

Accuracy of the digital cadastre

Origins of the digital cadastre

Introduction

The Digital Cadastre Parcel Layer is produced and maintained by Land Information New Zealand (LINZ) and is a component of the digital cadastral dataset available from LINZ through the Bulk Data Extract (BDE) and third party resellers. The parcel layer is a digital spatial model representation of the parcel boundaries defined by approved land transfer and survey plans lodged with LINZ. The digital cadastre is used by many organisations including government departments, local authorities and private sector organisations specialising in GIS and land information systems.

Cadastral record maps

Prior to the mid-1980s, cadastral record maps were the mechanism used to provide a seamless map of New Zealand's land parcels. These hard copy maps were created at a variety of scales, which depended on the intensity of land use. These scales ranged from approximately 1:400 in some urban areas to 1:50,000 in remote rural areas.

As an example of the accuracy limitations of these cadastral record maps, a 1mm error on a 1:50,000 map corresponds to a 50m error in the plotted positions of the digital cadastre.

Digital Cadastral Database

From the mid-1980s, the cadastral record maps were digitised to form the Digital Cadastral Database (DCDB). Work was carried out to address some of the worst errors in the cadastral record maps, but many remained. Some additional errors were also introduced by the digitisation process. As new survey data was submitted, improvements were made to the positional accuracy of the DCDB parcels.

Landonline

Landonline was developed by LINZ to manage New Zealand's survey and titles systems. Between 2000 and 2002, spatial data from the DCDB was progressively added to Landonline. For more information on the DCDB and cadastral record maps, click <u>here</u>. (http://www.linz. govt.nz/survey-titles/landonline-data/landonline-bde/bdedocumentation/dcdb/characteristics/index.aspx)

The Survey Conversion Project

The positional accuracy of the DCDB data was not good enough to enable many of the benefits of Landonline to be realised. The Survey Conversion Project entered parcel dimensions (bearings and distances) into Landonline to improve the accuracy of the digital cadastre. About 70% of parcels in New Zealand, mainly located in urban and intensive rural areas, were targeted by the project. The accuracy of about 30% of the cadastre, predominantly in rural areas, is largely unchanged from the original cadastral record maps.

Accuracy of the digital cadastre

Accuracy, particularly in non survey-accurate areas, can be variable. Every node (including parcel layer nodes) in the BDE has a Landonline accuracy order which relates to the accuracy of the spatial location. Generally speaking, the spatial accuracy of a node is better where the node's position has been determined by using either surveyed bearings and distances captured from survey plans or adjusted survey data. The table below indicates the expected accuracy in survey-accurate and non surveyaccurate areas.

Accuracy status	Land use	95% accuracy ¹	Landonline accuracy order²
Survey-accurate (bearings and distance captured from survey plans)	Urban	0.20	7
	Rural	0.50	8
Non survey- accurate (digitisation of cadastral record maps)	Urban	5	9 or 10
	Rural ³	20	10
	Remote rural ³	100	11 or 12

¹ 95% of boundary points are more accurate than this value.

 $^{\rm 2}$ A number between 7 (most accurate) and 12 (least accurate) indicating the accuracy of boundary coordinates in Landonline.

³ In the digital cadastre a rural area is one where coordinates are mostly order 10 and a remote rural area is one where coordinates are mostly order 11 or 12.

The Spatial Parcel Improvement project

In mid-2010, LINZ began a two year pilot to improve the accuracy of the digital cadastre in non survey-accurate areas. The Spatial Parcel Improvement (SPI) project is capturing bearings and distances from existing survey plans, with a focus on urban and intensively used rural areas not covered by the original Survey Conversion Project.

The objective of the project is to have 95% of the coordinates in these areas accurate to two metres.

Here is an example of a non survey-accurate area that had displacement of up to 45 metres and after correction to better than two metres.



The cadastre before re-alignment - Rangiputa Township



The cadastre after re-alignment - Rangiputa Township

FURTHER INFORMATION

For more information see the <u>SPI project section</u> on the LINZ website. (http://www.linz.govt.nz/survey-titles/stats-projects-notices/spatial-parcel-improvement/index.aspx)