

The Swiss Cadastral System: a basis for security and prosperity.



knowing

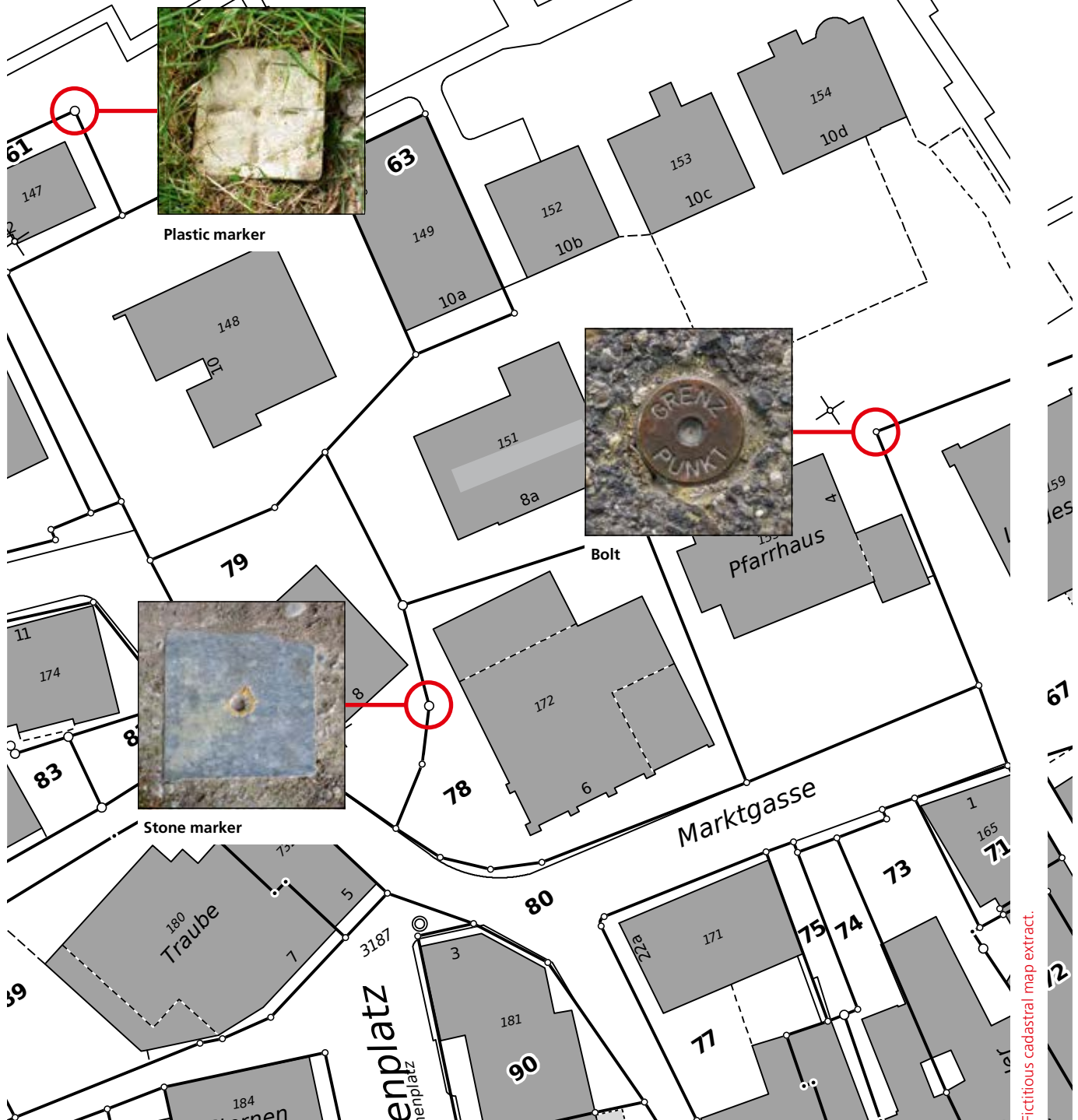
swisstopo



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Office of Topography swisstopo
www.swisstopo.ch

Guarantee of property: The cadastral system protects land ownership.



The main purpose of the cadastral system is to record and document property boundaries. These are compiled into the most important of all the cadastral products – the cadastral map, which is a comprehensive record of the location and dimension of all the plots of land in Switzerland and their geometric content (for example, buildings).

The boundaries are kept up to date and are legally binding. The map, together with the land register, thus secures land ownership in Switzerland. This is a prerequisite for a liberal state system and a prospering economy.

The cadastral system: multifaceted and of enormous benefit for society

One of the fundamental values of our democratic system is legal security. It is the duty of the state to regulate rights and obligations and to enforce the applicable legal provisions.

The cadastral system makes a valuable contribution towards fulfilling this duty by establishing the cadastral maps, thereby securing land ownership in conjunction with the land register's official records of land titles. The maps show the exact location and dimension of each plot of land, while the land register gives a legally binding description of the owner. Together, the cadastral maps and land register are thus the two pillars that guarantee ownership of land and real estate.

The cadastral system is also of great importance for the national economy: cadastral land surveyors – who can often be observed setting up their tripods and measuring instruments on roadsides – collect basic geographic data that represent an accurate picture of the country. This enables us to know where everything is located: buildings, gardens, farmland, lakes, rivers, forests, roads, railways, underground structures, construction projects, the boundaries between plots of land, etc. These basic geodata are used in a broad variety of areas, including construction planning, supply network mapping, navigation systems, city maps and tourist information.

This brochure provides a brief introduction to the cadastral system of Switzerland. We hope it will find your interest.

Innovation: the cadastral system supports progress – for example in the field of urban development.



It is estimated that between 60 and 80 percent of all political decisions include a spatial aspect, such as when a municipality is planning a new tram route or looking for new solutions to improve its district heating system.

Thus, spatial planning goes hand in hand with innovations: modern railway vehicles, smart technologies for easing traffic congestion, improved systems for protecting vital infrastructure, or a web application designed to display the locations of parking facilities for disabled drivers, for

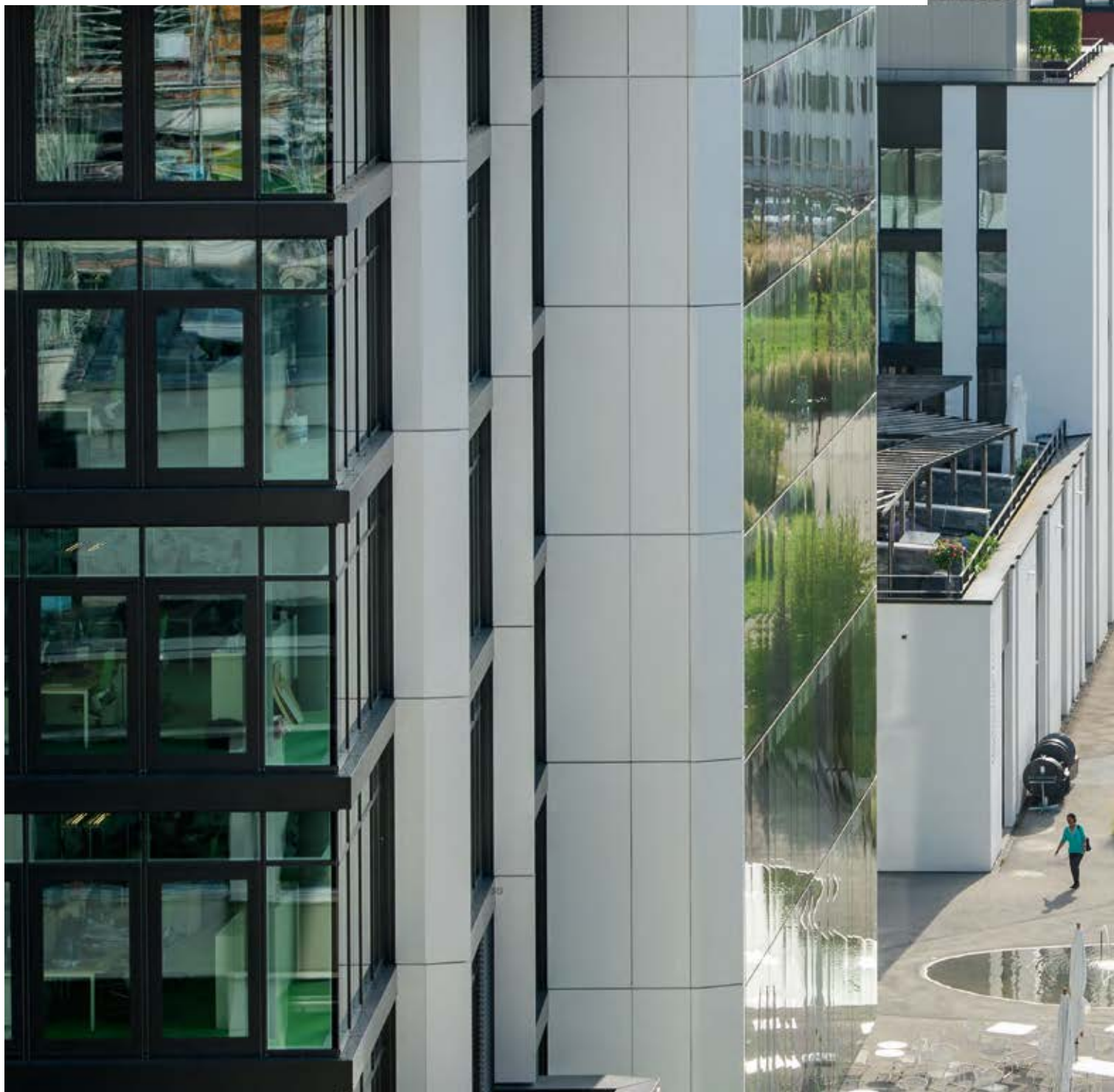


Example of advanced urban development: the Metro carriageway slab on the two-level Charles Bessières bridge in Lausanne.

example. All these innovations are based on the data provided by the cadastral system.

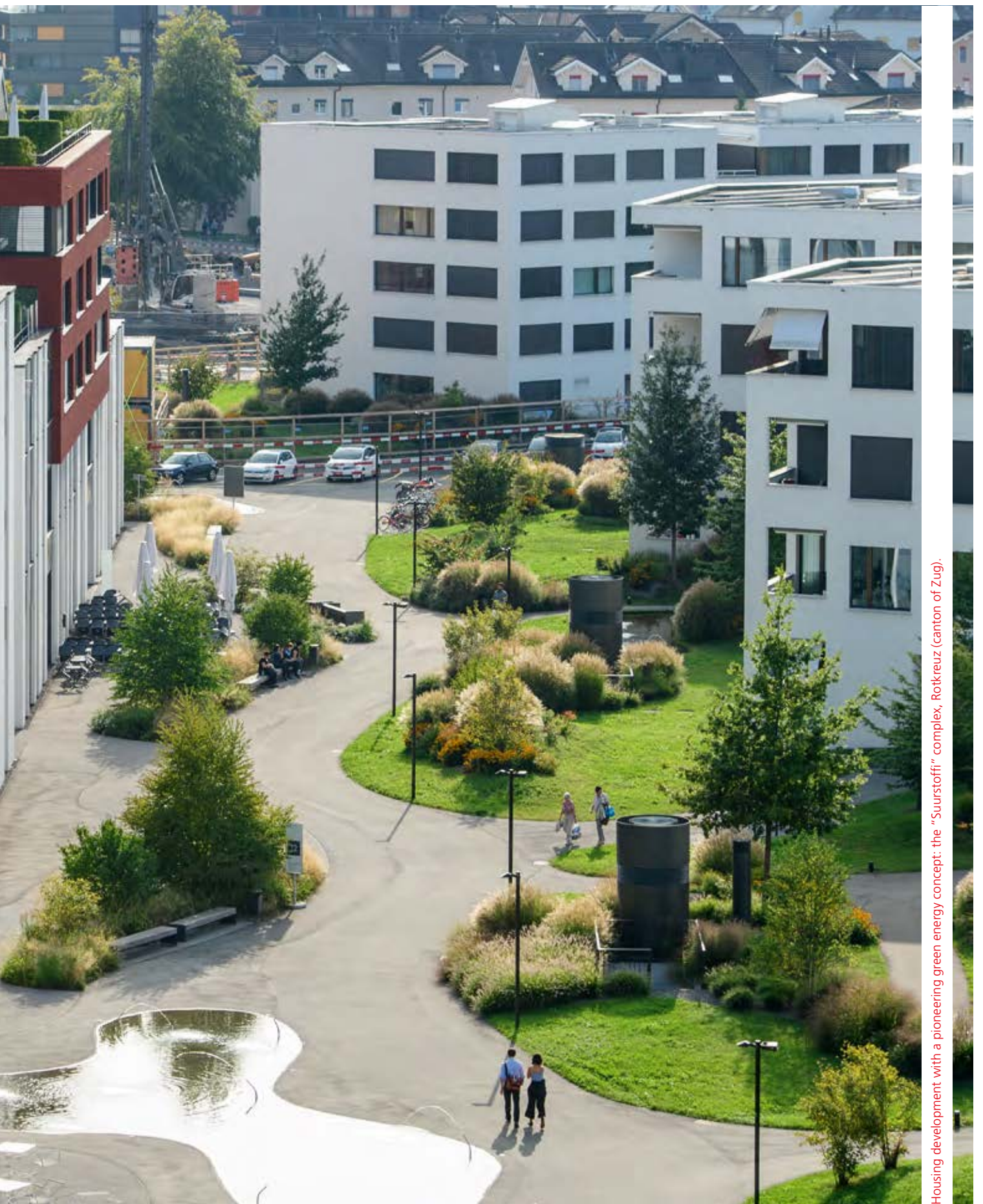


Value preservation and growth: the cadastral system promotes prosperity.



The total value of mortgage loans in Switzerland amounts to several hundred billion Swiss francs. Thanks to the land register and the cadastral maps, the banks, insurance companies and pension funds that grant this huge volume of mortgages can trust that, if they have done their due

diligence properly, these loans are secured by collateral of equivalent value. Both the maps and the land register are official in nature (i.e. legally binding). This guarantees stability, which in its turn is fertile ground for a favourable investment climate and sustainable asset growth.



Housing development with a pioneering green energy concept: the "Suurstoffi" complex, Rotkreuz (canton of Zug).

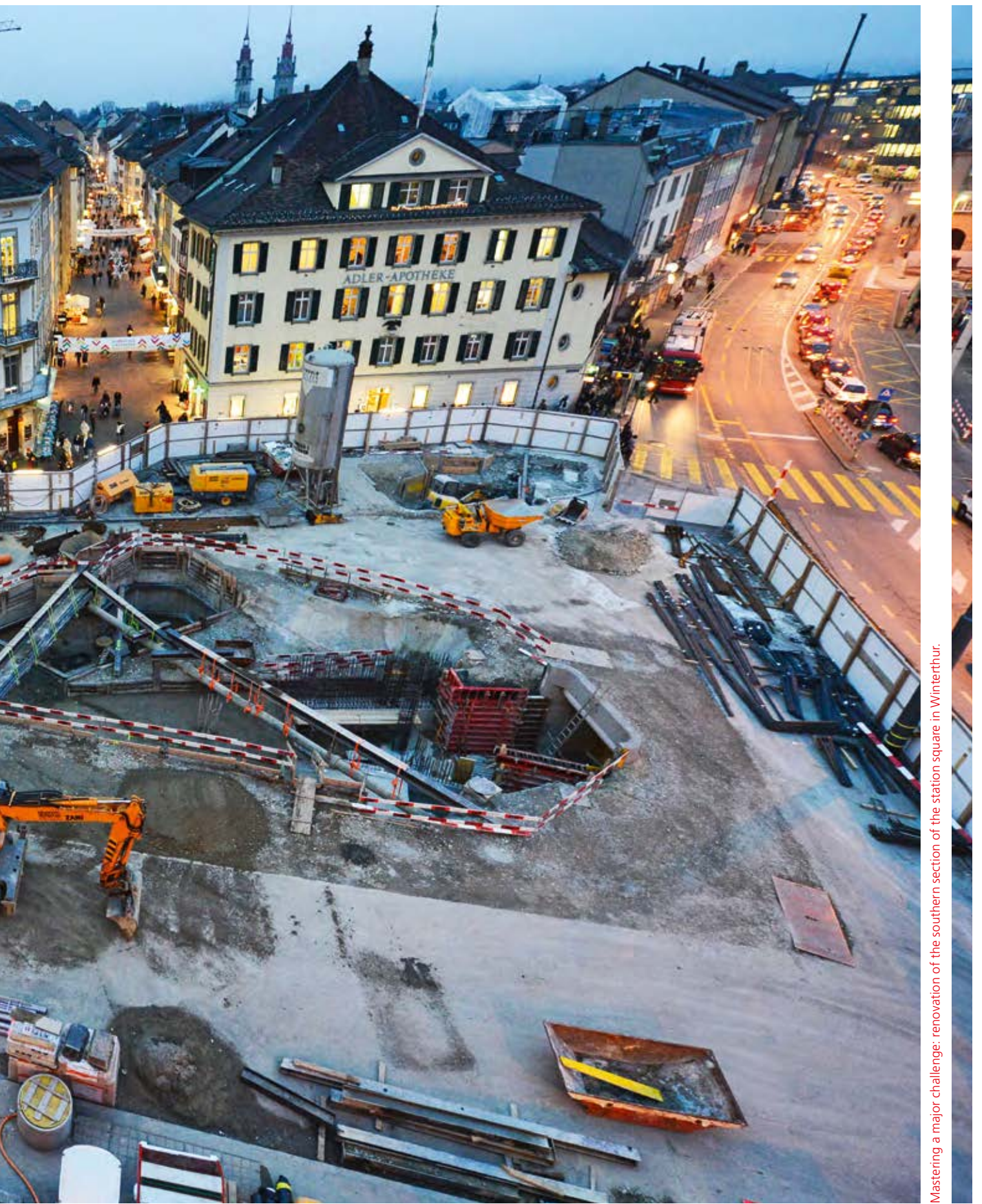


Planning security: the cadastral system provides reliable reference data.



Engineers and architects need to base their plans on accurate data. When buying an apartment, buyers need reliable documents. They and many other players in the business sector, public administration and private life want to benefit from reliable and accurate data provided by

the cadastral system. These data can be incorporated into other spatial and location-based resources, including geographic information systems, town and city plans, 3D urban models, zoning plans, supply network, cadastral plans, national geodata infrastructure, etc.



Mastering a major challenge: renovation of the southern section of the station square in Winterthur.

For the good of society: the cadastral system offers benefits for everyone.



Each of us benefits from cadastral surveying data, for example when using navigation systems. Farmers, too, use the global navigation satellite system (GNSS), for example to optimise the use of fertilisers, seeds and pesticides. Originally, the cadastral system was intended

for use solely in connection with the land register. Over time, however, it has become essential for numerous areas of private and public life, including spatial planning, nature conservation and national defence.



The A16 motorway through the Jura is the new transport route to the border with France (photo: stretch near Courrendlin in the canton of Jura).

Cadastral surveying: an ongoing task

The cadastral system of Switzerland is nearing completion, but this does not mean that cadastral land surveyors will then be out of work.



Cadastral surveying will always be an essential part of new infrastructure projects.

Survey marker, Airolo (canton of Ticino).

Top: cross-city link between Altstetten, Zurich main station and Oerlikon.

Bottom: passageway in La Sallaz district, Lausanne.

The face of Switzerland is constantly changing: new buildings and roads are being constructed all the time, plots of land are being subdivided or amalgamated, forests are growing, rivers and streams are changing course, and entire villages can be altered by natural disasters. Spatial changes have consequences for the cadastral system because its purpose is to depict reality as accurate as possible in order to ensure its economic and social value.

One of the main tasks of cadastral land surveyors is to update the cadastral surveying data. There are two types of updates:

Ongoing updates measure changes brought about by human activity, for example the construction of new buildings. Updates of this type can be carried out as soon as the responsible surveyor has been made aware of the change. For this purpose, a reporting mechanism has been established by means of which building projects are reported to cadastral surveying before construction work commences. The costs associated with ongoing updates are covered on a user-pays basis.

Periodic updates measure changes that take place without human intervention, for example a change in a forest perimeter. This type of update is required from time to time, and the associated costs are borne by the municipality or canton.

Surveying data: multifaceted and interdisciplinary

Cadastral surveying data are available in digital form (on a computer) or analogue form (on a plan or map). Digital data are available throughout the country as uniform and clearly structured vector or image files.

The surveying data encompass several information layers, for example nomenclature (place names), land parcels, buildings and other structures, and administrative borders (i.e. national, cantonal, district and municipal borders). The different types of data can be freely combined with one another and may also be linked with other data of spatial relevance, for example the noise cadastre, utility asset cadastre and zoning plan data.

Do you want to know more about cadastral updating?

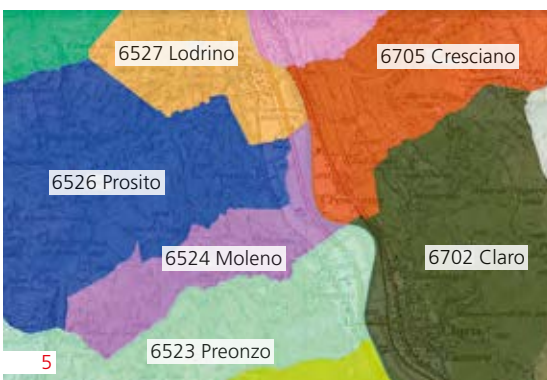
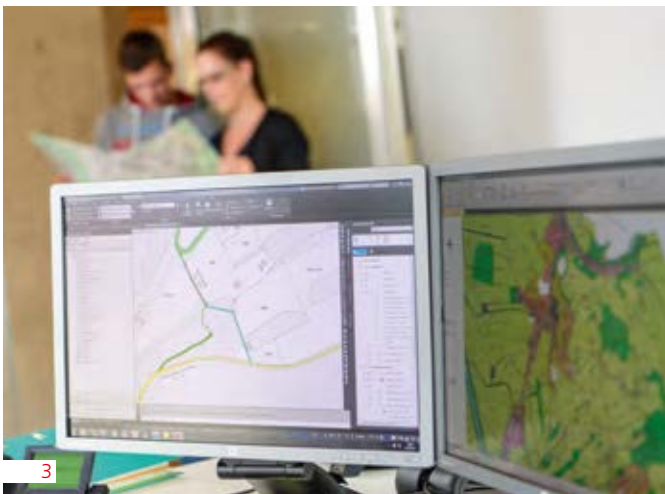
What happens if a land owner wants to change the boundary of his/her plot or have a new building added? How are the associated updating costs calculated? To find answers to these and other questions, visit:



• www.cadastre.ch/update

Data: their sources and uses

The cadastral system acquires data through various procedures.
The data are turned into products of added value.



Starting point and surveying methods

The data acquired by cadastral surveying are based on coordinates and heights recorded in the Swiss national survey. Designated control points that are precisely measured (location and height) provide the geodetic reference frames for all surveying activities in Switzerland.

At the federal level, the Federal Directorate of Cadastral Surveying at the Federal Office of Topography (swisstopo) is the authority responsible for cadastral surveying. Data are collected by the cantons and local surveying offices, whose personnel accurately survey the earth's surface using a variety of methods:

On the ground

- with conventional surveying instruments
- using the global navigation satellite system (GNSS)
- with the aid of laser scanning (contactless measurement of objects using laser beams)

From the air

- with drones equipped with cameras
- with photogrammetry (i.e. surveying on the basis of photographs)
- using laser scanning

Images on opposite page:

- 1 More than 3,000 specialists have been entrusted with the task of collecting, managing and updating data for the cadastral survey throughout the country.
- 2 Geomaticians also use drones in their daily work.
- 3 Data collected on site is processed digitally in the office ...
- 4 ... and made available to customers in accordance with their needs.
- 5 Map extract from the official index of towns and cities, showing postcodes.
- 6 Extract from the land register map.

Cadastral surveying products

- Cadastral maps: this is the most important tool for securing land ownership.
- CadastralInfo: this web service offers easy access to a broad range of real estate data.
- Official index of towns and cities: this data set includes postcodes and their respective perimeters.

The most important services

- The Register of Licensed Land Surveyors: a list arranged by name and canton of all persons qualified to carry out cadastral surveying and to update the cadastral maps.
- Information about the status of cadastral surveying: an overview of the progress of cadastral surveying and the quality standards of the respective data.

Cadastral surveying data not only flow into these products, but are also the basis for numerous other applications, as described above.

How to obtain information about land and property

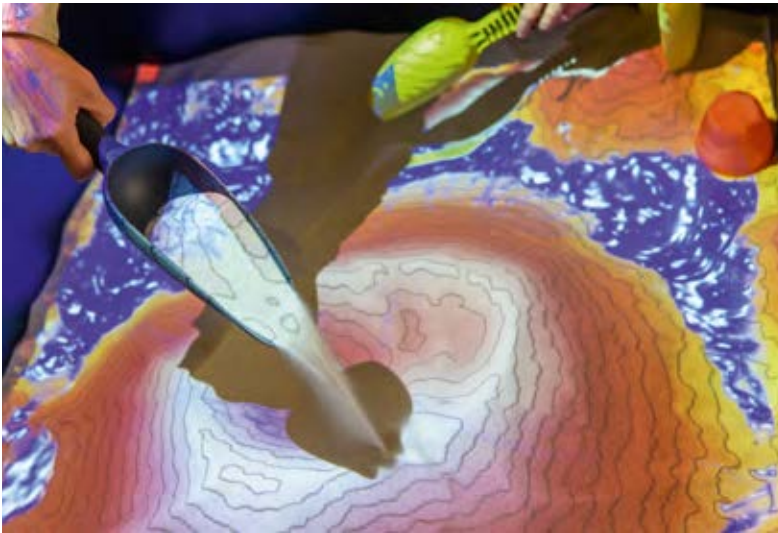
If you want to obtain information about a plot of land, simply go to www.cadastre.ch/info-en, then enter an address, and (if available) the name of the municipality, the plot number or national coordinates. You will get a variety of information, including views of the plot of land in question (map and aerial images), the responsible surveying office and a link to the cantonal geoportal.



- www.cadastre.ch/info-en

Know-how: specialised personnel required

The cadastral system offers attractive jobs throughout Switzerland requiring various levels of training.



Sandbox for professionals: the Augmented Reality Sandbox developed by SwissGeoLab brings topography to life! During experiments, landscapes can be altered, water flows can be simulated and the effects of dam breaches can be observed. Images (left): the sandbox in use at the careers exhibition in Wettingen (canton of Aargau). Photos on the right: students learn how to determine a geographic position.

Education

Professions in the field of cadastral surveying belong to the field of geomatics and are thus future-oriented. Geoinformation is a knowledge resource that is becoming increasingly important. The more familiar we are with the space we live in, how it evolved and how it is used and being developed, the more accurately we can predict the consequences of spatial planning decisions and changes.

How to embark on a career in cadastral surveying:

- Apprenticeship as an EFZ surveyor
- Further education as a geomatics technician
- Surveying studies at a federal institute of technology or university of applied sciences
- Federal licence for cadastral land surveyors.

Geomatics studies – great prospects!

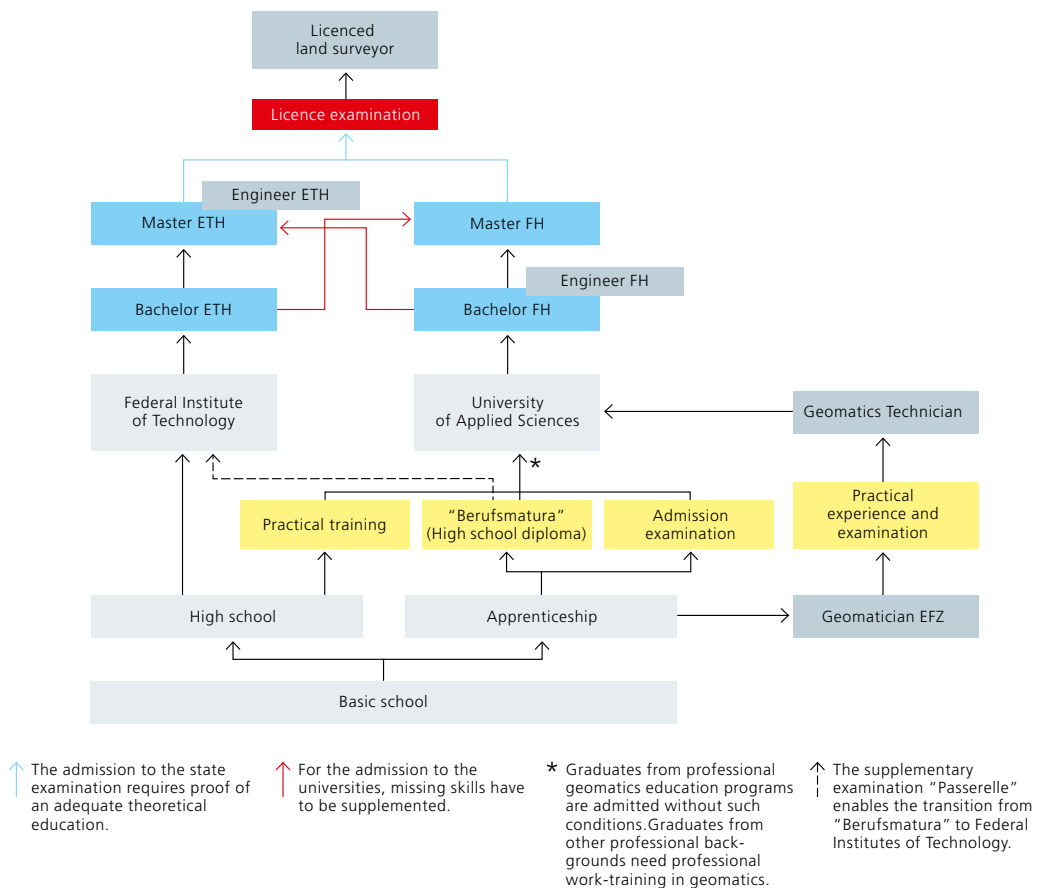
A graduate degree in geomatics provides the best chance of finding an attractive job in this field. Modern-day geoinformation systems and complex surveys call for highly qualified surveyors. They can apply their know-how in fascinating fields and major projects such as the prevention of natural disasters and the development of 3D models of the earth. The shift away from conventional surveying towards other, more complex tasks is opening up many new areas of activity.



How to become a geomatician

More information about career paths, requirements and educational institutions at:

- www.cadastre.ch/education



Surveying activities: successful cooperation

Cadastral surveying is organised in the form of a partnership. It is a joint effort between the federal government, the cantons and municipalities, and the private sector.



Flood prevention measures providing ecological added value are made possible thanks to cooperation between the public sector and private companies. Large photo: estuary near Hagneck, Lake of Biel. Bottom left: Lyssbach in Lyss.

Bottom right: hidden danger. With the naked eye it is difficult to detect that this slope in Dallenwil (canton of Nidwalden) has been shifting for many years. Precise data regarding ground movement facilitate predictions and help prevent damage.

Who is responsible for what?

The federal government and the cantons share responsibility for cadastral surveying.

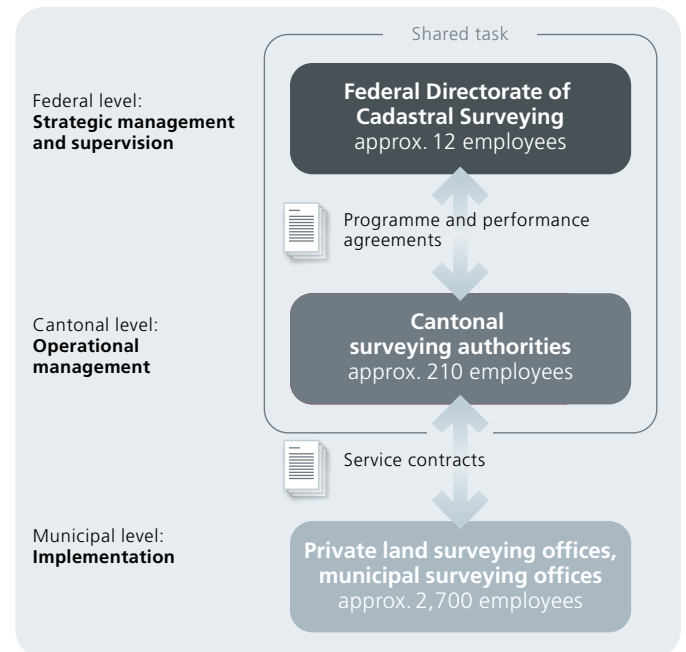
- Federal government: strategic management and supervision
The federal government defines the overall national strategy together with the cantons and specifies the quality requirements. The responsible authority is the Federal Directorate of Cadastral Surveying at the Federal Office of Topography (swisstopo).
- Cantons: operational management
The cantons are responsible for the realisation of cadastral surveying. The cantonal authorities responsible for the supervision of surveying specify the respective implementation plans, manage the activities involved and define the implementation standards.
- Municipalities, urban surveying authorities, private surveying bureaus: implementation
Licensed land surveyors who are listed in the Register of Surveyors manage the tasks that require qualified personnel.

Financing and legal aspects

The federal government and the cantons jointly finance cadastral surveying. The cantons bear the costs that are not covered by either federal contributions or third parties. The costs associated with ongoing updates are covered on a user-pays basis. The data belong to the respective canton, which is also authorised to collect the related fees and charges.

Integral part of the cadastral system

Cadastral surveying is an integral part of the Swiss cadastral system, along with the land register and the cadastre of public-law restrictions on landownership (PLR cadastre).

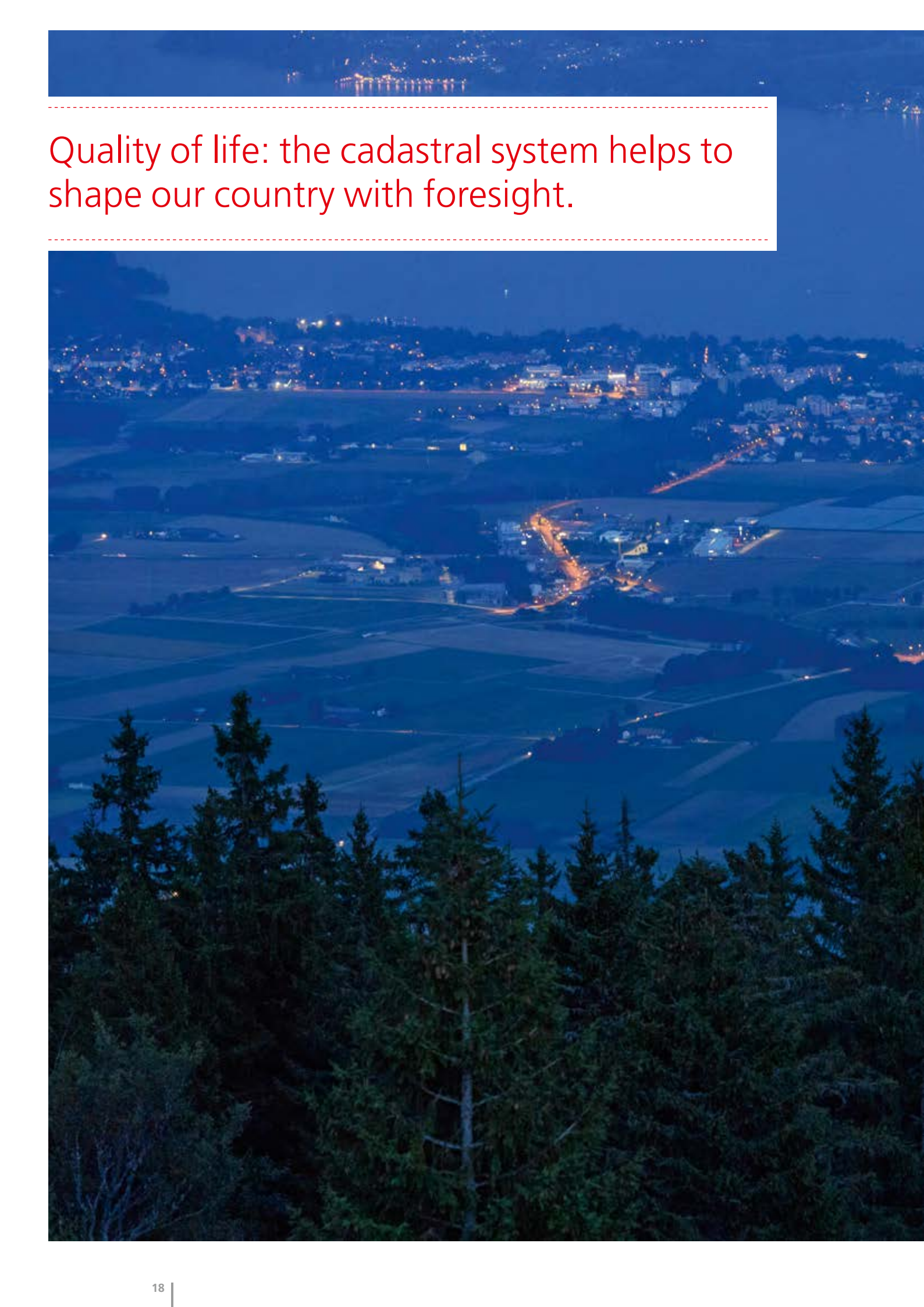


More than 100 years of cooperation

The federal government has been working closely with the cantons and the private sector ever since the Swiss Civil Code was introduced more than a hundred years ago.



• www.cadastre.ch/history

A nighttime aerial photograph showing a city with illuminated buildings and streets, surrounded by dark, forested hills. The city lights are reflected in a body of water in the background. The foreground is dominated by the dark, silhouetted branches of evergreen trees.

Quality of life: the cadastral system helps to shape our country with foresight.



View from La Dôle towards the Nyon region (canton of Vaud).

Information and contact details

cadastre.ch



cadastre.ch is the official Swiss cadastral surveying website. It provides information about all aspects of cadastral surveying, as well as the land register and the cadastre of public-law restrictions on landownership (PLR Cadastre).

Address

- Swiss Federal Office of Topography swisstopo
Geodesy and Federal Directorate of Cadastral Surveying
Seftigenstrasse 264, 3084 Wabern
infovd@swisstopo.ch

Useful links

- Cantonal surveying supervisory authorities:
www.cadastre.ch/cantonal
- Surveyors listed in the Register of Licensed Land
Surveyors:
www.cadastre.ch/surveyors

Orders

The website also offers information, that can be downloaded, and brochures and other printed material relating to cadastral surveying and the Swiss cadastral system, that can be ordered.

- www.cadastre.ch/order



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Office of Topography swisstopo
www.cadastre.ch

Publishing details

© 2017 Federal Office of Topography swisstopo

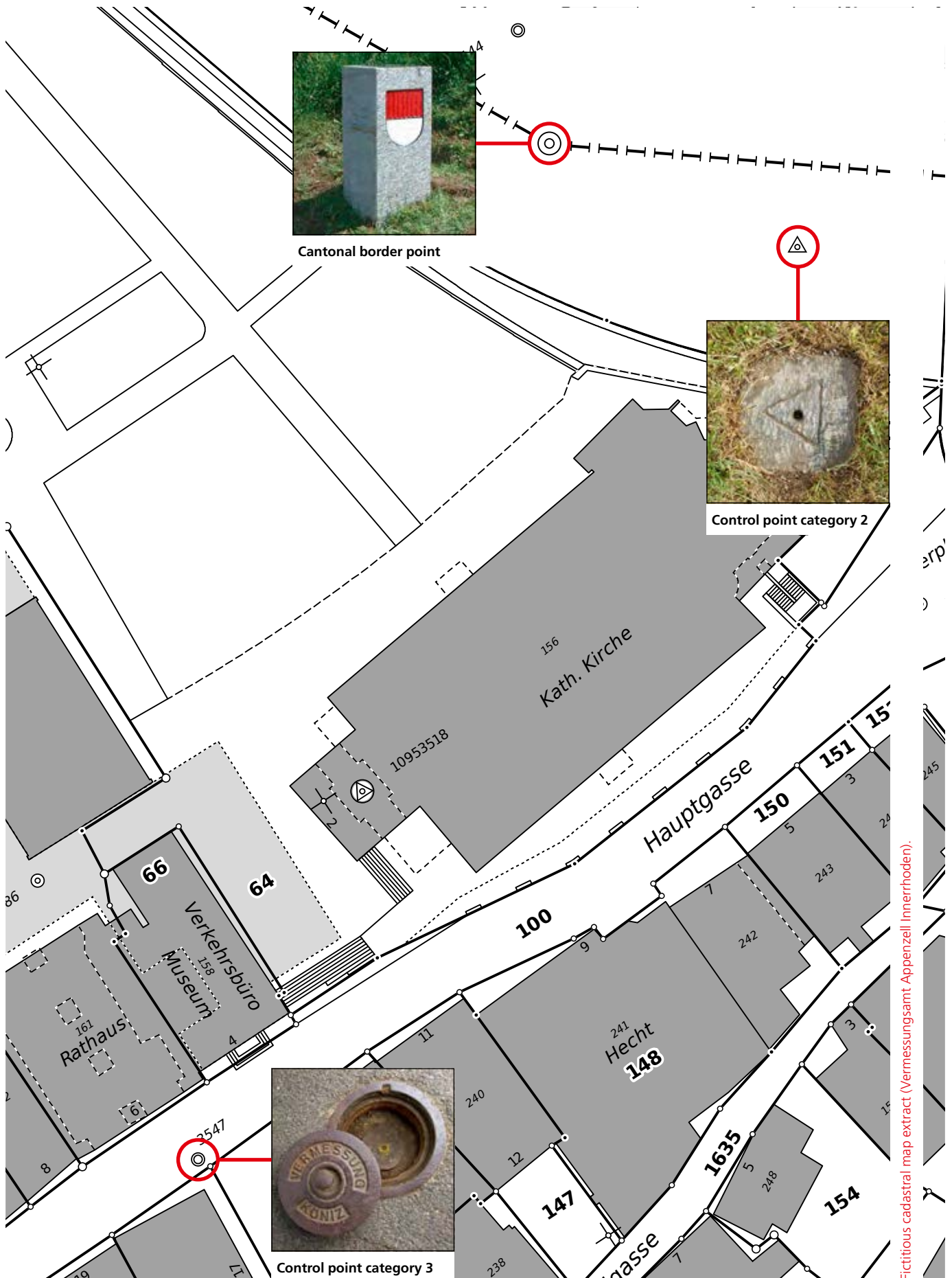
Edition: no. of copies in German 12,000, French 5,000,
Italian 1,600, English 1,500

Layout: Atelier Ursula Heilig SGD

Text: Beat Hühnli

Photos: Béatrice Devènes, Team hp Schneider, swisstopo

Printing: swisstopo



Fictitious cadastral map extract (Vermessungssamt Appenzell Innerhoden).

In our daily lives we are seldom aware of the markers that are put in place by cadastral land surveyors in fields, on roadsides and on buildings that serve as control and boundary points. Control points mark precise locations and heights. They are used as the starting point for other

measurements. Boundary points mark the course of parcel boundaries and borders. Most control and boundary points are secured with either a granite stone or a bolt.

