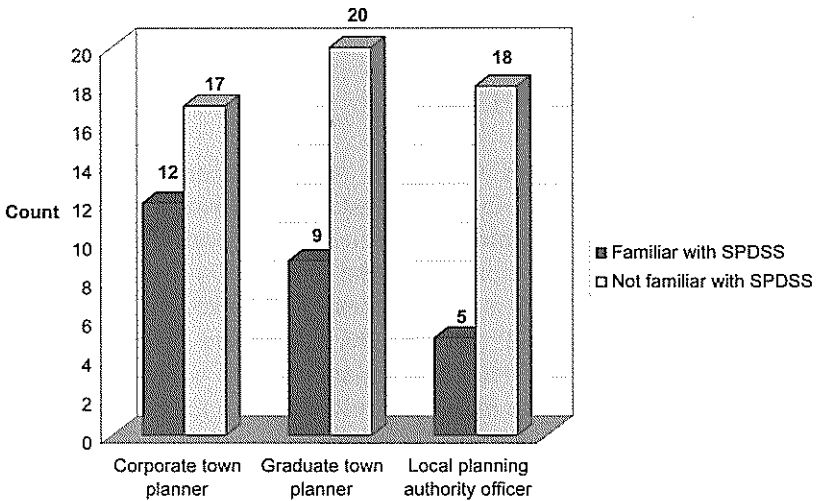
Figure 2: Familiarity with SPDSS

Table 1: Respondents' definition of SPDSS

Definition	Count	% of responses	% of cases
Computer-Assisted Planning	43	28.1	56.6
Analytical Hierarchy Process (AHP)	21	13.7	27.6
Database Management System (DBMS)	32	20.9	42.1
Digital plans and maps	17	11.1	22.4
Geographical Information System (GIS)	35	22.9	46.1
Analytical tool	1	0.7	1.3
Computer-aided planning tool	3	2.0	3.9
No idea	1	0.7	1.3
Total	153	100.0	

Note: 5 missing cases; 76 valid cases

The results shown in these two tables indicate that the level of understanding of SPDSS among the respondents is rather unsatisfactory. Figure 2 shows that more than half of the respondents were not familiar with SPDSS. This is supported by the results shown in Table 1 where 'Computer-assisted Planning' has been the most chosen definition of SPDSS with GIS comes in second. Although it is quite true that SPDSS in its simplest definition is a computer-based system to assist decision-making pertaining to spatial planning, but the researchers feel that this might not be the reason why many respondents chose 'Computer-assisted Planning' as one of the definition of SPDSS. More likely

the reason is that this definition is the most all encompassing as compared to other definitions provided in the questionnaire. Thus, many respondents might feel that this makes 'Computer-assisted Planning' the most likely correct answer as opposed to other provided definitions.

Although some would categorise GIS as SPDSS, but those that knew SPDSS well would have quickly dismissed GIS as SPDSS (at least not in the truest sense). GIS, at best, can only be considered as decision support system (DSS) generator rather than specific DSS technology. In fact, the development of SPDSS itself stemmed from the need to expand the capabilities of GIS in tackling complex and ill-defined spatial decision problems (Densham & Goodchild, 1989). Because of this, the fact that many respondents have chosen GIS as one of the definition of SPDSS might just reflect their lack of understanding of what SPDSS really is. Another reason why GIS is also popular among the respondents is that many of them are already exposed to the system since GIS is currently embedded into the preparation of development plans in Malaysia. Table 2 below shows the level of exposure among respondents to several analytical software and tools.

Table 2: Software that respondents have used/experienced

Software	Count	% of responses	% of cases
Expert Choice	5	4.2	6.7
Idrisi	2	1.7	2.7
GeoChoice	1	0.8	1.3
ArcGIS/ArcInfo/ArcView	38	31.7	50.7
MapInfo	42	35.0	56.0
ILWIS	5	4.2	6.7
Definite	4	3.3	5.3
What If?	1	0.8	1.3
GenaMap	1	0.8	1.3
GenaSys	1	0.8	1.3
SICAD	1	0.8	1.3
AutoCAD	2	1.7	2.7
Never used any	16	13.3	21.3
Not sure	1	0.8	1.3
Total	**120**	**100.0**	

Note: 6 missing cases; 75 valid cases

From Table 2, it can be seen that respondents have been fairly exposed to GIS software (especially MapInfo and the ESRI's Arc variants) but not to DSS specific software like ILWIS, What If? and Definite for instance. Furthermore,

GIS has been introduced and made popular in Malaysia for quite a number of years. Thus, the popularity of GIS might have also influenced respondents to choose it as one of the answers on the definition of SPDSS (refer Table 1).

Given the choices of SPDSS definition provided in the questionnaire (refer Table 1), one would have expected that AHP (Analytic Hierarchy Process) would be the most selected definition since this is a much better definition of SPDSS compared to the others. However, only 21 respondents selected AHP as one of the answer to the question on how they would define SPDSS.

The cross tabulation shown in Table 3 below further indicates the low level of understanding of SPDSS among the respondents. It can be seen that despite 26 respondents indicated they are familiar with SPDSS, only 11 (42%) chose AHP. One would have expected that if the respondents are proficiently familiar with SPDSS, all 26 of them would have chosen AHP as one of the definition of SPDSS.

Table 3: Cross tabulation between familiarity with SPDSS and AHP as definition for SPDSS

		Would define SPDSS as AHP?		Total
		Yes	No answer	
Familiar with SPDSS?	Yes	11	15	26
	No	10	40	50
Total		21	55	76

Note: 5 missing cases

EVALUATION ON THE INTEREST OF SPDSS

Despite the rather unsatisfactory level of SPDSS understanding, there is a high level of interest among the respondents regarding SPDSS. Figure 3 below shows that majority (81%) of the respondents perceived SPDSS as either very important or important to Malaysian planning.
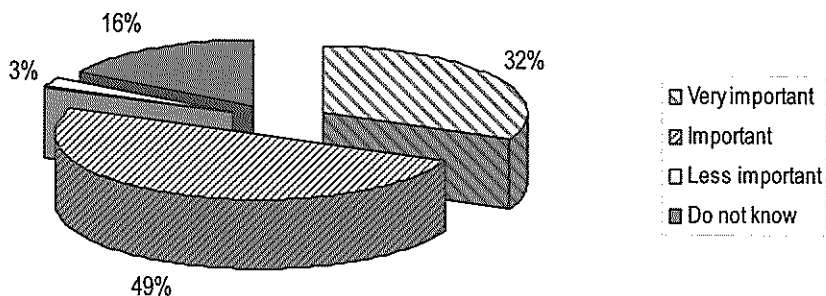
Figure 3: Perception on the importance of SPDSS in Malaysian planning

Additionally, 95% of the respondents expressed their interest to involve SPDSS in their work (refer Figure 4). When asked which area of their work that they would like to incorporate SPDSS, planning analysis and spatial management were the two most popular answers (refer Table 4).
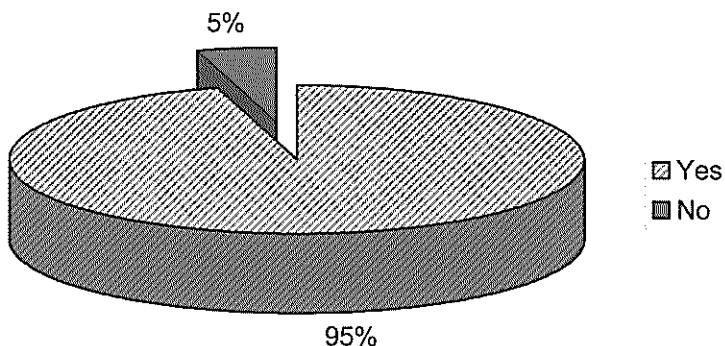
Figure 4: Interest to involve SPDSS in work

Table 4: Area of work to incorporate SPDSS

Area	Count	% of responses	% of cases
Planning analysis	66	45.8	88.0
Procurement	11	7.6	14.7
Layout design	26	18.1	34.7
Spatial management	40	27.8	53.3
Data management	1	0.7	1.3
Total	144	100.0	

Note: 6 missing cases

53

The respondents were also asked whether they would be keen to know more about SPDSS, to which 94% responded positively (refer Figure 5). Many preferred intellectual discourse programmes (i.e. training, seminar, conference and workshop) conducted at national level as the avenues for them to learn more about SPDSS (refer Table 5 and Table 6).
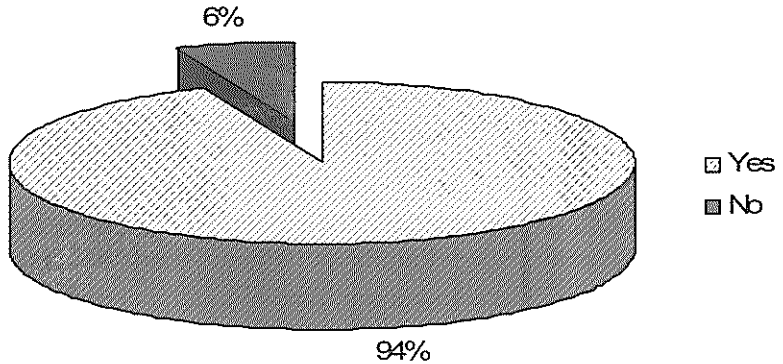
Figure 5: Keen to know more about SPDSS

Table 5: Avenues for learning SPDSS

Area	Count	% of responses	% of cases
Seminar	35	22.2	45.5
Training	53	33.5	68.8
Conference	17	10.8	22.1
Workshop	34	21.5	44.2
Discourse	18	11.4	23.4
On the job	1	0.6	1.3
Total	**158**	**100.0**	

Note: 4 missing cases; 77 valid cases

Table 6: Level of avenues for learning SPDSS

Level of avenues	Count	% of responses	% of cases
International	21	22.6	28.0
National	70	75.3	93.3
Local (departmental)	2	2.2	2.7
Total	**93**	**100.0**	

Note: 6 missing cases; 75 valid cases

In terms of level of SPDSS training, 61% of the respondents preferred executive level of training as compared to technical level (refer Figure 6). This is perfectly understandable given the level of SPDSS understanding which is rather low among the respondents. An executive level of training would normally expose the trainees to the fundamentals and theories behind the subject matter (in this case SPDSS) without going into the nitty-gritty of how to actually operationalise the subject matter. To the respondents, this would be a far more sensible start to better understand SPDSS.
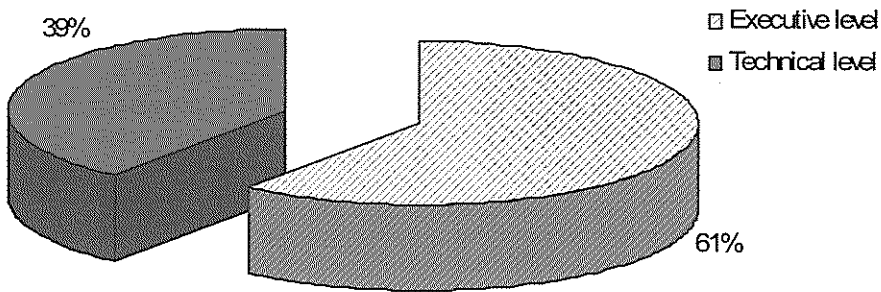
Figure 6: Preferred level of SPDSS training

It is interesting to note that the most demand for technical level of training came from respondents from the local authorities and the private planning firms (refer Table 7). These are the people who would need to operate SPDSS on the ground and thus in need of the technical know-how of SPDSS operation.

Table 7: Cross tabulation between level of SPDSS training and nature of respondent's organisation

Level of training	Nature of respondent's organisation							Total
	Federal dept	State dept	Local authority	Semi-govt	NGO	Private firm	Education	
Executive	6	7	15	1	1	18	9	57
Technical	2	3	13	2	0	15	2	37
Total	8	10	28	3	1	33	11	94

As aforementioned, majority of respondents were keen to know more about SPDSS (refer Figure 5). Thus, many were willing to attend a two-to three-day intellectual discourse programmes (i.e. seminar, training, workshop and conference) on SPDSS (refer Table 8) and were also willing to spend in the region of RM300-RM1,000 for attending those programmes (refer Table 9). However, the amount of money they were willing to spend corresponds with the

duration of programmes. Those who were willing to spend higher amount of money (RM500-RM1,000) also preferred a longer duration (five days to one week) of intellectual discourse programmes.

Table 8: Preferred duration of intellectual discourse programme

No. of day	Seminar	Training	Workshop	Conference	Total
1	5		1	1	7
2	15	13	8	5	41
3	7	13	5	5	30
4		2	1		3
5	2	7	3	2	14
> 1 week	1	6	3	2	12

Table 9: Preferred duration of intellectual discourse programme

RM	Seminar	Training	Workshop	Conference	Total
< 300	12	10	10	7	39
301-500	11	17	8	5	41
501-1000	7	14	5	5	31
> 1000	3	4	2	3	12

WEALTH OF SPDSS INFORMATION

As aforementioned, SPDSS is relatively new in Malaysia, thus, the availability of information pertaining to it might still be insufficient, to say the least. When asked, many respondents (52%) concurred with this statement (refer Table 13). For those respondents who said they have requested information on SPDSS, only 13% have managed to fully obtain the requested information (Table 14). This further proves that there is insufficient wealth of SPDSS in the country at the moment.

Table 13: Wealth of SPDSS information

Level of response	Frequency	%	Valid %	Cumulative %
Very sufficient	2	2.5	2.6	2.6
Sufficient	16	19.8	20.8	23.4
Insufficient	40	49.4	51.9	75.3
Do not know	19	23.5	24.7	100.0
Total	77	95.1	100.0	
Missing	4	4.9		
Total N	81	100.0		

Table 14: Amount of requested information obtained

Level of response	Frequency	%	Valid %	Cumulative %
Fully	3	3.7	12.5	12.5
Partially	13	16.0	54.2	66.7
None	8	9.9	33.3	100.0
Total	24	29.6	100.0	
Missing	57	70.4		
Total N	**81**	**100.0**		

The issue of availability of SPDSS information (or the lack of it) is not difficult to comprehend. For one, SPDSS is still new to many town planners in Malaysia. Secondly, the local knowledge base is presently quite limited. There are not many local SPDSS experts and formal SPDSS courses are even more limited. Looking at the curriculum of planning schools in Malaysia, a SPDSS specific subject is only being taught at the Department of Urban & Regional Planning, International Islamic University Malaysia (IIUM). Other planning schools in the country are concentrating more towards GIS-related subjects (refer Table 15).

Table 15: ICT related subjects offered in Malaysian planning schools

University	Programme /Study Duration	Subject Offered		Credit Hours/ Subject
International Islamic University Malaysia	1+4 years	1.	Introduction to Computer [1]	2
		2.	CAD-2D [1]	2
		3.	CAD-3D [1]	3
		4.	GIS Application for Built Environment [1]	3
		5.	PDSS [1]	2
		6.	Photogrammetry and Remote Sensing [1]	2
				14
Universiti Teknologi Mara	3+2 years	1.	Computer Application[1]	3
		2.	Computer Aided Design [1]	3
		3.	GIS Application [1]	2
		4.	Modelling and Techniques [1]	2
				10
Universiti Teknologi Malaysia	5 years	1.	CAD [1]	5♦
		2.	Quantitative Techniques & Computer [1]	3
		3.	GIS in Planning [1]	3
		4.	GIS for Local Authority [2]	4
		5.	Remote Sensing and GIS Application for Local Authority [2]	4

				19
		6. GIS and Environmental Management [3]		
		7. GIS Application and Implementation [3]		3
				3
Universiti Sains Malaysia	3+2 years	1. Computer Applications in Planning [3]		3
		2. Planning Analysis and Methods [3]		3
				6

Note: *1. Compulsory courses; 2. Elective courses; 3. Post-graduate level*
* MSc (2 years); ♦ Taught and applied in studio
Source: Mansor Ibrahim et al. (2004).

SPDSS PROMOTION INITIATIVES

In an effort to promote SPDSS among town planners in Malaysia, as well as to enlarge SPDSS knowledge base in the country, the Department of Urban and Regional Planning, IIUM has entered into a collaborative SPDSS network with three foreign universities. They are:

- International Institute for Geo-information and Earth Observation (ITC), Enschede, The Netherlands;
- Università degli Studi di Trento, Italy; and
- University of the Philippines Diliman, Manila, Philippines.

The network, entitled 'Expanding Expertise Network for generating and sharing knowledge related to Spatial Planning and Decision Support' (ENSPADS), is funded largely through the ASEAN-EU University Network Programme (AUNP) and expected to be carried out over a period of two years which begun in January 2004.

The network centres on the development of SPDSS course concepts and course materials through a joint effort of all partners. It is hoped that this will improve the curriculum development capacity of each of the partners. Several workshops will be conducted throughout the project period. Experiences gained during the implementation of the workshops and joint courses will strongly contribute to the technical capacity of the staff involved, while facilitates exchange of best practices as well.

Besides the research team which consists largely of academic staffs from the Department of Urban and Regional Planning and one staff from the Department of Business Administration of IIUM, a steering committee has also been formed. The committee members consist of selected people from the planning practice and also from relevant government agencies including FDTCP,

Malaysian Centre for Remote Sensing (MACRES), Ministry of Federal Territory and the private planning firms. The main task of the steering committee is to provide inputs to the IIUM research team on the need for SPDSS both in the market and also in the government agencies.

CONCLUDING REMARKS

This paper has demonstrated that despite the unsatisfactory level of understanding of SPDSS among town planners in Malaysia, there is a significant interest among them to understand SPDSS, learn what it is all about and apply it in their work. However, at present, the availability of information regarding SPDSS is rather limited in Malaysia. Efforts need to be made by the relevant parties, especially those in the academic circle, in enhancing SPDSS knowledge base in the country. SPDSS network must be developed not only at international level, but possibly at local level as well to further promote SPDSS in Malaysian planning.

ACKNOWLEDGEMENT

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THE TECHNOLOGY OF ASSET MANAGEMENT AND MAINTENANCE CULTURE IN ENSURING SUSTAINABLE DEVELOPMENT

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Abstract

Much of the developing world is facing rapid urban development. The UN statistics indicate that 70 per cent of the World's urban population will be concentrated in developing nations by 2030. As cities continue to expand, city governments continuously struggle to provide services to the people. Clean water, sanitation, sewerage services, housing and waste disposal are some of the myriad of services that have to be provided in order to maintain a certain level of acceptable services for human consumption and for the health, safety and comfort of urban dwellers. Yet as city managers continue to expand infrastructure, there is also the hidden but real costs of maintenance of these infrastructure and services.

Cities are built environments and so too are the infrastructure that are built to serve communities. Thus, communities and infrastructure are intertwined. To achieve quality of life for communities in the urban environment, the service delivery must be there. If there is a break in electricity supply, or there is lack of water supply, or even when a lift within an apartment complex breaks down, the quality of life of its residents deteriorates. As city governments and service providers spend more to upgrade urban service delivery systems, more resources will be used, much more energy and costs incurred to keep the urban assets in working order. This will ultimately lead to unsustainable development.

A new technology called Asset Management will be introduced in this paper. Although the technology has been in practice in countries such as Australia and New Zealand in the last 20 years, it remains a new phenomenon in many developed as well as developing nations. This paper will examine the systemic approach in the planning and management of the urban environment, such that this relationship between communities, service systems, quality of life and urban sustainability, may be revealed.

Keywords: Asset Management, Maintenance, Sustainable Development

INTRODUCTION

This paper intends to introduce a new paradigm in urban planning and management, in order to ensure sustainable development. As a country progresses and the rate of urbanization seems unstoppable, there will be an increase in its infrastructure to perform and deliver services to an ever growing urban population. To ensure the services are optimally received, it poses an increasingly greater challenge. This paper will look at cities as part of a web of life, and that without human intervention in managing cities and its assets, will mean deterioration in the quality of life of urban dwellers.

Cities will be seen as living organisms. Having no means to regulate and manage itself without human intervention, the urban system will eventually breakdown. This paper will show that to attain a good quality of life and sustainable urban development for communities in urban areas, human intervention must be present and managed at the optimum. The planning and management of the human environment as a living organism will be introduced as Good Asset Management, and that the best practice for the planning and management of urban Malaysia, lies in the science and technology of Good Asset Management.

MALAYSIA'S RAPID DEVELOPMENT

On 31 August 2005, Malaysia will celebrate the 48th Anniversary of National Independence. In a time span of less than five decades, Malaysia has been transformed from an insignificant country dependent on primary products like rubber and tin into a modern economy with the gross domestic product (GDP) coming mainly from the industrial and service sectors. Despite being a small nation, Malaysia is now the 17th largest trading nation in the world. In the 2003 World Competitiveness Yearbook, among countries with over 20 million populations, Malaysia is ranked fourth after the United States, Australia and Canada. With this rapid economic growth, Malaysia's per capita income has increased from RM1, 132 in 1970 to RM13, 683 in 2002. This is estimated to rise to RM14, 954 in 2004—more than a thirteen-fold increase over slightly more than three decades. More significantly, our purchasing power parity (PPP) has jumped from US$1,247 to US$8,862 in the same period. In the 2004 Budget, it was forecast that the PPP will increase to US$10,000 (or RM38, 000) in 2005. Concurrently, the incidence of poverty has been reduced from 52.4 per cent of households in 1970 to 5.1 per cent in 2002.

As Malaysia is moving towards greater economic growth both locally and globally, urbanisation will further intensify throughout the country. This will lead to a higher volume of infrastructure development in all sectors. In other words, the nation's wealth of physical assets will grow in tandem with the continuing expansion of urbanisation and the support systems of all sectoral growth. All these are evident in the Budget Strategy 2005 and the Government should be complimented on its forward planning approach, especially in the appropriate allocation of operation and development budgets to support growth in all sectors.

Urban economists tell us that at the peak period of urbanisation and economic growth, a nation's asset stock could grow at an annual rate of 8%. Settling down to a stable condition, annual asset stock increase will level out at 1.5% to 2%, as in the case of most developed nations. Looking at Malaysia's persistent efforts in sustaining economic growth with substantial allocations of funds for infrastructure development, the country's asset stock does not seem to have leveled out but is hovering at the mid-level range of growth.

A PARADIGM SHIFT TO A MAINTENANCE CULTURE

It is a fundamental fact that a nation's asset stock is there to provide service deliveries—it is a mean to an end and not an end itself. Intrinsically, however gloriously they may boost Malaysians' ego, assets are there firstly to support the optimal functioning of various sectors of the nation's economy; and secondly to provide efficient public service under the management of various local governments. This is fundamental to the continuing enhancement of the citizens' quality of life.

All physical assets whether infrastructure or buildings, and including their sub-assets in the form of facilities, fittings, plants and equipment have a life span of their own. All assets deteriorate over time and unless they are proactively maintained by timely repair and replacement of their working parts, they will not be able to perform their intended service deliveries. In time, if maintenance is neglected, the assets will eventually become economic liabilities. At worst, poor condition of an asset can even pose public risks. When assets are not performing, a delivery system under a portfolio will fail. When more than one delivery system fails to function in various sectors, a nation's economic system will falter, social costs will increase and the citizens' quality of life will decline.

In his consistent push to have Malaysian industries competing in the global market, the Prime Minister further stresses that "the Government will ensure a

conducive environment, including development of R&D, provision of funds, increased promotional and marketing efforts, provision of logistics services and", again "improved public sector delivery system, in line with the objective of achieving sovereign competitiveness".

In short, the Government is fully aware of how imperative it is that the national asset stock be well maintained across the functional and economic life span of public assets, as well as sub-assets. Only by such persistent efforts by all Malaysians will the nation be able to ensure optimal performance of its delivery systems to all sectors and the community.

While Malaysians have shown the world that they can build any world-class infrastructure or buildings, they have yet to show a positive attitude towards asset maintenance, let alone demonstrating prowess in maintaining the nation's valuable stock of assets. It is for this reason that the Prime Minister has been urging Malaysians to take note of the stigma of "First World Infrastructure, but Third World Mentality" in caring for assets.

In terms of land mass, population and economy, Malaysia is a small nation. However, in terms of the relative size of the nation's asset stock for the support of service delivery systems—from transportation systems to telecommunication systems, world's tallest twin buildings to state-of-the-art international airport terminal systems, information and communication technology (ICT) systems to world competitiveness, this country is by no means a small player—in fact, many in the world community consider Malaysia a developed nation. Under such impetus, it is timely for Malaysia to develop a Maintenance Culture forthwith.

LIFE CYCLE OF URBAN ASSETS

In this emerging new asset management science, critical and creative "criteria" from asset- to- asset-to community relationships are established to serve as primary guides for the "planning", "acquisition", "operation and maintenance" as well as "recycling, revitalization or disposal" of urban assets. These form the Four Phases of Total Lifecycle of an Asset (see Figure 1).
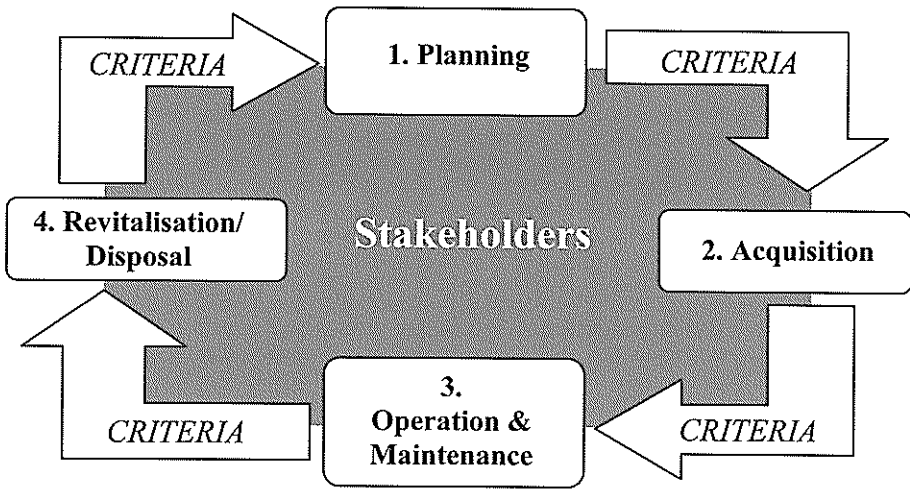
Figure 1: Total Lifecycle Management of Urban Areas

In good urban governance, it is imperative for the municipality concerned to have a comprehensive and dynamic system of recording all its assets in a computerised assets register. With such a register, a municipality can instantly obtain precise knowledge of exact locations, condition and level of performance of all assets — not only as individual assets but also in relation to a host of other asset systems, with regard to service delivery performance. In order to ensure spontaneous human interventions to maintain a city as a healthy and vibrant living system, the municipality must use a systems approach to manage the assets and sub-assets, each of which is a system by itself.

As a city is a living system involving the interconnections between the human community and the systems of service delivery arising out of the urban assets, we must look at this whole perspective as the ultimate relationships in a "web of life" as illustrated in Figure 1. In this respect, we must realize that no two situations with respect to where and when an asset system interacts with a community are the same. For each situation we must therefore identify a set of "stakeholders". With such a group, we must use the "epistemic" science to involve an appropriate method of questioning the stakeholders as an integral part of our asset management's holistic and systemic process.

By involving all the above systems thinking processes, the city is then embarking on the systemic process of **Good Asset Management** for *Total Lifecycle Management* of all its asset systems in close interrelationships with

the human communities. Through such a systemic process of deliberate human intervention, the city will be able to recycle and revitalize and thus function as a living system.

ASSET MANAGEMENT

Asset management is the greatest management challenge faced by custodians of public and private infrastructure in the world today. In order to do good asset management, asset managers need to know what their assets are, where they are located, what condition they are in, how they are performing and what stage are they in terms of their life cycle. This knowledge, called asset knowledge is then matched with the users' needs and expectations to develop strategies on how the use, value and return from this infrastructure can be maximised.

Asset management tools and technologies provide the fundamental strength to enable organizations to make informed decisions i.e. decisions based on both short term and long term needs. These tools and technologies enable organisations to effectively practice good asset management by:

- Quantifying current infrastructure holdings – what do we own and where it is.
- Qualitatively analysing infrastructure holdings – what condition is it in, what level of service is it providing, what is its capacity and functionality.
- Analysing performance – how has infrastructure performed in the past.
- Predicting performance – how will infrastructure perform in the future.
- Planning – short-term plans for routine maintenance, medium term plans for pro-active maintenance and long term plans for periodic maintenance.
- Analysing whole of life of infrastructure to determine best investment strategies and maintenance practices.

Planning decisions for new assets should be based on national, regional and local policies and consider budget constraints – for example, a decision to build a new highway should be based on sound provision needs of connectivity, network routes and corridor management.
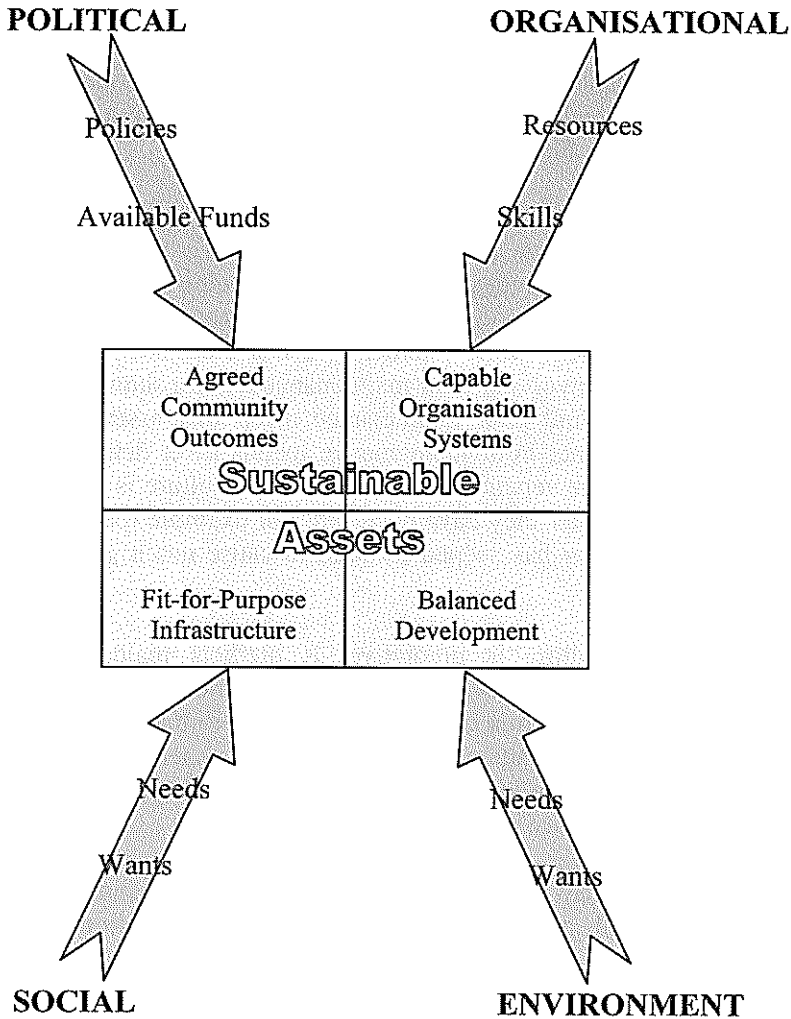
Figure 2: Sustainable Assets

Operational decisions for type of maintenance, timing of maintenance and location of maintenance should be a function of organisational resources and local skills. Availability of resources and skills often determine allocation of maintenance resources (see Figure 2).

Social decisions for planning assets and disposing assets should be driven by wants and needs of the users, citizens, businesses and community. For example provision of public toilets and their standards of hygiene should be need driven.

Finally all asset decisions must consider environmental demands of today and the future, particularly to preserve our natural resources. Asset management decisions **MUST** consider all these aspects to ensure that decisions are based on real needs and service level requirements. Integrated planning is good asset management leading to sustainable assets.

So whilst it is wonderful to have an infrastructure plan, we need to ensure that the plan is actually the best plan, i.e. plan based on good decision making. Good decision making involving good maintenance culture shows low life cycle costs. Smart decisions and good maintenance also mean that asset problems do not recur time after time. Good maintenance has eliminated most problems. Poor decision making involving poor maintenance culture shows high life cycle costs. Poor decisions and poor maintenance mean that asset problems keep recurring time after time. Poor maintenance means asset deteriorates quicker and needs more frequent repairs. Poor maintenance culture is reactive. It fixes asset problems much after they have occurred. For example roads have cracked and deformed and water has seeped through to cause much greater pavement damage.

Good maintenance culture is predictive. It predicts major problems and determines best maintenance decisions well before the major problems occur. For example regular inspection of foundation cracks in buildings would enable early grouting to prevent failure. Similarly ad-hoc asset management means decisions are based on individual or local knowledge only without any linkages to organisational or regional policies and planning.

Good asset management is integrated asset management and is based on a combination of social, political, environmental and organisational needs. It is the result of good, solid, integrated knowledge. A combination of good asset management and good maintenance culture leads to lowest lifecycle cots, best service delivery and sustainable assets.

CONCLUSION

A city or a municipality is a living system. It is constantly subjected to forces of change from within its systems assets and their sub-systems and from external conditions—social, political, economic and environmental. It is a dynamic system that needs to be constantly evaluated, modified, upgraded, renewed and revitalised in order to achieve holistic ecological sustainability.

Since a city is a web of life, any changes made to any part of the urban system and sub-systems affect the other systems. Therefore, changes cannot be made in an ad-hoc manner nor be based on the traditional reductionism approach. In other words, the effects of changes are not confined to the assets themselves. A whole systemic process involving careful dealing with the interrelationships between assets, the community and the overall ecological sustainability — social, political, economic and environmental factors — is needed. In short, we need to involve the systemic processes of good asset management to continuously maintain and revitalise our cities and municipalities.

Thus under the systemic structure of good asset management for a city or a municipality, the following quality demands are intrinsic:

1. Systems capacity building.
2. Accountability,
3. Transparency,
4. Community involvement as vital stakeholders-the concept of inclusiveness.
5. Eradication of marginalization of the informal sector in dual economies.
6. Poverty alleviation through systematic enhancement of quality of life for all citizens.
7. Close partnering between municipalities to achieve a strong and healthy web of life.
8. Benchmarking.
9. Best practice.
10. Effective leadership with holistic systematic support.
11. Ecological sustainability for total living urban systems.
12. Forming integrity of good governance.

Each of these forms the sub-systems of total and strategic asset management.

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TESSELLATION PLANNING AND HONEYCOMB HOUSING

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Abstract

In *honeycomb housing*, produced by *tessellation planning*, small courtyard neighbourhoods of 5 – 16 houses are linked together into *cul-de-sac* communities of up to 42 houses, which in turn form part of a larger neighbourhood of up to 300 houses. This physical arrangement promotes communal interaction and safety from traffic and crime. The house types used are novel, with wide frontages and every attached house is a corner unit. The compact footprints encourage contour housing. Every house faces a public garden in the centre of the courtyard, accessible for the very young, old and disabled, where big canopy trees can be planted. Using mathematics, we can prove that substantially less road area is required, which improves both the green and the saleable land area. Densities can also be higher. The mathematical basis of *tessellation planning* allowed us to develop prototype software tools that produce pre-drawing feasibility studies, and following this, rapidly create the layout plan and land-use breakdown.

Keywords: Tessellation planning, Honeycomb housing, Defensible space

INTRODUCTION

Fly over the country and you will see rows and rows of houses. Is there another way to lay out buildings? We present here a new method of subdividing land for housing. We believe it produces better social, environmental and aesthetic outcomes, and in a way that also uses land more efficiently. We can prove mathematically that substantially less road area is required, which improves both the green area and housing density. The new method was conceived as a practical and economical substitute for the terrace house, but it can also be seen to be an alternative to all forms of row housing and the linear approach to planning.

Conventional row housing and the linear approach to planning

Dwellings can be arranged on individual plots of land as detached units or linked to each other. Whether detached or linked, they line up along streets to form row housing. In a row house, owners of individual plots of landed property maintain sole occupancy rights. Orthogonal grids have been used as the fundamental tool for subdividing land. Linear roads provide access to individually owned plots of land. Roads and gridlines may be distorted by design or necessity but they retain their linear nature.

Terrace housing

Terrace housing has long been considered the densest form of landed property development possible. Indeed, of all the types of housing in Malaysia, it is the terrace house that predominates. The typical lot varies from 16' x 50' to   24' x 100', but the most common lots now are 20' x 65' and 22' x 70'. The ubiquitous terrace house plan has been designed and re-designed many times but always within the same restrictive framework without much scope for innovation.

The housing layout has also become stereotyped. In the typical estate, the terrace houses are lined up along grid-lines with 40' service roads in front and much narrower back lanes and side lanes. Communal areas for schools, civic and religious buildings, as well as open areas for children's playgrounds and parks, are also provided. Despite the infrastructure provided, the design of many housing estates does not really meet the practical needs of the average resident. Apart from the aesthetic boredom of rows and rows of houses, among the drawbacks of the terrace house layout is the lack of public security and any genuine sense of community (Malaysian Encyclopedia Vol. 5 Architecture, 1998).

In trying to improve the monotony of housing in rows, planners have devised various strategies:

1. Strata-title development

In this approach, groups of houses share ownership of the communal facilities, allowing greater freedom in designing the access route and common facilities, and also allowing high densities. The Desa Park Homes (see Figure 1) development is an example of this type of approach. It is able to achieve densities as high as conventional terrace house layouts. However, strata- titles are considered not as valuable as land titles.
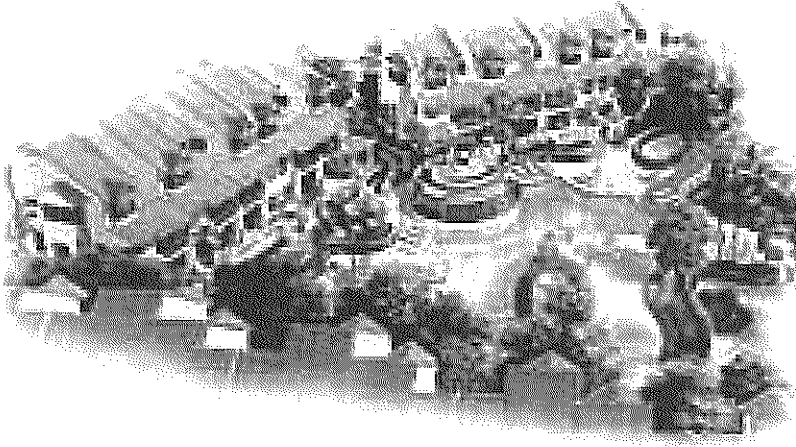
Figure 1: Strata-title Desa Park Homes

2. *Organic layouts*

Following the trend in more developed countries, local planners have devised 'organic' layouts, where winding roads and occasional *cul-de-sacs* break the boredom of the iron grid. However de: sity is sacrificed. A Guthrie development at Bukit Jelutong is an example of this trend, but the houses there cost RM500,000 or more (see Figure 2).

Figure 2: Bukit Jelutong layout

3. Clustered layouts

Similarly, the cluster approach can produce interesting outcomes but, in most cases, loses out on efficiency. The circular clustering of houses at Brondby near Copenhagen in Denmark shows a wide expanse of green area between the clusters (see Figure 3).

Figure 3: Brondby, Denmark

4. Honeycomb housing

Using the *tessellation* method of planning, all the houses are built around small parks with large shade trees in hexagonal *cul-de-sacs*, which efficiently interlock to form townships similar to a bees' honeycomb (see Figure 4).
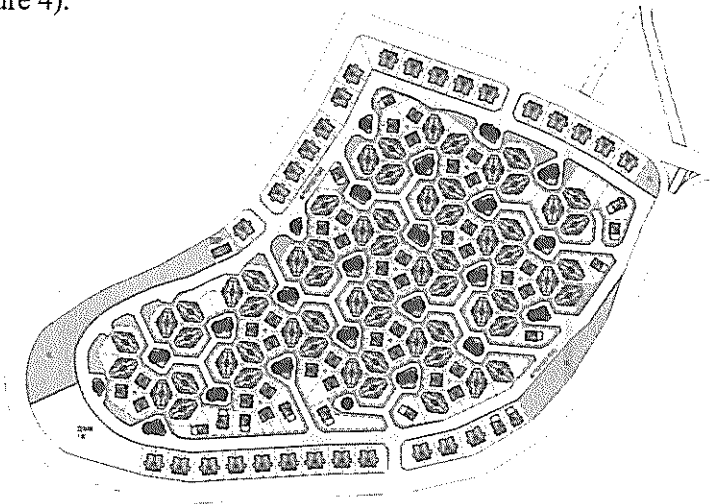
Figure 4: Honeycomb layout at Sungai Lunchoo Johor Bahru

TESSELLATION

In mathematics, to tessellate means to cover a plane with a pattern having no gaps or overlaps. For centuries artists and craftsmen have used tessellation as a tool to create visual effects on surfaces. Tiling is the most common form of tessellation and in its simplest form the tiles are regular polygons. The Muslim craftsmen in Spain in the 15th century created beautifully complex visual effects by tessellating a small simple basic tile pattern (see Figure 5). Intricate and complex designs can be built up from basic tile patterns in a simple way by this process (see Figure 6). In honeycomb housing, the creative power of tessellation is applied to town planning, where the colours are not merely decorative but represent functional space.
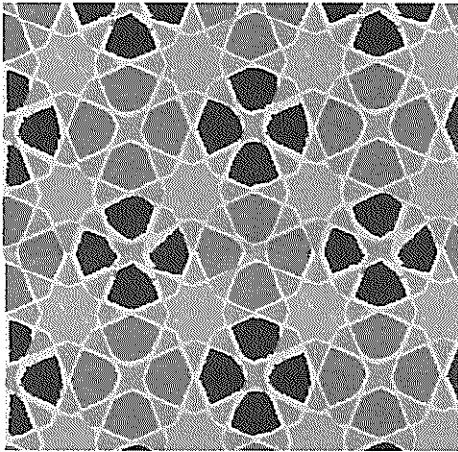
Figure 5
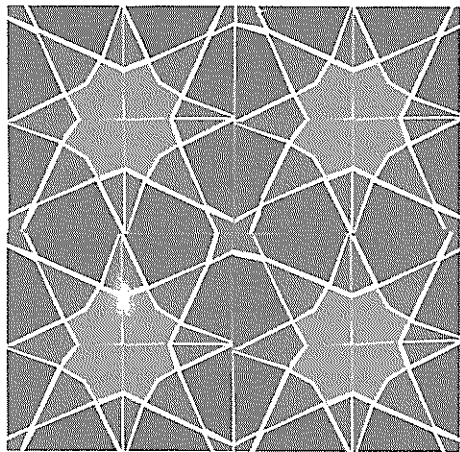
Figure 6

SEGMENTS OF THE TILE

A small triangular tile, the *mother-tile,* is the basic building block that creates the honeycomb layout. It contains three of the requisite elements of a township plan:
- road (yellow)
- House & garden (red)
- Public green area (green)

We call these colored segments *daughter-tiles*.

(a)

(b)

(c)
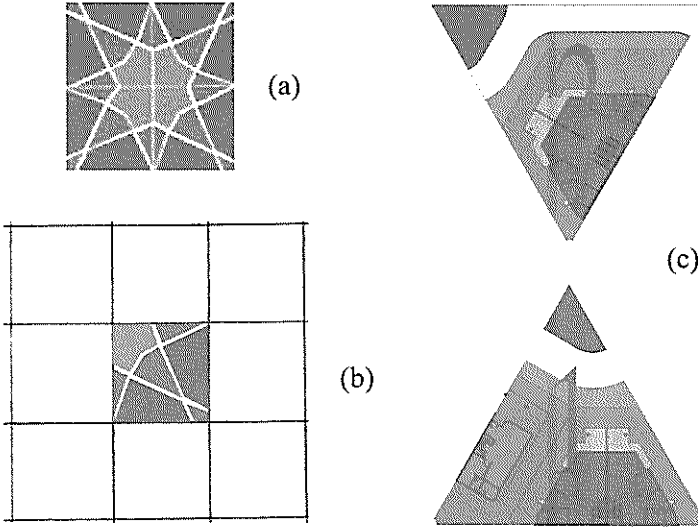
Figure 7: The *mother-tile*

The mother-tile, and close variations of it, tessellate according to simple rules to form what appears as a complex and intricate pattern. When tessellating, daughter-tiles meet and link up with similar ones in adjoining tiles. The same coloured daughter tiles form *conjoined tiles*. It is the complex shapes of these interlocking daughter-tiles that we perceive, rather than the simplicity of the triangular grid. Refer to Figure 8.

Conjoined house and garden tiles form the basis of new house types (see Figure 9). Linked Honeycomb Houses ideally join back to back and are accessed from different *cul-de-sacs*. This is the case with the duplex and triplex. But the houses can also link side to side at the same time, as in the cases of the quadruplex and sextuplex.
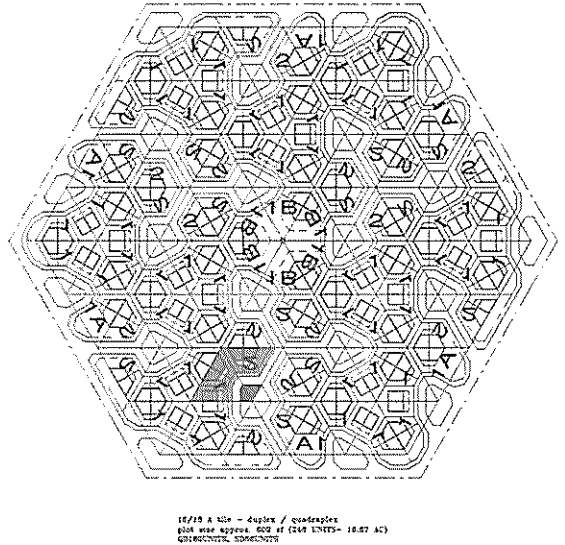
Figure 8
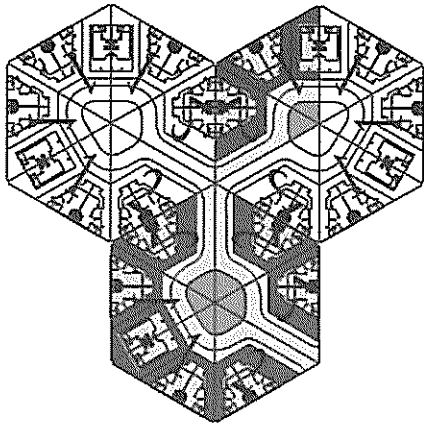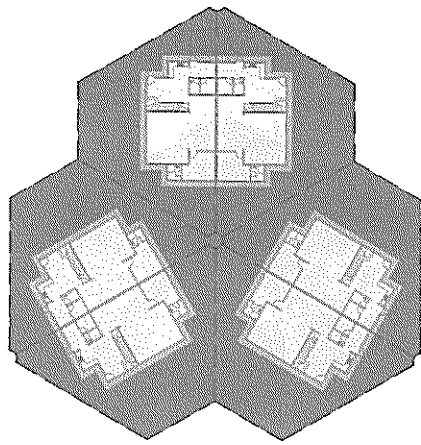
(a)   (b)
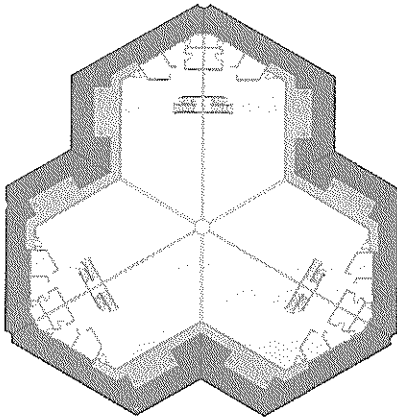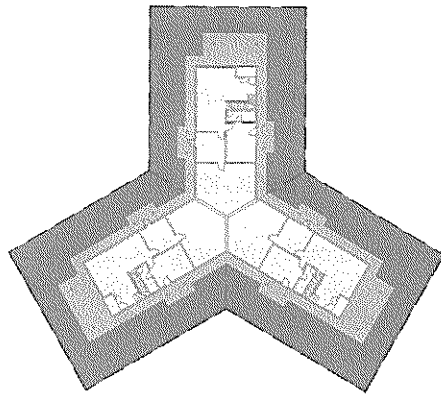
(c)   (d)

Figure 9

DESIGNING THE COURTYARD NEIGHBOURHOOD TILE

A *courtyard neighbourhood tile,* containing the planning elements necessary to form a small community, is created by tessellating the mother-tiles to form a hexagon. Communal space is created in the middle, surrounded by the houses. The road accesses each unit around the courtyard space and forms an extremely

efficient circulation system. Through this design we have created a spatial boundary, a central area that can become the communal focus, and a sense of entry into this place. The design is such that there is a clear, common perception of the neighbourhood. See Figure 10 and 11.
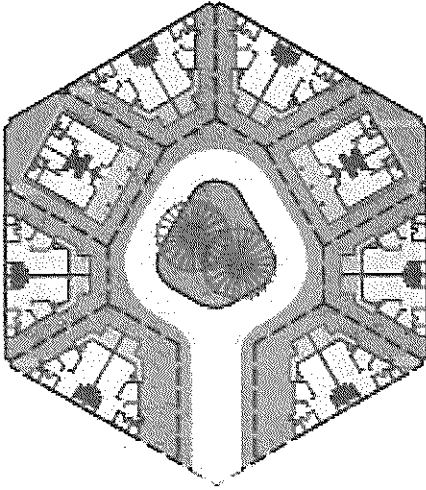
Figure 10: Courtyard Neighbourhood   Figure 11: *Cul-de-sac* Neighbourhood
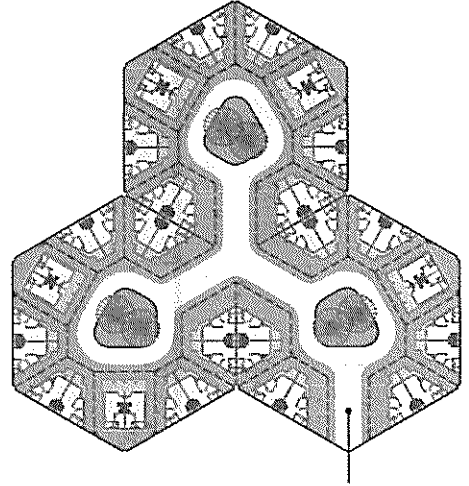
DESIGNING BIGGER NEIGHBOURHOODS

When the courtyard neighbourhood tile is tessellated, the roads are linked to create *cul-de-sac* neighbourhoods without loss of efficiency. Opportunities to link dwelling units into multi-unit blocks exist along the tile boundaries (see Figure 12). Joining many courtyard and *cul-de-sac* neighbourhood tiles on a real site is simple and efficient. It results in more livable spaces with an improved relationship between people and people, people and cars, and people and their environment.
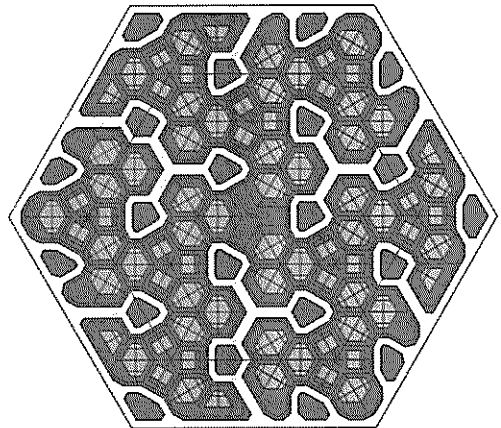
Figure 12: Precinct Neighbourhood Tile

THE SOCIAL ASPECT OF HONEYCOMB HOUSING

Using the tessellation method of planning, houses are built around a small park with large shady trees in a *cul-de-sac*: this communal garden, easily accessible to all, acts as a social focus for a small, friendly neighbourhood and is a defensible space designed to reduce crime naturally. The short winding roads reduce traffic speed so that urban areas become safe and pleasant for children and pedestrians, encouraging outdoor social interaction and the development of a community.

CARS VERSUS PEDESTRIANS

Planners have long realized the negative effect of fast-moving traffic on neighbourhoods (see Figure 13). Radburn in New Jersey, built over 70 years ago in the US, is the prototype for the separation of pedestrians from traffic. Delft in the Netherlands, built in the 1960s, is one of the first examples where the roads are designed with traffic-calming features to slow down vehicles (John Gehl, 1987).

In honeycomb housing the network of roads comprises looping *cul-de-sacs* and short connecting roads leading to distributor roads. This pattern slows down traffic naturally, rendering it safe for pedestrians. The short connecting road with no access to houses provides space for visitors' parking. See Figure 14.

Figure 13
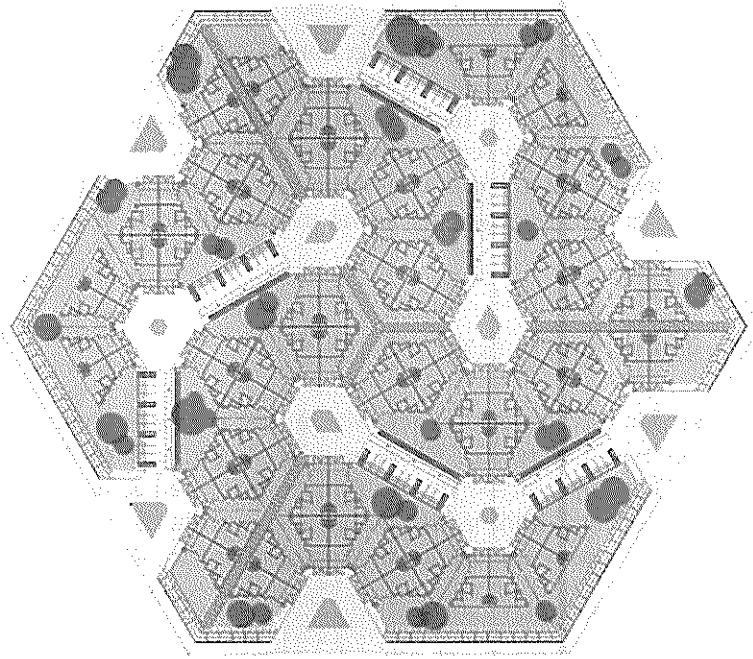
Figure 14

CREATING COMMUNITIES

The outdoor space between buildings is an important arena for social contact and spontaneous interaction, which are important in developing a sense of community. The creation of a safe, pleasant and shady area of suitable size, just outside the home, is a basic feature of honeycomb housing. The central courtyard becomes the social focus of the neighbourhood and is accessible to all to enjoy, the very young, the old and the disabled. Sociologists find that individuals relate better to small groups rather than large. In honeycomb housing the neighbourhood contains only 5 to 40 units defined clearly by the single access road and the communal courtyards. It is easy for people to get to know each other by sight, to get acquainted, to set up informal social groups and to initiate collective action. See Figure 15.

CENTRAL COURTYARD

Figure 15

DEFENSIBLE SPACE

The issue of public security in residential areas is a hot current topic. In a national survey conducted in July 2004 by Merdeka Centre and IKMAS, 42% of Malaysians surveyed said crime was their biggest worry. The concept of *Defensible Space* with a hierarchy of private space, semi-private space and public space, first proposed 30 years ago by Oscar Newman (1972), is now widely accepted (see Figure 16). Residents must be allowed to exercise influence over the environment just outside their homes: visitors should know when they are entering a semi-private domain. Environmental design
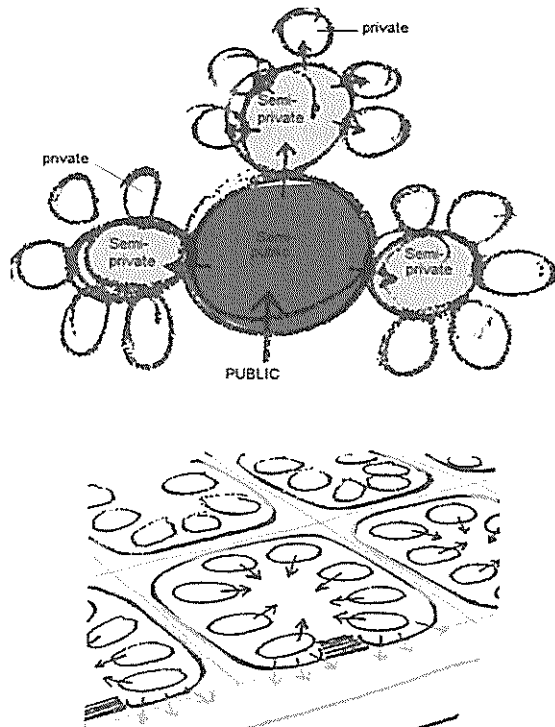
Figure 16

can assist in providing *natural surveillance* of the external spaces. The honeycomb layout can be seen as a technique to design townships where every house lies in a *cul-de-sac*, which naturally produces defensible spaces. Furthermore, it completely eliminates back-lanes from where 30% of break-ins in Malaysia originate, according to UTM researchers (A.B. Abas and I.N. Sugianto, 2004).

Play areas

Play is an important aspect of learning for the child; growing up can be seen as a process, where the child becomes more and more independent of the parent, exploring first the spaces around the mother and progressing to other rooms in the house and then the front yard. The opportunity for exploring new environments is best presented in small discreet steps so that children can explore them at their own pace (John & Elizabeth Newson, 1968).

The problem with the typical Malaysian situation is that the process of exploring new territory independent of the parent stops at the front gate, beyond which parents do not considered it safe. When the child is finally old enough to go out unaccompanied by an adult it is too big a transition and the child is disadvantaged compared with one that is able to explore bit by bit the neighbourhood around the home.

This suggests that the spaces outside the home should be made conducive to the growing-up process. They should be safe for smaller children, with ample play and civic amenities. Play areas with football fields some minutes away from the home do not serve the needs of pre-schoolers or young primary school children.

The environmental aspect of honeycomb housing

Tessellation planning makes undulating land suitable for high-density landed property development with less cut and fill. Big trees in the *cul-de-sacs* provide cooling shade; they also serve as a source of food and a habitat for small birds and animals.

Sloping sites

Building long rows of terrace houses cheaply requires hills to be cut and streams to be filled. Honeycomb link units have compact footprints that allow more level changes to be placed between the blocks. In this respect their shape is very much like big detached houses, and it is evident from existing townships that the typical developer flattens large expanses of land for his terrace houses,

but lets the bungalows go up and down to better suit the original contours (see Figure 17).

Bringing nature into townships

The road shoulder with its underground cables and pipes is not suitable for trees: but big shady species can thrive in the small communal gardens of honeycomb housing. The clearing of trees to create concrete jungles is the main contribution to the heat-island effect. Roofing houses with thick insulation and shading the external hard landscape and roads by maximizing the tree canopy area are strategies used in honeycomb housing. Evaporation from leaves will further cool the external environment. The landscaping of the parks will create microhabitats. Linking the small islands of green via the footpath landscaping and the private gardens will encourage biological diversity.
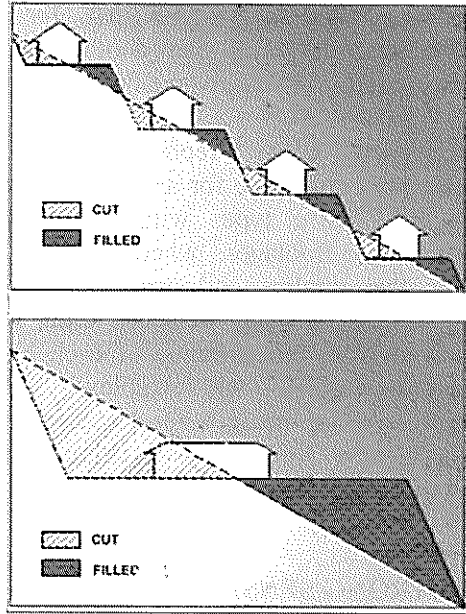
Figure 17

WILDLIFE TECHNOLOGY

Wildlife technology is a new concept being developed by UPM (Universiti Putra Malaysia). Suitable species of introduced butterflies, birds and small mammals will gradually adopt a honeycomb township as their natural home (John & Elizabeth Newson, 1968).

Residents of honeycomb townships can once again live like their rural ancestors, in harmony with nature, by contrast with people in the present urban concrete jungles.

AESTHETIC ASPECT

Tessellation Planning, without incurring any cost penalty, allows new townships to break free from the mental grid-lock that produces rigid rows of housing. To most architects, designing yet another terrace house is a boring chore (see Figure 18).

Honeycomb housing represents a new and refreshing challenge for architects. It leads to new house types with wider, more articulated frontages, where linked units like the duplex and triplex give the impression of being detached units when viewed from the entrance of each house. The quadruplex and sextuplex give the impression of being semi-detached units. These new forms give architects more room for creativity. See Figure 20.
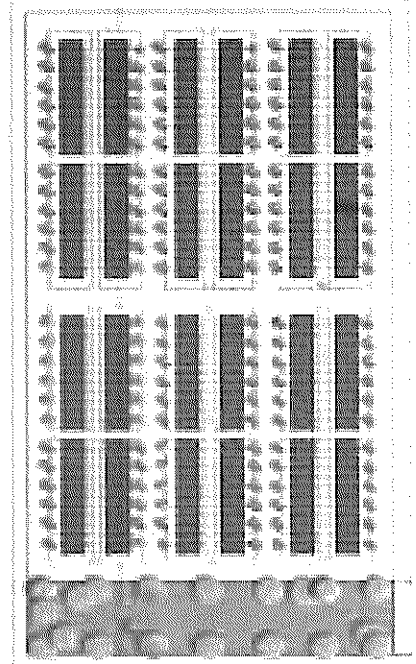
Figure 18

A STRONG SENSE OF LOCATION

The home is often a family's biggest investment: its resale value is affected most by its location. A home in a private and exclusive location, within a nice friendly neighbourhood, set in a lush, mature landscape with birds singing in the trees, will fetch higher resale values.
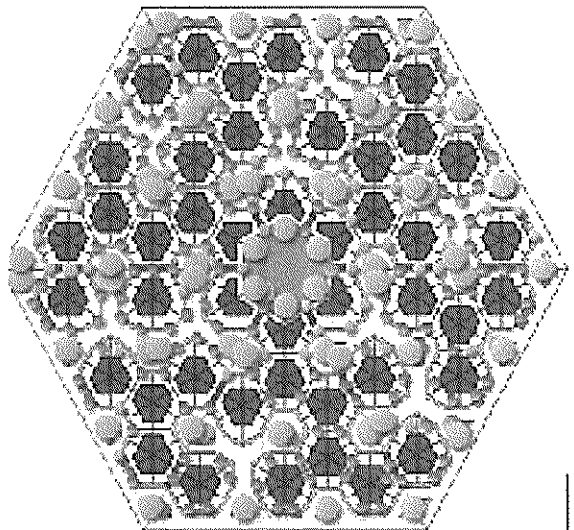
Figure 19
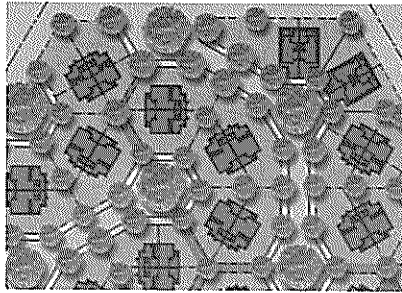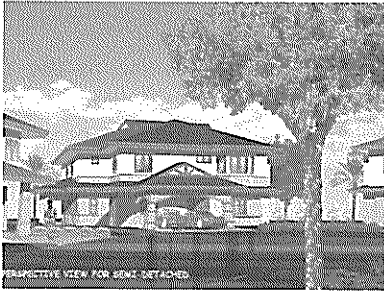
(a) Duplex
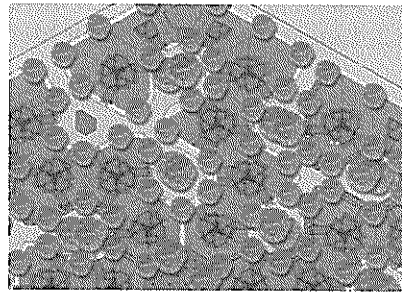
(b) Triplex
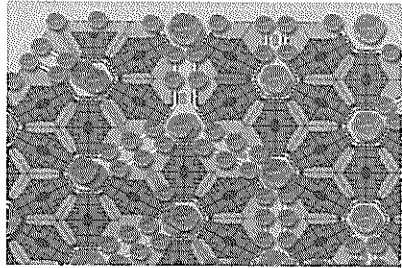
(c) Quadruplex
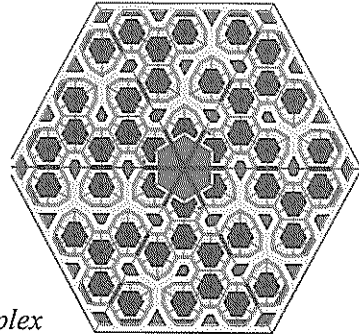
(d) Suxtuplex

Figure 20

Hierarchy of roads

It is very easy to get totally lost when looking for a house in the typical Malaysian township. Make one wrong turn and it is easy to compound this error with other mistakes, which takes you further and further away from where you actually want to go.

Using the tessellation method, we can adopt a technique to make it easy for people to navigate the streets and not to have to worry about getting lost. In the example shown, there is one main entrance road, Jalan Tulip Utama, in this 100 acre site which is 66' wide. Then there are smaller 50' distribution roads, Jalan Dahlia 2, Lingkaran Orkid 3, Sabit Melati 4, and so on. See Figure 21.

The houses are accessed from *cul-de-sacs*, which are addressed in a hierarchical fashion, each referring to the distribution road they come from, Desa Dahlia 1/ 2, Desa Orkid 1/3, Desa Orkid 2/ 3, Desa Orkid 3/3, and so on. See Figure 22.

The fact that the smaller roads do not connect to other small roads means that if we make a wrong turn into one of them, we go out the way we came in. Miss a turning on the circular road, and we just have to keep going until we get back to the junction again. Errors are not compounded. The system is self-correcting.
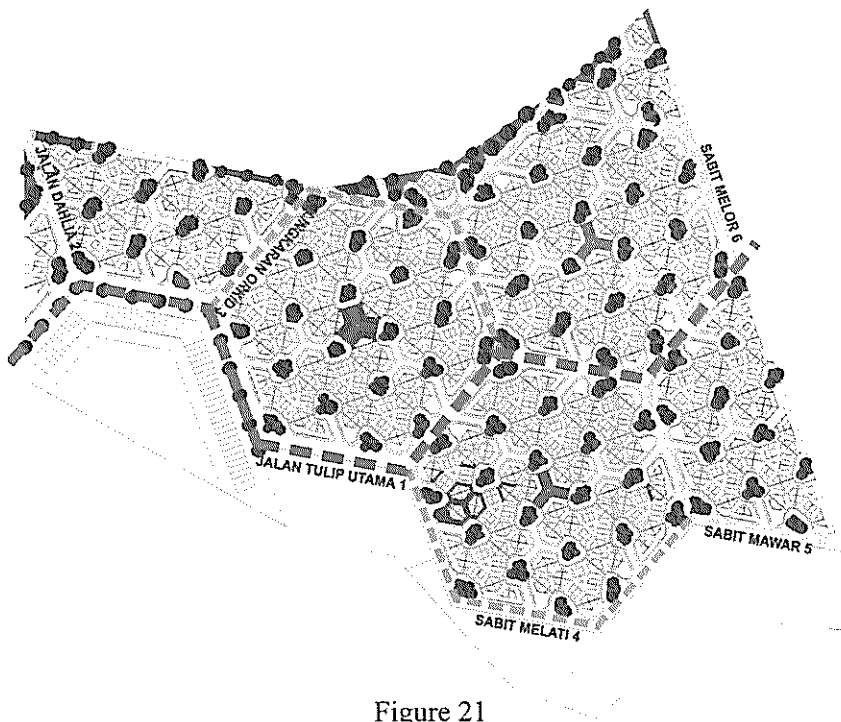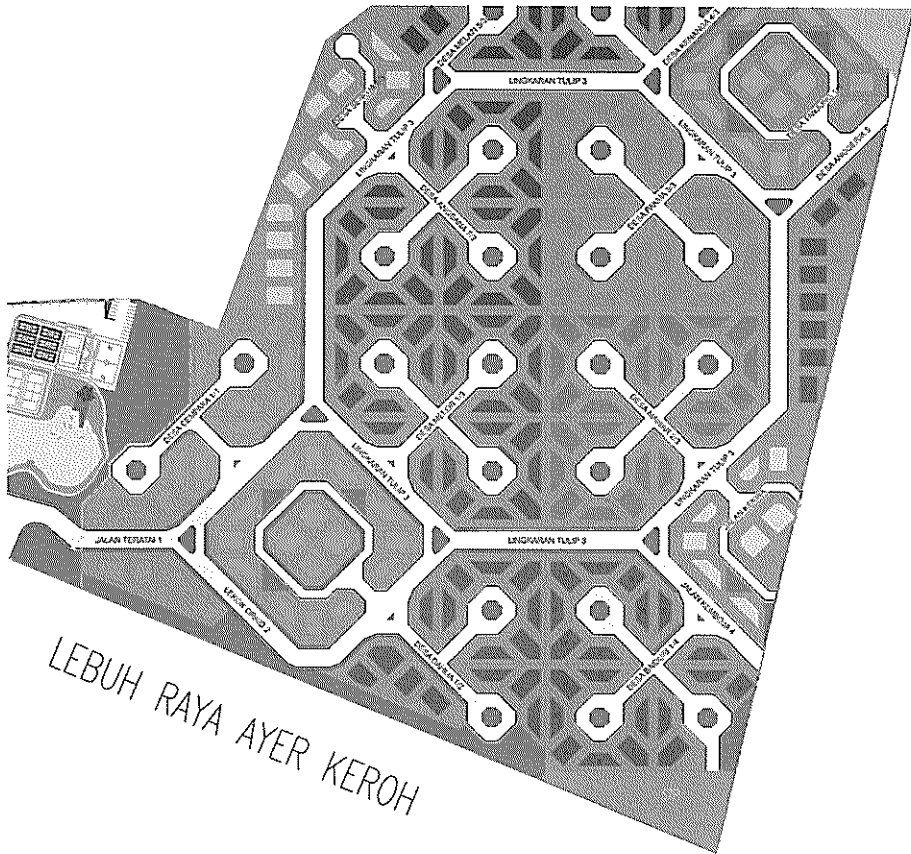

Figure 21

Figure 22

The economic aspect of honeycomb housing

A terrace can be seen as a row of houses surrounded by roads. In contrast, honeycomb houses surround the road. It is easy to understand intuitively that roads accessing internally are more efficient than roads accessing houses from the external boundary. This accounts for the efficiency of *cul-de-sacs*. See Figure 23.

Given a fixed area and number of houses to access, the shorter the *cul-de-sac*, the less the area taken up by the road. A square *cul-de-sac* neighbourhood has less road area than a long rectangular one (see Figure 24). A circular one by itself would be the most efficient (see Figure 25). However, as we have seen with the example from Brondby, Denmark, the circle does not tessellate (Figure 26). However, hexagonal neighbourhoods interlock without gap or overlap.

The second consideration is the length of the distribution roads that encircle a precinct. The perimeter of a hexagonal precinct is 7% shorter than the perimeter of a square one of the same area.

The third factor is the shape of the individual lot and its effect on the buildable footprint after taking account of setback requirements. In the example shown, the truncated triangle shape of 6000 square feet yields a higher plinth area compared to a typical 60' x 100' site (Figure 27).

All of the above factors combine in honeycomb housing to produce greatly increased efficiency of land use.
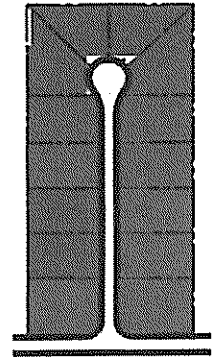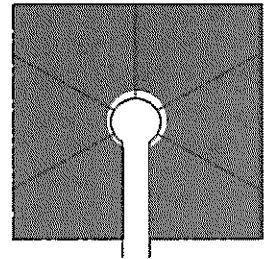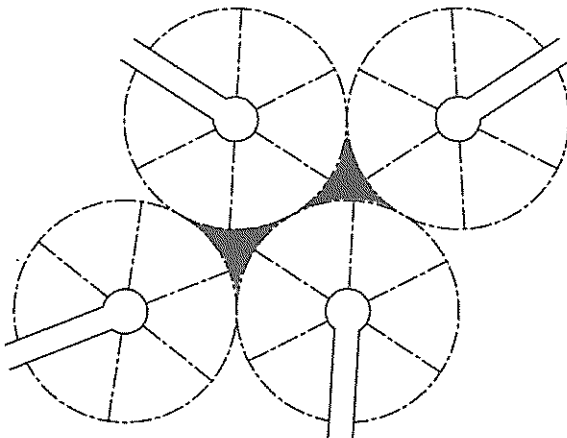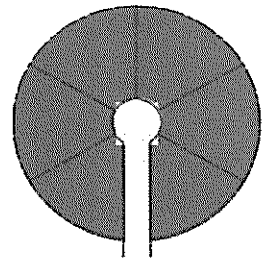

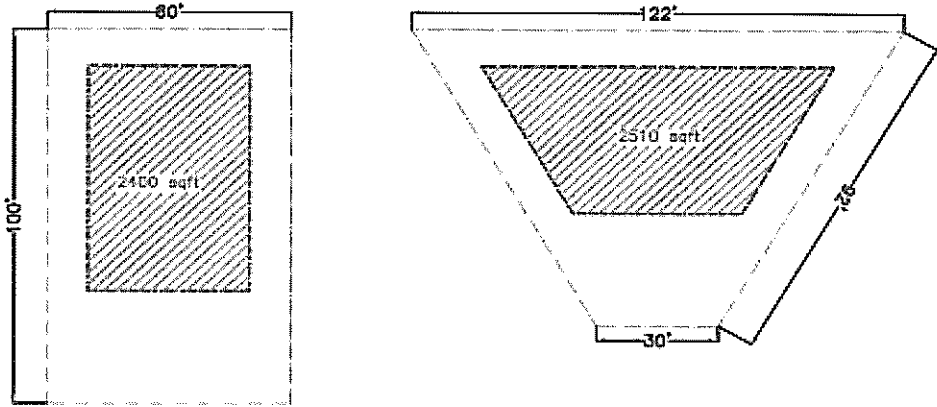Figure 23

Figure 24

Figure 25

Figure 26

Figure 27: The honeycomb housing system offers bigger buildable areas than the row housing.

ANALYSIS

Reducing roads and improving land-use efficiency

A honeycomb neighbourhood comprising 5 units of quadriplexes and duplexes is compared with a terrace house arrangement of an equivalent 5 units. We then compared a honeycomb neighbourhood comprising 16 units of quadriplexes and duplexes against a terrace house arrangement of an equivalent 5 units (see Figure 28). It is demonstrated in the table below that the honeycomb layout is more land-use efficient (Table 1).
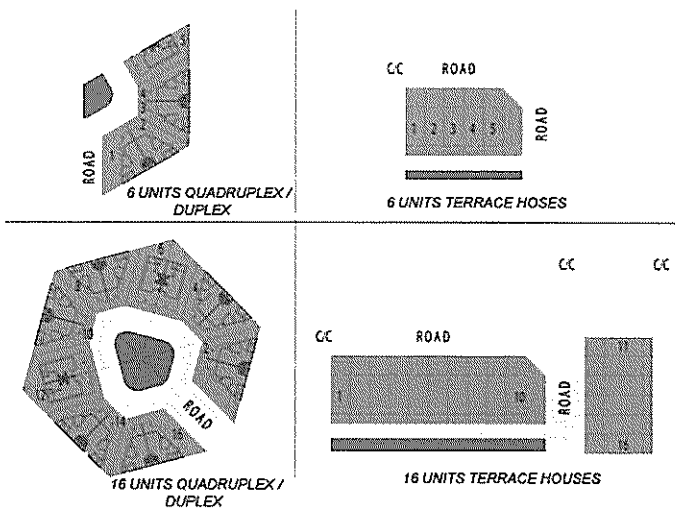

Figure 28

Table 1: Honeycomb Terrace

5 UNIT				
	HONEYCOMB HOUSE		TERRACE HOUSE	
	(SM)	(%)	(SM)	(%)
ROAD	334	26	611	41
GREEN	93	7	103	7
HOUSE	861	67	761	52
TOTAL	1288	100	1475	100
16 UNIT				
	HONEYCOMB HOUSE		TERRACE HOUSE	
	(SM)	(%)	(SM)	(%)
ROAD	879	23	1323	35
GREEN	264	7	269	7
HOUSE	2721	70	2190	58
TOTAL	3864	100	3782	100

A similar exercise comparing 2 and 8 detached houses laid out in rows and against the same numbers of equivalent honeycomb houses comes to the same conclusion (Figure 29). Comparisons of private and public green areas and of potential tree canopy areas also yield interesting results (Table 2).
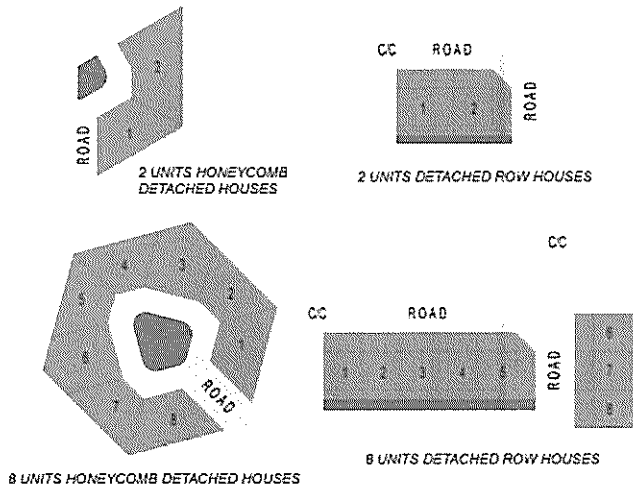

Figure 29

Table 2: Honeycomb Bungalow

2 UNIT				
	HONEYCOMB HOUSE		*BUNGALOW*	
	(SM)	*(%)*	*(SM)*	*(%)*
ROAD	334	26	426	33
GREEN	93	7	90	7
HOUSE	861	67	761	60
TOTAL	1288	100	1275	100
8 UNIT				
	HONEYCOMB HOUSE		*BUNGALOW*	
	(SM)	*(%)*	*(SM)*	*(%)*
ROAD	879	23	818	25
GREEN	264	7	235	7
HOUSE	2721	70	2190	68
TOTAL	3864	100	3243	100

Honeycomb housing produces greatly increased land use efficiencies. These advantages are summarized in the mathematical table comparing an 18' frontage terrace housing against sextuplex honeycomb housing (Table 3).

Table 3: Mathematical Comparison

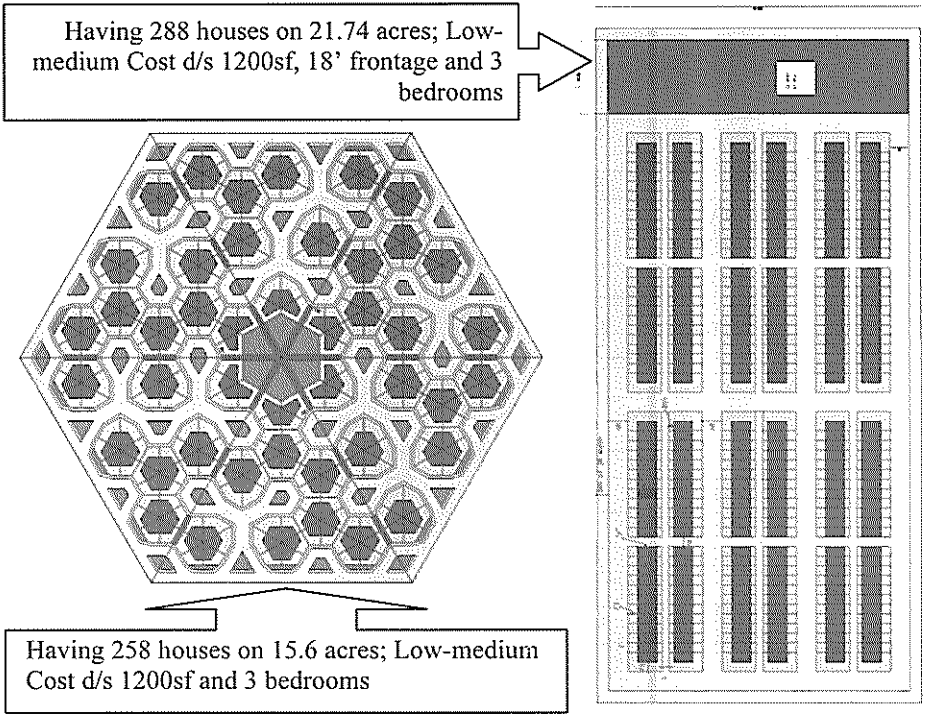| % of site	Terrace Housing	Honeycomb Housing
Road Area	46%	37%
Saleable Land	43%	52%
Private Gardens	6%	12%
Public Green	10%	10%
Potential area Shaded by Trees	15%	46%
Houses Per Acre	13.2	16.5

Having 288 houses on 21.74 acres; Low-medium Cost d/s 1200sf, 18' frontage and 3 bedrooms

Having 258 houses on 15.6 acres; Low-medium Cost d/s 1200sf and 3 bedrooms

Figure 30

Figure 31

Apartments

Tessellation planning can also be applied to the layout of apartments. The apartment blocks are arrayed around an open courtyard which contains the driveway, car parks and a central garden. In the new designs of 5 storey Honeycomb apartments, access corridors are eliminated. Units cluster around a well ventilated and naturally lighted central lobby on each floor which serves as a semi-private meeting area for residents and a safe playpen for their children. Each floor is accessed by stairs, an also a lift to cater for young families, the old and the handicapped (see Figure 32, 33 & 34).
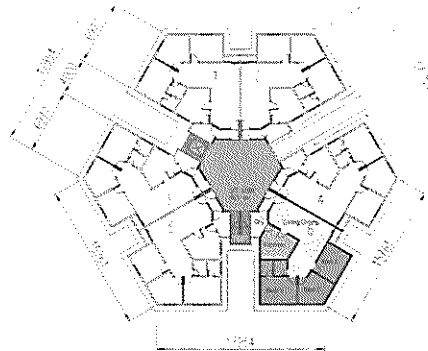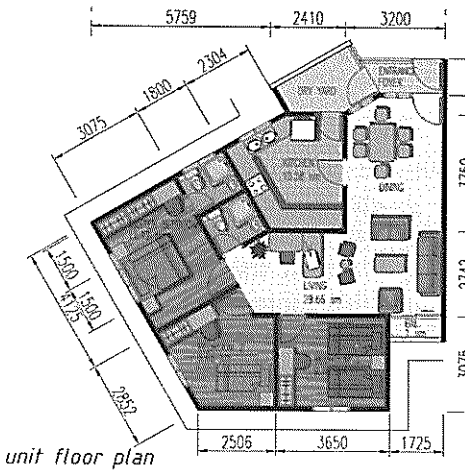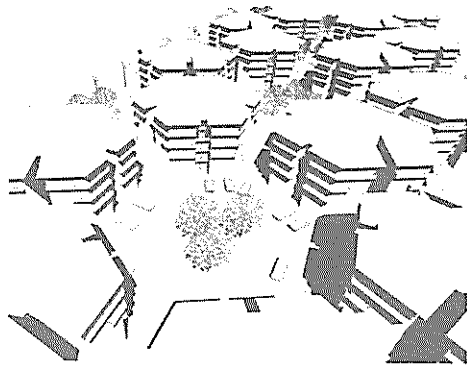

Figure 32

unit floor plan

Figure 33   Figure 34

Proof of concept

Presenting our ideas to various people in the housing industry, we find that most warm to them. However, doubts are often expressed as to whether others in the industry or consumers can accept this radically new concept. Furthermore, many are also skeptical about our claims as to the improvement in land-use efficiency: they expect such 'complicated' layouts to be more expensive. Certainly, we agree that our claims on the cost savings are counter intuitive but we can prove them.

Consumer and industry surveys

Reactions to honeycomb housing have been tested through scientific surveys. UPM undertook a targeted consumer survey at a Home Ownership exhibition in the Mid Valley Shopping Mall in June 2004. Researcher staff gave out questionnaires after a 15 minute pictorial explanation at our booth. From 116 respondents, 76% said they would like a house in a honeycomb township. Similar results were obtained even from housing developers. From 69 members of the Housing Developers Association who responded to a questionnaire given out after a 60 minute presentation, 78% agreed to the statement that 'Honeycomb townships are desirable'; 61% agreed they could be commercially implemented, with 35% unsure but only 4% disagreeing. Another survey of 59 respondents attending an August 2004 seminar on 'Lightweight Steel for Residential Construction' also yielded positive results: 91% thought honeycomb townships were desirable and 80% agreed they could be commercially implemented.

Clearly, honeycomb housing, based on the tessellation method of planning, is capturing the imagination of both consumers and the housing industry.

General mathematical model

Distances and areas of a tessellation layout and an equivalent terrace layout were expressed in terms of variables x, y, etc. Using formulae from the Pythagoras theorem and the solution to quadratic equations, a mathematical model of the two alternatives was built up. We then tracked how land-use efficiency and density vary as a range of buildable footprint areas of the two alternatives are input. We were able to prove in all cases that tessellation layouts reduce the total area of roads, thereby resulting in more saleable land, and lowering infrastructural cost. We also showed that housing densities can be improved.

Infrastructure

By going through the same process with the length and the quantity of roads and drains we also found big reductions. There was a small increase in the cost of sewerage but overall, there was a substantial reduction in Infrastructure costs.

IT aspect and prototype software

The industry-standard method of designing housing layout is largely an intuitive process. The design and drawing of a housing layout is required before a feasibility study can be done and the first solution is very unlikely to be satisfactory. The search for an optimal solution involves a lot of hard work with multiple iterations between layout drawings and feasibility studies and is often not done fully. By contrast, the tessellation method of planning involves geometrical manipulation that can be captured by mathematical formulae and a set of algorithms that can be programmed.

Proposed systematic computer-aided process

Thus, a key feature of the tessellation method of planning is the fact that it makes possible an application software that can rapidly produce a feasibility model capable of handling what-if questions to reach an optimal layout proposal; a further capability is the almost automatic production of a drawing of that layout.

There is no similar software in the market that provides these capabilities based on the conventional method of design. The application software described may become a compelling alternative to the current slow and laborious intuitive method.

Using the mathematical model and employing a set of algorithms, and partly funded by Malaysian Venture Capital Bhd, we have developed:

- A prototype of software that can rapidly produce a feasibility model able to handle what-if questions to reach an optimal layout proposal without drawing a layout plan first. Density and percentage sellable land are calculated using the mathematical model (Figure 35 and 36).

- AUTOCAD add-on tools that simplify and speed-up the drawing of tessellation layouts
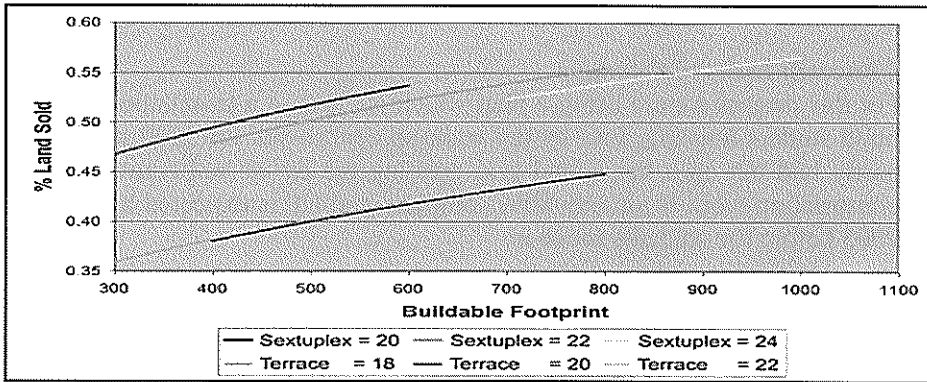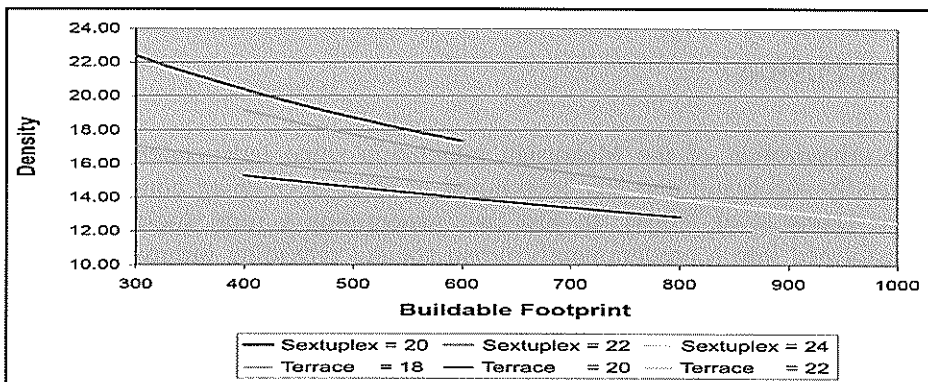

Figure 35

Figure 36

THE PROJECTS

From case studies and using the feasibility planner, we are able to show developers that they can improve their sales revenue from the increase in sellable land and units, and reduce their costs by cutting down the amount of roads and drains to be constructed. We are already working as consultants on real sites to realize the first tessellation developments.

a) Puncak Alam

We are working on the layout of a 400 acre mixed development site north of Shah Alam. The proposal includes low and low-medium cost apartments, medium to high medium cost attached housing, industrial and commercial properties and the full range of amenities that make up a township.

b) Universiti Industri Selangor

For this project we are using a plan which is close to a tessellation layout to build student housing. Five storey walk-up apartments for 5000 students are partly laid out on a hexagonal grid creating the *cul-de-sac* courtyards. The construction work is already 80% complete and CF is expected by February 2005 before the students move in.

Research and Development

We have been advised by senior patent attorneys, following worldwide searches, that tessellation planning appears to be entirely novel and can be considered an invention. We have taken steps to apply for patents in Malaysia and Australia.

CONCLUSION

The urbanization of the Malaysian population since Independence has been generally successful and has been noted in other developing countries (Mohd Peter Davis et al, 2004). In just two generations a rural society has been transformed into a predominantly urban society providing improved incomes, health, nutrition, housing and education in a population that has grown from 8 million to 25 million. However, in this rush to modernize there have been some negative side effects. But these are mistakes that were made; they are not inevitable consequences of urbanization. Once honestly accepted, the mistakes can be avoided in future townships in Malaysia and importantly in other developing countries as they embark on rapid urbanization.

We believe that there are commercially feasible technological solutions that can improve the homes and townships we live in. We should like to spread our new ideas on honeycomb housing to as many people as possible so that these ideas can be put into practice as part of a wider concept which we call *township technology*. We will be offering to license our proprietary knowledge on tessellation planning to town-planners and architects almost free of charge.

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THE APPLICATION OF THE CONCEPT OF DEFENSIBLE SPACE FOR SECURED HOUSING ENVIRONMENT

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Abstract

Housing areas in Malaysia has always relied on the local authorities to take care of the neighbourhood, resulting in apathy in respect to the community's well being, safety and a rise in crime. Most housing developments have been designed to provide a secure home rather than a secured living environment. The provision of a large and undefined communal space, leads to a situation of "anonymity" and become "lost spaces" which allow criminals to "disguise" among the crowd.

A viable solution in ensuring a secured housing environment is through the provision of "defensible" communal spaces that encourage community interaction and social cohesion. This paper will discuss the current problems concerning crime and safety in high-density housing settlement in Malaysia. The paper will also review the prevailing ideas and concepts that have been articulated by prominent theorists for the designer to use in designing secured housing development, This is where the defensible space theory raises the issue of 'creating' a community within a neighbourhood, and how it could be applied successfully to local housing.

Keywords: Housing, Community, Communal Spaces, Territoriality, Safety

INTRODUCTION

Whenever the issue of crime in housing is brought up, it is usually concluded that it is hardly preventable due to the larger issues of socioeconomic condition of the country. Many residents try to resolve the problem by seeking the help of overstretched law enforcement agencies. Some residents even try to secure their units with locks and grills, to the extent that they imprison themselves in their own home.

However, the viable solution in securing the housing units is through the provision of a *defensible* communal space that encourages community

surveillance and lead to the unity of the neighbourhood. The design of the communal spaces which are too large and not well-defined, with high volume of traffic, large number of people using the same entrance and sharing the public space can all lead to a situation of rendering the community member as anonymous beings. This anonymity will encourage crime as criminals are easily 'disguised' and become 'unknown' among the crowd. Hence, in a direct physical response to this situation, the concept of defensible public spaces gives the upper hand back to the community by providing the means of surveillance, better recognition of community members and deterrence to would be criminals.

Before we delve further into the concept of a defensible space, we must look at what exactly is being 'defended' in the first place. The answer would have to be the neighbourhood, since physically it would be easier to render a physical element more secure. However, in this case we have to state that any neighbourhood is very much made up of the community inside it; hence the very basic unit that is actually being protected is the *community*. However, the concept of community is much wider and more open to contemporary interpretation. Ramon (1991, pg. xi) states that 'conceptually, a community can be a neighbourhood, a community of interest with and without geographical boundaries, or the configuration of a person's connections and ties'. It is the social nature of humans that must exist in the first place in order to make the defensible space theory work, as well as the desire, commonality and recognition of similar belief system (Conrad, 1996).

Only by stressing the underlying importance of the social factors that runs through every successful community can we proceed to the more 'deterministic' contributions of physical design. The physical surrounding affects not only the way the individuals within it interact with one another, but it affects the way they are perceived by themselves and by outsiders. Rather than thinking of the physical design as merely the stage and setting in which social activities are carried out, this paper suggests that the physical elements play a much more active and bigger role in defining a community and a neighbourhood. A sense of pride can result from a healthy, clean and safe living environment, and a sense of place can be inculcated through sensitive and ingenious layouts. The physical aspect of a community is a logical example of creating a secured housing environment, whereas the social aspect contributes towards reinforcing and maintaining a secured housing as well as liveable environment.

The concept of secured housing environment should begin at the initial planning stage of the housing development. Well-designed housing layout with appropriate and well thought out external public spaces can encourage social interaction among the residents and also function as a defensible space whereby residents can cast a watchful eye on the external public spaces. As more residents know each other, a strong 'sense of belonging' emerges among the residents and thus makes it more difficult for criminals to act. By knowing and taking care of each other's well being, a community spirit of co-operation prevails and prevents crime naturally.

Therefore, what is a defensible space, and how is this possible to reduce crime especially that concerns people in mass housing? The term defensible space was widely used by Oscar Newman when he first put forth the idea of a secured housing environment. It was in response to the failure of the Pruitt-Igoe public housing development in St. Louis, United States[1] (Newman 1996, pg. 10).

Quoting Newman (1996, pg. 9) the concept is as follows:

> *All Defensible Space programs have a common purpose: They restructure the physical layout of communities to allow residents to control the areas around their homes. This includes the streets and grounds outside their buildings and the lobbies and corridors within them. The programs help people preserve those areas in which they can realize their commonly held values and lifestyles.*

> *Defensible Space relies on self-help rather than on government intervention, and so it is not vulnerable to government's withdrawal of support. It depends on resident involvement to reduce crime and remove the presence of criminals. It has the ability to bring people of different incomes and race together in a mutually beneficial union. For low-income people, Defensible Space can provide an introduction to the benefits of mainstream life and an opportunity to see how their own actions can better the world around them and lead to upward mobility.*

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[1] This 2,740-unit high-rise development had to be eventually demolished because of the high rate of crime, vandalism and disuse, as well as the relatively low rate of occupancy of not more than 60%. The development was in fact hailed as one of the prime examples of the Modernist movement, proclaimed to be following the grand planning principles of Le Corbusier and the International Congress of Modern Architects. Therefore, its much publicised failure became a turning point in rethinking the Modernist as well as so-called contemporary urban housing environment.

Krupat (1985, pg. 178) explains the concept of defensible space as '...works on a set of proposed linkages: Design features encourage a feeling of territoriality in the form of a feeling of shared ownership and responsibility for physically defined areas. This feeling encourages territorial behaviours, such as surveillance and defence that reduce unwanted intrusion and criminal behaviour' (Figure 1). Hence, the keyword here is *territoriality*, which in urban neighbourhoods seems to be sorely lacking. Once again, the element of territoriality can be traced back either to physical or social reasons. Either way, the defensible space theory encompasses both of these aspects and underlines the importance of each in contributing towards a successful implementation of the defensible space theory.
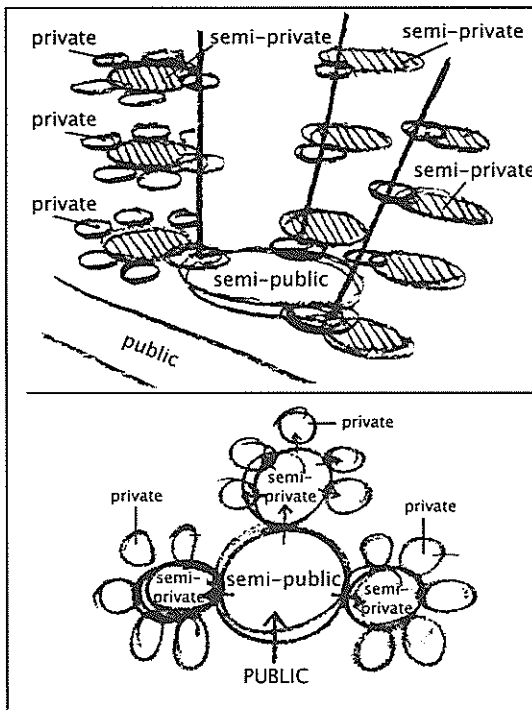

Figure 1:
Defensible space hierarchy in a multi-level building (top) and in external areas surrounding a building (bottom).
(Source, Krupat. 1985, pg. 179)

The concept of territoriality brings us back to the example of the Pruitt-Igoe development that was described by Newman as '...not [of] very high [density] (50 units to the acre), [nevertheless] residents were raised into the air in 11-story buildings. The idea was to keep the grounds and the first floor free for community activity. "A river of trees" was to flow under the buildings. Each building was given communal corridors on every third floor to house a laundry, a communal room, and a garbage room that contained a garbage chute'

(Newman 1996, pg.10). In effect, it provided so much ambiguous spaces that nobody was willing to take care and be responsible for, that crime and vandalism became the norm here.

The Pruitt-Igoe development was disastrous because it was primarily 'occupied by single parent, welfare families...the grounds were common and disassociated from the units, residents could not identify with them [and were proved unsafe] ...the river of trees soon became a sewer of glass and garbage. The mailboxes on the ground floor were vandalized. The corridors, lobbies, elevators, and stairs were dangerous places to walk. They became covered with graffiti and littered with garbage and human waste. The elevators, laundry, and community rooms were vandalized, and garbage was stacked high around the choked garbage chutes. Women had to get together in groups to take their children to school and go shopping.' (ibid, pg. 10).

Newman thus investigated the reasons behind the eventual failure of the development and the subsequent demolition of the whole estate (see Figure 2). He came up with identifiable patterns and data that eventually became the crux of his theory that basically centres on the neighbourhood. There has to be a line where the factors that form such neighbourhoods and subsequently the community that lives must not be crossed. Newman attempted to do just that by first looking at some factors that does influence the cohesiveness of such neighbourhoods.

Figure 2: The Pruitt-Igoe housing development had to be torn down, at a loss of US$300 million, after it was declared unfit to be lived in.
(Source: Newman, 1996, pg. 12)

BUILDING MORPHOLOGY

Newman made the connection between the increase in crime and increased building height, and how it was more or less consistent across the spectrum. (Refer to Figure 3).
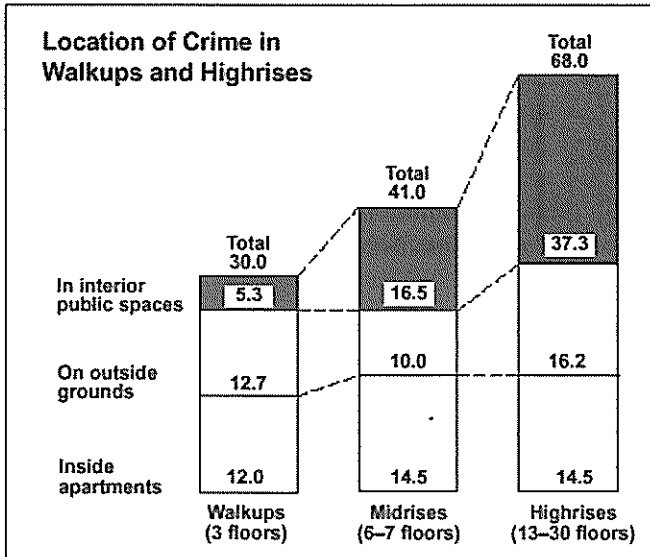

Figure 3: Crime seemed to be more concentrated in shared public areas, which increases with the more percentage of public areas allocated as the building height increases.
(Source Newman, 1996, pg. 13)

Newman likes to illustrate his point by stating that just opposite from the Pruitt-Igoe development was '…an older, smaller, row house complex, Carr Square Village, occupied by an identical population. It had remained fully occupied and trouble-free throughout the construction, occupancy, and decline of Pruitt-Igoe.' (ibid, pg.11). What intrigued Newman the most was which aspect that separated these two developments, resulting in two very different outcomes? The clearest difference, he states, taking into consideration the similar 'social variables' in both, would be the building morphology involved.

This of course would be stating the obvious, as Newman obliviously pushes forth determinedly. Newman thus lists the problems that are associated with tall multiple dwelling units with shared entries, namely:

1. Disassociation with surrounding streets and developments,
2. Public grounds do not encourage territorial feelings of dwellers,
3. Shared corridors for multiple dwelling units do not discourage use by outsiders, and
4. Diminished claim to individual dwelling unit's territory.

This is of course in direct contrast to walk-ups and landed properties i.e. row houses and individual units. The most important difference that has to be highlighted in this aspect is the fact that landed properties and walk-ups have more control over their communal spaces, and that the grounds are seen as an extension of their property and hence, of their surveillance. It can then be used either individually or shared between small number of family units and can be safely used because psychologically, these immediate spaces are 'theirs' and any member of the public trespassing can be easily recognised and more importantly, their presence can be questioned.

Of course, this is a fairly straightforward look at how design can be wholly responsible for changing how people perceive their neighbourhood. Poorly conceived design can be as much a problem as anything else, which is why Newman stresses that it can be rectified from the very beginning by keeping in mind some basic design guidelines. The following are his most relevant guidelines for the purpose of discussion on building morphology:

a. Landed property versus multiple storey dwelling units

Preference is placed on landed property with a maximum of 2 storey walk-ups. This, Newman argues, ensures that as little as possible surrounding space is designated as public circulation. This means that yards and gardens and driveways would be taken care of. It also means that more of the shared grounds, if secured and under the control of the residents would be a safe place for children and people to use and play in (Figure 4 illustrates the above idea graphically).

b. Ensure smaller number of families sharing a main entry

Newman argues that '… the smaller number of families sharing an entry and landing allows the families to control the public spaces better. They can more readily recognize residents from strangers and feel they have a say in determining accepted behaviour' (Newman, 1996, pg.23)

c. *Ensure that the design 'extends' the private nature of the adjoining streets*

By having entrances that face the streets, more people will be aware of what is happening in the streets immediately in front of their dwelling units. This includes windows that overlook the streets, as well as constant coming in and out that would deter any outsiders from simply going in without business. The other point is that by allowing parking on the street in front of each dwelling, it allows the sidewalk and the streets to be associated as an extension of the units themselves.
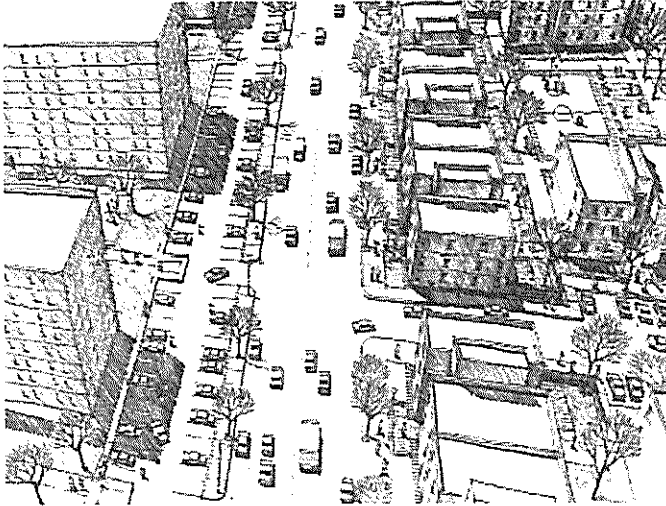

Figure 4: A comparative example of a high-rise and a walkup built at the same density with differing results and control of the streets. The walkup on the right is more intimate, has better control over the streets as well as its grounds.
(Source Newman, 1996, pg. 21)

d. *Keep the circulation simple*

The layout is kept simple, as was advocated by Alexander et al. (1977) so that there would be no confusion and no blind spots that could hide any strangers. It also ensures that most people can easily observe anybody who walks onto the grounds in the surrounding units.

e. *Form clusters of units*

The main cluster is of course the blocks themselves so that it forms an enclosure to the ground level. This feeling of enclosure is important as it defines a space instead of just leftover space. The next cluster is the dwelling units, in which Newman theorised, as previously mentioned, that small families sharing the same entry (in this case the same landing) be kept small so that interaction and recognition can occur.

f. All-around surveillance

Units should be designed so that not only would they have their own private views outside, but also each unit should be able, in turn, to observe the surrounding perimeter. With the use of landings, which can double as community space as well, observation of the inner grounds is possible as well.

PHYSICAL PLANNING AND EFFECT OF SURROUNDING ENVIRONMENT

The next element to be discussed is more general but has more far-reaching influence on the whole defensible space theory. The planning of the neighbourhood involves taking the physical aspect of the neighbourhood and weaving it into the city fabric. It takes an in-depth knowledge of past, present and future conditions of the urban fabric, plus an almost intuitive response to the expected socioeconomic and other hard-to-define factors that will affect the neighbourhood. The previous discussion was on building morphology and how the actual 'design-able' environment that could be claimed as private territory and thus can be personalised. This takes the concept further by taking into consideration the whole immediate urban blocks and its effect on the urban community.

Newman thus mentions further on that the defensible space theory could be further defined from the following factors (Newman, 1996, pg.28):

> The two physical factors were the size of the development and the number of families sharing common entries into a building ... As public housing has become housing for the poorest of the poor, the only variables that lend themselves to modifications are the physical, *project size* and the number of apartments sharing common entries.

> *Project size* is a measure of the overall concentration of low-income families in a project or cluster of projects ... the larger the concentration, the more residents felt isolated from the rest of society and felt their perceived differences to be greater ... a large project provides a continuous area in which gangs can operate, allowing even one gang or group of drug dealers to contaminate all of its public space.

Project size can be related back to the human scale itself,

> *[Human scale] means an arrangement of space that enables human beings to master their immediate environment, and not be enslaved by it ... it means autonomy for each household, with a garden large enough to be defensible and to accommodate changes that make the resident's mark independently of the designer ... of giving satisfaction to the users of [the designer's] buildings...'* (Coleman, 1986, pg.118).

Hence it does not necessarily mean giving people small gardens, narrow alleyways and exclusive enclaves. It just means giving people the satisfaction to '... adapt their property to suit their infinite variety of lifestyles and self-images' (ibid, pg.118). It is all a matter of balancing their actual perceived needs of the residents and the infrastructures allocations to be fulfilled by the developers.

Density is another issue that has to be carefully looked into. Again, there are no hard and fast rules for obtaining the ideal density of an urban neighbourhood. The question is – do more multi-storey dwelling units actually mean more dwellings to the acre? On the surface, this question answers itself: of course. But Newman and Coleman both contradict this statement. Except for the occasional high-rise units that tower over the city, the rest are just medium rise that would greatly benefit if it were built as walk-ups or at least low-rises.

Coleman argues this scenario in Britain,

> *'Flats certainly pack in more litter to the acre, more crime and more vandalism to the acre, and more social malaise in general. But they do not, in Britain, pack in more dwellings to the acre. Densities are strictly controlled by the planning process, and are usually lower in modern flats than in the demolished houses that have been superseded.'* (ibid, pg.119).

So then, why do we keep building high-rises? There are a lot of reasons mostly personal and not related to the actual needs of the expected community. But most importantly, by insisting on building high-rises and cramming people onto the same small square feet, we are saving costs in the physical structure, but lose out in the long term maintenance and problems that might occur. Of course, an excellently built high-rise is possible using the defensible space theory, but then the basic human impulse and need to be *grounded*, so to speak, to be connected to the earth and each other will still be there. And this is in no way

totally condemning dense pattern of uses. What is needed is an intelligent and dense mix of uses in the urban neighbourhood.

SOCIO-ECONOMIC STRATIFICATION

Implicit in the term socio-economic stratification is the fact that certain urban neighbourhoods are more attractive to certain groups than others. Public housing, or more commonly known in Malaysia as low cost housing, caters primarily for certain brackets of the population. It could be recognised by certain similarities such as:

a. **Income** *(lower income group rather than middle income group),*
b. **Place of employment** *(leaning towards jobs located within the immediate vicinity or at least within the city for ease of travel),*
c. **Size of family** *(large and/or extended family),*
d. **Types of employment** *(which raises issue of permanently staying or moving to another place once more income is generated, plus the ability to take care of the place of dwelling and the subsequent upkeep),*
e. **Home ownership** *(self own versus renting which varies from one neighbourhood to another),*
f. **Race** *(homogenous rather than heterogeneous, although this is not supported by any evidence).*

It differs from the points made in the previous chapter regarding the physical planning and effect of surrounding development since the points are now more individualistic and personal rather than taking into consideration outside influences. Therefore, the points made above all contribute towards the creation of a defensible neighbourhood from a behavioural outlook. It greatly affects how those living in the neighbourhood perceive themselves as well as how others from outside the neighbourhood perceive them. Depending on which point has a greater/lesser role; it could lead to a number of issues:

a. *Identity awareness*

The theory is that people of similar backgrounds and living in the same neighbourhood with similar living conditions would have a stronger reason to bond with each other. This would create an identity that could be used to their advantage and result in a stronger community. Nevertheless, it is a double-edged knife. If the identity is not a positive identity i.e. slum or ghetto, then it could result in more harm than good. A negative identity unfairly 'brands' those living there, attracts unwanted

attention and unsavoury characters, and tends to isolate the development from its surrounding.

b. Cultural assimilation

Moving beyond the reference to culture based on race or religion, but more towards the culture of the community. In this case, it would be the urban culture existing in the urban neighbourhood. Does such culture exist? To a certain extent, though far from being typical, the answer is yes. The worrying trend is that the larger and more 'anonymous' the environment is, the less inclination by each member to bond and thus form some sort of cultural assimilation among themselves. Newman points out that if this is the case of the built environment in large urban housing, '… the more difficult it is for a code of behaviour following societal norms to be come established among residents.' (Newman, 1996, pg.26)

c. Crime and safety

This factor would have to be one of the most contested one: 'The relationship between the socio-economic characteristics of residents and a project's crime rate had long been suspected … [however] regardless of the social characteristics of inhabitants, the physical form of housing was shown to play an important role in reducing crime and in assisting residents in controlling behaviour in their housing environments.' (ibid, pg.25) Again, there are too many variables and conflicting evidence to form a conclusive finding, but it has to be said that the social and physical aspects both contribute towards the crime rate and hence the safety of the housing environment.
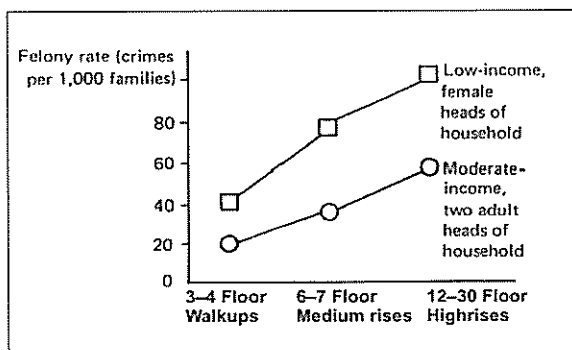

Figure 5: Variations in crime rate as produced by different socio-economic groups occupying different building types. (Source Newman, 1996, pg. 26)

Therefore, the right 'mix' of people, plus the trust between each other goes a long way in ensuring the failure or success of any urban neighbourhood. It is difficult the gauge the outcome of the melding of different ethnic groups, different social background etc. However, it is vital that a right balance must be achieved so that at the very least a singular identity for the community could be achieved. Only then can the true concept of defensible space be brought out and maintained for the long run.

APPLICATION

Newman, being an active participant in the built industry, has often tested his ideas in the real world with varying success. Most of the projects are located in problematic urban neighbourhood, and with some simple adjustments to the physical surroundings and active participation of those living in the neighbourhood, the marked improvement in neighbourhood morale and safety was achieved. These projects were all based on some basic understanding of the concept of defensible space, some of which are outlined below.
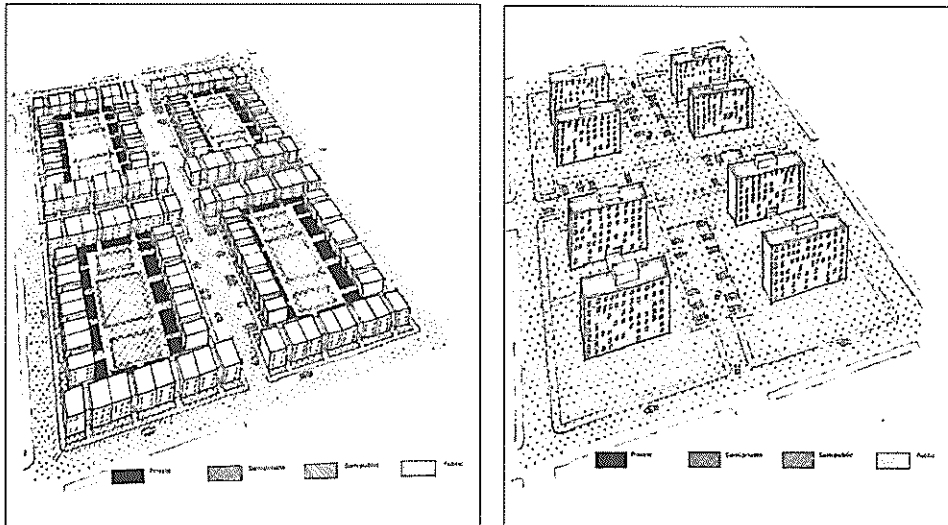

Figure 6: Comparing the nature of walkup apartment housing vs. high-rise dwellings.
(Source: Newman, 1996, pg. 19 & 20)

Figure 6 compares the two types of multi-storey housing common to be found in the urban areas. The walk-up housing has more defined common space which is more secure, and the streets are relatively safer since surveillance is possible to be done by every single inhabitant. Comparing this with the example on the left, which has too much open space that is considered as public space, and hence difficult to monitor?
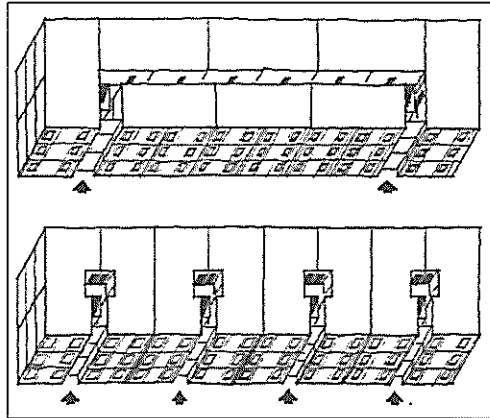

Figure 7: Comparison of two ways to subdivide the same building envelope to serve the same number of families, but in differing ways in terms of security and neighbourly contact.
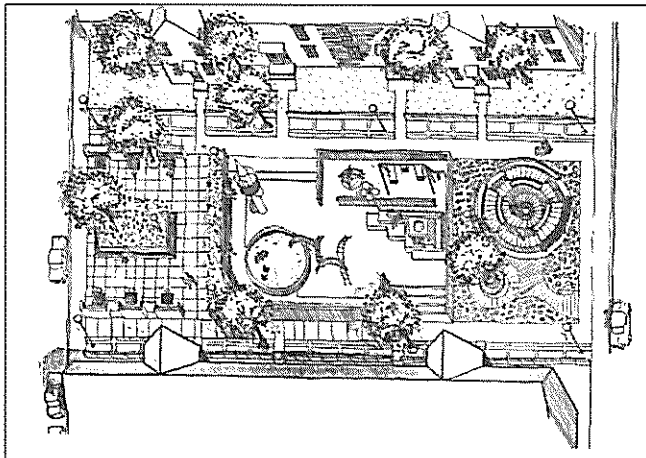(Source: Newman, 1996, pg. 22)

Figure 8: Proposal for the central area of a community in Clason Point in New York to serve the community and increase safety.
(Source: Newman, 1996, pg. 73)

Figure 7 looks deeper into how even in a typical walk-up housing there are varying ways in which the contact between neighbours could be improved and the security raised. By including less public space i.e. common corridors in the project and replacing it with staircases, which are easier to monitor and would be a deterrent to outsiders, surveillance is vastly improved.

Figure 8 is a proposal for an existing housing in New York that suffered from increase vandalism and crime, especially in the central area where residents are afraid to use or even walk through since outsiders congregate here and surveillance is difficult. Newman proposed the above so that it will be an active portion of the neighbourhood, with users at various times of the day. The proposal also extended the perceived front yard of the units facing the central area by defining it with seating and light fixtures. This further reinforces the idea of whole area belonging to the community, and ensures that the adjacent residents would take care of not only their front yard but the whole central area as well.

Alexander et al (1977) have expanded the view of defensible space in his set of living 'patterns'. The patterns that specifically touch on issues of safety, surveillance and community participation are as follows, though by no means a comprehensive list:

Pattern 14: Identifiable Neighbourhood

'People need an identifiable spatial unit to belong to' (ibid, pg. 81). Alexander continues to emphasise the importance of neighbourhood size of approximately 300 yards across, with about 400-500 inhabitants, with local groups in cities encouraged to form such neighbourhoods, as well as physically keeping major roads outside these neighbourhoods (ibid. pg. 84).
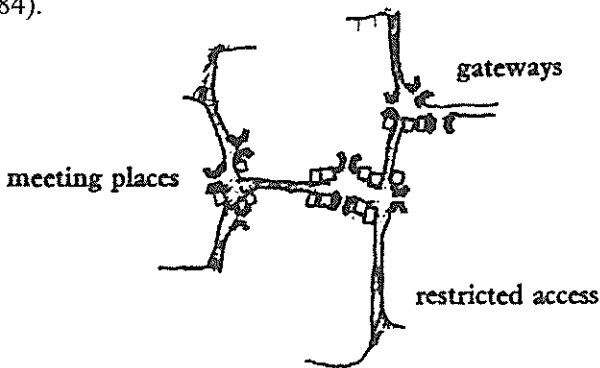

Figure 9: Identifiable neighbourhood

Pattern 15: Neighbourhood Boundary

'The strength of the boundary is essential to a neighbourhood. If the boundary is too weak the neighbourhood will not be able to maintain its own identifiable character' (ibid, pg. 87). Once again, the neighbourhood concept is given physical form through a number of means; strengthening boundaries, cutting down on number of streets so as to restrict unnecessary through traffic, and placing gateways and meeting places (ibid, pg. 90).
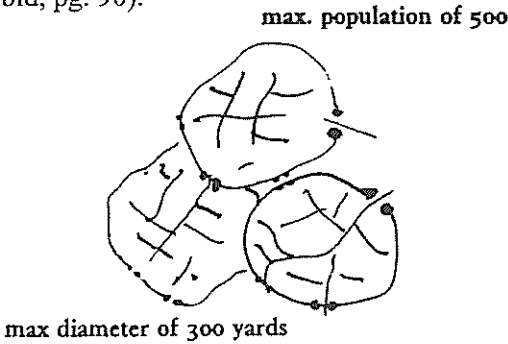

Figure 10: Neighbourhood boundary

Pattern 37: House Cluster

'People will not be comfortable in their own houses unless a group of houses forms a cluster, with the public land between them jointly owned by all the householders' (ibid, pg. 198). These identifiable clusters help residents to form groups and network of neighbours and ultimately friends. Alexander proposes a cluster of 8 to 12 households centred on a common land.
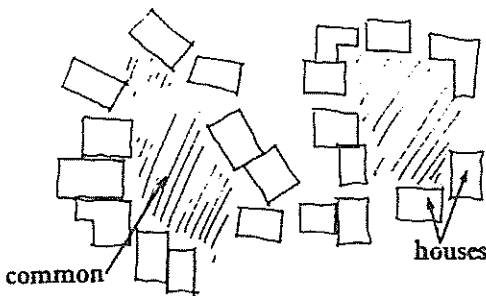

Figure 11: House cluster

Pattern 164: Street Windows

'A street without windows is blind and frightening. And it is frequently uncomfortable to be in a house which bounds a public street with no window at all on the street' (ibid, pg. 770). Not only does it make the person living inside the house more connected to the outside world and offers respite from the solitary and inward nature of urban living, the windows act as security measures in which they can take active part in the surveillance of the surrounding neighbourhood.
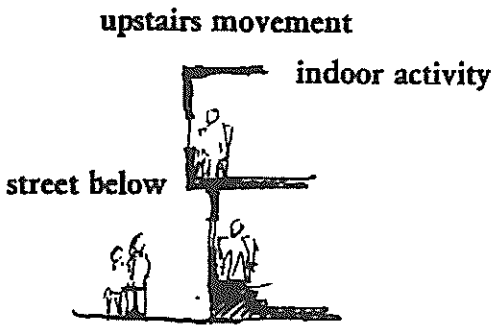

Figure 12: Street windows

CONCLUSION

It cannot be denied that the defensible space theory, which has been around for a good portion of 30 years since Newman first brought it up to light in his writings as well as his work, does put forth good and logical proposals. It summarises the workable aspects of what could be considered as a successful neighbourhood concept to urban neighbourhoods as well as blighted and problem urban dwelling areas. The ideas are of course familiar, especially to planners and those interested in the critical reviews of American urban and suburban literature. Countless architects and academicians have put forth the exact same arguments and came to the same conclusion as Newman, but nobody has so successfully *packaged* the concept and *marketed* it to the mass quite like Newman.

It has brought to light the importance of giving the power and the *responsibility* back to the dwellers. In Malaysia especially, secured housing environment is the preferred choice for high-rise multiple dwelling units, even those that are targeted for the 'low-end market' users. The examples shown in the previous

chapter shows how even dwelling units in gated compounds are still being secured with additional grilles and extra locks. This can even be seen for balconies on the upper floors. It would seem somewhat hilarious if not for the fact that it heralds a disturbing trend: *people do not trust others and feel most secure only in their own dwelling.*

Some might argue that this is just a natural reaction to the constant crime and is just part of the cost of living in cities, but it is just one more option in a few. Newman has made a commendable effort in highlighting the other option, which is to rely on yourself and on your neighbours, to have faith in their good intentions and to take back the power of making responsible choices to ensure the safety of your neighbourhood and more importantly your community. The way to bring this trait out is by supplementing it first with the right infrastructure that is both sensitive in its response to its surroundings and robust and yet flexible enough to cater to changes. Only then can the appropriate social response come from the community, resulting in pride in where they live, a strong local identity and self-reliance in taking care of their neighbourhood.

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