Progress Report on the Green Paper  
Proposing Reform of Boundary Surveys in Ireland

Dr Paddy Prendergast, Dublin Institute of Technology, Dublin  
Mike Flynn, Midland Mapping Services Tullamore, Co. Offaly  
Paul Corrigan, Paul Corrigan & Associates, Sandyford, Co. Dublin  
Brendan Sweeney, Hempenstall Surveys Ltd, Kinsealy, Co. Dublin  
Áine Martin, Atlas Computers, Rathfarnham, Dublin 16  
Paul Moran, ESB International, Dublin 2

Abstract:
In August 2008 the Irish Institution of Surveyors published a green paper proposing significant reform of boundary surveys in Ireland, which outlined many national reasons and international trends driving the need for this reform. The authors studied case studies of boundary disputes in Ireland to identify issues causing concern and developed proposals to introduce standards for boundary surveys to minimise these issues for the future. The findings suggested that a dual system using conclusive and non-conclusive boundaries should be adopted to allow landowners to register boundaries as conclusive under certain conditions. Landowners should be allowed to decide if they wished to remain with non-conclusive boundaries, or whether they wished to agree their boundaries with adjoining owners and register them as conclusive. The land register would then record a variety of extra information about boundaries registered as conclusive and the proposed concept recommended a gradual migration towards conclusive boundaries over a number of decades.

Introduction:
Ireland has a dual system of land administration for land tenure consisting of the Registry of Deeds (RoD) and Land Registry (LR). The RoD and LR are currently under the control and management of the Property Registration Authority (PRA), which was established under the Registration of Deeds and Titles Act (Oireachtas 2006).

Under the Irish Government's e-Government strategy e-Conveyancing was identified as one, which could result in significant benefits to a wide range of stakeholders. Consequently, significant reform of the existing system is planned to enable the development and introduction of an e-Conveyancing system for Ireland.

“As you know the Government is committed to moving towards e-Government and I see the move towards e-conveyancing as a vital part of this project” An Taoiseach, Mr. Bertie Ahern T.D., 23/6/2005

This reform programme presents an opportunity to review all aspects of the current system. The Irish Institution of Surveyors established a Commission on Land Registration in autumn 2006 to prepare a report in this regard. The Green Paper Proposing Reform of Boundary Surveys in Ireland was published two years later and now processes are underway to persuade the authorities and the other professions of the benefits of adopting these new ideas.

Although there are major benefits within the e-Conveyancing process for adopting conclusive boundaries, many more benefits of land registration reform lie in other areas such as interoperability for GIS and SDI in a range of sectors such as spatial planning and land taxation, and the supply of better quality information to enhance decision making with regards to land policies relating to environmental management, agriculture, mari-culture & aqua-culture, coastal defences, and many more.

Irish Land Administration Systems for Land Tenure:
The RoD was established in Ireland in 1707 as a repository to voluntarily register deeds and conveyances relating to land and to give priority to registered deeds over unregistered deeds. Although the system was voluntary, the potential of a penalty for not registering deeds was an incentive for registration.

The RoD retains a memorial (summary) of the deeds submitted for registration and the original deeds are returned. It also retains an index of lands, but this index of lands was discontinued in 1946. Deeds may (not
necessarily) also contain a map associated with the deed, but these maps are of variable quality, some also contain dimensions, and some are of excellent quality.

However, the RoD system was perceived as slow, expensive and inconclusive, so a new system of land registration was established in 1891 to improve the land administration system for recording land tenure. The focus of the new system was on rural areas and a government grant scheme was provided to permit tenant farmers purchase their landholdings with the condition that the farms once purchased were registered in the LR.

This LR system was based on the Torrens system, but with one significant difference. Large scale topographic maps from Ordnance Survey Ireland (OSi) were used to record property boundaries rather than creating a cadastre. This led to the adoption of a system of non-conclusive boundaries (Irish terminology for general boundaries). Essentially property boundaries are delineated using topographic features on OSi maps, which have created three differences to fixed boundary systems, which are:

- The location of the title boundary within the topographic feature is not determined;
- The ownership of topographic feature (if there is one) containing the boundary is not established;
- The position of any title boundary is regarded as approximate.

This use of non-conclusive boundaries within the Irish land registration system allows the three main stakeholders to transfer risk with respect to boundaries. Ordnance Survey Ireland cannot be challenged on the accuracy of the position of boundaries, because they survey topographic features not title boundaries. The Property Registration Authority cannot be challenged on the accuracy of their title boundaries because they only accept the accuracy of what Ordnance Survey Ireland supplies them. Consequently if there is an accuracy issue PRA state it should be taken up with Ordnance Survey Ireland or with the party who submitted that particular boundary. As a result boundaries are only approximate, so the State cannot be challenged for not providing a State guarantee for boundaries. Therefore one can deduce that all three stakeholders benefit from non acceptance of responsibility to define boundaries with clarity. The green paper challenges this status quo and suggests that security of tenure is being undermined by it.

A comparison of the Irish LR system with international cadastral systems reveals significant similarities and fundamental differences (figure 2). There is very little difference in the structure and the information contained in the textual part, but there are significant differences between the types of information held in the mapping part. The cadastral map is supported with measurements, descriptions and coordinates of markers, which define boundaries on the ground but there is an absence of evidence supporting the location of boundaries in the LR index map. When the position of a line on the cadastral map is challenged in a boundary dispute, there is supporting evidence available from the land register / cadastre to assist in resolving the dispute. This is not the case in Ireland.
e-Conveyancing:
The conveyancing process in Ireland is perceived as being complex, inefficient and costly, due to the quantity of documentation involved, the diversity of information sources and the number of stakeholders involved. Additionally, advances in technology resulted in an increased demand to conduct business on-line, both in Ireland and internationally. Consequently, the Law Reform Commission (LRC) contracted management and technology consultants Bearing Point in 2003 to conduct an in-depth study to model the current conveyance process in Ireland as a preliminary stage to developing a model for an e-Conveyance process.

The Law Reform Commission’s Report on e-Conveyancing: Modelling of the Irish Conveyancing System (2006) proposed a vision statement for e-Conveyancing (figure 3) which required a multitude of developments and reforms under five main headings:

- **Process** - development and implementation of an electronic conveyance process;
- **Information** - Conversion of information into digital form;
- **IT Systems** - development and implementation of an Information Technology architecture;
- **Legislation** - reform of relevant primary and secondary legislation;
- **Education** - enhancing stakeholder skills to use the new system.

The report also proposed an e-Conveyancing model for the future (figure 4) in which surveyors are identified as one of the main stakeholders (professionals) who progress the property transfer for the consumer. The report recommended the establishment of an e-Conveyancing Project Board as a steering group to coordinate the development and implementation of e-Conveyancing process. The Irish Institution of Surveyors (IIS) is not currently represented on the e-Conveyancing Project Board, but considering the contribution the IIS has already made with the publication of the green paper and the establishment of the Inter-Professional Task Force on Property Boundaries would welcome participation in this project.
The Law Society of Ireland’s e-Vision:
The e-Conveyancing Task Force of the Law Society of Ireland recently published their proposals called e-Vision: “Back to basic principles - vision of an electronic system for conveyancing” (2008). This e-Vision states that the current conveyancing process has been used by the State as a tool for implementing social policy, for the collection of tax, for statutory enforcement and various other aims, for which the process was not designed. As a result, The Law Society states that even the most basic residential conveyance now requires multiple enquiries that have little do with ownership, transfer and security of title. Consequently the primary recommendation of the e-Conveyancing task force was that the conveyancing process be paired back to basics of simply transferring title. Much detailed legislative, procedural and administrative reform will be necessary to achieve this including a number of interesting recommendations from the perspective of surveyors, which are:

a) A recommendation to move from ‘caveat emptor’ (buyer beware) to seller disclosure for property transactions because it is considered no longer appropriate to modern conditions. This would move the responsibility from the buyer (to ensure they acquire what they think they are purchasing) to the seller (to make a declaration of what they are selling). The IIS Commission on Land Registration considers that this declaration should also include a detailed description of the property boundaries. However if any issues were subsequently discovered which were not disclosed, the seller may have a case to answer.

b) A recommendation that title to all land in the State, and any interests in land must be registered in the Land Registry. The two main effects of this proposal are:
   - That all properties currently registered in the Registry of Deeds (currently estimated at five hundred to six hundred thousand properties mainly in urban areas) should be transferred to and registered in Land Registry and that the Registry of Deeds should subsequently be closed;
   - That no interest should affect title unless it is registered, (i.e. if it not registered then it is not legal, so the many exemptions which currently apply to registration would no longer apply). The title Register should be definitive, conclusive and all encompassing.

The e-Vision proposals highlight the importance of the three original fundamental principles of land registration:
- The mirror principle - the register of title reflects accurately and completely beyond all argument the facts that are material to the title;
- The curtain principle - the register is the sole and definitive source of information for purchasers;
- The insurance principle - if as a result of human error the title is proven to be defective in any way then the person or persons suffering loss as a result must be able to claim compensation.

The Report (2008) states that the primary aim of the e-Vision is to ensure that property professionals can be confident in the reliability of information being supplied by the e-Conveyancing system, so there is a need for
quality assurance (validation of electronic information), standardisation (of data definitions and forms) and professionalization (better understanding of the different roles played by the property professionals).

**The Property Registration Authority's Digital Mapping Project:**

The conversion of the LR information into digital form has been ongoing since the mid to late 1990s and the digital mapping project got underway in 2006 to convert the information from its mapping archive of approximately 36,000 maps into digital format by way of a commercial contract. In order to undertake this project it was necessary for OSI to harmonise the specification of their three large scale map series (1:1000 - urban, 1:2500 - sub-urban & 1:5000 - rural) using a specification enhancement process. Consequently an agreement was reached between OSI & PRA to complete this harmonisation over a 5 year period in an agreed sequence for the counties slightly ahead of the PRA digital mapping project.

The digitisation process was carried out in India in compliance with conditions set out in a digitisation protocol (PRA 2007). Phase one created seed points for each property, which were then electronically linked to the textual part of the register, called folios in Ireland. This created a link between the mapping information and the folio information, but without property boundaries at this stage (figure 5).

In phase two, the property boundaries are digitised on a County by County basis as follows:

- Registration in the particular County was suspended (normally for 2 to 3 months);
- The LR maps for the County were scanned on site in Ireland;
- The scans of the LR maps and the harmonised OSI maps were delivered to the contractor in India;
- The scans were geo-rectified onto the new national grid for Ireland, ITM (Irish Transverse Mercator);
- The scans were then viewed on screen with the OSI vector map on top;
- If a topographic feature on the OSI map was within a certain tolerance (Table 1) of the registered title boundary on the LR scanned maps, then the location of the boundary as defined by the OSI topographic feature was adopted as correct. The polyline geometry (coordinates) of the OSI topographic feature was copied into the LR layer for title boundaries;
- A polygon was created for the parcel once all the polylines for the parcel were completed;
- The parcel polygon was linked to the seed point, which was already linked to the folio information (figure 6)

![Figure 5 - Seed points for properties in a County where the boundaries have not yet been digitised (red dots signify freehold, green dots signify leasehold, and no dot signifies unregistered land which is assumed to be registered in the Registry of Deeds) (Source - PRA www.landdirect.ie).](image)
Figure 6 - Seed points (red dots) and boundaries of properties (red lines) in a County which has been digitised (Source – PRA www.landdirect.ie).

Table 1 - Digitising tolerances used in the PRA digital mapping project for the acceptance of topographic features on OSi maps in lieu of the location of registered title boundaries on the PRA scanned maps (PRA 2007).

<table>
<thead>
<tr>
<th>MAP SCALE</th>
<th>AREA</th>
<th>TOLERANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:1 000</td>
<td>Urban</td>
<td>± 1.0m</td>
</tr>
<tr>
<td>1:2 500</td>
<td>Sub-urban</td>
<td>± 3.0m</td>
</tr>
<tr>
<td>1:10 560</td>
<td>Rural</td>
<td>± 20.0m</td>
</tr>
</tbody>
</table>

The PRA are to be congratulated on a number of issues relating to this digital mapping project:

- There has been a significant improvement in cartographic quality of PRA maps (figure 6);
- Since the boundary lines were not re-digitised, time was saved in the digitising process, but more importantly the coordinates of the PRA title boundaries exactly match OSi topographic features in most cases (some boundaries are not associated with OSi features) thus eliminating difficulties in the future resulting from multiple definitions of the same feature;
- Initially the IIS Commission on Land Registration considered the tolerances (table 1) to be too large, but the digitisation was in effect a national rectification of PRA boundaries after a century of recording them on paper. Consequently, the Commission now agrees that the tolerances had to be made sufficiently large to enable the rectification to take place for a high percentage of boundaries;
- Numerous cases have been identified by IIS members where the digitising tolerances were not large enough to rectify registered title boundaries onto OSi topographic features, the boundaries were digitised in their old positions, even though it is obvious in some cases that new digital boundary is incorrect (figure 7);
- IIS members have recorded a lower number of cases where the registered title boundary was rectified in association with an OSi topographic feature which was surveyed in an incorrect position (figure 8). This is not the norm, and the positional accuracy of new OSi maps has generally improved compared to the legacy mapping;
- In a significantly less number of cases the registered title boundary was not rectified in association with OSi topographic features even though the distance was less that the digitising tolerance set (figure 9);
Figure 7 - PRA digital title boundaries (red line) which do not conform to OSi mapping (black lines) and are obviously incorrect (Source - PRA [www.landdirect.ie](http://www.landdirect.ie)).

Figure 8 - PRA digital title boundaries (red lines) overlain with boundary survey (blue lines). OSi and PRA maps do not include small area highlighted measuring 6.7m x 11.4m - OSi survey from aerial photos misinterpreted topographic feature under copse of trees (Source - IIS member).
The Green Paper proposing Reform of Boundary Surveys:
The Irish Institution of Surveyors established a Commission on Land Registration in autumn 2006 to prepare for the introduction of e-Conveyancing in Ireland. The PRA digital mapping project was one piece required to implement e-Conveyancing and since the project was over five years to be completed in 2010 the timing was opportune. The Commission met weekly for over a year and discussed numerous case studies of boundary disputes and the green paper went through a consultative process and numerous editions before publication in August 2008. Up to this stage these discussions were confined to approximately 100 surveyors, so the green paper was widely circulated to broaden this debate to:

- all IIS members;
- all the professional bodies involved in the property sector including the Society of Chartered Surveyors, the Institution of Civil Engineering Surveyors, Engineers Ireland, the Royal Institute of Architects of Ireland, the Law Society of Ireland, the Bar Council, and the Irish Auctioneers and Valuers Institute;
- the two main State agencies involved - Ordnance Survey Ireland (OSi) and the Property Registration Authority (PRA)
- over 100 academics in third level institutions involved in teaching under-graduate and post-graduate programmes for property professionals;
- Internationally to members of CLGE the European umbrella body for surveying (Council of European Geodetic Surveyors) and to members of FIG the global association for surveying (International Federation of Surveyors).

Since publication many presentations have been made to the Property Registration Authority’s GI Users Group, representatives of the Law Society’s Conveyancing Committee, the Society of Chartered Surveyors, South Tipperary County Council, Compass Informatics, and a visiting group from University College Bergen in Norway. A series of articles have also been published in the Conveyancing & Property Law Journal, the Engineers Journal, and the IAVI Property Valuer and a number of smaller articles have also been published in successive issues of Geomatics World stimulating debate of these issues in the UK. More recently a paper was presented to a two day international conference in Bergen in Norway on the 29/30th April 2009.

One of the key concerns identified in the green paper is that the non-conclusive boundary system used for land registration in Ireland does not provide adequate security for landowners and that the Irish public have been unaware of the significant deficiencies of the current system. It highlights the fact that the position of all the new digital PRA boundaries are different from their positions on the original paper maps and consequently these new PRA maps cannot be taken at face value any longer.
It proposes the introduction of a four star service for boundary surveys for the Irish market to be offered in parallel to the three star service currently available. The new four star service proposes that PRA maps should be checked on the ground by competent qualified surveyors in a three stage process involving:

a) A scoping stage to compare the boundaries on the new PRA digital map in relation to the boundaries on the ground to identify if there are any issues which may need resolving;

b) a ground truth survey of the current line of occupation to an accuracy standard significantly better than OSi and PRA maps (to ensure they cannot be contested);

c) a map analysis which produces a ‘boundary discrepancy map’ using standard colours to signify particular issues, such as
   - Green - area of land inside the title boundary and occupied on the ground;
   - Amber - area of land inside the title boundary, but not occupied on the ground (this will include ownerships extending to the centre of roadways which is normal registration practice in Ireland);
   - Red - area of land outside the title boundary, but occupied on the ground (these areas may need to be resolved if their dimensions are greater than the accuracy tolerances of OSi & PRA maps).

The provision of a series of CPD (Continuous Professional Development) events on need for reform of boundary surveys is expected to continue. Many IIS members have already put the boundary survey proposals into effect and these will be invited to present case studies on their surveys at a workshop during summer 2009 to learn lessons on the practicalities of the proposals and the range of interpretations being taken by different surveyors. Additionally an application to the Law Society is being prepared to acquire accreditation for providing CPD seminars on boundary surveys for the legal profession. Furthermore a range of seminars and workshops will be provided for surveyors throughout 2009 to enhance their skills for boundary surveys in preparation for issuing of licences by the IIS, which currently has been deferred for a number of months.

Although the Law Society’s e-Vision document specifically deals with information in the folios, the green paper proposes very similar concepts for the corresponding PRA mapping information. There is a parallel need for professionals to be as confident in the reliability of mapping information as well as the folio information supplied by the e-Conveyancing system. Consequently these two documents from two separate professional bodies both recommend significant change of system of land registration for Ireland’s needs in the 21st century.

### Inter-Professional Task Force on Property Boundaries:

Although the green paper has stimulated a significant debate in the surveying profession in Ireland and to a lesser extent in the other professions involved in the property sector, the two main state agencies, the PRA and OSi have not responded formally to it yet.

The solutions outlined in the green paper cannot be developed and implemented in isolation by surveyors, so there was a need to involve wider participation. Consequently the IIS established an ‘Inter-Professional Task Force for Property Boundaries’ and invited all the professional bodies involved in the property sector to nominate two representatives to participate. The first meeting took place in on 1st April 2009 and representatives attended from the Law Society, Engineers Ireland, the Society of Chartered Surveyors, the Royal Institute of Architects of Ireland, the Irish Auctioneers & Valuers Institute, the Irish Planning Institute and the Irish Institution of Surveyors. The discussion ranged over many mapping issues impacting upon the services offered by all these professions and a preliminary list of mapping difficulties was created.

The next meeting is scheduled for mid May and the Law Society of Ireland has offered to host it. Additionally it was decided at the first meeting to invite representation from the Property Registration Authority and Ordnance Survey Ireland, so invitations have been issued in this regard. At the second meeting all of the professions will present 15 minute presentations describing the current difficulties being experienced and offering initial ideas on how they might be resolved. A draft ‘terms of reference’ will also be tabled for discussion to decide on the scope and objectives for the work of the task force. The ultimate intention of the Irish Institution of Surveyors is to develop these ideas into recommended solutions set out in a white paper supported by all the professional bodies involved.
The IIS considers that this multi-disciplinary input is the best way to ensure the solutions developed are pragmatic, simple, effective and cost efficient. At this early stage the input has been positive and the green paper has stimulated a growing debate and significant reform is now being discussed by all the professions involved.

The EU INSPIRE Directive:
The EU INSPIRE Directive was published in May 2007, so each EU Member State has until May 2009 to transpose it into national legislation. Unlike any previous EU Directive it will be implemented using two mechanisms, Implementing Rules that will be binding, and Guidelines which will not be binding. The full range of spatial datasets has been listed under three categories of decreasing priority and cadastral parcels are listed in the highest priority list of Annex 1. This means cadastral parcels are considered as reference data as the smallest / lowest / basic unit of ground with homogenous rights, restrictions and responsibilities to land and unique ownership. Therefore they are important as generic information locators and a key means of linking information to other thematic fields such as environmental restrictions, soil management, spatial planning & land use zoning, infrastructure management, public lands management, flood risk management and others.

The intention is for a defined level of harmonisation of data specifications for all of these datasets across Europe to facilitate interoperability of datasets and services. Version 2 of the Data Specifications for all of the Annex 1 datasets were published in December 2008 and the specification for cadastral parcels specifies the information attributes necessary for boundaries and parcels (INSPIRE 2008), which are:

<table>
<thead>
<tr>
<th><strong>BOUNDARY</strong></th>
<th><strong>PARCEL (single area)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometry - polyline (coordinates)</td>
<td>Geometry - polygon (coordinates)</td>
</tr>
<tr>
<td>InspireID - unique boundary identification number - UBIN</td>
<td>InspireID - unique parcel identification number - UPIN</td>
</tr>
<tr>
<td>Estimated accuracy - length in meters</td>
<td>National Cadastral Reference - link to text information - folio number or seed point number</td>
</tr>
<tr>
<td>Topology - description</td>
<td>National Calculated Area - area computed from digital information</td>
</tr>
<tr>
<td>Origin / History - start date &amp; time and end date &amp; time (if appropriate)</td>
<td>Label - extra information - plan number?</td>
</tr>
<tr>
<td></td>
<td>Reference point - existing seed point</td>
</tr>
<tr>
<td></td>
<td>Original map scale - 1000, 2500 or 5000</td>
</tr>
<tr>
<td></td>
<td>Estimated accuracy - absolute in meters - 1m urban &amp; 2.5m rural recommended</td>
</tr>
<tr>
<td></td>
<td>Topology - description</td>
</tr>
<tr>
<td></td>
<td>Origin / History - start date &amp; time and end date &amp; time (if appropriate)</td>
</tr>
</tbody>
</table>

Figure 10 - INSPIRE specification for cadastral boundaries and parcels (INSPIRE 2008).

The INSPIRE specification has very many positive aspects and defined the requirements with clarity, but the IIS Commission on Land Registration was disappointed that only minimum standards were specified for accuracy of parcel geometry without any reference to what best practice might be. There is a need for national professional bodies in association with CLGE and FIG to describe this best practice.

Conclusions:
A number of workshops and seminars are planned to be held during 2009 to enhance skills of boundary surveyors, including:
- Workshop for surveyors to discuss findings of testing survey standards outlined in green paper;
- Seminars to debate survey methodologies - the continued use of old procedures versus the development of new procedures to exploit modern technology (use of GPS in Network RTK mode);
- Training Courses for surveyors on mediation for boundary disputes.

In the opinion of the IIS the state of a nation's boundaries defines the image of the surveying profession. Surveyors in Ireland need to be more professional and significantly improve the quality of their service to address
this issue. The IIS Commission on Land Registration and the Inter-Professional Task Force on Property Boundaries realise that change will not happen in a major jump, but in a series of incremental coordinated steps primarily to satisfy the needs of landowners. This can best be achieved in a partnership arrangement between private surveyors and the existing stakeholders.

The green paper has served its function to raise awareness and stimulate debate on these important issues. If the Inter-Professional Task Force on Property Boundaries performs as it is hoped, a white paper is expected in 12 to 24 months where the content is likely to address a wider reform of land registration rather than just reform of boundary surveys.

References:


