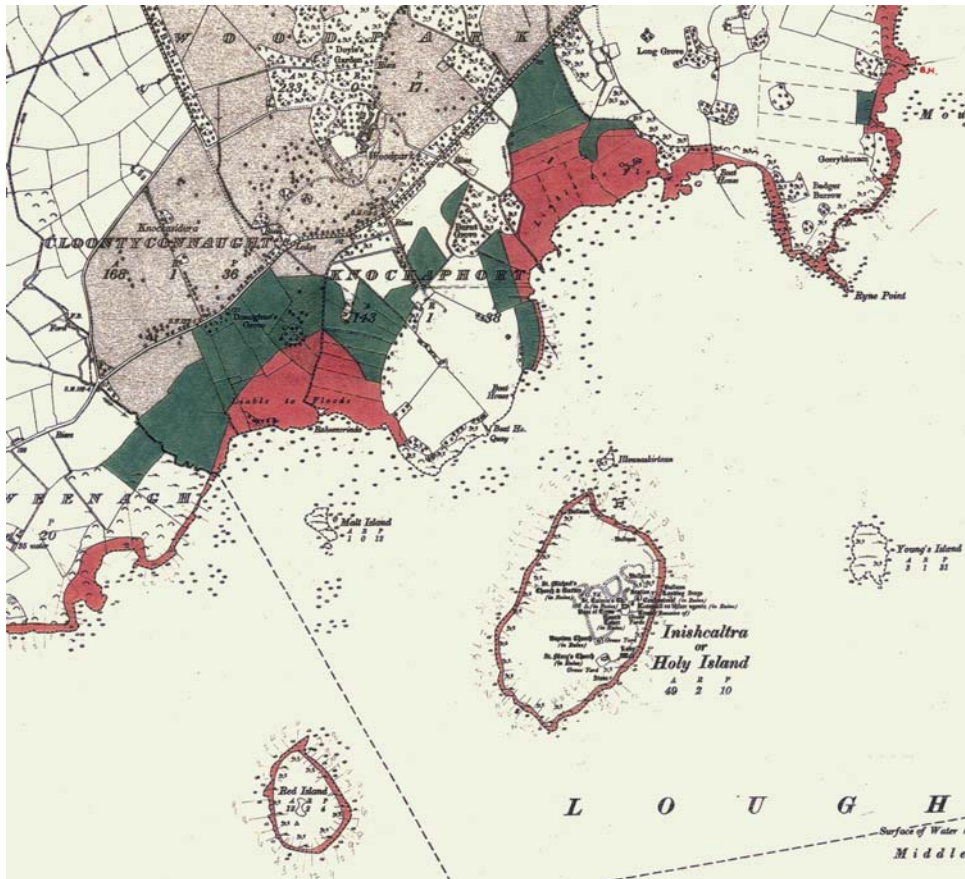


AutoCAD® Map brings ESB property records into 21st century



ESB is the state owned electricity company of Ireland. It is a vertically integrated utility with an annual turnover of €3.5 billion, providing electricity generation, distribution and electricity supply. ESB is currently implementing a multi-billion Euro capital investment programme to make the company carbon-neutral by 2035. Half of this investment is directed at promoting renewable energy generation.

ESB International (ESBI) is a wholly owned subsidiary of ESB which has been responsible for driving much of the renewable portfolio including expansion abroad. ESB International is one of the non-regulated businesses in the utility and has grown over more than 30 years to employ over 1,200 today, mainly in its overseas business. ESBI develops, owns and operates power stations, as well as providing a wide range of engineering and technical consultancy services to clients in the power sector in over 100 countries.

ESBI was recently appointed as GIS consultant for a major historical mapping project on behalf of ESB Estates Management, the unit which looks after the administration of all of the ESB properties in Ireland including those of the Power Generation division. "Over the last 80 years, ESB Power Generation has acquired land and property across the country for both thermal and hydro electric power stations," explains Paul Moran, ESBI consultant and surveying expert. "Most of the records of the lands acquired, including the all-important maps, were of course paper and in many instances only a single copy remained on file. There are other important property-related records and associated maps, notably the many rights of way and wayleaves that had been negotiated with landowners over the years."

Yet another important category involved farmland that was deemed to be vulnerable to flooding in the catchment area of the hydro-electric power generation schemes, from the original Shannon Scheme through others on the Erne, Lee, Liffey. "With the major schemes there are literally thousands of acres involved which were acquired freehold by ESB when the projects were carried out." That is an excellent example of the importance of mapping, Paul Moran points out, because the original land acquisition and flood compensation agreements were often based on contour lines rather than marked boundaries. "So decisions today or tomorrow would be totally dependent on the original map."

In that broad context the map digitisation project was driven to a large extent initially by the business governance need in ESB Estates Management for a satisfactory disaster recovery solution and the capability of accurate reprinting as required. The technical considerations then extended to aiming for compliance with Property Registration Authority (formerly the Land Registry) requirements and the newer OSI standards including the move on from Irish Grid 1975 coordinates to the Irish Transverse Mercator (ITM) adopted by the OSI and OS Northern Ireland in 2001.

Last year the ESB, advised by ESBI, went to tender for the digitisation of its mapping records. The contract was won by Amicus Technology of Galway, a highly regarded CAD and GIS consultancy firm and also an Autodesk reseller and trainer. "In many respects this was a very straightforward project for which AutoCAD Map 3D had all of the required capabilities," explains Mark Green, Amicus managing director. "The inevitable complications and wrinkles arose principally from the nature of the source material, which meant that the process required attention to detail and human judgement for every item."

The task involved scanning and digitising over 800 original maps, not always in the best condition and many of which were on old canvas type paper that demanded sensitive handling. All of them were large format (A0 or equivalent, about 1,000x800mm) mono Ordnance Survey sheets, hand coloured in water colour wash to delineate land and property parcels of different categories. "For obvious reasons, ESB insisted that the scanning work be done at its head office archive. So we transported our large format roll-feed scanner to Dublin and two experienced technicians spent over three working weeks scanning all of the maps."

The technical aspects were specified by ESBI, Mark Green says. "There were two key objectives: to generate a digital copy of all maps so that the originals could be preserved in the archives, to be accessed only when essential, and to ensure that copies of any map or section could in future be printed as required with absolute fidelity to the original. A complementary requirement was that the digital information could be incorporated seamlessly in the ESB's current property management systems."

The initial scanning was done at 400dpi in 256 colours so that the colour coding and map details would be captured accurately. "These maps formed part of legal agreements for purchase or compensation. The hand colouring supported the written records in distinguishing between, for example, land acquired outright, land for which compensation had been paid—or offered and refused—and rights of way." These 400dpi scans are stored in the master database of property for printing and other ESB use as required. A separate copy set with resolution reduced to 200dpi in *.TIFF* format was produced for use in GIS systems, georeferenced to the up to date OSI vector maps.

"AutoCAD Map allowed us to overcome the raster/vector issues, plus the simple problems of original maps that were old, sometimes distorted and in any event subject to the limitations of 19th and early 20th century surveying compared to today's aerial and GPS technologies," Mark Green explains. In essence, each map is matched to a *.TFW* file containing the location coordinates, scale and rotation which can be used in any GIS system while the specified *.dxf* format allows for data exchange with any system. "A big advantage of Map is that it allows the export not just of the geometry but of the significant attributes in a format that all GIS software can use."

For administrative purposes, the maps are indexed to an Excel spreadsheet that contains all of the ancillary information for each land parcel and is in turn integrated with an Access database linked to the AutoCAD Map files. These are the platforms for ESB's ongoing property management and digital land registration processes with the PRA. "Perhaps surprisingly, accessing and searching all of this information is highly important in the day-to-day management of the ESB, especially in legal matters, and ease of use through MapGuide is saving hundreds of valuable man-hours," Mark Green sums up.

He points to the Shannon area as an excellent example: "ESB has often had issues where the waterline or water course route has shifted over time from the original purchase or compensation agreement. Local knowledge has all too often disappeared with time and ownership changes while many property purchases in the past were not registered with the Land Registry, common practice in statutory agencies historically. So the only definitive records are those maps and documents in the custody of ESB, now digitised for 21st century administration." The target of ESB Estates Management is that there will be 100% registration of all of its properties with the PRA and in compliant mapping format. This will integrate with the ESB's GIS system for ongoing property asset management, including leases and licensing such as grazing, and linked in turn to workflow systems such as rent invoicing.