

Cadastral Surveying as a Means for Restricting the Impact of Natural Disasters

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Key words: Cadastral procedures, easements, land consolidation, natural disasters, traffic accidents

SUMMARY

The Swedish system for real property formation is not only used to create new property units or restructure old units, but is also applied to an increasing degree to resolve problems of different types in connection with the acquisition of land and the creation of rights of different types in connection to infrastructure developments. Within the framework of a cadastral procedure it is possible to acquire land through compulsory measures for different purposes. The procedure is carried out by the Land Survey of Sweden, a government administration.

During the past few years, southern Sweden has experienced a series of devastating storms and other extreme weather conditions. Gale force winds have caused serious damage to overhead telephone lines and electricity power distribution networks which resulted in serious problems for the local population. Trees were also uprooted in the storm and fell across the contact wires along railways lines causing disruption and long delays, which gave rise to major problems, particularly for those industries that are dependent on goods transport by rail.

With a view to minimizing these problems in the future, power supply companies decided to implement a comprehensive programme for restructuring their networks, which included placing cables underground, and the National Railway administration wanted to eliminate the risk of trees falling across the railway. By creating a right – easement - through a cadastral procedure, companies can have the right to construct network with a new alignment and with guarantees that they can safely remain in place, or to fell all dangerous trees on other peoples land within a specified distance from the track.

In an attempt to decrease the number of road traffic accidents in Sweden, including those caused by snow storms and icy road conditions, the cadastral procedure have been used to make it possible to build cable median barriers on a large number of roads to reduce risk of collisions.

SAMMANFATTNING

Det svenska fastighetsbildningssystemet används inte bara till att nybilda och ombilda fastigheter utan även för att utveckla infrastrukturen i de delar den berör olika typer av

markanvändning. Med hjälp av förrättningsprocessen är det möjligt att med tvång få tillgång till eller lösa in annans mark för olika ändamål. Lantmäteriet styr över all fastighetsbildning i Sverige.

Södra Sverige har de senaste åren blivit drabbat av flertalet förödande orkaner vilka har orsakat stora skador på bl.a. luftburna tele- och elledningar och på järnvägsanläggningar. Fallande träd har orsakat strömavbrott, tågolyckor och förseningar. För att minska dessa problem i framtiden har både ledningsföretag och det statliga Banverket startat landsomfattande projekt för att säkerställa att inga avbrott och skador skall uppstå när Sverige blir drabbat av orkaner eller annat extremt väder i framtiden. Genom en lantmäteriförrättning tillskapas rättigheter – servitut eller ledningsrätter – vilka möjliggör ett säkert ledningsnät eller en säker banverksanläggning.

I strävan att minska antalet bilolyckor i Sverige bygger det statliga Vägverket s k mitträcken eller vajerräcken på större vägar. Med hjälp av lantmäteriförrättning löser man de kommunikationsproblem som uppstår när det inte längre är möjligt att korsa de större vägarna på samma sätt som tidigare.

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1 INTRODUCTION

1.1 The Swedish System

The Swedish system for real property formation, in the form of legislation and cadastral processes, including registration, is not only used to create new property units or restructure old units, but is also applied to an increasing degree to resolve problems in connection with the acquisition of land and the creation of rights of different types in connection with infrastructural development. Thus, within the framework of a cadastral procedure, it is possible to acquire land through compulsory measures for different purposes. In most countries, this is carried out through expropriation and decisions taken in courts of law. The fact that the Swedish cadastral procedure is such an effective tool is a logical result not only of forward-looking real property formation legislation, but also of the fact that real property formation in Sweden is a central government responsibility carried out by Lantmäteriet (the National Land Survey of Sweden). There are no private cadastral surveyors in Sweden. The Swedish system is considered to be both cost-effective and guarantor of legal security.

2 DEVASTATING STORMS

During the past few years, southern Sweden has experienced a series of devastating storms and other extreme weather conditions. Gale force winds have caused serious damage to overhead telephone lines and electricity power distribution networks which has resulted in serious problems for the local population. When one of these storms came in over Sweden from the North Sea approximately 30 000 km of overhead electric power supply cables were damaged and power supplies to 660 000 homes were severely disrupted. Two of Sweden's nuclear power plants were forced to close down production because of several breaks in the cables and because of the large amounts of salt spray that was blown inshore – so-called salt storms – and covered the distribution plant, which increased the risk for flash-overs¹.

There are many examples of homes which were without telephone and electricity for several weeks after that night.

¹ www.wikipedia.org



Before and after the storm²

Train, bus and ferry traffic stood still in large areas of southern and western Sweden. Because of the combination of powerful gusts of wind, which at times approached hurricane force, large numbers of trees were uprooted: it is estimated that 75 million cubic metres of timber³ was blown down in western Sweden. This is equivalent to three year's planned felling.

These large areas of severely damaged forest also had a negative impact on the environment: water quality in the worst hit areas was affected as the intensive run-off leached the ground; metals affected animal life and were brought to the surface in connection with clearing operations. The uprooted trees also increased risks for forest fires as well for attacks by damaging insects and other pests. All property owners were forced to extract the timber within a given time to avoid having to pay fines to the State. Total costs, including effects on future forestry production, have been estimated to SEK 10 billion⁴. According to media reports 17 persons lost their lives.

2.1 Utility Easements

With a view to minimizing these problems in the future, power supply companies decided to implement a comprehensive programme for restructuring their networks, which included placing some cables underground.

² www.energimyndigheten.se

³ www.svo.se

⁴ www.energimyndigheten.se

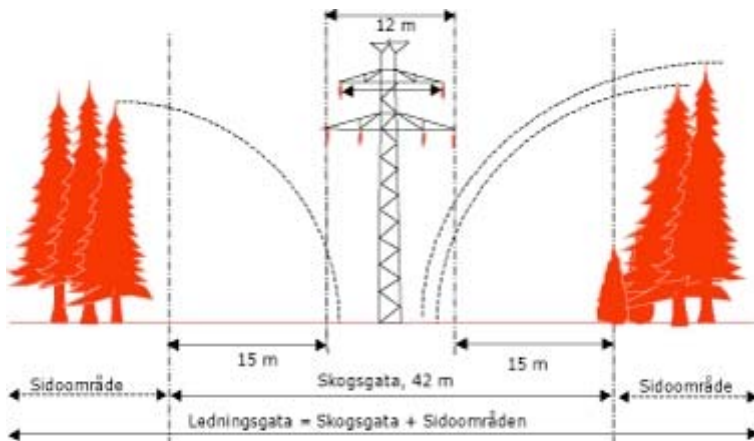


Figure 1: Clearcuts for major electricity power transmission lines and cables are widened in forest areas

The right to construct networks with a new alignment and with guarantees that they can safely remain in place, so called utility easements, is established through a cadastral procedure. Utility easements are linked to a given real property, or to the owner of the utility network, and are valid for an unlimited time. A utility easement is normally based on an agreement between the property owner and the owner of the utility network. Compensation is paid to the property owner when the easement is formed or changed. The decision concerning the utility easement should include: what the owner of the network is allowed to do within the property and what he is not allowed to do adjacent to it, the compensation that is to be paid and when access to the property is permitted.

2.1 Easements

The trees that were uprooted in the storms often fell across the overhead contact wires along railway lines causing disruption and long delays to both passenger and goods transport and also affected production in different sectors of Swedish society, particularly in those industries that are dependent on goods transport by rail. Replacement transportation had to be arranged at short notice. After the storm there remained a huge amount of work repairing overhead contact wires, clearing and repairing tracks and repairing damage to rolling stock. Following the storm it took a month before traffic was back to normal on all lines



Trees fell across contact wires

To eliminate the risk of trees falling across railway lines a right – easement - can be created through a cadastral procedure, which gives the National Rail Administration the right to fell all dangerous trees on other people's land within a specified distance from the track. Cadastral procedures are now being carried out, within a special project, throughout Sweden, with the aim of guaranteeing approximately 4 500 km of track from the risk of falling trees. These are the lines which are of particular importance for Sweden's provision of transport services.

This type of easement makes it permissible to clear all vegetation within a 20 metre zone on both sides of the track, measured from the centre line. Individual trees outside the zone can also be felled. Many of these 20 m zones are already the property of the National Rail Administration, which means that encroachment on properties owned by individual property owners' land will be relatively limited

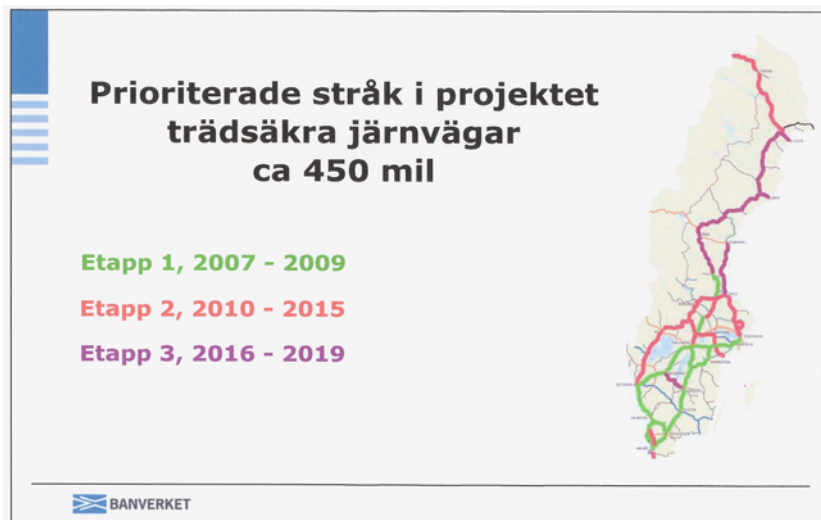


Figure 2: Lines that have been given priority in the project, approximately 4 500 km of track. Stages of the work 1-3

. There are properties along the tracks that have a relatively small area and where forming an easement would result in a large encroachment. In these cases security against falling trees will be arranged through the National Rail Administration signing an agreement with the property owner. Rights are thereby created without the need for a cadastral procedure.

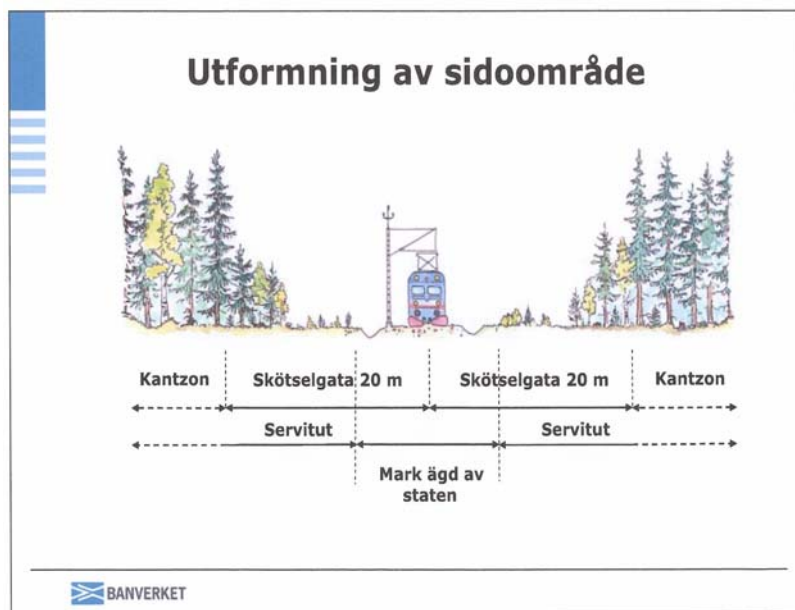


Figure 3: The layout of the lateral zones

An easement is a legal relationship between real properties which gives the owner of one property the right to use another owner's property in a defined way. An easement is not limited in time. In accordance with the Real Property Formation Act every property that is reformed must be suitable for the purpose for which it is intended to be used, and the benefits of the easement must be greater than any inconvenience that it may cause. A further condition is that the applicant's property must be improved through the formation of the easement. The easement must be of substantial importance for the preferential property. The compensation that is paid when the easement is formed should be equivalent to the decrease in the market value of the encumbered property. The property owner also receives payment for the forest that must be felled. An easement can be formed without agreement between the parties. The decision concerning the easement should include, amongst other things, the rights and responsibilities of the preferential property, the amount of compensation that will be paid and when access to the land can take place. When both utility easements and easements are formed the cadastral surveyor can act as both mediator and judge. As far as possible, within the framework of the cadastral procedure, the cadastral surveyor will always attempt to get the parties to reach a voluntary agreement, but if this proves not to be possible, the cadastral surveyor can take the decision.

3 TRAFFIC ACCIDENTS

In an attempt to decrease the number of road traffic accidents in Sweden, including those caused by snow storms and icy road conditions, cable median barriers have been built on a large number of 2+1 roads to reduce the risk of collisions. As the cable barriers make it impossible to cross the road and also block existing road junctions, cadastral procedures have been employed to create new road junctions.

These solutions mean that the number of junctions will be decreased by, for example, building parallel roads on both sides of the main road up to a suitable junction. These parallel roads can be either private roads for use for agricultural or forestry purposes or smaller roads for local traffic. Access to land for the new roads and the right to build and maintain them is gained through a cadastral facility procedure with support of the Joint Facilities Act.



Figure 4: A cable barrier

The roads, which become a joint facility following the cadastral procedure, are managed by the involved property owners within the framework of a joint property association. Joint property associations, with the associated articles, are also formed by the cadastral surveyor.

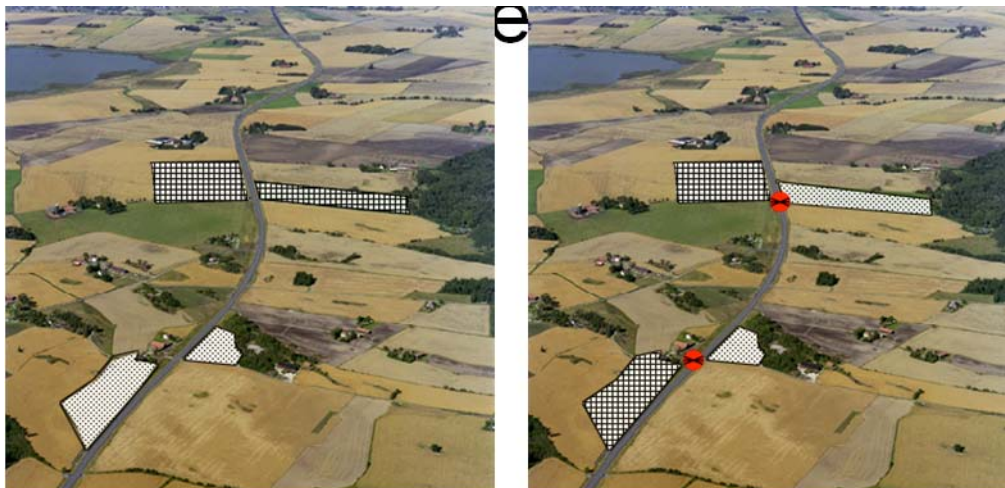
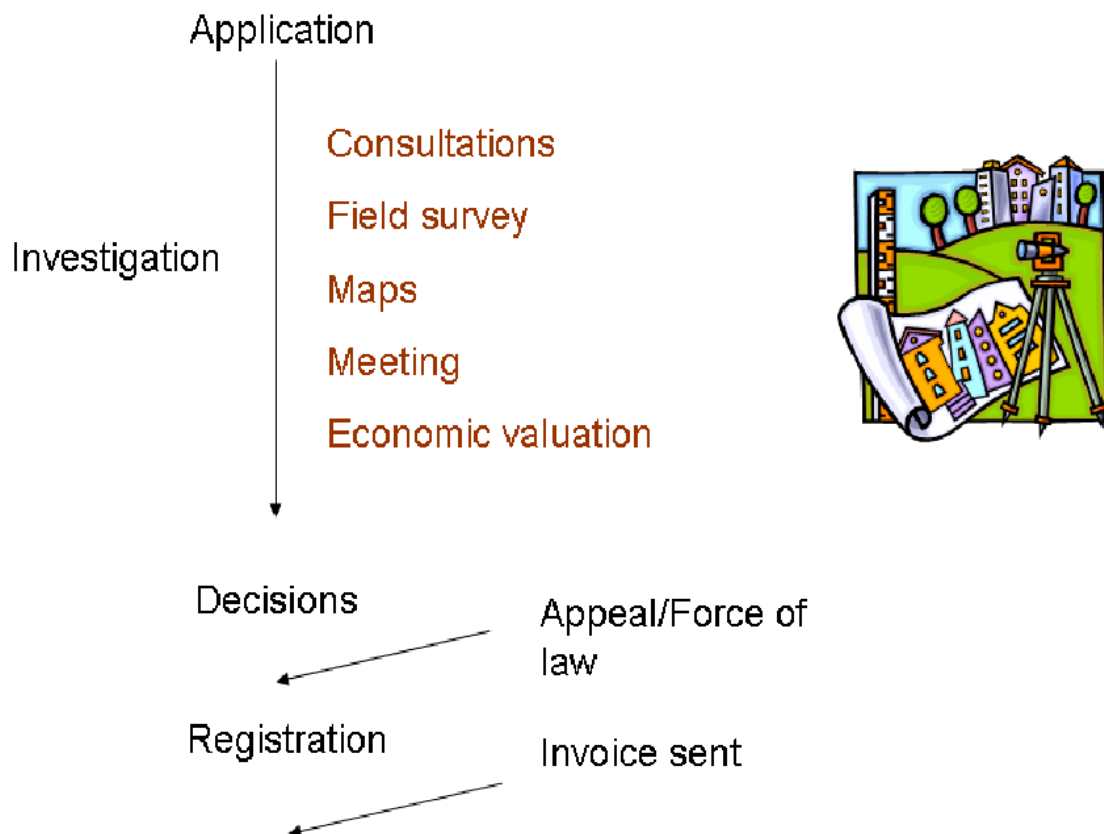


Figure 5: An example of land consolidation

In certain situations, as an alternative to building parallel roads and new junctions, it may be possible to exchange land so that the affected agricultural and forest properties form a merged unit on one side of the road which eliminates the need for crossing roads. These exchanges of land, re-allotment, are carried out in cadastral procedures with the support of the Real Property Formation Act. This is shown in the illustration above

4 THE CADASTRAL PROCEDURE

A cadastral procedure always begins with an application for a specific measure, such as the formation of an easement, to be carried out. As soon as an application has been received the cadastral surveyor begins an enquiry to evaluate whether the necessary pre-conditions for carrying out the requested measures exist. The cadastral surveyor must make an unbiased evaluation of the claims. Measures must be checked against the applicable legislation. During the enquiry research in the archives is carried out and checks are made in the Real Property Register. Maps and various lists are obtained to help identify the properties and owners that are involved. The cadastral surveyor also consults representatives for public administration such as the county councils and the local building committees. Where necessary, one or several meetings will be held with the property owners to keep them informed of progress and to obtain their comments and opinions. In addition, an economic valuation is carried out to obtain a measure of the potential benefits of the measures. As has been stated above, the benefits of an easement must outweigh the incontinence and costs it may cause. The cadastral land surveyor's enquiry must result in reliable basis for taking a final decision and satisfy legal requirements.



It is possible to appeal against the cadastral surveyor's decision. Normally, an appeal must be lodged within four weeks after the decision. If no appeal is made, the transaction will be

registered and made public in the Real Property Register. All documents, that have been received as well as those created by the cadastral authority are registered and saved in the digital archive.

BIOGRAPHICAL NOTES

Lars Jansson is a chartered land surveyor and is presently Deputy Director General at the National Land Survey of Sweden

Anna-Karin Lang is a chartered land surveyor and is employed at the National Land Survey of Sweden where she mainly works with cadastral procedures.

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