Chapter 18 Property Registration Authority

Digital Mapping in the Property Registration Authority

Digital Mapping

18.1 The Property Registration Authority (PRA) is responsible for the management and control of the register of land in the State. Its headquarters are in Dublin and it has decentralised offices in Waterford and Roscommon. Internal processing of casework is conducted directly onto an electronic register. Customers of the PRA can avail of a number of services electronically. In 2008 some 42% of all applications for registration were lodged electronically.

Electronic Registration

Electronic Registration is where the lodgement of documents occurs in electronic format only and all registrations are made on an electronic register. The documents can be digitally signed electronic documents, instructions or applications received in a secure messaging environment or scanned versions of paper documents.

18.2 Applications for registration in the Land Registry gave rise to a fee income of €57 million in 2008. In addition, almost 100% of all document inspection and requests for copies of Land Registry Records are now carried out through an electronic portal[58]. These latter services, which generated fee income of €4.2 million in 2008, include online applications for certified copy folios, filed plans[59], certified copy instruments, folio inspections and index searches. Currently these are low fee transactions, but their volume is high.

18.3 A programme of computerisation delivering online services to bring about 'electronic registration of title' is the PRA's contribution to a national eConveyancing project. As part of this the PRA is now engaged in the roll out of a digital mapping system. The mapping programme will replace paper maps (some 32,000 map sheets containing approximately 2.5 million land parcels). On the completion of that project, all aspects of the land register will be held in electronic format. The full completion of the electronic map is a necessary prerequisite to electronic registration. In July 1999, the first phase of the computerisation drive began with the objective of bringing land registration information into line with international best practice. The programme entailed the conversion of almost 110 years of historical paper records into electronic format. Ultimately, over 6.4 million pages of official records were systematically scanned, indexed and published over the Internet.

18.4 The Digital Mapping project is the final stage of transition from a paper based register to a fully electronic national register of property ownership providing textual, geographic and index information. This process will facilitate further developments in the areas of electronic registration and electronic conveyancing that will support the further integration of property related services in the future.

18.5 The status of online access to the PRA's information and services has been enhanced over the past decade through the initiatives outlined in Figure 64.

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58 www.landirect.ie

59 A filed plan is an official extract from the Land Registry Map, showing one or more parcels which are the subject of a particular title.

Figure 64 Service Developments

Year	System Developed	Function of Systems
1999	Integrated Title Registration Information System (ITRIS)	Electronic register of titles
1999	Electronic Access Service (EAS)	Customer access to database of computerised folios
2002	Imaging Project	Scanning, indexing and publishing of over 6 million official paper records for access online
2002	Electronic application for registration of title online	Customers can apply for registration of title online
2006	www.landdirect.ie	EAS enhanced by additional functions based on PRA's new digital map
2009	e-Discharges	Allows electronic discharge of registered burdens

Electronic Conveyancing

In 2006, the consultancy firm, Bearing Point, published a report on the state of readiness of the various parties such as estate agents, solicitors, financial institutions, property developers, law search agents, surveyors, Revenue Commissioners, Land Registry, Registry of Deeds, local authorities and the Courts Service for the introduction of a system of electronic conveyancing in Ireland. That report was commissioned jointly by the Department of Justice, Equality and Law Reform and the Law Reform Commission and, since then, the introduction of such a system has been official Government policy. Any such system will, of necessity, be developed incrementally and all of the projects undertaken to date by the PRA were acknowledged in the report as being key building blocks.

Business Case and Budget

18.6 In preparation for the digitised mapping project, the PRA engaged an international company which provides geospatial products and services to assist in the preparation of a business case for the digital mapping programme. It completed its work in 2005. A business case was presented to the Department of Finance who approved the project.

18.7 The original budget for the project was €28.1 million. Expenditure to 31 May 2009 has amounted to €19.5 million. The PRA is projecting the overall cost at €26.25 million. The breakdown of project expenditure is set out in Figure 65.

Figure 65 Project Expenditure

	Project Element	Expenditure to Date	Projected Expenditure to Completion	Projected Total Expenditure on Completion
		€m	€m	€m
Current	OSi Copyright	6.68	2.34	9.02
	An Post Geodirectory	0.25	0.14	0.39
	Maintenance	0.76	0.48	1.24
Capital	DMAPS System Development and Data Capture	7.33	1.47	8.80
	OSi Licences	4.50	2.30	6.80
Total		**19.52**	**6.73**	**26.25**

Project Risks

18.8 There are considerable risks associated with the development and implementation of major eGovernment projects. The Digital Mapping project is a major initiative which changes the way the PRA does its business and requires a high level of project management both to guarantee successful delivery and mesh the new system with other elements of the service.

Audit Focus

The audit sought to review the project and seek the assurance of the Accounting Officer that

- the contracting arrangements were adequate
- the project is on time and budget
- the digital maps produced to date are of high standard
- the envisaged productivity gains are being achieved
- the project is on line to contribute to the PRA's overall move towards electronic conveyancing
- the security arrangements are adequate to protect the integrity of the database of electronic maps.

In addition, the observations of the Accounting Officer were sought on how major risks associated with eGovernment projects were being addressed in the development of the Digital Mapping project including

- the risk of the development not addressing identified needs
- the risk of lack of user involvement and acceptance
- the risk of the technical solution being overtaken by more cost effective offerings
- over reliance on external sources in the development and delivery phases and a corresponding lack of internal capacity.

Procurement and Contracting

18.9 The Digital Mapping project involved contracting for the different services required including

- development, implementation, integration and support services for a digital mapping system (Contract 1)
- digitisation, data capture and conversion services (Contract 2)
- provision and licencing of digital maps (Contract 3)
- access to a geodirectory[60] database with addresses and geocodes[61] (Contract 4)

18.10 The audit reviewed the procurement process in relation to the four contracts in order to ascertain whether they complied with government and EU procurement procedures. The findings were as follows

- Contracts 1 and 2 were completed by way of a restricted tendering process with a pre-qualification stage. Each contract was awarded on the basis of the most economically advantageous tender. The Official Journal of the European Union and the etenders website were used to obtain expressions of interest.
- Contract 1 was awarded to a company in Cambridge, UK, with some elements subcontracted to companies in Dublin, Cork and Scotland. Contract 2 was awarded to Landmark – a company in Exeter, UK, with some elements subcontracted to companies in India and Cork.
- Contract 3 was agreed with OSi and Contract 4 with An Post (the sole providers) by way of negotiated procedure without prior publication of a contract notice. Advice was obtained from the Attorney General in respect of the OSi contract that this was regarded as an acceptable procedure.

18.11 Overall, the four contracts complied with government and EU procurement procedures and the records maintained to evidence decision making were transparent.

Project Delivery and Management

18.12 The Digital Mapping project involved completing the digitisation process in stages at different locations both within the PRA and at contractor premises. It entailed

- scanning and geo-positioning of the entire original Land Registry paper map record
- creation of a seed-point for each registered land parcel
- quality assurance and making available of seed point information internally to staff and externally to customers
- temporary suspension of registrations on a county-by-county basis as a prelude to digitising that county
- re-scanning and geo-positioning of paper maps for each county (to cater for new registrations since the scanning of the original)
- digitisation of boundaries of each land parcel using rules defined in a Digitisation Protocol

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60 The geodirectory, jointly produced by An Post and OSi provides a complete database of every building in Ireland for which there is a postal address. The PRA is deploying the geodirectory database as a gazetteer to its new digital map record.

61 The geocode is a unique eight digit identifier which distinguishes each address in the Geodirectory database.

- quality assurance and making available of digitised boundaries for each county.

18.13 The conduct of the project was reviewed in the light of Department of Finance guidance on ICT development. It was concluded that the project management approach complied with that guidance.

Project Status

18.14 The project is undertaken in two stages

- the loading of seedpoint information – Phase I
- the digitisation of mapped land parcels – Phase II.

18.15 Phase I involved placing seedpoints on approximately 2.5 million parcels of registered land across the country. This delivery was on time and in line with the overall project plan. The progress in completing digitisation of mapped land parcels is set out in Figure 66.

Figure 66 Project Status – Phase II

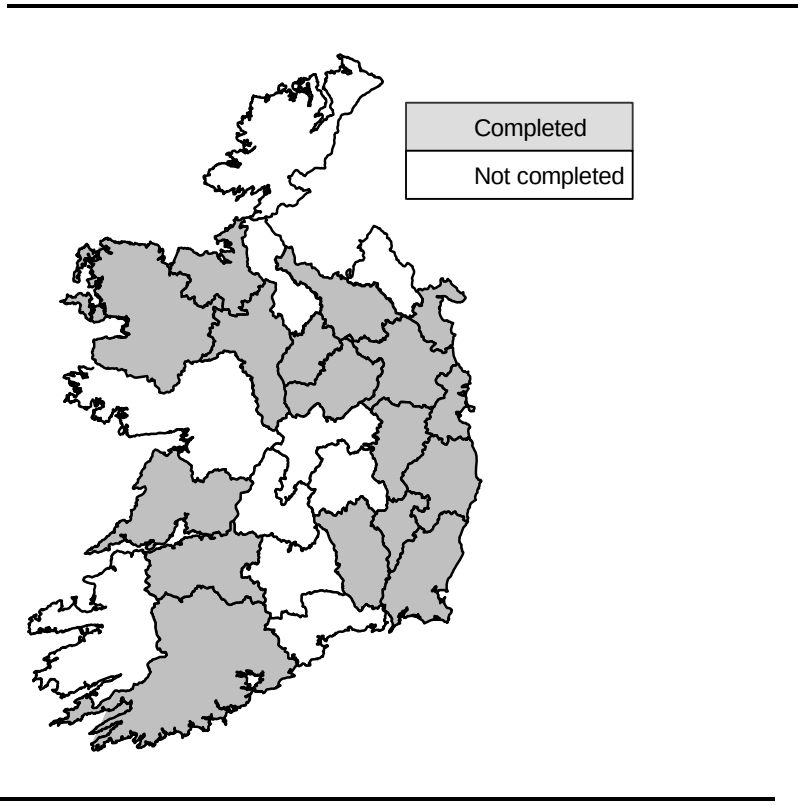
Year	Planned Digitisation Number of Counties	Digitisation Completed Number of Counties
2006	1	1
2007	8	7
2008	6	7
2009	7	2[a]
2010	4	—

Note:

a Completed to 30 May 2009.

18.16 Implementation of Phase II commenced in December 2006. Figure 67 shows the counties where digitisation had been completed by end of May 2009.

Figure 67 Digitisation Completed at May 2009



Quality of Electronic Mapping

18.17 Because the PRA operates a guarantee on behalf of the State, the reliability of its recorded data is of paramount importance. The Accounting Officer informed me that the PRA, together with its implementation partners has put in place an extensive quality assurance mechanism. There are three separate quality assurance processes. These are performed by a subcontractor of Landmark Solutions, the prime contractor for the digitisation process (Contract 2) located in Noida India, while the prime contractor is based in Exeter (UK). Final quality assurance processes are conducted in the PRA offices.

18.18 The quality assurance system in place in India involves both a visual check and an automated system-performed check of 100% of all records converted. This is complemented by targeted manual checks. Approximately 20% of all records undergoes a further stage of testing in the Noida facility before the data is transferred for further testing to Exeter. The quality assurance process uses a comprehensive statistical sampling technique that results in a sample dataset that is representative of an entire shipment batch. The 20% sample of each batch of mapping data is determined using random number theory. Every record of the sample chosen is checked for the parameters as set out in the Digitisation Protocol[62].

[62] The Digitisation Protocol was developed by the PRA technical staff and outlines the procedures and protocols for creation of PRA vector boundary data during the conversion process.

18.19 A further set of quality assurance processes is performed against the data by the Exeter company to check for logical consistency within the data. When all data is verified in a batch, that batch is then loaded on to a secure site for downloading by the PRA.

18.20 The PRA's own quality assurance process uses a purpose-built computerised Data Acceptance System (DAS) which enables the sampling of digitised boundary data based on predefined parameters.

18.21 In the event that the mapping boundary data does not achieve the required standard, that batch concerned is rejected and returned to the prime contractor in Exeter for rework. When all batches for a county have been accepted, the boundary data for that county is then loaded on to the live internal production system and subsequently made live to customers through the website.

18.22 The Accounting Officer stated that, to date, only one batch of data, out of a current total of 159 delivered batches, had failed the extensive quality assurance regime. She ascribed this to

- good project governance and project management arrangements
- the expertise and experience of the project team
- clear guidelines set out in the Digitisation Protocol augmented by the high-quality training programme conducted by PRA expert staff on-site in Noida and
- the high degree of input provided by the PRA at all stages of the project.

18.23 She stated that there was constant and very close contact between the PRA and the implementation partners in India and the UK. One member of the implementation partner's staff from India had been based in the PRA's offices in Dublin throughout the assignment and this had proved invaluable. The liaison work was also supported by an online Query Resolution System. As a result of these measures, most issues could be resolved quickly and with expert input before the data was delivered to the PRA offices.

18.24 In regard to the extent of claims of mapping errors by service users she explained that all titles registered on the Land Register were guaranteed by the State which was bound to indemnify any person who suffered loss through reliance on the register[63]. However, it was not sufficient to claim that an error in registration had arisen, actual loss must be specifically detailed and must be proved. In the usual course the question which arose was whether or not the error could be rectified. If it could and such was usually the case then the loss involved is usually no more than solicitor's costs. Consequently, most errors did not result in any compensation payment.

18.25 The Accounting Officer informed me that three claims had been received in respect of Digital Mapping cases, of which two had been received in June 2009. No compensation payments had arisen to date in any of these cases.

Productivity

18.26 There are two elements to the productivity gains to be achieved from digital mapping – those deriving from the automation of the copy filed plans production and the efficiencies in mapping casework output.

18.27 The Accounting Officer noted that while considerable efficiencies had been achieved to date, it would only be possible to assess the full productivity gains as part of a post-project implementation review of digital mapping, which is likely to be undertaken towards the beginning

63 In accordance with Section 120 of the Registration of Title Act, 1964.

of 2011. Figure 68 outlines the level of reported staffing and output associated with filed plan production.

Figure 68 Mapping Staff Levels and Outputs 2005-2010

Year	2005	2006	2007	2008	2009	2010
Mapping Staff	50	40	37	25	12	10
Output of Filed Plans	222,000	217,000	201,000	224,000	—	—

18.28 The Accounting Officer reported that the actual productivity gains achieved in the first counties to be digitised were well beyond those set out in the business case for the project which had targeted a 40% efficiency improvement. Productivity gains ranging from 56% to 83% in different functional areas[64] have been achieved to-date, depending upon the length of time since the implementation and embedding of the new system.

18.29 The Accounting Officer anticipates that further productivity will be achieved as the project is fully rolled out over the next 18 months. It is also anticipated that gains will be achieved as the backlog of applications for registration based on manual mapping is cleared over the next 12 to 18 months. Manual mapping is a feature prevalent in the Dublin and Roscommon offices, where casework for those counties where maps have not yet been digistied, is carried out. In those offices, arrears of casework had accumulated due to insufficient resources available to address the high volume of transactions resulting from the large growth in the property market.

18.30 In response to inquiries in relation to the impact on staffing, the Accounting Officer informed me that the productivity gains had contributed to an overall decrease in staffing levels at the PRA. The PRA had 702 staff at end June 2008 but by June 2009 this had decreased to 647 as a result of posts being vacated and not subsequently filled.

Data Security

18.31 The Accounting Officer informed me that all changes to the register wer performed by PRA staff only and that customers had no facility to alter the register. Additionally, changes to the register could only be brought about through the processing of a formal application for registration. This provided the initial layer of an extensive audit trail which recorded all modifications to the register. The PRA had a hierarchy of access rights based on the roles performed by staff members who process casework. The system conducted a series of automated rule-based validations. All changes to the register were, in the first instance, retained in a separate provisional layer which was only available and visible to PRA staff. Changes appeared on the live system only on completion of the associated application which involved both a legal and mapping assessment by a 'settling' officer. Additionally, post-registration 'spot checks' were conducted by an internal technical assurance group to ensure consistent application of PRA operating procedures.

18.32 In regard to business continuity, the PRA informed me that processes and plans were in place to enable recovery of data and continuity of business functions following a disaster. A formal written disaster recovery plan was already in place, but would need to be revised following the commissioning of a new disaster recovery site at the PRA's Waterford office which was due for completion by the end of 2009.

[64] Different functional areas in the PRA process different categories of cases e.g. First Registrations, Transfers of Part, Leases, etc.

Demand and Development Risks

18.33 To counter the risk of development not addressing identified needs, the Accounting Officer pointed out that prior to undertaking this project, the PRA prepared a business case which established the business needs and objectives underpinning the project. These were translated into a set of specific system requirements and functions using a structured requirements analysis and systems development process, governed by a formal project management methodology.

18.34 The PRA took specific steps to tackle the risk of lack of user involvement and acceptance. As part of its development of the business case, the PRA engaged extensively with key stakeholders to understand their expectations. A series of prototypes was subsequently developed and presented to those stakeholders resulting in a clear understanding of user requirements. The Accounting Officer has also stated that the needs and expectations of the PRA's customers are monitored through customer focus groups, surveys and briefing sessions. Digital mapping permits much better response to business trends and service level demands and offers considerable advantages over paper-based mapping systems in this respect. Figure 69 outlines the increasing usage by customers of the PRA's online services. The Accounting Officer added that recorded levels of use is clear evidence of the relevance of the facility to the PRA's customer base.

Figure 69 Usage of PRA's Online Services[a]

Year	2000	2004	2005	2006	2007	2008
Number of professional users	1,700	7,500	9,200	10,900	13,000	14,000
Number of online transactions	€0.2m	€1.2m	€1.7m	€2.5m	€2.9m	€3.0m

Note:

a Digital Mapping began to impact on transaction levels from 2007.

18.35 In response to the risk of the technical solution being overtaken by more cost effective offerings, the Accounting Officer stated that the Digital Mapping system was based upon industry standard specifications developed on 'open' systems architectures. The system was accessible through popular web browsers and took account of compliance requirements emanating from EU initiatives. The system was based upon common, cost-effective 'off the shelf' software combined with specialised bespoke functionality. The Digital Mapping system did not place any additional technical or financial burdens upon customers.

18.36 To counter the risk of over reliance on external sources in the development and delivery phases and a corresponding lack of internal capacity, the PRA in the early stages of the project placed a strong emphasis on the development of internal digital mapping expertise. The project was managed on an overall basis by PRA staff and there has been an ongoing emphasis on the transfer of skills. While there would be some need for technical maintenance arrangements after the completion of implementation, the PRA did not envisage a requirement for external resources in the managing of the system on an ongoing basis. The digitisation of the paper maps was a finite task scheduled for completion in 2010 and the PRA would have no ongoing dependence on external resources for this process thereafter.

Conclusions

The PRA has been engaged in a project to digitise its maps as part of a wider programme designed to facilitate electronic conveyancing. By the end of 2008 maps had been digitised in 15 counties.

The audit sough assurance from the PRA that risks associated with largescale eGovernment projects were being managed. It concluded that reasonable steps had been taken to manage the process.

However, it will be necessary for the PRA to keep the quality of the mapping under review as dealings are processed so as to ensure that the electronic plans for each land parcel accurately represent previously registered holdings.