

# Quality Improvement of the Cadastral Information in Sweden

EWA SWENSSON, Sweden

**Key words:** Cadastre, quality, legal coordinate cadastre

## SUMMARY

This is a summary on the paper on quality improvement in the Cadastral Information in Sweden. This explains the statement about different quality levels in the Real Property Register and the Cadastral Index Map. There is also a discussion about the possibility to give the coordinates legal status for boundaries.

Det här pappret beskriver kvalitetsarbetet i fastighetsregistret. Det förklarar också ställningstagandet om olika kvalitetsnivåer i fastighetsregistret och den digitala registerkartan. Pappret innehåller också en diskussion om att ge koordinater legal status för gränser.

# Quality Improvement of the Cadastral Information in Sweden

Ewa Swensson, Sweden

## GENERAL FACTS ABOUT SWEDEN

Sweden is a long country in the north of Europe. It extends from approximately 55 degrees N in the south to the 69 N degrees in the north. In size Sweden is comparable with Iraq or Spain. Bulgaria and Zimbabwe are countries with approximately the same populations as Sweden, about 9 million.

The majority of the population lives in the southern and middle parts of the country due to topography, climate and historical reasons. The south is mainly agricultural land, the middle is mixed with forest and the north is characterised by extensive forests and mountains.

Administratively the country consists of 21 counties, divides into 290 municipalities. All land (and water) in Sweden have a legal and registered owner, such as private persons, companies, organisations or the state itself.

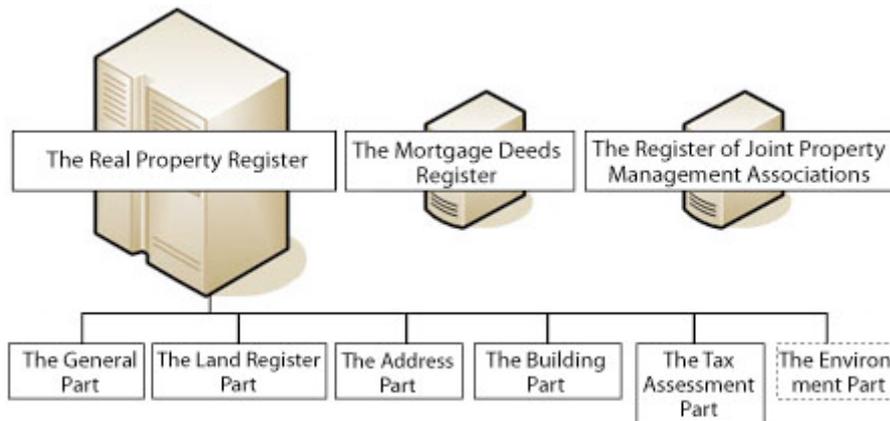
## THE REAL PROPERTY REGISTER

All land and all inland water, except the four biggest lakes, are divided into real properties. Today there are about 3,3 million administrative units.

Lantmäteriet manages and develops the Real Property Register, the Mortgage Deed Register, the Real Property Price Register and the Register of Joint Property Management Associations. Updates are taken care of by cadastral authorities, land registration authorities, municipalities and others.

The Real Property Register rests on statutory provisions. Among other thing the provisions show how the Real Property Register should be led, for which purpose the personal data can be used and what information the register will contain. The register is made up by five parts: The General Part, the Land Register Part, the Address Part, the Building Part and the Tax Assessment Part.

The General Part is the official register over Sweden's division into property units and joint property units. The General Part contains information about properties and joint property units, coordinates, plans and provisions, blocks, joint facilities and index map.



**Figure 1 The Real property Register**

The Land Register Part contains registration of ownership and site leasehold information, such as purchase price, purchase data and owner. The part also contains mortgages, rights registrations, notes and information about older conditions.

The Address Part contains information about physical addresses and certain added information, such as popular name, postal code and township.

The Building Part contains information about building that hold dwellings, non-residential premises, industries etc. There is information about, for example, the situation of the building and information from the address part and the tax assessment part. The building part also contains certain supplementary information, such as alternative names etc.

This paper has its focus on the General part of the Real Property Register.

## THE CADASTRAL HISTORY

The Cadastral History in Sweden originates from the 16<sup>th</sup> century, when the king Gustaf Wasa imposed tax on landholders around the country. This early recording only covered information about possessor and liability to pay tax and was documented in books by the Crown. There was no mapping.

Nation-wide small-scale geometric maps were created in 1628 and later. At that time rural villages were split up in very small parcels. The extensive enclosure movement spread around the country by land consolidation and reallocation during the early 19<sup>th</sup> century. Much of the basic parcel structure of that time can still be found in the countryside today.

During times more and more information has been registered, e.g. are no servitude registered before 1970. From earlier times there are also a lot of joint property units all over the country. Usually they are not in the Real Property Register and are sometimes difficult to find. From time to time the rules about the contents in the Register have varied. It means that it is not completed.

## **CADASTRAL PROCEDURES**

All changes that are made to a real property unit must be done through a cadastral procedure. New properties can be formed and existing properties reformed: a cadastral procedure can also involve checking boundaries and creating rights so that, for example, several properties can jointly use a road or a broadband cable. Real property owners, purchasers or holders of other rights who want cadastral procedure to be carried out must apply to a Cadastral Authority.

The cadastral procedure is documented in dossiers. The dossiers describe the changes of the properties. They do not describe all properties after the procedure. The dossiers in the archive are the strict legal description of the properties and its origin.

The Real Property Register and the Archive are linked, digitalized and are made public for reading. Costumers, who want information from the Register into their own systems, have to make an agreement with Lantmäteriet and have also to pay for distribution.

## **THE GENERAL PART OF THE REAL PROPERTY REGISTER**

The General Part of the Real Property Register consists of mainly two parts: The Real Property Register, which is a description of the data in text format, and the Cadastral Index Map, which is a geographic representation of cadastral data. These two parts are closely connected and are intended to be merging in one joint database. This new database is based on Inspire and the work in LADM (Land Administration Domain Model).

The General Part of the real Property Register contains information about:

- Administrative identity
- Extension, central coordinate position
- Share of joint property unit
- Share of joint facility
- Rights
- Plan, regulations and other information from the plan register

This paper is not on address or plan regulations.

The Cadastral Index Map constitutes a systematically constructed atlas divided into sheets. The atlas is compiled on the basis of a map or corresponding input material. Depending on the circumstances the various sheets of the Cadastral Index Map shall be compiled on one of the following scales: (1:500), 1:1000, 1:2000, 1:5000, 1:20 000, 1: 50 000 or 1:100 000.

The cadastral maps in scale 1:500 – 1:5000 are only for the urban areas (prime maps), these are based on modern municipal base maps of high standards – 2 or 3 layer. Lantmäteriet has made an agreement with the municipalities for getting better data in the national digital cadastral map, stored in a database at Lantmäteriet.

The cadastral maps in rural areas are in scale 1:20 000, 1:10 000 and 1:5000. These are made with a new generation of Land use map, based on ortophoto (instead of aerial photos). They are also in 2 or 3 layers. The Cadastral Index Map has quality-marking of single features about source of data and geometric accuracy but this information is not publicly accessible.

## THE BOUNDARY AND ITS HIERARCHY

Since the 16<sup>th</sup> century all boundaries have been marked on the ground, mostly with iron posts or pegs. In modern times, when GPS is used in the measures, it is allowed to use the coordinates and a simpler form of boundary markings. But, this is important: the landowners must understand where the boundaries are and the boundaries must be possible to reconstruct. The Swedish Land Code states a fairly clear hierarchy of boundary evidence. (See figure 2)

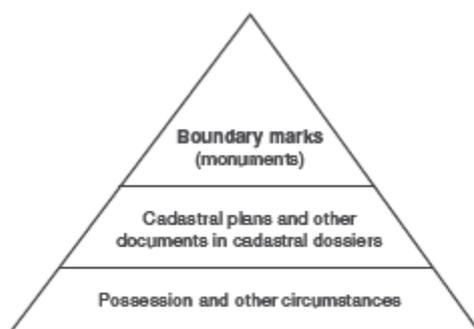


Figure 2: Top to bottom hierarchy of boundary evidence.

(Andreasson K 2009)

As shows in the figure the digital index map has no legal status. This map is only an illustration of what is stored in the archives. In reality there often is a need to read the dossiers.

Some boundaries have other origins than formal cadastral procedure, e. g older informal (private) division of land or expropriations. This properties often lack coordinates or other numeric information.

If disapproving of a property definition order made by the Cadastral Authority. When the decision has gain legal force, it is accordingly noted in the Real Property Register and thereby effective from then on. There are very few disapproving disputes in Sweden. Most people know where they have their own boundaries.

## NEW CLIENTS – NEW DEMANDS

During the last years and due to the new possibilities created by the rapid development of the IT-system the demands of the system have increased dramatically. Demands on

dissemination, from partners and the market, but also from the public society itself have pushed on the development of dissemination system. The customers want to have complete and correct information but the Real Property Register and the Cadastral Index Map have a lack of information and has neither enough standards for comply to the users' requirements. A special demand is to create better GIS-functionality, use standards and get understandably and useful metadata. Some customers also want boundary-coordinates with legal status.

Though the archive is public and digitalized it is difficult to read and understand the older dossiers.

## **MAIN AIMS FOR THE GENERAL PART OF THE REAL PROPERTY REGISTER**

Some goals have been declared for the General Part of the Real Property Register in Sweden

- Part of the infrastructure.  
The register is a base for many other registers with connection to land in some form.
- Registration made by the original source  
The organisations or authorities who make the legal decisions should also be able to update the register
- Flexible for new demands  
As a base register it must be possible to extend and adapt for new demands
- The price must be relevant  
The customer must think the price for the information is relevant
- The administration for the register is cost-effective  
It is easy to manage the register
- E-government  
The register should be a corner-stone in e-government.

## **DEFINITION OF QUALITY**

In this context quality is defined as content, actuality, completeness, correctness and structure.

## **THE WORK WITH QUALITY IMPROVEMENT SO FAR**

During the last five years there has been a project, called Albin, which has worked with quality enhancement purpose. More than 50 people have been involved in the project and it has cost more than 10 millions euro.

The main goal for the project has been to prepare introduction of the new modern Real Property Register, merging of the text format and the cadastral index map. The result of the project is that there now is a closer connection between the text format and the cadastral index map.

## **VISION FOR THE GENERAL PART OF THE REAL PROPERTY REGISTER**

A vision for the coming 20-30 years has been formulated as:

### ***You can always rely on the Real Property Register***

This means that a customer's judgement or decision usually can be based on the Real Property Register without other examinations. In some extraordinary case it always will be necessary to make research in the archive.

## **STRATEGY FOR THE VISION**

The time for implement the vision depends on how much money Lantmäteriet decide to spend on this. The strategy is formulated for the next coming ten years.

- Content

The register contains of all information about the definition of a property or joint unit and its extension, its rights and obligations according to constitutions.

- Actuality

All information should be available as soon as a legally decision has been taken

- Completeness

All properties and joint unit with its owners are in the register.

All easements with its servient property unit and dominant property unit are in the register according to constitution

All joint facilities unit and the properties share in it are in the register

All property units, joint units, easements and joint facilities have a geographic representation

- Correctness

All information about property units, joint units, easements and joint facilities has a geographic representation.

Different quality-levels and goals shall be defined. The levels can vary for different parts of the country and between rural and urban areas.

- Quality-marking and metadata

The quality-marking must connect to the ISO-standard. It must also be understandable by the costumers. The quality-marking can be used for quality-declarations.

When the quality-marking has been introduced and accepted by the customer, it can be possible to introduce a legal coordinate cadastre in some defined quality-levels.

## **ACHIEVEMENT OF THE STRATEGY**

Some starting points are important for the quality improvement:

- **Guarantee a long-time financing**  
Many parties are interested in the quality improvement but usually they want some other to pay for it. There is not enough Governmental subsidies
- **Develop regulations and methods**  
Some types of easements e.g. are not in use anymore. There is no need to have them in the Register. We are also trying to find better methods for simplifying the work.
- **Right priority**  
It must be the customers who give the priority to the quality project. We must find methods to find out the customers' needs.
- **Formulate clearly quality goals**  
The different levels must be clearly defined and depicted. They must be understandable for the customers. They can differ from urban and rural areas.
- **Long-times cooperation**  
There are other organisations which produce geographic information, e.g. when roads and railways are built. This information is sometimes better than in the Real Property Registers.
- **Rely on long-term competence**  
The knowledge about older registers and legislation and also how to read old texts are in the head of people who soon are retired. There is a challenge to transfer this knowledge to younger persons.
- **Quality Control before updating**  
New information provides the Register every day. There must be better quality controls before updating the register. "Right from me"

## **GUIDELINES FOR PRIORITIES**

The main goal for quality improvement is to increase the use of the information due to new demands. The priorities for the coming ten years are as follows:

- **Complete quality improvement carried out in well defined areas**

- Thematic improvement carried out for the whole country
- Improve better external quality in some priority areas
- Define and introduce quality levels and descriptions

## CONCLUSION

The General Part of the Real Property Register is a corner stone in Land Management. The registers origin is very old and not into line with costumers need or e-government. There is a great need of improvement but no enough financing is at hand. Lantmäteriet, as the responsible authority, has to find new ways of quality enhancement without losing the legal aspects. One way is to clearly define different quality levels, cooperate with other organisations and secure knowledge of older register and legislations. When the different quality-levels have been accepted and understandable there can be a discussion about legal boundary coordinates.

## REFERENCES

Andreasson K 2009: The Swedish Boundary System – Present Situation and Prospect for Change, The Boundary – CLGE Seminar in Bergen, Norway, 29-30 April 2009

The FIG Statement of Cadastre, FIG-publication no 11/1995

## BIOGRAPHICAL NOTES

Ewa Swensson obtained a M.Sc degree in Surveying at The Royal Institute of Technology in Stockholm 1974. After nine years of work as a cadastral surveyor at the regional cadastral authority in Härnösand , she was employed at the head office of Lantmäteriet (the Swedish Mapping, Cadastre and Land Registration Authority) in 1984. Her main assignment was develop and education in cadastral procedure. 1995-1999 she was head of the Cadastral Development Department in Lantmäteriverket. 1999-2004 was she head of the Cadastral Authority in Uppsala and Västmanlands County. 2004-2008 was she the head of the Cadastral Authority in Skåne and 2006-2008 also head of the Cadastral Authority in Hallands County. From 2008 she is working as a senior adviser of Cadastral Development at the Cadastral Department of Lantmäteriet.

Since 1976 Ewa Swensson have had different kind of Commissions in the Swedish Association of Graduate Engineers: Member of the Board, Audition, Head of the Election Committee and also Chairperson of the Academics in Lantmateriet

1994-1994 was Ewa Swensson expert in the Swedish Preparatory Group for habitat II.

Besides this Ewa Swensson was 2000-2003 chairperson in the Cartographic association in Uppsala County, Chairperson of the GIS Association in Uppsala County and 2002-2008

editor and publisher of “Kart- & Bildteknik”, the Swedish Association for Cartographers Magazine.

2008 -Ewa Swensson is Swedish delegate in the ISO working group for “Land Administration Domain Model”.

2008 - Ewa Swensson is member of the Board of Association for Chartered Surveyeimg, Property Evaluation and Transactions (Aspect ) and Swedish delegate in the Council of European Geodetic Surveyor (CLGE).

## **CONTACTS**

Ewa Swensson  
Lantmäteriet  
Box 505 90  
Se-202 15 Malmö  
Sweden  
Phone + 46 40 660 80 70  
Fax +46 40 660 80 14  
[ewa.swensson@lm.se](mailto:ewa.swensson@lm.se)  
[www.lm.se](http://www.lm.se)