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Why Cadastral Reform?

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ABSTRACT

Why has it been necessary to have a conference on cadastral reform? In fact what is cadastral reform in the Australasian context? The paper addresses these issues from an historical perspective and looks at present issues and pressures on Australasian cadastral systems.

Present cadastral reforms are reviewed and some issues which need to be addressed in the future are highlighted. In particular the paper emphasises that an holistic approach is necessary in reforming cadastral systems while recognising that cadastral systems are fast becoming information systems as we move into the era of an information society.

The paper recognises that our present cadastral systems had their genesis in the 19th Century and that many of our practices, laws and regulations and institutional arrangements are not applicable to today's society. Present day changes to our cadastral systems however must recognise that it is only during the last decade that cadastral principles have been accepted within our land administration systems.

INTRODUCTION

"Cadastral reform in a rapidly changing environment is inevitable and essential, not optional. If reform is not initiated, there are risks of a degraded cadastre, inefficient practices, overpriced surveys and an inability to fully utilise new technologies" (Smith, 1990)

The Australian surveying profession has supported many conferences on a diverse range of topics from the Global Positioning System (GPS), electronic distance measurement (EDM), adjustment techniques to environmental and land development issues, but it has never sponsored a conference concerned solely with cadastral issues or cadastral reform. This is all the more interesting considering that cadastral related activities have from virtually First Settlement comprised the major activity for the professional surveyor in Australia. On the other hand virtually every national surveying conference has had at least a couple of papers concerned with cadastral matters.

There have been numerous suggestions in many surveying forums that cadastral activities are becoming less important in the spectrum of activities of the surveyor.

To some extent this is true of the technical aspects of cadastral surveying considering the impact of EDM and the advances in computerised theodolites and data processing. However the importance of cadastral issues to society in the broadest sense appears to be as important as ever, and in some forums increasing.

For example the number of papers which could be considered to be concerned with cadastral reform at the recent XIX Congress of the International Federation of Surveyors at Helsinki, Finland (10-19 June, 1990) numbered over 40. This was arguably the largest group of papers with a common theme out of about the 300 papers presented at the congress. The two major topics in the Congress which were concerned with cadastral reform were computerisation of land parcel records and equally the creation and maintenance of digital cadastral data bases. Papers included a discussion of *institutional, administrative, technical, legal, conceptual and modelling* issues. Discussion also included issues concerned with *data integration, the private sector, uses of cadastral systems, access and delivery of cadastral data, developed and developing countries, government systems, linkages to other systems, socio-economic aspects and strategies for reform*. The Congress was attended by over 3,000 participants from 78 countries with technical and scientific papers in nine commissions ranging from Professional Practice, Survey Instrumentation, to Planning and Valuation.

As was seen at Helsinki, cadastral issues are alive and well. Australia is no different with the interest in cadastral issues increasing significantly over the last decade. A cursory review of the papers in The Australian Surveyor will confirm this view.

In reviewing cadastral reform, this paper examines the concept of cadastral reform, reviews briefly the historical interest in cadastral issues, considers some of the current issues and pressures on the cadastre, highlights evidence of a desire or need for cadastral reform and discusses the need to take a broader view of cadastral systems than many governments are doing at present.

WHAT IS CADASTRAL REFORM?

Cadastral reform is concerned with improving the operation, efficiency, effectiveness and performance of the cadastral system in a state or jurisdiction. In simple terms cadastral systems are the foundation of and an integral component of parcel based land information systems (LIS) which itself is a central component of the land administration and land management systems in a state or jurisdiction. A parcel based land information system is also referred to as a multi-purpose cadastre in many jurisdictions. The term "cadastre" however can have a different interpretation in different countries and states. In the Australasian context it generally refers to the land registration system and the corresponding cadastral surveying and mapping system, together with the related computerised indexes. Cadastral systems are not local government LIS or utility information systems even though these systems often rely heavily on a cadastral base and are often considered to be a part of a multi-purpose cadastre.

In both the Australasian and European contexts, cadastral systems are also closely linked with land valuation systems. In the European context originally the cadastral systems were concerned with land valuation and later were linked to land

registration systems. In Australasia the reverse is usually the case although the end result, which is a close relationship between land registration and land valuation, is very similar.

Some of the major cadastral reforms being introduced or being considered for introduction into Australia include:

- the development of complete computerised indexes of land parcels at a state level updated by the title registration system
- the development of automated and fully computerised land title systems
- the development of statewide digital cadastral data bases updated by digital subdivision data
- the reform of the institutional arrangements for the components of the cadastre
- reforms to conveyancing and title registration procedures often instigated by Law Reform Commissions
- reforms to the registration of surveyors and the statutes and regulations concerned with the performance of cadastral surveys
- the introduction of coordinated cadastral surveys
- the introduction of coordinated cadastral survey systems where the mathematical coordinates have "legal" significance in that the mathematical coordinate over-rides monumentation on the ground
- the move from a cadastral *surveying* system, to a cadastral *mapping* system supported by cadastral surveys
- the incorporation of the core *computerised* cadastral system as part of a broader LIS or multi-purpose cadastre
- systems to improve the delivery of cadastral information whether this information is textual or graphical. This includes imaging systems and the use of remote terminals and FAX machines.

What is certain is that Australasian cadastral systems are rapidly moving to systems much more akin to their European counterparts.

The principles of a modern cadastre are clear and simple and have been recognised in most countries for over a century but it is only during the last decade that they are being fully accepted in Australasia.

HISTORICAL REVIEW

Two decades ago "cadastre" was an unacceptable term in government land administration circles although the term "cadastral surveying" was generally accepted. The term "cadastre" has now become accepted within land administration terminology throughout much of Australasia.

Cadastral issues have always been of major importance to the development of Australasia. During the last century administrators and Surveyors General had to develop new cadastral surveying and mapping, and land registration systems to cope with a large harsh country. They attempted to use many fundamental cadastral principles however they did not have the technology and resources available today. They did however develop the Torrens System of title registration, introduce very

sophisticated and accurate large scale mapping systems in the large cities, attempted various methods of controlling azimuth in cadastral surveys (such as the systems in Queensland and WA) and introduced the use of coordinates based on a local origin (as in New Zealand). Cadastral issues were of such importance that based on the platform of reforming the conveyancing system, Robert Torrens made his way to Premier of South Australia. In addition there were two major Royal Commissions, one in Victoria and one in NSW, concerned with land and cadastral issues, as well as many other investigations and reports. In a traditional sense Surveyors General and cadastral issues were at their peak during the latter half of the 19th Century. This level of activity to a significant extent continued up to the beginning of the First World War.

The low point in cadastral developments was between the end of the First World War and the end of the 1970s. There were some major initiatives in most states during this period such as the introduction of Survey Coordination in the 1950s and 1960s and in the latter part Survey Integration in NSW, but for the most part the initiatives during this period did not have a major impact on the profession or society.

The view around Australia in the 1970s was that we had the best cadastral system in the world. The review of cadastral systems by Peter Dale in the mid 1970s was not received very warmly in Australasia. In the late 1970s I travelled around Australia and interviewed all Surveyors General and Registrar Generals as to the state of their systems. The general view was that there was nothing wrong with their systems and nothing worth researching. The one significant exception was George Kennedy, the then Surveyor General of South Australia who was endeavouring to introduce a cadastral system based on a photogrammetric map base. I was advised by more than one person that my research efforts would be more productive if I concentrated on improving the methodology for Laplace azimuths!

One of the reasons for this low point in cadastral activities was the emphasis during the period on extending the geodetic network across the country and completing the mapping of Australia. Due to these major activities, the emphasis in the tertiary institutions which set up surveying schools across Australia in the 1950s and 1960s, was on geodesy, photogrammetry and measurement surveying. Emphasis on land related issues and in particular cadastral matters was sometimes non-existent or at best tolerated by the measurement scientists as a "necessary evil" in the courses. The 1970s however saw an increasing emphasis on land studies and cadastral issues in surveying degrees due to the sponsorship of such people as Peter Angus-Leppan at the University of New South Wales and Brian Murphy at The University of Melbourne.

The impact of computerisation and the adoption of some fundamental cadastral principles in the 1970s saw a move to change the institutional structures surrounding the administration of our state cadastral systems. In this regard the institutional changes in South Australia were a model and led the way in Australia. These moves in the 1970s were in some states as a result of the recognition that the cadastral surveying and mapping activities had to be integrated into one function and closely linked to the land registration functions. These moves have resulted in the breaking down of some inefficient and anachronistic institutional arrangements

in many states albeit there is still a long way to go in some of the Australian states.

The 1970s and 1980s have seen the move for our cadastral systems to be part of the development of state-wide parcel based LIS. Australia's cadastral systems however are still grappling with much institutional, legal and technical "baggage" from a past era. As Australia rapidly becomes an information society in the 1990s we will be forced to come to grips with many if not all of these issues.

In support of the present system, it must be stated that it has served its purpose. Australian cadastral systems have an enviable record of very few ownership and boundary disputes as evidenced by the lack of court cases. This is a credit to the professionalism and technical expertise of both government and private sector surveying and legal professionals, and government administrators. This is in sharp contrast to many developing countries where there is often a ten year backlog in the courts to hear boundary and ownership disputes. The difficulty at the present in Australia is that much of the present system was not designed for today's society. It has difficulty coping with the technological, economic and social pressures. This results in many aspects of the present system being expensive and inefficient.

IMPACT OF SOCIAL, INSTITUTIONAL, ECONOMIC AND TECHNICAL TRENDS ON CADASTRAL SYSTEMS - THE ISSUES

One of the major issues pushing cadastral reform is the trend for cadastral systems to become information systems and not systems to just serve the traditional conveyancing/land ownership user base. The cadastral system has already become the basis of a much broader LIS in most states and jurisdictions in Australasia. There is an increasing recognition, especially in such organisations as the World Bank, that cadastral data has an increasingly important role to play in effective and efficient land management, especially in urban areas. Another increasing pressure will be the need to link parcel based LIS with environmental and natural resource data.

More apparent issues in Australasia today, which are having a major effect on cadastral systems, are government policies for cost recovery, deregulation, both of systems and professions, quality control and the transfer of government activities to the private sector.

As stated by Smith (1990), reasons for change take many forms:

- demands from government (cost recovery, accountability and efficiency)
- demands from society (free market, elimination of protectionism and value for taxpayer funds)
- new technology
- challenges from other disciplines and professions
- service delivery (effective land ownership and property boundary system; land information to meet society's requirements)

EVIDENCE OF DESIRE OR NEED FOR CADASTRAL REFORM

Cadastral reform has existed since First Settlement. It is not a "one off"

administrative change. However cadastral reforms have increased significantly over the last decade with an expectation of that momentum and level of change being maintained for at least another decade. There is certainly no lessening of interest internationally in cadastral issues as evidenced by the FIG papers. Many Surveyors General and land administrators around Australia are presently committed to a high level of cadastral reform as stated above.

The importance of cadastral and related issues is evidenced in the appointment of professors and heads of academic surveying departments around Australia and in other English speaking countries with expertise in this area. This would have been unheard of ten years ago when it was virtually mandatory to have a geodesy, photogrammetry or measurement science background for such appointments. This trend for people with such backgrounds to be appointed to senior positions is also being seen in international organisations and other forums.

There has certainly been an increase in interest in cadastral and LIS in developing countries over the last decade. For example it is only in the last 15 years that the Australian International Development Assistance Bureau (AIDAB) has taken an active interest in cadastral and LIS projects. The increase in interest in this area has been mirrored in other donor countries world wide with the major aid organisations such as the World Bank becoming very interested in the last decade.

NEED FOR A HOLISTIC VIEW OF CADASTRAL SYSTEMS

Unfortunately there is not a large body of knowledge in the English speaking world concerned with the cadastre and related land administration and land management issues. This void has been filled to some degree over the last two decades however there has still not developed a cohesive body of knowledge for the area as is found in most accepted disciplines. Cadastral issues are however different from the more mathematical and scientific disciplines in surveying. A lot has been achieved over the past two decades albeit a lot more has to be done. Simply the acceptance of cadastral concepts in the English speaking world has only come about during the past decade. Achievements and reforms must therefore take this into account.

Interestingly there is some similarity between the establishment of the credibility of cadastral and LIS studies a decade ago in the surveying profession in Australia and the development of the geographic information system (GIS) discipline today world wide.

The key to understanding cadastral systems is in taking a global view of a system. This means in the Australian context looking at conveyancing, land registration, cadastral surveying and cadastral mapping as one system which is intimately linked. It means looking at the social, economic and institutional environment in which the system operates. Cadastral systems must be viewed in the broad sense as part of an information system which is central to the land administration and land management processes in any state or jurisdiction.

Further work must be undertaken to better understand the unique nature of cadastral data as compared with other spatial data in a land or geographic information system. Also a better understanding must be gained as to the role that the cadastre plays in

the administration of land in both rural and particularly urban areas. These issues are particularly important in developing and improving systems in developing countries.

CONCLUSION

Cadastral issues are real. The importance of an efficient and effective cadastral system is particularly evident in developing countries. Simply appropriate cadastral systems are necessary for the operation of both the private and government sectors, and economic development, in all countries.

In developing, reviewing or improving cadastral systems, the cadastral system in question must be viewed as a whole, not as disparate parts. In both developed and developing countries it is essential to create a vision or model for the future. This is an area where the surveying profession and land administrators have performed poorly in the past. ***I believe it is very important for each country, state or jurisdiction to clearly state their cadastral vision for the future.***

The key question however will always be - ***have we got the vision right?*** This is the most important issue presently facing the surveying profession and influencing the impact of our profession on society. This issue alone justifies this conference.

REFERENCE

Smith, G.L. 1990. "Cadastral Reform: Barriers, Risk and Opportunities".
Proceedings of Commission VII, XIX Congress FIG, Helsinki, pp282-294.