Use of Digital Historical Maps in the Property Formation of Sweden

Ewa Qvist
M Sc Land surveying, Head of the Cadastral Authority in Skåne
Lantmäteriverket, Sweden email: ewa.qvist@lm.se

Abstract
This is an introduction to a method of using digital historical cadastral documents. Furthermore it describes how the documents produced in the cadastral procedure are transferred into the digital archive.

This paper begins with an outline of the Swedish legislation related to the cadastral procedure and the characteristics of relevant register and archive and their use in property formation. Finally a description is given of the addition to the digital historical archive.

Introduction

General Facts About Sweden

Sweden is a Nordic country of about the same size as Spain, but just below 9 million inhabitants. The majority of the population lives in the southern part due to the topography, clime and historical reasons. Stretching over 1500 kilometres, the south is mainly agricultural land, the central is mixed with forests, while the north is characterised by forests and mountains. Many important cities have been established all the way from the west coast up to the Gulf of Bothnia.

Figure 1 Sweden in Europe

Administratively the country consists of 21 counties, divided into 290 municipalities. Private persons, companies, organisations, municipalities or the state owns all land. There are today more than 3.2 million real property units in the Real Property Register.

Gustafsson Stefan: Digital Historical Maps, Final Report juni 2001, Lantmäteriverket, Sverige
Aim and Structure of the Paper
The aim of this paper is to present a brief introduction to the Swedish cadastral system, the property formation procedure and how the digital cadastral archive is used in the daily work.

Real Property Transaction without Notaries
Unlike many other jurisdictions, the Swedish cadastral system does not include any notaries when properties change owners. The strict requirements of form for this are that the deed must be a contract of writing, including the property unit designation, the purchase sum and an explicit note that the vendor transfers the property to the buyer. Both parties must also sign the contract. Within three months the new owner is due to apply for title. If a land transaction only concerns a part of a property, it needs to be followed by a property formation in order to be valid. If not, the transaction is null and void.

The Cadastral History
The cadastral system in Sweden originates from the 16th century, when the king Gustaf Wasa imposed tax on landholders around the country. These early recordings only covered information about possessor and liability to pay tax and was documented in books by the Crown.
Nation-wide small-scale geometric maps were created in 1628 and later. At that time the rural villages were split up into very small parcels, leading to difficulties in individual farming. The extensive enclosure movement spread around the country (land consolidation and re-allotment project) during the early 19th century. Much of the basic parcel structure of that time can still be found in the countryside today. Many arable and forest boundaries hence date over 150 years back.

Real Property Formation

Combination of Two Procedures
In Sweden, the property formation process comprises both a cadastral survey and the subsequent change in or addition to the Real Property Register. One (state or municipal) Cadastral Authority handles the whole process. All documents in this process are collected in an act, which is put into the archive and then digitized. The documents in these acts are the official content of the real property.

Cadastral survey
Cadastral surveys are usually carried out at the request of one or several property owners, according to some type of agreement. Subdivisions for housing purposes are the most common actions. Another frequent category is reallotment (mutation of existing properties) of various ranges, concerning arable and forest land as well as urban land.
In order to realise infrastructure projects and other exploitations for public needs, the state or municipality may also apply for cadastral surveys. This can be based on agreements as well as being coercive. According the Swedish land legislation, some compulsory purchase can hence be executed through property formation (re-allotment) conducted by a cadastral surveyor. Cadastral procedures are generally considered more efficient than the court processes, which is the reason why exploiters often choose surveyors as their tools in order to acquire land by coercive means.

Real Property Registration
Until a new lot is registered and given its unique designation the administrative property unit does not exist. When registered, all properties are listed in the Real Property Register according to their designation.
The registration procedure generates new indirect notes as well as direct changes in the written part of the Real Property Register. Alternations in the cadastral index map are made at the same time.

Samuelsson Göran: Det svenska Lantmäteriets digitala arkiv, Kart & Bildteknik 2004:4, Sverige
The Real Property register – a Joint Register

The real property register in Sweden contains its general part, of both a written part and a digital cadastral index map.

The general part, which is the official register of the country’s division into property units, contains information about property designation, acreage, location (by co-ordinates representing the centre of each parcel), affected property formation etc. The register is not complete. Before 1972, for example, the easement (servitude) and joint property units were not registered.

The cadastral index map covers all currently existing properties, showing their unique designations and approximate boundaries. It is always mirroring the current situation. Today almost the whole map is digitised, with exceptions of a few urban areas. Some boundaries do respond well to the cadastral maps, while others only represent a rough picture. The cadastral index map is, hence not a valid evidence for boundaries legal location.
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**Oversikt**

- Appuna Öregård 2:1
- Appuna Beställen 91:1
- Appuna 15:1
- Kyrlingsdén 1:1

**Vidarebeskrivning**

- Appuna kyrka
- Doktor Andersson
- Ulf Andersson
Figure 2 and 3 illustrate the document in the act with legal description. Figure 4 illustrates how this is represent in the cadastral index map.

Figure 5 is a map from a land consolidation act.
The Archive

There is a cadastral archive in every cadastral authority. The total content is about 2.6 millions acts with a side number of more than 50 million. There are original documents from four hundred years until today. The archives are very much used. Every year at least 2000 000 acts are in use, most of them in the property formation process. These imply a great wear of the archive. It is necessary to protect them for the future. The archive is very much used. Every year at last 200 000 acts are in use, most of them in the property formation process. This implies a great wear of the archive. It is necessary to protect hem for the future.

A average archive in a county content about 100 000 acts, corresponding about 2 millions documents and at least 100 000 maps.

Lantmäteriverket decided in 1998 to digitalize all cadastral archives owned by Lantmäteriverket (that means that the cadastral archive in some municipal were not automatically digitised.) Work is going on to scan all the documents and this work is expected to be completed in 2008. All the origin paper documentation is kept in a depot.

The archives are scanned as picture files. The whole cadastral archive will contain about 60 million picture files and in original format it is more than 130 TB data. Today the picture files shown in Internet are store at the DjVu-size while the archive version is store at Tif-size on record in a robot.

The digital archives as whole are available for those working with real property formation
All digital historical maps (older than 100 years) are available on the Internet which ensures that the documents can be used in other areas than real property formation. For example by using the information in the digital archives, culture researchers can discover new historic sites that should be preserved for the future. The environment researchers can monitor changes in the environment over years and researchers of genealogy can find out property holding possessions of late relatives.

The Technical Procedure for Property Formation

The property formation started with a written application. This document can be scanned.

The land surveyor who undertakes a property formation function has all required information available in his desktop computer; this includes the historical act with its map and a description. The historical map can be imported as a layer and combined with the current map using the GIS functions of the program ArcCadastre.

A field survey takes place and it is common that GPS is used to collect field data. This data is used for computations and to contract the new map using ArcCadastre as well as to update the cadastral register. A map is produced, a printed copy as well as a digital document and this is added to the historical archive.

All documents drawn up by the surveyor can be electronically signed.

The whole new act is now electronic and is added to the historical archive.

In 2005, not all of these functions are in use but the process is in progress.