



Permanent Committee on Cadastral Reform

Cadastral Reform Workshop

(Strengths and Weaknesses of Cadastral Systems)

Report on Workshop held 18–19 March 2008

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1. Executive Summary

1.1 Background

At the PCCR meeting in Christchurch in October 2007 it was agreed that it would be valuable to compile information from each jurisdiction on the strengths and weaknesses of their cadastral systems as an initial step towards the development of a Cadastral Systems Strategy.

As a first step, it was further agreed to commence this process through a workshop to identify the current state of cadastral systems across the jurisdictions.

It was identified that the shared information would be not only valuable as a training and information package in cadastral systems, but also provide a basis for involving a wider audience of stakeholders in developing a Cadastral Systems Strategy.

1.2 Outcomes of the Workshop

The current situation in cadastral jurisdictions - common features, strengths, weaknesses and issues - are summarised from individual jurisdictional presentations (attached at appendix 11.5) and outlined in section 5 of the report.

Likely influences on direction and change in coming years are considered in section 6 of the report.

The development of a best practice spatial cadastre – its definition, and essential and desirable elements are raised in section 7 of the report.

1.3 The Way Forward – (an action plan for the future)

Section 8.2 of the report details the marketable benefits which a highly developed spatial cadastre provides to Government and the wider community, while section 8.3 considers a number of issues and obstacles which may arise along the pathway of cadastral reform.

Part 8.4 of the report lists the opportunities for marketing cadastral reform, and to address the issues raised in section 8.3.

A detailed Action Plan of the actions arising from the workshop is listed at section 10 of the report. This sets a future course for cadastral reform across the jurisdictions represented at the workshop.

2. Introduction

2.1 The origins of this workshop arose from a suggestion by LINZ staff that they would benefit from ... *‘training in cadastral systems including those from other jurisdictions. Not from a purely theoretical perspective but more practical things of how they work, what they do well and why, what do they do not so well and why, etc.’* ...

The idea was promoted by Don Grant Surveyor-General LINZ, and at the PCCR meeting in Christchurch in October 2007 it was agreed that it would be valuable to compile information from each jurisdiction on the strengths and weaknesses of their cadastral systems as an initial step towards the development of a Cadastral Systems Strategy.

2.2 It was further agreed to commence this process through a workshop to be held in March 2008 to identify the current state of cadastral systems across the jurisdictions as the first step in developing a unified cadastral vision.

It was identified that the shared information would be valuable as a training and information package in cadastral systems, and provide the basis for involving a wider audience of stakeholders in developing a Cadastral Systems Strategy.

2.3 As a prelude to the workshop, a questionnaire was developed by LINZ covering a broad range of matters relating to cadastral systems in operation across the jurisdictions linked by PCCR.

2.4 The workshop was held in Sydney on 18 – 19th March 08.

3. Workshop Objectives

3.1 It was agreed that the purpose of the workshop (what we want to achieve) was to:

- Understand the strengths and weaknesses of systems across jurisdictions and learn from the experiences of others.
- Develop principles for a common (best practice) cadastral systems model which might be implemented across Australia and New Zealand.
- Develop a training package in cadastral systems to better educate stakeholders and users of the cadastre.
- Develop a ‘saleable’ package for Governments, users and stakeholders of the importance, value, and benefits of cadastral systems which justify their on-going development and maintenance, as well as the identification of risks and community costs of not doing so.

3.2 The workshop objectives (to achieve the workshop purpose) were defined to:

- Focus on weaknesses, and identify common weaknesses for improvement.
- Set a benchmark and develop measures for the performance of cadastral systems.
- Prioritise matters for further development.
- Commence development of a strategy to ‘sell’ cadastral systems to others.
- Test the relevance and validity of *Cadastre 2014* at the present time in Australia and New Zealand.

3.3 Workshop Output

- It was also agreed that the workshop output would be a report to ICSM detailing workshop proceedings together with recommendations and follow-up actions.

4. Change in Recent Years

4.1 Major Changes

The major changes which have occurred in recent years were noted as resulting from:

- Government fiscal policy and changes in prioritisation of programs and expenditure.
- Perceived changing public service roles in Government, and increasing participation in traditional public service roles by the private sector.
- Cost accountability in the delivery of Government Services.
- Multiple restructures of Government agencies, changes in roles and responsibilities within key agencies dealing in matters related to survey, title registration, cadastral system management etc., and a lack of consistency in those changes across jurisdictions.
- Splits between regulatory and processing functions within Government in matters relating to surveying and mapping, and other cadastral functions.
- On-going change and developments in technology affecting the cadastre.

4.2 Drivers of Change

The key drivers of change were observed as:

- A (perceived) rationalisation in the role of Government and delivery of Government services.
- Government expectations of reductions in the cost of Government services; reduced resource levels within Government agencies; the introduction of ‘efficiency dividends’ in the delivery of Government services; and the introduction of ‘user-pay’ principles for Government services and information.
- On-going unveiling of new public and private rights relating to land and land use (eg water management) and the need to accommodate further new rights in the future.
- Changing society and community expectations in relation to the availability of, and access to, information for more personal and investment related beneficial decision making.
- Increasing levels of boundary disputation, and an increasing societal attitude to resolution of grievances through litigation. There is no clear or common scenario as to who should have responsibility, or who is best qualified, to resolve these issues. The traditional role of Surveyors-General appears to have been undermined.
- Within surveying, changing demographics of the industry; an ageing surveyor population; a skills shortage within the industry; and a lack of interest in surveying and mapping as a career.
- Rapidly changing technology which continues to push boundaries.

4.3 Resistors to Change

Resistors to change and cadastral reform were listed as:

- Society not knowing or understanding what they ‘don’t know’ in relation to the importance of the cadastre and the roles (and security) that a highly developed cadastre fulfils.
- A prevailing attitude that ‘nothing has gone wrong’, therefore nothing needs to be rectified.

- The importance of the cadastre, and the issues pertaining to its upkeep and development with respect to historic, societal, current and future planning, development and investment decision making not being understood by politicians or Local Government Authorities- the importance and benefits of cadastral system development and maintenance, and the need to finance it, are not being ‘sold’.
- A lack of understanding of the potential risks associated with cadastral failure or if development of the cadastre falls behind. Risks are not quantified or managed. Emerging issues include management of a marine cadastre (eg Port Phillip Bay dredging), and off-shore mining and exploration management and control. The community at large is not aware of any risk.
- The legal fraternity not understanding the significance or importance of the cadastre, nor the benefits that the community, industry and commerce derives from a highly developed cadastre - this includes an understanding of the implications of a ‘Co-ordinated Cadastre’.
- Governments lagging behind with supporting legislation and regulation required for cadastral reform due to competing priorities against other perceived higher priority issues.
- There being no long term view or strategy relating to surveying and cadastral matters, quick-fix and short term expediency prevails.
- Inter-jurisdictional arrangements within arms of Government not being conducive to change due to multiplicity in systems, multiplicity in roles and responsibilities, lack of integration and a lack of co-ordinated functions aligned to an overarching higher level purpose – who has overall responsibility for stewardship and leadership in cadastral matters?
- A lack of available human and financial resources being available to instigate reform, as well as the time taken to implement change.
- Changes, and the benefits of change, generally not being properly explained – the benefits of cadastral reform need to be ‘sold’.
- Within surveying, an ageing surveying population wanting to ‘stop the merry-go-round’ and keep things the same - this is exacerbated by a limited intake of newcomers into the industry.
- There being a professional objection/laziness within surveying to self-management.
- Surveyors seeing themselves as agents of the Crown and wanting Crown support (‘tell us how to do the job’).

5 Current Situation in Cadastral Jurisdictions

5.1 Common Features of Cadastral Systems

The features, strengths, weaknesses and issues of individual jurisdictions are tabled at Appendix 11.5

Generally, common features across the various jurisdictions include:

- Torrens based systems for registration (some General Law land remains in some jurisdictions), a single register for all land dealings, and unique parcel identifiers.
- A geodetic framework for survey control, a few survey accurate DCDB's, minimum standards of survey, co-ordination of surveys in some jurisdictions.
- A separation of roles and accountability between standards (Surveyors Boards), administration of the spatial cadastre (Surveyor-General or equivalent titled person), and the registration of land (Registrar or equivalent titled person).
- Supportive legislative and regulatory frameworks to control activities and outcomes, and ensure the quality of data provided.
- Integrated systems linking geodetic, survey, title, and other rights and interests in land, with on-line access to information services.
- A high degree of data integrity, inspiring community confidence in cadastral systems.

5.2 Common Strengths of Systems

Generally, common strengths across the various jurisdictions include:

- Interconnectivity between land activity systems and data bases.
- Access to data and systems, with a high-tech capacity to deliver on-line search and lodgement services.
- Quality of DCDB's, and the integrity of data.
- A strong potential to expand services based on using DCDB's as the foundation tool to develop other systems (eg utilities, service authorities and LGA's).
- Unique parcel identifiers.
- A high degree of co-ordinate accuracy in geodetic networks, and quality assurance measures in place in titling systems.
- Relatively high level of surveyor competency.
- Public confidence in systems, and boundary definition.
- A low level of dispute and/or litigation in land dealings.

5.3 Common Weaknesses of Systems

Generally, common weaknesses across the various jurisdictions include:

- Mixed management responsibilities within Government agencies, split roles result in a lack of strategic leadership.
- No single authority for surveying and spatial data management (in some instances).
- Out-of-date legacy systems no longer suitable in a modern, technology driven environment, a slow uptake on new technologies.
- Some jurisdictions lack a single system of registration for land dealings.

- The potential of e-plan lodgements is under-utilised.
- Variability in DCDB spatial accuracy.
- Poor recognition of the built environment in spatial cadastres.
- A need for further (urgent?) development of the 3D cadastre, and marine cadastre.
- System ability, cost recovery and responsibility for correction of errors in survey and title are not well defined.
- Outdated legislation (in some cases).

5.4 Common Issues

Generally, common issues across the various jurisdictions include:

- Skills and resource shortages, an ageing surveyor population, and a lack of interesting surveying and mapping careers by younger generations.
- The cottage industry nature of the surveying industry.
- Maintenance of competency standards, the approach to reinstatement (technical redefinition rather than application of legal principles).
- Increasing restrictions on land use, emergence of new rights and interests in land, and the conflict between public access rights and landowner rights of ownership.
- The need for development of a marine cadastre.
- An increasing importance and need for a 3D spatial cadastre.
- The slow pace of cadastral reform, the perceived lack of importance of the cadastre by Governments, and the lack of priority funding for cadastral improvement initiatives.
- An increasing focus on risk management>

6 Future Trends

Looking forward – where do we want to be in 2014, what are the likely future influences on directions and change?

Changes and influences were perceived to fall into categories related to user demands, changes in technology, and other peripheral influences.

6.1 User Requirements, including:

- Increasing and on-going demands and new usages by consumers, - DCDB's will become more authoritative eg water rights definition and management
- Greater spatial accuracies of DCDB's (2D, 3D and 'as-built' data bases)
- A requirement for 24/7 access to data and information
- The drive for public access demand to land, and the resulting tension created between access and ownership rights and the abilities of owners to limit access
- Definition and management of variable boundaries and marine boundaries

6.2 Technological Change, including:

- Increasing reliance on digital data (e-plans will replace current paper plans)
- Every piece of land having a unique identifier
- All boundaries will be unambiguously redefined
- Marking of boundaries will still be required
- 'Click-of-the-mouse' computer access to data and cadastral information

6.3 Other Peripheral Influences, including:

- Climate change
- Demographic changes
- An increasing influence of *Google Earth*, aligned with increasing personal use of GPS by the public together with a misguided reliance in the accuracies users believe they can produce

7 Towards a Best Practice Spatial Cadastre

7.1 Definition

Where does a spatial cadastre start and finish? For PCCR purposes, which it can control or influence:

- A spatial cadastral system starts with surveys which enable all territorial land parcels to be defined as to location, extent, and other interests by spatial elements.
- It ends with handover of documentation to a registration authority in which the accuracy and integrity of all spatial data is assured, and which fully protects public and private rights and interests related to land or land interests.

7.2 Essential Elements

The essential elements of a best practice spatial cadastre include:

- A geodetic network as a framework
- A supportive legislative framework
- Roles and responsibilities both within Government, and between Government and the private sector which are clear and understood
- Regulatory standards and regulated practitioners
- Suitability for purpose with respect to survey accuracies and known quality
- Auditable with accountability defined and understood by all parties
- Unambiguous and re-definable boundaries
- Data which is readily discoverable and accessible
- A high degree of integrity of data, kept complete and current
- Unique parcel identifiers, reliable links to tenure systems to serve higher purposes

7.3 Desirable Elements

Desirable elements in a best practice spatial cadastral model include:

- Complete coverage of any jurisdiction
- Data which is of known quality
- Linkages to other rights and interests in land
- Efficient, effective and maintainable

8 Marketing Cadastral Reform, and the Benefits of the Spatial Cadastre

8.1 Stakeholders, and their Relationships

Key stakeholders were defined as:

- The Minister responsible for cadastral matters, Cabinet, and other Agencies within Government (policy, legislation and funding)
- Registrars and Tenure Managers (integration within the title system)
- Legal profession and conveyancers (act for landowners, ‘beneficial ally’ in case for on-going/increased maintenance funding of the cadastre, collaborative relationship in matters relating to legislation and regulation)
- Surveyors Boards and other high-level surveying organisations (regulate surveying, set competency standards)
- Practising Surveyors (survey regulation, work contributes to maintain/develop the cadastre)

Other stakeholders noted were:

- Asset and Utilities Managers (product users)
- Emergency Services
- Financial Institutions (rely on the cadastre for transactional security)
- Land Developers (project development)
- Land Owners (property security)
- Local Government Authorities (land administration)
- Other users of spatial data, eg Electoral Commissions (specific needs)
- Planning Authorities (planning & development)
- Real Estate Agents (property dealings)
- Valuation Authorities (taxation)

8.2 Marketing the benefits of a highly developed spatial cadastre to stakeholders

Ideas to ‘sell’ the benefits of the spatial cadastre to stakeholders include:

- A highly developed cadastre is fundamental to economic development, and provides the security required to underpin economic growth, development and investment decision making, protection of infrastructure investment, and other drivers of the economy.
- The cadastre provides fundamental security and stability, protection and risk mitigation in all land related dealings across Government, the economy at large, business and industry, the wider community through home ownership, and other consumers and end-users of cadastral data.
- There is widespread public confidence, and reliance, on the integrity of the cadastre and the quality of the data held within its framework.
- It provides Government with intrinsic benefits and protection in decision making, project investment and risk mitigation.
- It has the potential to provide improved operational efficiencies across Government through a single authority, cadastral based integrated management system to prevent duplication across various government services in investment and decision making.

- The cadastre provides the framework for continuing changes in public and private rights related to marine boundaries and the marine cadastre, the impact of climate change, environmental change management, management of water rights, variable boundaries etc.

8.3 Issues and Obstacles

Higher level issues include:

- The significance of the cadastre, the role it fulfils, and the benefits it provides to society are not understood or appreciated by politicians, the legal profession and other stakeholders.
- There is no long term view or strategy for on-going development and funding of the cadastre – issues are generally dealt with by short term expediency or ‘quick fix’ solutions.
- Funding for maintenance of the cadastre and development initiatives is seen as a low priority by Governments.
- Roles and responsibilities for control and management of the cadastre and related activities have changed with restructures of Governments, there is overlap in responsibilities and no single authority with clearly defined accountability and responsibility for cadastral matters – eg responsibility for resolution of boundary disputes and survey discipline, (and who is best qualified to resolve such matters).
- There is mixed jurisdictional responsibility for cadastral matters across Australia and New Zealand (and within each jurisdiction)
- Resourcing, continuity, on-going change, and leadership development continue to be issues for Governments and industry, and are not being adequately addressed.
- Risks associated with any failure of a poorly maintained cadastre are not quantified or understood by stakeholders – eg development of the marine cadastre, ambiguous boundaries, boundary disputes, poor surveyor performance, time taken for registration etc.
- ‘Co-ordinated Cadastre’ and/or ‘Legal Co-ordinates’ is terminology not understood by the legal profession and other stakeholders, and needs to be replaced by more appropriate and easily understood terminology.

Survey issues include:

- The quality of data submitted by private surveyors, ambiguous boundary definition, and the resultant requisitions and cost recovery issues.
- A technical approach taken to redefinition vis a vis the application of legal principles.
- A lack of user knowledge and/or understanding of data quality control management, coupled with a lack of quality documentation and procedures.
- A growing skills shortage, and the cottage industry nature of surveying affecting a professional approach to surveying.
- The need for more effective management regimes for surveyor performance.
- The variability of survey accuracy standards across, and between, jurisdictions.

System issues include:

- Legacy systems impeding the efficiencies of a survey accurate cadastre.
- Systems which are too complex.
- System delays in registration.

- The lack of and/or poor integration of various services which fall under the umbrella of the cadastre
- Resourcing and recruitment issues affecting the approach to audit and plan examination.
- The need for development of 3D and ‘as-built’ cadastres.
- The need for development of marine cadastres.
- Dealing with earth deformation ie shifts arising as a result of weather events.
- A lack of user knowledge and/or understanding of data quality control management, coupled with a lack of quality documentation and procedures.

8.4 Opportunities for marketing and addressing issues

Suggestions brought forward to address higher level matters include:

- Undertake a marketing campaign to sell the strengths, values and benefits of the cadastral system, including a comparison with under-developed countries where it doesn’t exist.
- Develop a collection of ‘success stories’ to be available for distribution to stakeholders, where the cadastre was the key to significant benefits to Governments and/or the wider community.
- Prepare a paper on the need for a spatially accurate cadastre around the coastline to help manage climate change effects.
- Develop a ‘tool-kit’ to address a lack of understanding of the cadastre and educating stakeholders and others.
- Prepare a case for ‘joined-up’ government benefits of single role/function accountability in cadastral matters, improving efficiencies and reducing cross agency barriers in the delivery of government services related to the cadastre. Ensure that the Cadastral Agency is responsible for the DCDB – which should become the single authoritative source of boundary information. Include a scenario for making greater use, and new uses of a survey accurate cadastre.
- Investigate implementation of a ‘title’ (system enabling registration) for every parcel of land.
- Develop a business case for funding cadastral improvement initiatives (including the 3D cadastre), based on costs of service, timeliness, and reduced transaction cost to end users.
- Instigate an ICSM Strata Working Group to develop a framework for a 3D and ‘as-built’ spatial cadastre.
- Rename/redefine a spatial cadastre to distinguish it from the DCDB – the spatial cadastre to become a substitute for title diagrams.
- Develop and market a case for e-lodgement of plans and efficiencies to be gained through the introduction of new technologies.
- Promote the connection between survey infrastructure, and the management of emergency events and natural disaster prediction, involve Emergency Services in promoting the case for improvements.
- Develop a standard ICSM risk assessment framework.

Suggestions brought forward to address survey matters include:

- ID, and make public, areas of uncertainty with respect to ambiguous boundary definition.
- Legislate/regulate to determine the rules for definition of ambiguous boundaries.
- Make the DCDB the single controlling source of boundary information.

- Make CPD compulsory for surveyors.
- Work closer with the universities to improve education, and with Surveyors Boards to improve training of new surveyors.
- Ensure that newer surveyors are educated and trained to understand differences between technology driven boundary solutions and boundary definition based on legal principles.
- Develop young surveyors to drive and promote change.
- Promote surveying and mapping career options in universities, colleges and high-schools.
- ICSM to set expectations for a single set of accuracy standards for surveys, make a comparison of inter-jurisdictional standards.
- Make an inter-jurisdictional comparison of surveyor performance requirements, and the remedies for non-performance.

Suggestions brought forward to address system matters include:

- Prepare a cost/benefit case for 'letting go' legacy systems, including a risk management process.
- Look at systems improvements which will ensure the provision of quality data from surveyors.
- Development of e-plan lodgements and the automation of business rules.
- Implement succession planning for system and knowledge management and transfer.
- Develop, and automate on-line, business rules, practise manuals and procedures to manage all matters related to the cadastre.

9 Education & Training

9.1 Education and training requires further consideration. It was agreed at the workshop that training had commenced with this workshop – workshop participants commented that they now have a much better understanding of all jurisdictions, including (in some cases) their own. - the workshop served the purpose of identifying ideas which can be followed up.

9.2 The NZ Cadastral Questionnaire is a 'work in progress' which requires further development and consolidation, following additional inputs from PCCR members. The questionnaire and the workshop report will become the basis for transfer of knowledge to other staff, and provide the guide for further training – a review of the presentations from jurisdictions (Appendix 11.5) is needed for identification of shortcomings.

9.3 Some matters relevant to the education and training of surveyors are included in 8.3 and 8.4 above.

10 Follow-up Action Plan

The following matters were listed for follow-up, some being definite actions while others are ‘currently deferred’ but listed for further consideration in the future – what is important is that the ideas do not get lost but are considered for action from time to time.

Action Described	Who	Due Date	Comment
1 Review of currency of <i>Cadastral 2014</i> with respect to change over time and Aus/NZ state of development – including review of alternative (more appropriate) definition of the cadastral	Paul Harcombe	May Meeting	Progress Report
2 Develop a plan for bringing key stakeholders ‘on-board’ to support cadastral development initiatives – marketing the benefits	Barry Cribb	May Meeting	Progress Report
3 Further consideration of training needs on cadastral systems – especially the development of a package on ‘ <i>A Summary of Cadastral Systems in Australia and New Zealand:</i> ’ <ul style="list-style-type: none"> • training (for cadastral system managers) For later consideration <ul style="list-style-type: none"> • information; and/or (for users/industry) • multi-media (for public relations) 	Bill Hirst Barry Cribb	May Meeting	Progress Report
4 Follow-up matters that PCCR members wish to be added in the NZ Cadastral Questionnaire, and further analysis of the spreadsheet	Don Grant	May Meeting	Progress Report
5 Jurisdiction presentations to be e-mailed to Peter Murphy	All	End April	
6 Review the workshop report (as a reality check)	PCCR	May Meeting	Agenda Item for Meeting?

Action Described	Who	Due Date	Comment
7 Share and bank 'success stories' for promotion to stakeholders (for 'marketing the benefits' – Action Item 2)	Don Grant	May Meeting	Add to NZ Questionnaire
8 Prepare a business case to improve service delivery and reduce costs of cadastral services to end-users			Deferred
9 Develop a single accuracy set for surveys, for consideration by Jurisdictions	Don Grant ICSM		Don Grant to collate current standards
10 Promote the development of young surveyors to be future leaders with a better understanding of cadastral matters	Garry West	May Meeting	
11 Prepare a case for single cadastral control, alignment of responsibilities etc to reduce duplication, waste in the delivery of Government cadastral related services			Deferred
12 Establish a working group to deal with 3D cadastral matters, including strata titles	Peter Murphy	May Meeting	Agenda Item?
13 Explore the development of e-lodgements of survey, and other efficiencies which may be possible through developments in technology	Garry West	May Meeting Completed	
14 Consider the implications of differentiation between a 'Spatial Cadastre' and the DCDB	Peter Murphy	May Meeting	
15 Develop a case for the greater uses and efficiencies achievable from a survey accurate cadastre. – Members to forward Jurisdiction information to Bill Hirst	Bill Hirst	May Meeting	
16 Distribute New Zealand legislative definitions of the cadastre and cadastral risk matrix.	Don Grant	May Meeting	

11 Appendices

11.1 Workshop Agenda

11.2 Workshop Participants

11.3 References, and Selected Extracts from Cadastre 2014

11.4 Features of a Current Cadastral Model

11.5 Jurisdiction Presentations

11.6 Workshop Exit Survey Summary:

11.1 Workshop Agenda

DAY 1

Time	Session	Outline	Comment
0930 – 1000	MORNING TEA		
Start 1000	1. Welcome, Background and Introduction	<ul style="list-style-type: none"> -Welcome -Background to the Workshop -Self Introductions -Facilitator Introduction -Program Outline -House Rules -Purpose and Objectives of Workshop -Workshop Output -Questions and Clarification 	<p>PGM</p> <p>GJD</p>
	2. Background Discussion	<ul style="list-style-type: none"> -Changes in Recent Years, Drivers of Change -Drivers for this Workshop -Likely Benefits of Uniform Cadastral Systems -Obstacles to Change -Key Stakeholders and Wider Audience -Where does a Cadastral System Start and Finish 	Forum Discussion

DAY 1 (cont.)

Time	Session	Outline	Comment
	3. Current Situation	<p>-Presentations from Jurisdiction Leaders</p> <p>-Group Discussion: *Define key Elements of a Cadastral System *Best Features (Strengths) from Jurisdictions *Perceived Weaknesses of Systems *Problems and Issues</p> <p>-Report Back (3 Reports, 4 Headers as * above) -Clarification and Questions</p>	3 Mixed Groups, each to deal with 3 Jurisdictions
1300 - 1345	LUNCH		
	4. Defining a Best Practice Model	<p>Consolidation: -Where Does a Cadastral System Start and Finish</p> <p>-Essential Elements -Desirable Features</p> <p>-Consensus (?)</p>	Forum Discussion
	5. Issues and Obstacles	<p>-Common and/or Specific across Jurisdictions -Key Stakeholders and the Wider Audience</p> <p>-Report Back, (3 Reports) -Ranking Major Issues and Obstacles, Dot Points * 4</p>	3 Mixed Groups, each to deal with 3 Jurisdictions Group
1530 - 1600	AFTERNOON TEA		
	6. Future Trends	<p>-Looking Forward (where do we want to be in 2014?) -Future Influences -Technology Changes -Other</p>	Forum Discussion
Finish 1700	7. Review Progress, Close for Day	<p>-Discussion, Comments -Announcements?</p>	Group PGM/PH

DAY 2

Time	Session	Outline	Comment
Start 0900	8. Recap	-Review Day 1 -Outline Day 2	GJD
	9. 'Selling' a Best Practice Cadastral Systems Model	-Target Audience(s) -Benefits -Resistance -Power and Control	Forum Discussion
1000 - 1030	MORNING TEA		
	10. Opportunities	-Addressing Issues and Obstacles, Converting to <i>Opportunities</i> -Bringing Key Stakeholders and the Wider Audience 'On-board' -Report Back -Ranking of Ideas: Dots * 4 (most important, highest value returns)	3 Mixed Groups, each to deal with 3 Jurisdictions Group
	11. Education and Training	-Review of Questionnaire Responses -Matters for Future Consideration: *Essential Training Needs *Current Shortcomings *Establishing Standards *Development of Training Modules *Roles and Responsibilities	Don Grant Forum Discussion
1300 - 1345	LUNCH		
	12. Recommendations to ICSM	-Matters for Attention -Matters for Follow-up	Forum Discussion
	13. Action Plan	-Matters for PCCR Follow-up -What, Who, When, Action List	Group
Finish 1500	14. Close	-Closing Summary -Closing Comments -Exit Survey	PGM Group GJD

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11.3 References, and Selected Extracts from Cadastre 2014

11.3.1 *Why Cadastral Reform?*

Ian Williamson

Reproduced from Proceedings of National Conference on Cadastral reform, Melbourne 1990

11.3.2 *Cadastral Reform – An ICSM Discussion Paper*

Andrew Jones, Chris Rowe, Peter Kentish

April 1999

11.3.3 *Cadastre 2014, A Vision for A Future Cadastral System*

Jurg Kaufmann, Daniel Steudler (FIG Commission 7)

July 1998

11.3.4 Selected Extracts from *Cadastre 2014* (copy attached)

11.3.5 Definition of Cadastre, *Cadastre 2014* (copy attached)

11.3.6 Common Aspects of Reform Projects and Summary of Trends, *Cadastre 2014* (copy attached)

11.3.7 Purposes Served by the Cadastre, *Cadastre 2014* (copy attached)

11.3.8 Strengths and Weaknesses of Existing Cadastral Systems, *Cadastre 2014* (copy attached)

11.3.9 High Level Cadastral Training Requirement – Scoping Document

LINZ, (date?? - post Cadastral Survey Act 2002)

11.3.10 *Evaluation of Land Administration Systems (submitted to the Journal of Land Use Policy for publication in 1st or 2nd issue 2004)*

Daniel Steudler, Abbas Rajabifard, Ian Williamson

11.3.4 Selected Extracts from *Cadastre 2014*

From Foreword

... This publication presents a clear vision for cadastral systems in the future as well as being an excellent review of the strengths and weaknesses of current cadastral systems...

... this report will become a benchmark against which cadastral systems world-wide will measure their development and reform ...

... The cadastral vision developed by the working group fully recognises the changing role of governments in society, recognises the changing relationship of humankind to land, recognises the dramatic influence of technology on cadastral reform, recognises the changing role of surveyors in society and recognises the growing role of the private sector in the operation of the cadastre ...

From Introduction

... The major results of the last four years can be summarized as follows:

- The cadastral systems in developed countries attempt to be too perfect. This perfectionism results in weighty procedures and slow and expensive services.
- In consequence, one aim of cadastral reform projects is to improve services of the cadastral systems.
- The automation of cadastral systems is widely seen as an appropriate tool to improve the performance of cadastral systems. Automation, however, of the traditional perfectible systems without re-engineering the procedure aspects may result in performance failure.
- The innovation of cadastral systems tends to be in the direction that cadastral systems will be embedded in land information systems.
- Cost recovery and privatization issues are increasingly important within the context of cadastres.
- ‘Cadastre 2014’ will be a complete documentation of public and private rights and restrictions for land owners and land users. It will be embedded in a broader land information system, fully co-ordinated and automated, without separation of land registration and cadastral mapping. It will remain a public task, although operational work will be done by private organizations, and it will have 100% cost recovery.
- ‘Cadastre 2014’ can provide optimal services to the different societies at a lower cost than today’s systems. It will not only concentrate on private rights, but increasingly on public rights and restrictions as well ...

1. Existing Cadastral Systems

1.1 Four Basic Aspects

A) Legal and Organisational Aspects

Basic elements of cadastral systems

Basic legal aspects of cadastral systems

Links to topographic mapping and completeness of the cadastre

B) Levels of Planning and Control

Responsibilities of planning and control in the cadastral system

C) Aspects of Multipurpose Cadastres

Purposes served by the cadastre

D) Responsibilities of Public and Private Sectors

Responsibilities for data acquisition; data management; data maintenance; data distribution

Level of carrying out by public and private sectors for data acquisition; data management; data maintenance; data distribution

Level of financial participation of public and private sectors for data acquisition; data management; data maintenance; data distribution

2. Cadastral Reform and Trends

2.1 On-Going Reforms

Customer service - to improve the quality of data (timeliness)

Efficiency of the cadastre – to improve the quality of data (accuracy)

Aspect of multipurpose cadastre – (economical aspect)

To involve more the private sector

2.2 Trends

Technical trends

Legal trends

Organizational trends

- 4. Justification for Cadastre 2014**
- 4.1 Need for Support of Sustainable Development**
- 4.2 Creating Political Stability**
- 4.3 Omit Conflicts of Public and Private Interests**
- 4.4 Support of the Economy**
- 4.5 Need for Flexibility and Effectivity**

11.3.5 Definition of Cadastre, *Cadastre 2014*

The following definition is based on that of Henssen [1995], which only refers to the private property law aspect. It has been adapted to take into account public and traditional law aspects as well:

Cadastre 2014 is a methodically arranged public inventory of data concerning all legal land objects in a certain country or district, based on a survey of their boundaries. Such legal land objects are systematically identified by means of some separate designation. They are defined either by private or by public law. The outlines of the property, the identifier together with descriptive data, may show for each separate land object the nature, size, value and legal rights or restrictions associated with the land object.

In addition to this descriptive information defining the land objects, Cadastre 2014 contains the official records of rights on the legal land objects.

Cadastre 2014 can give the answers to the questions of where and how much and who and how.

Cadastre 2014 can replace the traditional institutions of 'Cadastre' and 'Land Registration'. It represents a comprehensive land recording system.

11.3.6 Common Aspects of Reform Projects and Summary of Trends, *Cadastre 2014*

Although the purposes of the reforms differ from country to country, there are common aspects. The **reform projects** want to:

- improve customer services with increased efficiency and an improved cost/benefit ratio;
- involve more of the private sector;
- provide more data in better quality;
- provide data that are sufficiently accurate;
- have data available at the right time.

The **development trends** of the cadastral systems are the:

- introduction of digital cadastral maps based on national reference systems;
- transformation of land registry information into digital form;
- introduction of title registration systems instead of deed registration systems;
- embedding of the cadastre into land information systems by linking different data bases;
- unification of real property and land property registration systems;
- reduction of staff in the cadastral organizations and land management;
- regionalization of and increased involvement by the private sector;
- introduction of cost recovery mechanisms to at least cover the processing costs or to recoup the investment costs.

11.3.7 Purposes Served by the Cadastre, *Cadastre 2014*

The Cadastre serves the following purposes:

legal purpose
fiscal purpose

facilities management
base mapping

value assessment
land use planning

environmental impact assessment
other

11.3.8 Strengths and Weaknesses of Existing Cadastral Systems, *Cadastre 2014*

Strengths

State guarantee of title, legal security
fast service for users

complete coverage
comprehensive, liable, secure system

system is computerized and automated, digital data
system serves other purposes (i.e. as basis for LIS)

integration of different systems
land reg. & cad. mapping in **one** organization

legal support, legal basis
good base mapping

meeting local needs / flexibility in market adaptation /
decentralized / structures / private sector involvement /
cheap system to handle / involvement in economy /
centralized management / profession

Weaknesses

limited computerization
link land reg.–cad. mapping not efficient enough or inappropriate

national consistency could be greater
administrative control over land by different organizations

low budget funds
uncomplete legal framework

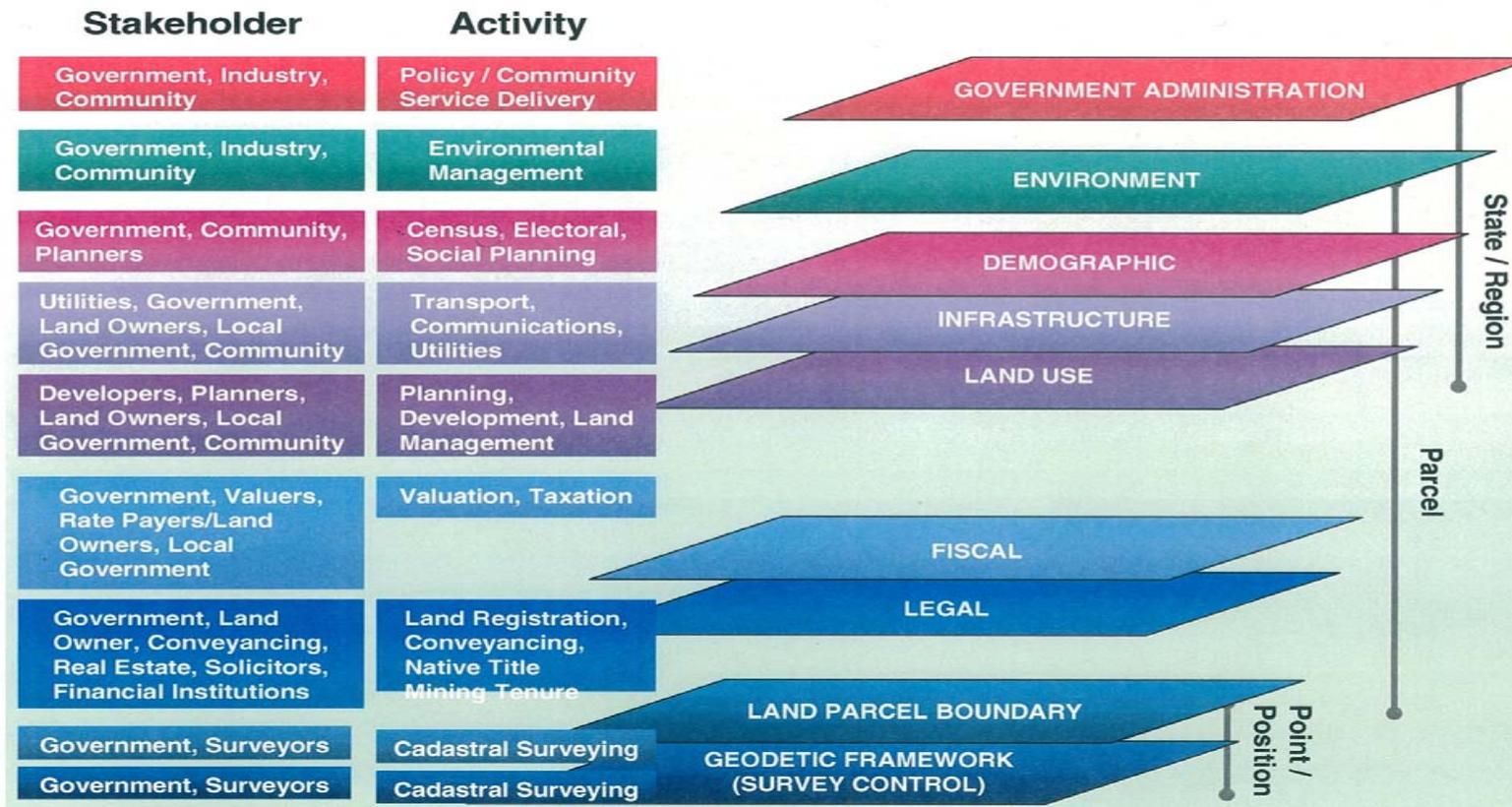
little accuracy of maps
slow updating, slow customer service

financing model unsuitable
expensive, costly / duplication of data, work / weak def. of parcel

system not efficient enough / low degree of coverage /
high investment cost / rigid structure, little flexibility /
low level of integration with other purposes

11.4 Features of a Current Cadastral Model

Cadastral Model



11.5 Jurisdiction Presentations

11.5.1 Aust. Capital Territory

Key Elements

- Survey accurate cadastral coordinates (99%)
- All Torrens, all leasehold, no adverse possession
- Local datum (based on AGD spheroid)
- DCDB records block/section numbers, street addresses, road names.
- Legal requirement for DPs to agree with DCDB
- No 3D in DCDB
- First Community Title in progress

Perceived Weaknesses

- Aging workforce – skill shortages
- Old legacy datum and local datum not geocentric, more than one local datum
- Survey office under-staffed limiting development – all plans checked
- Unit plans not always adequately checked
- RGs in different portfolio
- Not all land parcels have titles (leases)

STRENGTHS

- Very high coordinate accuracy and data integrity
- Whole to part approach with design and coordination
- Cartographic standards high and enforced
- Generally high quality surveying
- Same section manages surveyors, DCDB and geodetic control (not RGs)

Problems and Issues

- Resources – can industry meet demand and Govt. maintain support?
- Maximising potential of survey accurate coordinates
- Greater degree of E-plan lodgement
- Review of survey directions
- CORS
- Incorporate 3D into DCDB
- Potential to improve Unit Plan checking

11.5.2 New South Wales

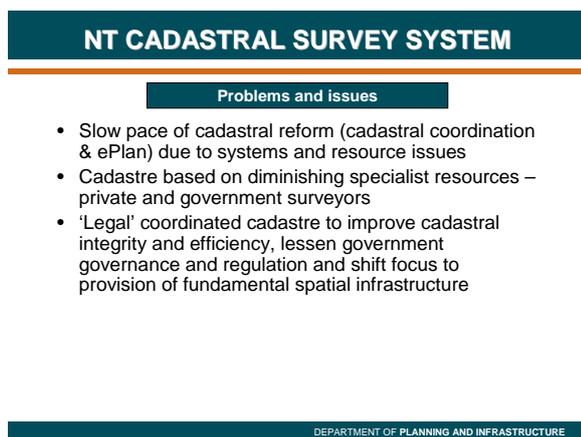
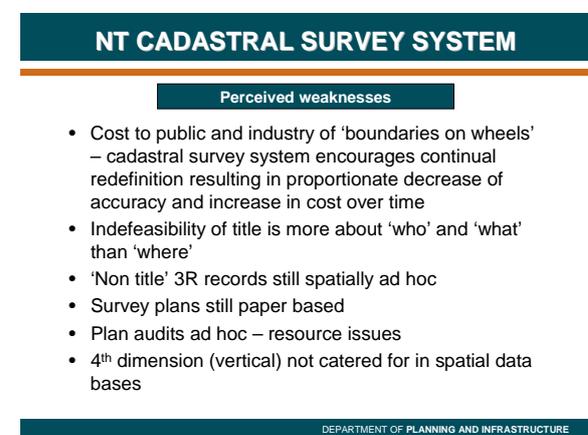
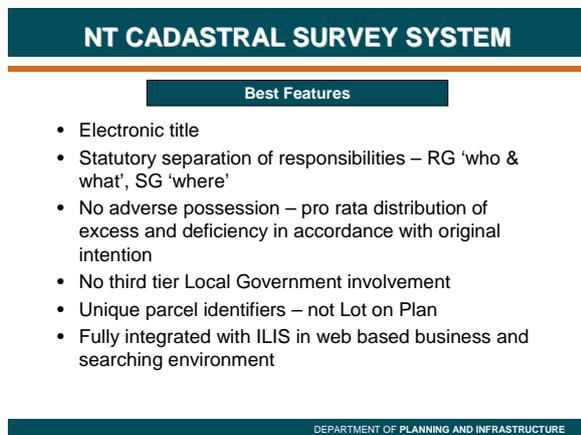
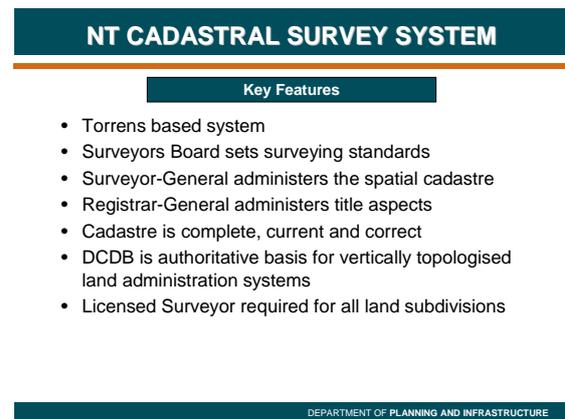
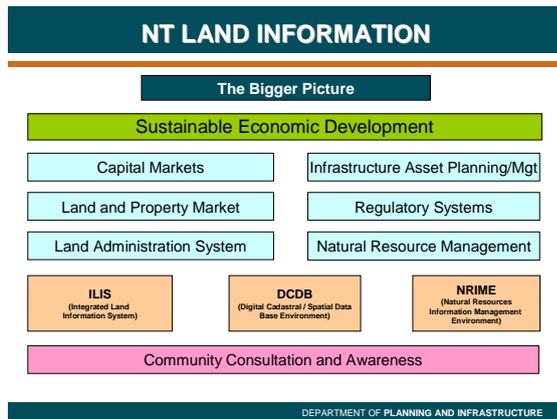
1. Strengths

- Series of registers linked through parcels - government control
- Some joint governance of surveyors with industry, particularly in education, training and CPD
- Registration through BOSSI has a broader scope to include mining , land surveyor regulation and spatial information advisory role
- GDA is the uniform standard datum for all spatial data, most agencies have completed conversion
- Surveyor General sets survey standards, quality assurance, specification monitoring
- Online delivery system of information services for surveyors through one stop portal
 - Fee for geodetic information
- Some recent cadastral (DCDB) upgrade initiatives with water, energy authorities and local government across NSW on a collaborative basis
- Continuously Operating Reference Station network expanding, SydNET (13 stations around Sydney is now fully operational with designs underway to extend coverage over NSW

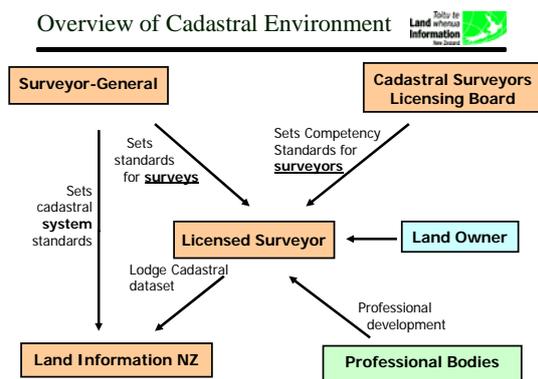
2. Weaknesses

- Integrated surveys with permanent marks not necessarily coordinated
- Spatial accuracy of many control marks across NSW is poor , particularly in rural /remote areas
- Skills shortage
 - BOSSI has three pathways to registration
 - Through Professional Training Agreements and viva voce exams
 - New joint approach with industry covering engineering and town planning components via intensive workshops with competency assessment
 - Focussed support of candidates through mentoring, intensive workshops have doubled registration numbers in last 2 years
- Culture clash, lack of cohesion in surveying & spatial information disciplines, this is improving
- Legacy issues in terms of the cadastre itself in terms of quality and integrity
- No agreed system for managing complex and emerging rights, climate change adaption
- Surveyor education is questionable in adoption of new technology
- Age profile is a continuing concern for future viability of the industry

11.5.3 Northern Territory



11.5.4 New Zealand



Focus on Govt. Outcomes

Strength

- Clear justification of system in terms of outcomes
 - Outcome A – confidence of boundaries in tenure systems
 - Outcome B – other mandated government purposes
- Low compliance costs/times

Weakness

- Additional value-added role of cadastre less clear
- Public-value (could-do cf must-do). Who is responsible?
- Over-reliance on the market?

Cadastral End Outcomes

- A. *Holders of rights, restrictions and responsibilities in land confidently know the boundaries to which they apply so that they can efficiently identify, trade and use their rights*
- B. *Other parties can rely on and efficiently use the cadastre for achieving other mandated Government outcomes (e.g. electoral boundary definition, resource management, emergency management, land administration)*

Accountabilities

Strength

- Clear accountabilities between SG, RGL, Department CEO (cadastral database, cadastral dataset processing), Board, Institute, Surveyors, Territorial Authorities

Weakness

- Lack of strategic leadership (split roles)
- Loss of synergy across roles/accountabilities
- Differing views on roles between Dept & surveyors

Profession



Strength

- Strong University course
- Active Licensing Board

Weakness

- Limited resources to provide professional support
- Shortage of survey staff generally
- Low cost/investment mentality limits resource for training & professional development
- Differing views on department's role to provide advice
- Decreasing & ageing survey expertise in department

Data Integrity



Strength

- Relatively high level of surveyor competency
- Department's validation/gatekeeper role limits entry of errors into the cadastral database
- Single inter-linked database (geodetic, cadastral, titles)

Weakness

- System for correcting errors through to titles is unclear
- Error correction cumbersome
- Role of state guarantee not completely clear (none?)

Other Strengths



- Single cadastre for Crown, Titles, Maori land
- Strong regulatory/operational links to geodetic & titles
- Vector/mark based cadastre resistant to earth deformation
- Digital database holds structured mark/observation data
- Good indexing, access to digital cadastral data
- High proportion of geodetic based surveys (98%+)
- Good links to historical marks & observations
- All new surveys add structured data to database
- Automation improves integrity & throughput in most cases
- Supports title system - ranked best in world on procedure, time, cost - World Bank Report 2006

Other Weaknesses



- Some rights not in cadastre or not well represented (mining, some public rights (access), some Maori rights)
- Hard to browse unconverted paper records (field notes, deeds)
- 3D parcels & building-based parcels managed in legal sense but not spatially (unlike European cadastres which show buildings)
- Weak parcel - address link – esp multi-occupancy parcels
- Poor spatial accuracy in some areas (50m+)
- Marine cadastre is ad hoc
- Automation limits flexibility in unusual cases
- Constant change in Govt expectations of surveyors

Problems & Issues for the Future



- 3D rights more prevalent, high value, increased opportunity for unrecorded overlaps
- Marine rights increasingly important – not managed consistently
- Increasing levels of dispute / litigation – accountability is critical
- Increasing focus on risk management approach
- Increasing expectation of spatial accuracy in all areas
- Increased focus on public rights in remote areas

11.5.5 Queensland

Overview

- *Overview of model*
- *Changes in 2003 legislation*
- *Strengths*
- *Weaknesses*
- *Problems and issues*

Roles & Responsibilities under Surveyors Act 2003 & SMI Act 2003

**Surveyors Act 2003 - What's different?**

- Competence
- Annual review of competence
- Consulting endorsement - compulsory only for cadastral
- Company registration - changed eligibility requirements
- No restrictions on title
- Board composition and appointment
- Formalisation of 3-tier disciplinary model

Survey and Mapping Infrastructure Act 2003 -What's different?

- Standards hierarchy
- Standards set by chief executive
- Exemption from Survey Standards
- 40 days to deposit plan of new marks
- Obligation to resolve inconsistencies in surveys

Strengths of Qld Cadastral System

- **Surveys**
 - Boundary dispute mechanism
 - Identification surveys to same standard, and plan required
- **Plan preparation**
 - Codification of standards & processes
 - Single plan for all purposes (can be too complex for some users)
- **Plan examination**
 - Accreditation system (if working properly)
 - Documentation of examination process (procedure, checklist)
 - Regionalised examination resulting in local contact
- **Register**
 - Single register
 - Torrens – (no Old System)
 - Good searching systems (CISP, SMIS, ATS)
 - Image archive
- **DCDB**
 - Single DCDB
 - Fully contiguous
- **Surveyors**
 - General registration, incl graduate & associate
 - Registration of corporations

Weaknesses of Qld Cadastral System

- **Surveys**
 - No uncertain boundary system
 - Surveyed status (around 3% of lots in Qld are at least partially unsurveyed - abt 60% of area of Qld)
 - Clarity of legislation for ambulatory boundaries
- **Plan preparation**
 - Complexity of plan and standards
- **Plan examination**
 - Limited field auditing
 - Regionalised examination → problems of consistency
- **Register**
 - Limited remote access to searching systems
 - Search cost (revenue source) inhibits cadastral integrity

- **DCDB**
 - Largely graphical accuracy

Issues with Qld Cadastral System

- **Surveys**
 - Approach to reinstatement
 - Integration of cadastral surveys with control network
 - Durability/robustness of marks
- **Plan preparation**
 - Quality of plans
 - Paper plan
- **Plan examination**
 - Management of accreditation
 - Is accreditation another registration system?
- **DCDB**
 - No pre-registration capacity (local councils etc)
 - Spatial accuracy
- **Surveyors**
 - Skills shortage
 - Assessment against competency framework

11.5.6 South Australia

The Key Elements of the South Australia Cadastral System

Institutional Arrangements

- Contemporary legislative and regulatory framework
- Industry regulation model
- Consultation between Government and industry through Survey Advisory Committee established under the Survey Act 1992
- Plan levy to fund registration responsibilities of industry

Survey Process

- Historically all land surveyed prior to grant of freehold title
- Subsequent subdivision of freehold land not always surveyed
- Placement of Metal Pins on Crown surveys since 1880's and Permanent Survey Marks (PSM's) on all surveys since 1929
- Strong geodetic network developed post WW2, and continually strengthened and extended
- Preservation of PSM's placed on cadastral surveys by mark maintenance activities since 1970's
- Coordination of PSM's through the Tertiary network program commenced in 1970's.
- Comprehensive Survey Data Base containing PSM attributes: approx 110,000 PSM's, 86,000 with 4th order coordinates or better
- Gazettal of Designated Survey Areas (DSA's) and regulations requiring certified surveys for all land divisions in DSA's
- Connection of cadastral surveys to coordinated survey marks in DSA's
- Coordination of new PSM's placed in DSA's by project surveyor
- Comprehensive survey examination process of all surveys lodged
- Selective field audits

The Best Features (Strengths) of the Cadastral System

- Outcome based regulations and practice directions
- Placement and retention of Permanent Survey Marks
- Integration of cadastral survey marks into the geodetic network through the Tertiary Network Programs (coordinated PSM every 250 m in urban area)
- Progressive expansion of DSA's now covers large portion of the developed areas of the state and is being extended to rural areas.
- Bearings and distances captured from all survey plans lodged in the LTO since 1990 to underpin the creation of a Survey Accurate Cadastre
- Legislation in place enabling 'coordinated cadastre'
- Majority of survey records available electronically either as scanned images or data base files
- Implementation of Electronic Plan Lodgement

Perceived Weaknesses of the Cadastral System

- spatial integrity of the DCDB, 920,000 land parcels : 28.5% parcels >5m: 64%
0.3m-5m: 7.5% <0.3m
- DCDB does not show registered interests
- Number of boundaries created without survey
- Cadastral uncertainty in some old settled areas – Confused Boundaries
- Examination process lessens quality of surveys lodged
- No authoritative street address file, particularly rural
- Limited linkages between the various survey record data bases

Problems and Issues associated with the Cadastral System

- Funding and resources for the Tertiary Network Program
- Age profile of technical and professional staff and recruitment
- Supply/demand for surveyors
- Processing times for surveys and costs
- Quality of surveys lodged

- Lack of CORS GPS network in SA
- Expertise of surveyors when dealing with difficult boundary definitions

11.5.7 Tasmania

KEY ELEMENTS

Governance

Spatial Cadastre:	Surveyor General (Director of Geospatial Information)
Crown Estate:	General Manager Information and Land Services
Registration of Private Estate:	Recorder of Titles
Statutory Valuation:	Valuer General

Survey Quality Promoted Through:

Accreditation of Land Surveyors:	ISA (Tas) through sub-committee Tasmanian Land Surveyors Accreditation Board
Registration of Land Surveyors:	Surveyor General – has no discretion once evidence of accreditation is provided
Setting of Survey Standards:	Undertaken by SG with the agreement of ISA/SSI and Recorder of Titles
Plan Examination:	Undertaken by Recorder of Titles or SG to ensure suitability for purpose
Field Audit of Surveys:	Undertaken by SG for compliance with Survey Directions
Adjudication of Survey Disputes:	Undertaken by SG in accordance with <i>Surveyors Act 2002</i>
Correction of Survey Errors:	Directed or Undertaken by SG
Discipline:	Initiated by complaint to Director of Fair Trading and Consumer Affairs

Survey Standards (Directions)

- Outcome oriented and aim to be technology neutral.
- Integrates the cadastral system with the geodetic system through mandatory coordination of cadastral surveys.
- NOT a legally coordinated system, except for the marine lease cadastre.
- Survey accuracies, format of the public record, and boundary and reference marking (including mark types and numbers) are prescribed.

Tenure Recording Systems

Private Estate:	Involves Torrens style registration of guaranteed parcel (usually defined by survey; boundary not guaranteed), together with ownership and secondary rights and obligations. Strata (community type) titles also able to be registered. Residual Deeds system recording transactions in those parcels not yet in titles system.
Crown Estate:	May be unalienated or titled, generally attributed in the DCDB by parcel identifier, status and administering authority. Includes Crown leases and licences.

Marine Cadastre: Titles system does register land below HWM.

Marine farm leases over Crown estate able to be registered to the 3 nm limit, recorded within a separate spatial layer.

Integrated Cadastre - DCDB

- DCDB spatial accuracy ranges from survey accurate (2% better than 0.1 m positional uncertainty) to graphically accurate (a further 10% is attributed as better than 1.0 metres positional uncertainty) to 100m in remote locations.
- DCDB not integrated as repository for all land related information but acts as a spatial index to survey, titles and property (street address and valuation) information through attribution of identifiers in those system databases at the point or parcel level.
- DCDB holds only boundary or easement lines, not observational or field related data.
- DCDB acts as spatial basis for many administrative plans.
- Digital lodgement restricted to very limited circumstances.
- Image is web delivered free of charge, but significant costs attached to DCDB and survey data access and survey lodgement.

BEST FEATURES

Torrens style registration of title and secondary rights and obligations for most of the private estate.

Creation of new parcels generally requires survey, including often the existing boundaries of the parcel, which provides for the ongoing improvement of the physical and recorded cadastre.

Online access through LIST, identified spatially or by textual attributes, to title, survey and property (valuation and addressing) information.

DCDB has the ability to spatially identify every title (including strata titles) and property within the state. Attribution is currently 98% complete, road easements are yet to be comprehensively detailed.

Legislated system of surveyor accreditation, registration, audit and discipline (not yet fully tested); survey standard setting and correction of errors.

Efficient system for the maintenance of survey standards.

Mandatory coordination of surveys since 1/1/05 has lead to significant progress in the upgrade of the spatial accuracy of the cadastre.

PERCEIVED WEAKNESSES

Lack of a single system for registering all land parcels. This includes the disjoint between the recording of unalienated Crown estate (recorded by property identifier, status and administering authority) and the private estate (recorded as titles or residual general law deeds).

Historic title, survey and property information is not directly accessible through the DCDB. From a survey perspective this is very significant as many titles are based on plans compiled from 'historic' survey plans.

Variable DCDB spatial accuracy, together with the lack of a mathematically rigorous spatial upgrade methodology.

Lack of digital lodgement and data flow from the survey process into the DCDB and registration process.

Disconnect between the survey and registration system in the maintenance of survey standards. ie inability to influence survey standards at the point that is generally the most effective, the acceptance of a surveyor's plan by the registering authority.

Limited ability to correct titles required as a result of corrections to surveyed boundaries.

Lack of structure in the management of Crown estate tenure.

Lack of a sustainable financial model for the accreditation process.

PROBLEMS AND ISSUES

Increasing impact of statutory restrictions on land use, requiring discovery through disparate sources.

Increasing demand for higher accuracy DCDB, in particular by infrastructure owners such as local government and utility companies. This is being highlighted particularly as these authorities map their assets by GPS or as high accuracy ortho imagery becomes more commonly available.

Gradual deterioration of the paper-based survey record, and the consequent loss of information forming an essential part of survey evidence required for boundary reinstatement.

Lack of maintenance of competency among some land surveyors as circumstances change over time: eg

- in the use of the geodetic system and adjustment processes for the integration of cadastral surveys.
- in a practical understanding of the correct use and limitations of GPS.
- through updated QA procedures to cope with the use of digital data acquisition, transfer and manipulation by CAD.

There is a shortage of Registered Land Surveyors to service the current land development boom. This also impacts on the ability of the Office of the Surveyor General to maintain expertise and knowledge through succession planning.

11.5.8 Victoria

Victoria - Key Elements

- GOVERNANCE
 - Cadastral Legislation
 - Surveying Act 2004, Cadastral Surveys Regulations 2005, S-G Practice Directives 2007, Survey Practice Handbook (1990's)
 - S-G responsible for "surveying" / Surveyors Board responsible for "surveyors" (standards, compliance, disputes) / (education, training, registration, competency, conduct)
 - Survey Control Legislation
 - Survey Co-ordination Act 1958, Survey Co-ordination Regulations 2004 (geodetic datums, standards, GPSnet-CORS, ground marks data base, EDM base lines)
- TENURE
 - General Law deeds, Torrens freehold title, Crown land
- INTEGRATED CADASTRE
 - Digital Cadastral Map Base (Vicmap Property)
 - Parcels Index , Standard Parcel Identifier, positional accuracy varies
 - Connection to Grid – parcel co-ords – improve map base accuracy
 - Local Government Survey plan certification / Titles Office registration



Victoria - Best Features

- Community and Government confidence in land and property dealing – integrity of the cadastre
- Strong partnership between Government, industry bodies and surveying profession
- Surveyor-General and Surveyors Registration Board of Victoria have defined powers and functions
- Survey Audit program – Cadastre risk management
- Victorian Online Titles System (VOTS) – electronic titles, imaged survey records
- Further Professional Education or Training (FPET)
 - LS competency maintenance
- Streamlined Planning through Electronic Applications and Referrals (SPEAR)
 - web based subdivision approval application using PDF images (prior to ePlan)



Victoria - Perceived Weaknesses

- No single authority for surveying and spatial data
- Vicmap Property DCMB not survey accurate
- Three land tenures: Torrens, General Law deeds & Crown land parcels
- Geodetic /Cadastre connection regime - Surveyor determines values
 - Minimal verification by Surveyor-General of Victoria
- Survey plan examination quality affected by Land Registry policy to achieve "quota" of approved plans
- Crown Land Records
 - Reporting arrangements – overlap between SGV and Land Registry
 - Lack of co-ordination with other government departments
- Survey Information Systems
 - Update/maintenance risk due to legacy systems
- No online survey information access to:
 - Other agencies (Roads)
 - Infrastructure projects
- Inability to enforce local government co-operation in new applications
 - SPEAR / Street addressing, survey marks in new subdivision



Victoria – Problems and Issues

- Definitions and recording of rights and restrictions
 - eg: carbon credits register
- Marine cadastre and legal descriptions
- 3D parcels in digital cadastre
- LS Sustainability
 - Low fees with low salaries barrier to young graduates
 - Time to obtain registration re-engineer and risk management
 - Supervising surveyor graduates surveyor training and development
- Victorian Spatial Council looking for legislation for empowerment
 - Survey Co-ordination Act 1958 requires updating
 - Competing interests as to desired outcomes



Victoria – Future Directions

- Survey Accurate DCMB
 - Drivers: SPEAR, ePlan, registered plan diagram
- Intergration of Geographic Names Register and DCMB
- Crown Titles
- Auscope C.O.R.S. Geodetic Program Implementation
 - Upgrade to MGA 2000?



11.5.9 Western Australia

KEY ELEMENTS OF THE WA CADASTRAL SYSTEM

- Unique Identifiers, Unambiguous, Re-definable Boundaries.
- Complete coverage of jurisdictions
- Fundamental Geodetic Network.
- Regulated Practitioners/Regulatory Standards
- High degree of integrity of data
- Reliable links to Tenure System to serve other/higher purposes.
- Up-to-date data (Complete/Current) *Accuracy-Timeliness Currency Kept Current.*
- Suitable for purpose – Survey Accuracies, Known Quality (Fit For Purpose).
- Readily Discoverable/Accessible
- Clear Definition. Roles/Responsibilities – *Within Government, Between Government/Private Sector.*
- A System which is auditable, accountability (Probity)
- Low level of disputation and litigation (Outcome Of A Best Practice System)
- Efficiency, effective and maintainable.
- Linkages to other rights and interests in land
- Supportive Legislative Framework

BEST FEATURES (STRENGTHS) OF THE WA SYSTEM

- Off Line processing in Plan Audit.
- Happy customers.
- Coped well with sustained property boom
- DCDB is a working tool of land registration system.
- Some automated links to title register – including of registered interests that affect part parcels.
- WALIS deals with custodianship and standards of relevant datasets.
- Single state source of spatial cadastre.
- Government committed.
- Spatial upgrade of state @83% - expected completion 1st pass within 3 years.
- Digital lodgement benefits being realised – fast and efficient communications; automatic spatial validation and input into database.

PERCEIVED WEAKNESS OF THE WA SYSTEM

- Poor recognition of built environment
- Strata titles legislation is confusing (management, titles, planning)
- Spatial extent (lettable areas vs title area)
- Survey legislation is outdated.
- Survey benefits of a spatially accurate DCDB not being fully utilised due to lack of enabling legislation, regulations and/or guidelines.
- Plan (pdf) and maths file need to be integrated (land xml to come).
- Linkage of 3 key systems (Title, Spatial, Valuation systems need improved linking).
- CSD file is not general.
- 3D is poor.
- No 3D Visualisation.
- Poor history records – can't search and display superseded boundaries.

PROBLEMS AND ISSUES ASSOCIATED WITH WA SYSTEM

- Key planning agency has limited IT at present.
- Poor handling of referential topology in spatial data by users of DCDB extracts.
- Absence of a Cadastral strategy – lack of comprehensive strategic plan for holistic cadastre – legal, fiscal, physical.

12.6 Workshop Exit Survey Summary:

(Average from 15/22 respondents ie 68% of participants)

OUTPUT – To what extent did we achieve what we needed to?

1	2	3	(3.7)	4	5
Poor	Fair	Satisfactory		Good	Excellent

ORGANISATION – How effective was the workshop structure?

1	2	3	(3.8)	4	5
Poor	Fair	Satisfactory		Good	Excellent

USE OF TIME – How well did we use our time?

1	2	3	(3.6)	4	5
Poor	Fair	Satisfactory		Good	Excellent

PARTICIPATION - How well did we do on making sure everyone was involved equally?

1	2	3	(3.8)	4	5
Poor	Fair	Satisfactory		Good	Excellent

DECISION MAKING – How well thought-out were our decisions?

1	2	3	(3.4)	4	5
Poor	Fair	Satisfactory		Good	Excellent

ACTION PLANS – How clear and do-able are our action plans?

1	2	3	(3.2)	4	5
Poor	Fair	Satisfactory		Good	Excellent

ANY OTHER COMMENTS?

- 'would have preferred much more small group work'
- 'well done, found it difficult to read whiteboard, overhead projector/computer system could have been used to work on issues'
- 'follow-up workshop needed within 12 months'
- 'well facilitated, kept us on track – came away with a much better understanding of all jurisdictions, including my own'
- 'we've made a start, use of time good apart from debate on definition of cadastre'
- 'useful exercise, needs to be repeated – say every 2 years'