

# Digital Archive of Geospatial Data of the Republic of Slovenia

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**Key words:** Digital cadastre, e-Governance, Real estate development, Slovenia

## SUMMARY

Evidence maintenance and procedure management The Surveying and Mapping Authority of the Republic of Slovenia (hereinafter GURS) generate numerous analogue documents, archived by and stored at the respective regional offices. The bulk represents the land cadastre archive which constitutes the official land (parcel) record. Those formed in the future shall become part of it as well. This analogue archive contains cadastral maps (hereinafter ZKN) and surveying reports. The document digitalization project started in year 2000. The GURS prepared the technical standards (such as meta data, formats, raster data, data use and update) and content standards (such as sorting documents into groups). The task of scanning was carried out by the GURS in cooperation with external contractors. In year 2013, the technological standards prescribed for long-term preservation (e.g. PDF, PDF/A-2b) were upgraded and the data were transferred to the database of the Ministry of Public Administration. At the moment, the digital archive includes 23 million pages of geodetic digital documents. Based on maps' scales, and their location and time data, an IT solution was developed to provide an effective access to the archived digital maps. The eZKN application was developed by the GURS in cooperation with the external contractor.

## SUMMARY

Pri vzdrževanju evidenc in vodenju postopkov na Geodetski upravi Republike Slovenije nastajajo številni analogni dokumenti, ki se arhivirajo na posameznih območnih izpostavah. Najbolj obsežen arhiv je arhiv zemljiškega katastra, ki predstavlja uradno evidenco zemljišč, parcel. Analogni arhiv je sestavljen iz zemljiško katastrskih načrtov (ZKN) in elaboratov. S pripravo projekta digitalizacije dokumentov smo začeli leta 2000. Pripravili smo osnovna tehnična (metapodatki, formati podatkov, rastrska slika, način vzdrževanja in uporabe) in vsebinska izhodišča (razvrščanje dokumentov v skupine). Nalogo so izvajali referenti GURS in zunanji izvajalci. V letu 2013 smo privzeli nove tehnološke standarde za formate predpisane za dolgoročno hrambo elektronskih dokumentov (PDF in PDF/A-2b) ter prenesli podatke na centralno bazo podatkov na Ministrstvu za javno upravo. Trenutno imamo v digitalnem arhivu triindvajset milijonov strani digitalnih dokumentov geodetskih storitev. Na osnovi meril ZKN in njihove lokacije smo vzpostavili informacijsko rešitev, ki omogoča pregled in uporabo vsebine katastrskih načrtov v digitalni obliki. Aplikacijo imenovano eZKN je razvila Geodetska uprava RS skupaj z zunanjim izvajalcem.

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## 1. INTRODUCTION

The Surveying and Mapping Authority of the Republic of Slovenia (Geodetska uprava Republike Slovenije, hereinafter GURS) is a body within the Ministry of the Environment and Spatial Planning. Its mission is to provide high quality official spatial data infrastructure and land administration system, as well as to provide its users with efficient services and official spatial data in a way that meets the high standards of a spatially-enabled modern society. GURS performs administrative, professional, technical, and supervisory tasks related to the integration of spatial databases, and performs various projects in the area of real estate. The work of the Surveying and Mapping Authority includes tasks of the National Surveying and Mapping Service, which involve establishment, management, and maintenance of databases in the area of the basic geodetic system, real estate (land cadastre, buildings cadastre), state borders, spatial units and house numbers, cadastre of public utility infrastructure, and topographic and mapping system.

In the record-keeping and maintenance procedure, several analogous documents are produced, which are archived at individual regional offices. The most comprehensive archive is the Land Cadastre Archive, which represents the official record of land or parcels of land. Documents have been created since the establishment of the so-called reambulatory cadastre in the period 1867–1882 (Lisec and Ferlan, 2017). Today, digitisation represents an indispensable part of the updating of processes, as well as the official record keeping data. The preparation of the digitisation project of GURS archived documents began in 2000, and it was completed in 2019. There are currently thirty-three million pages of digital documents of geodetic services in the digital archive. The project of digitisation of archived documents is part of the information renewal of real estate records, co-financed by the Republic of Slovenia and the European Union, by the European Regional Development Fund (2017–2019), and implemented under the Operational Programme for the Implementation of the European Cohesion Policy in the period 2014–2020 (Operational Programme 2014–2020, 2015).

## 2. HISTORY OF DIGITISATION AND PROPERTIES OF ARCHIVES

The beginnings of the land cadastre in Slovenia date back from the first half of the 19th century, when the first documents that are part of today's archive were created. With each spatial change, documents were created and then archived. With the changes in legislation, alongside the changes in the competences of the Surveying Service (local, state), as well as the political systems (Austria-Hungary, Yugoslavia, Slovenia), the technical developments and solutions all made an impact on the structure, content, and format of the documents. In the initial period, the documentation for the introduction of the changes in the cadastre

consisted of only a few pages (sketches), but today, some of the surveying reports are longer than 10 pages (possibly more than 1000) of various contents, such as applications, authorisations, records, sketches, presentation of changes, decisions, and notices. Presently, the archive of GURS analogue documents is located in 37 locations around the country, which is further divided into 2,698 cadastral municipalities, 5,713,872 parcels and covers 1,188,946 buildings (or 1,884,400 parts of buildings). Every day, approximately 150 administrative officers and 300 surveyors create new documents.

The need for digitisation of the land cadastre archive emerged around the year 2000, mainly due to the demand of surveyors, who have to take into account the data of past procedures in their work. At that time, Slovenia already had a fully exposed land cadastre information system, including digital descriptive and graphic data. Based on testing and pilot studies for the digitisation of archived documents, basic content and technical starting points were created for establishing a digital archive system that would enable the preparation and optimal use of digital archival documents at local and central level. Basic starting points (Boldin, 2002):

- establishment of a system for centralised management, maintenance, and issuance of data,
- accessibility of data via intranet/internet,
- quick access to specific data groups,
- establishment of a system for optimal management (searching, browsing, printing, saving) of digitally archived documents.

On the other hand, technical features are not only important, not only for the scanning process itself, but also for the subsequent use, processing, storage, and display of digital data. Factors such as light, humidity, temperature, handling, storage, wear, ageing, colour oxidation, etc. have a bearing effect on the format of the scanned documents. Digitisation was preceded by an analysis of bitmap resolution, colour depth, file size, and format. Considering these factors, the most suitable resolution was 300 dpi and 24-bit raster image of all documents (displaying 16.7 million colours) (Slak et al., 2019: 48).



Illustration 1: Comparison of a document scanned in 256 colours capacity and 16.7 million colours capacity (source: GURS).

The goal of digitisation was to make the content in the classic archive identical to the digital one. This means that the content and technical conditions and settings are provided so that we can use the digital archive as a substitute for the classical one (document printing, document integrity). Due to the selected resolution and large formats, two identical TIFF (no loss of data) and DjVu (with some compression) files were created for the initial digitisation period

of the archive, to allow users to open and scroll through the archive faster. The DjVu format was chosen, which reduced the file size and divided the raster image into four layers. Initial studies estimated that around 15 million pages of documents will be generated.

To ensure long-term, high quality, and uniform digital material, apart from the agreed technical characteristics of the files, written instructions are also included to enable all surveyors and outsourcers to prepare and digitise the material in the same way.

In 2001, when the digitisation began, the files were recorded in TIFF and DjVu format. Each page of the surveying report was recorded as its file. An index file was created that linked the file and the attributes (content) of the document. The HTML interface was used for browsing. The files were only accessible to the clerks at the local surveying department.

## **2.1 Digitisation of the archives after 2013**

A major update of the digitisation system - organisation, management and use of data - was carried out in 2013. The updating of technological standards took into account the document, "Uniform technological requirements for the collection and storage of material in digital form", of the Archives of the Republic of Slovenia. Content features are (GURS, 2013):

- the sequence of pages in a digital surveying report must match the sequence in the analogue surveying report,
- the pages of the document must be properly oriented in content,
- blank pages are not digitised,
- documents that have nothing to do with the maintenance process are not digitised land cadastre records,
- digital surveying reports must have bookmarks, which have to be named in accordance with the valid code list (for surveying reports after 01.01.2014),
- the name of the PDF file consists of the cadastral municipality code, surveying report code, or provisional procedure numbers and three zeros. Example: 1456\_06342\_000.PDF.

Technical specifications:

- The PDF file is produced in Acrobat 1.7, or newer version, and must comply with the ISO standard for long-term retention formats: ISO 19005-2 and ISO 32000-1 (PDF 1.7), Level B Conformance (PDF/A-2b),
- the resolution of the raster image is 300 dpi,
- the colour depth is 24 bits.

The already digitised archive has been transformed into a new format. The entire surveying report or the cadastral procedure defined by the unique procedure identifier within the cadastral municipality (IDPOS) is written in a single optical character recognition (OCR) PDF file. The archive was completely rewritten in the central database and made accessible to all users.

Period	Contents	Number of documents	Financing sources
2003-2006	Land cadastre plans	75,000	Own funds
2001-2009	Land cadastre	4,000,000	Own funds
2009	Land cadastre and public infrastructure cadastre	291,650	Own funds
2010	Land cadastre	27,575	Own funds
2013	Land cadastre	4,050,300	Own funds
2016	Land cadastre	120,000	Own funds
2014-2018	Land cadastre	3,892,529	Part of running maintenance
2016-2018	Building cadastre	1,068,178	Part of running maintenance
2017	Land cadastre	6,750,000	eProstor
2017	Building cadastre	250,000	eProstor
2017	Spatial plans	58,000	eProstor
2018-2019	Building cadastre	1,411,500	eProstor
2018-2019	Land cadastre	1,120,541	eProstor
2018-2019	Spatial plans	1,430	eProstor
		<b>23,116,700</b>	

Illustration 2: Period and scope of digitised documents (Slak et al., 2019: 48).

### 3. TYPE OF DOCUMENTS

#### 3.1 Land Cadastral and Building Cadastral Surveying Reports

Most GURS archives refer to surveying reports executed after the time of their creation within one cadastral municipality and are physically located in cabinets or shelves at one former surveying authority's branch offices. One surveying report contains combined documents of one geodetic or cadastral procedure. A surveying report is a unit that concerns the same person or substance, or the same type of document or matter with different content. The surveying report thus represents the complete documentation of cadastral procedures relating to each change, along with all documents which are recording the process of changes in the data for which the geodetic service is responsible, in terms of storage and maintenance. A unique IDPOS numbering method (process identifier) has been formulated in the past for the systematic management of surveying report records. All available documents can be found in one folder. The EVELA surveying report record, established in 1991, allows the land parcel to be linked to various surveying reports and procedures (Slak et al., 2019: 47). EVELA already

enabled the linking of the surveying reports with the attribute data of the land cadastre and the cadastre of buildings (e.g. parcel, building), before the archive was digitised.

The surveying reports were produced in different time periods, with different techniques, in different formats, with different labels and in different media. Therefore, one of the key preparations for digitisation was the creation of optimal groups of documents of the same type (sketches, records, decisions, records of tachymetric measurements, etc.) and ensuring the visibility of the content (Slak et al., 2019: 46). Pre-2014 surveying reports with more than 50 pages are digitally bookmarked to allow quick access to each set of documents. Surveying reports created after 1. 1. 2014 have all documents marked with annotation. Currently, there are 1,388,269 land cadastral and 247,437 building cadastral surveying reports stored in the archive.

### **3.2 Land Cadastre Plans and Indicative Sketches**

The archived land cadastre plan and the indicative sketches (hereinafter referred to as the ZKN = in Slovenian: zemljiškokatastrski načrt), as a document recording the changes in the land cadastre, are part of the land cadastre archive. The standard design sheet size is 71.5 cm x 58 cm and is generally in the scale ratio 1:2880. Four indicative sketches together cover one sheet of the plan, and are physically interconnected by adhesive tape and drawn on a solid cardboard base. Since the introduction of digital cadastral plans in official use, the Surveying and Mapping Authority in 2009 has completed the maintenance of classic cadastral plans. These have become material for archiving.

ZKN deals with information locally and temporally. Spatial location is defined indirectly through the nomenclature label, using a system of mathematically correct grids for all coordinate systems and scales. Plans show the status of plots in the period starting from the sheet setup up, to the completion of the maintenance, so each digital plan is described with time information. We know the different timeline of the documents. With the creation of the new cadastre plan, the existing one was no longer maintained.

The development of the eZKN application, which provides insight into the archived cadastre plans stored by GURS and the Archive of the Republic of Slovenia, was dictated by the wishes of the property owners, the needs of surveyors, and the legal provisions on free public databases. Most of the material of the Franciscan and revised cadastre is kept by the Archives of the Republic of Slovenia (27,734 plans), and the more recent ones by GURS (to the extent of 75,000 plans).

### **3.3 Land Parcel registry**

A land parcel registry is a book listing all the parcel numbers over a period of time, and the changes in relation to the parcels. In addition to the parcel number, attribute data is provided to link the parcel with other records (e.g. land register). The land parcel registry was established and maintained within each cadastral municipality and may comprise several books for different periods of time. The contents are written in tabular form. The rows list the

parcels in order from the smallest number (with subdivisions) to the largest. Firstly listed are the land plots, followed by building plots, and then the new plots which are entered during the year of creation. The columns include the following information: ZKN number (for locating), number of the ownership property deed (link to the land register), name and surname of the property holder, place of residence of the property holder, procedure numbers when changes occurred on the parcel, culture, cadastral class, area, or cadastral yield. When the data was changed, the old records were crossed out and new ones were entered next to them. For introducing the changes, referents used different kinds of pens (ink, pencil, crayons, wax crayons, etc.). The first record-keeping was set up and maintained by hand. After EVELA was established in the 1990s, the books and the later issues of the printouts ceased to be maintained. The difficulties encountered during the digitising process of the parcel registry were mainly due to the damaged documents as a result of usage and diversity of layers (see Illustration 7). There are approximately 5,000 parcels in the archive.

### **3.4 Government Spatial Planning Acts**

Government spatial planning acts (hereinafter referred to as the DPA = in Slovenian: Državni prostorski akti) are implementing general legal acts that determine the area of planned spatial arrangements, and the spatial implementing conditions for their realisation. They contain descriptive and graphic parts, as well as accompanying information material. The following changes have been introduced alongside digitisation:

- setup of a complete archive of government spatial planning act documentation in digital form,
- unified format of the graphic part of the documents in all applicable acts,
- the graphic part of the government spatial planning acts archive was merged with the D96/TM national coordinate system,
- the complete documentation of the graphic part of all applicable government spatial planning acts is publicly available.

The remaining detailed documentation produced in the framework of the digitisation project will be made available to the public after the spatial information system is fully established in 2021. The analogous material has been linked to a different number of folders. The majority of the text sections was in A4 format. Each folder contained from 10 to 60 documents of graphic work in the format range A3 to A0, part in a format larger than A0 (maximum size: 1,100 mm x 2,060 mm, maximum length: 750 mm x 5,530 mm). The entire analogue material was digitised individually through folders in PDF/A-2b format. Thus, each government spatial planning document in digital form was provided in at least one PDF file (Slak et al., 2019: 54–58). The archive contains about 60,000 government spatial planning documents.

## **4. MASS DIGITISATION (2017–2019)**

To renew the real estate records, which is also part of the improvement of the graphical part of the land cadastre, the documents of the cadastral surveying reports had to be digitised first. Due to the succession of projects, the size of the archive (approximately 10 million analogue pages of the archive) and the short implementation deadline, the archive was digitised with

the help of external contractors. The preparation of the archive (folding in sequential order; elimination and marking of non-digitised documents; preparation of bookmarks of large surveying reports) was executed by the GURS staff. All the documents were transported to the contractor, who digitised them, wrote down the files with the prescribed names, and created bookmarks, along with OCR (Optical character recognition). After the technical and content adequacy control, carried out by the GURS referents, the digital content was transferred to the server of the Ministry of Public Administration.

The archives of GURS are necessary for the daily work of the referents and other external users, so the absence period of the archive was quite short (maximum of three weeks). The outsourcer was downloading, digitising, and processing 650,000 pages of material per month. The contractor used over 30 scanners simultaneously. Depending on the size, type, as well as the visible damages to the files, they used flow and flatbed scanners, as well as special scanners for technical documentation, large formats, and books.



Illustration 3: Digitisation of parcels on the so-called book scanner by using a glass plate (Zeutschel optical scanner Q1; photograph: Boštjan Pucelj).



Illustration 4: One of the external contractors' warehouses (photograph: Boštjan Pucelj).

## 5. PRESENT SITUATION, MAINTENANCE, AND USE

In 2019, GURS completed the digitisation of the land cadastre and building cadastre archives. The archives of the Register of Spatial Units (house numbers, etc.) remained undigitized, whose documents first need a precise methodology for managing the digital archive. This project is ongoing.

At the end of 2019, there were 23,116,700 documents in the GURS database. Out of these, 20,210,945 are land cadastre documents, 2,729,657 buildings cadastre, 75,000 land cadastre plans, 59,430 government spatial acts, and approximately 40,000 economic public infrastructure. As a result of the increasing number of new surveying reports, the database is increasing annually by 500,000 building and land cadastre documents. The influx of surveying reports is approximately 3,000 studies per month. The total amount of data is over 5TB of data. The information is stored in two locations of the servers of the Ministry of Public Administration, in order to provide better data security. The newly developed IT solutions have enabled the inclusion of the GURS clerks and surveying contractors in the digitisation process. The application for managing digital surveying reports is available free of charge to all the surveyors who have, since 2015, alongside the paper forms, also submitted digital study records to the Surveying and Mapping Authority. All new surveying reports are digitised and included in the databases on behalf of the Surveying and Mapping Authority within 2 weeks of the finalisation of the procedure.

Geodetic companies (or external users) have to provide specific, correct, accurate, and official geodetic data in their professional field work, data which they always search and use from the land and building cadastre archive. The same is valid for GURS clerks, who check the archives in their daily work, as well as for cadastre maintenance. Some of the materials were damaged throughout the years. In addition, with the constant expanding capacity of the archive, as well as the increasing demand for data, we had to provide staffing and technical solutions to ensure that users received the required documents in a timely manner. With the development of technology and information solutions, we were able to create an online environment that allowed all users to access data. The digital archiving format has the following advantages over the classic format:

- 24-hour availability for surveying (daily),
- documents remain intact,
- all documents of a lasting nature are digitised,
- digitised formats of all sizes,
- optical character recognition (OCR),
- files contain bookmarks.

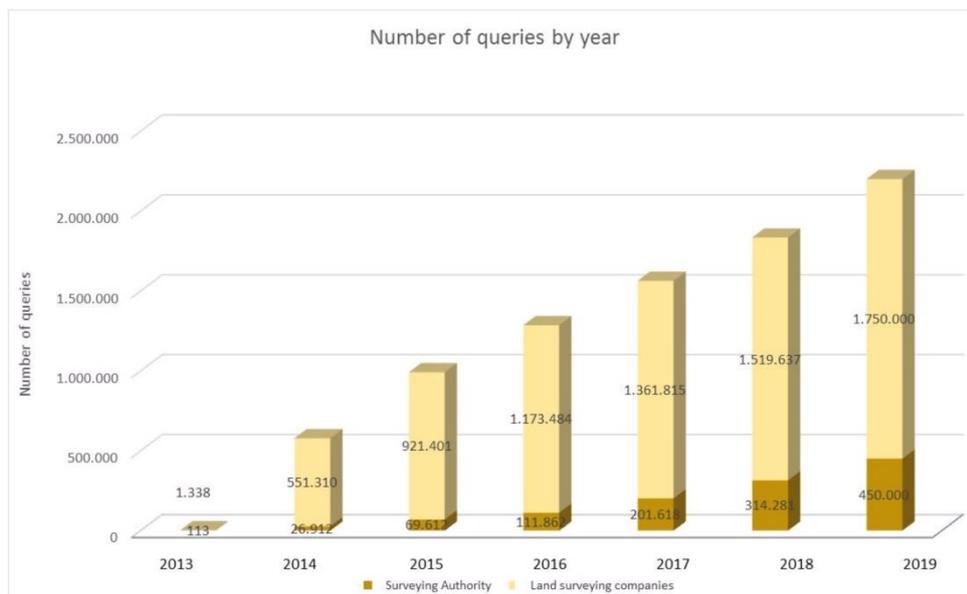


Illustration 5: Display of search queries in the GURS digital archive by year.

## 6. EXAMPLES OF DOCUMENTS

The cadastre archive includes documents of different sizes. The smallest are A6 (some even smaller) and up to A0. Most are A4 one-sided or double-sided written or printed content. The documents kept by GURS were produced after the creation of the revised cadastre (from 1882 onwards, depending on each cadastral municipality) and up to today. The number of files in each surveying report is different. It can be from 1 to thousands of files.



Illustration 6: Example of a surveying report on the regulation of borders and land parcels (rail). The document is 4m long (in one part). It is digitised as a single file (photograph: Boštjan Pucelj).

The document material is diverse. Usually, it is on plain paper. Cardstock paper, tracing paper, 'endless' paper, and other types may also appear. The biggest problem with digitisation was with documents that had different layers on one sheet. This means that the creator (or several of them) used different pens (e.g. pencil, crayon, ink, print, pen, felt-tip pen, on the same sheet) when entering additional content.

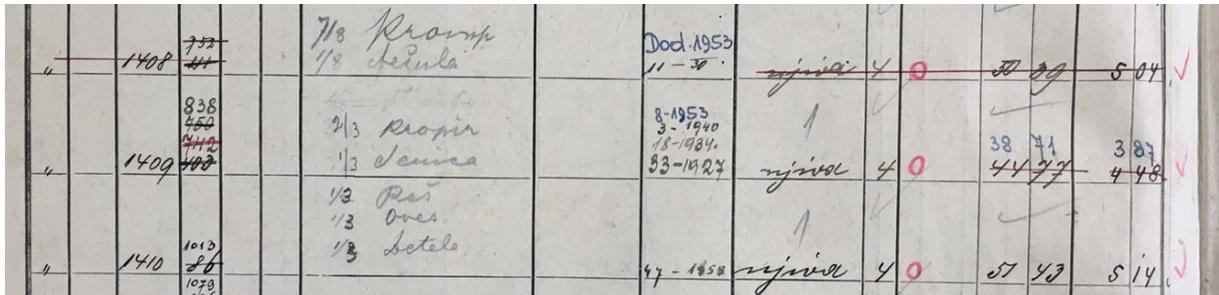


Illustration 7: Content of a land parcel registry, where different types of pens were used on the same sheet (source: GURS).

The archives (especially the land cadastre) also contain surveying reports (e.g. procedures for harmonising the boundaries of cadastral municipalities, new surveys, land consolidation), which can hold thousands of documents. In large surveying reports (over 50 pages), individual documents were put together and bookmarked. This allows the user to search through extensive material faster and easier. For extremely large surveying reports, we have added a table of contents to the first (or last) page of the document, from which the user obtains more information, and does not need to view all the extensive material. The index shows the number of notebooks, pages, document type, and other tags referenced on other material (such as sketches, reports), referenced by the person who prepared them.

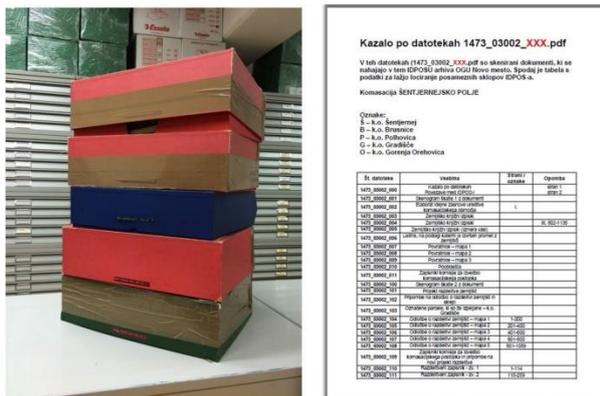


Illustration 8: Example of an 8,541-page land consolidation surveying report (65 digital files) and an index (photograph: Boštjan Pucelj).

The building cadastral surveying reports were created after the year 2000, and were in most cases printed (except for the reports). There were no technical problems with these

documents, as they are in standard formats (A6, A5, A4, A3), with the exception of certain large sketches for larger objects.

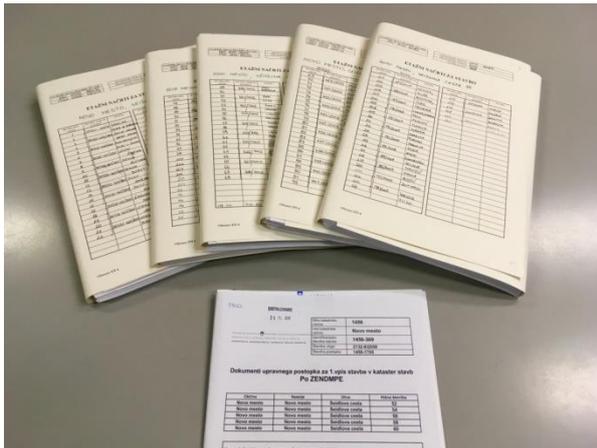


Illustration 9: Example of a building cadastre surveying report. An interesting feature of the cadastre record for multi-storey buildings is that the scope of documents has been reduced with the change of legislation. In the illustration above, parts of the building are listed under ZPPLPS (1999–2004) and cover 581 pages; below is ZENDMPE (2000–2006) 42 pages (photograph: Boštjan Pucelj).

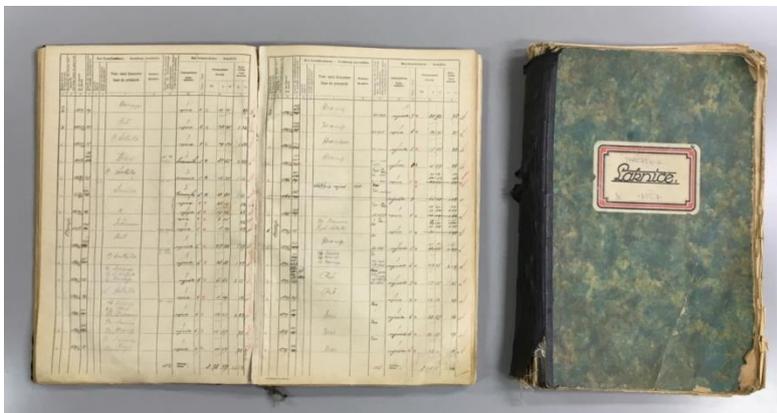


Illustration 10: Land parcel registry (photograph: Boštjan Pucelj).

## 7. EZKN VIEWER

The viewer of archived digital land cadastral plans (eZKN) provides easy access to archived material kept by the Surveying and Mapping Authority of the Republic of Slovenia, and the Archives of the Republic of Slovenia (ARS). The digital raster images of the plans can be viewed on screen and stored on the user's local computer. Data of the Surveying and Mapping Authority is organised by individual lists, according to the criterion (grid of lists) in which they are produced. For each criterion, there are several timelines of the plans that can be viewed, based on the value of the data in the "Status" field (e.g. the last maintained plan has a value of 0, the older plan has a value of 1, etc.).

Data from the Archives of the Republic of Slovenia is organised per unit at the level of the cadastral municipality. The application accesses ARS data directly, so that it is necessary to know how to view the data material in order to use the data.

In order to view the data in eZKN, you must first select a location. The application provides us with a table of archived plans with basic information about the plans which are stored in the collections. We can use spatial search engines to quickly navigate through an area, which allows searching by title, parcel number, cadastral municipality, and general list designation. To see the full image of the plan, we first select the appropriate row in the spreadsheet (highlight it) and then click on the smaller image (eZKN, 2018).

The table with basic information on the plans contains the following data: cadastral municipality, scale, timeline of the plans (e.g. Franciscan cadastre, indicative sketch, last maintained plan), local designation of the plan list, nomenclature of the list, year of creation, and year of completion of maintenance. The eZKN viewer also lets you filter your data. GURS plans cover the entire area of the country. They are available in the highest resolution and there are approximately 75,000 plans. ARS plans include the plans of the Franciscan cadastre (for kresijas in Carniola, Styria, Carinthia, Littoral) and the revised cadastre (for kresijas in Carniola, Carinthia, Prekmurje). In some regions, the material was not completely preserved, or the material was located in another country (e.g. Littoral region - Trieste, Italy). ARS files are freely available in lower resolution (full resolution is payable). The application works on the system infrastructure of the national computer cloud system at the Ministry of Public Administration. The eZKN application is public and free to all users.

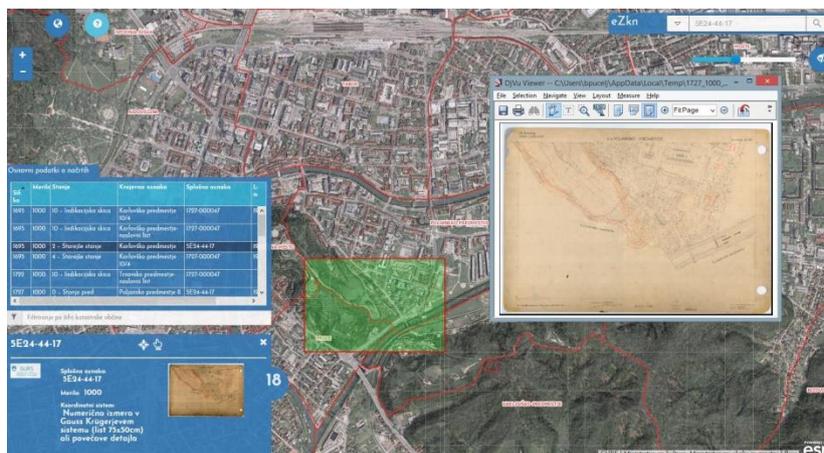


Illustration 11: Screenshot of the eZKN application.

## 8. THE CADASTRE AS A CULTURAL HERITAGE

In Slovenia, the occurrence of a parcel-oriented land cadastre is often associated with the year 1817, when the Land Tax Act was adopted. With this began the cadastral survey of all the lands of the Austrian part of the monarchy back then, which also included the majority of the Slovenian territory. With surveying, followed by maintenance, the plans, graphics, and descriptive materials began to emerge. This material is very diverse, as it was bound by the

material regulations in force at the time and place. Although the basis for the creation of a cadastre was of a fiscal nature, in addition to the administrative regulation of plots, ownership, legal rights, and descriptive data of real estate, the documents find various data that is of interest to new owners, heirs, land planners, and above all, to history researchers. Documents that have no direct connection with the cadastre, but which have filed various requests, explanations, minutes or confessions, outlining the time, social situation, and space, are also appearing in the proceedings. Although individual documents assert clients' rights and facilities in obtaining certain administrative or legal procedures, the collection also contains documents (within individual surveying reports) that allow researchers to gain insight into the social arrangement, use, and topography of the area. Administrative procedures that show the impact of changing legislation are also an interesting area of research. From the spatial data, it is possible to reconstruct individual positions of objects that have been removed, and for which there is no trace in the field today. During the maintenance of the cadastre, certain material that had no permanent character or was not related to the procedure, was eliminated. However, some records were kept, as they could not be eliminated due to the fact that they were on the same sheet as durable material (see Illustration 12).

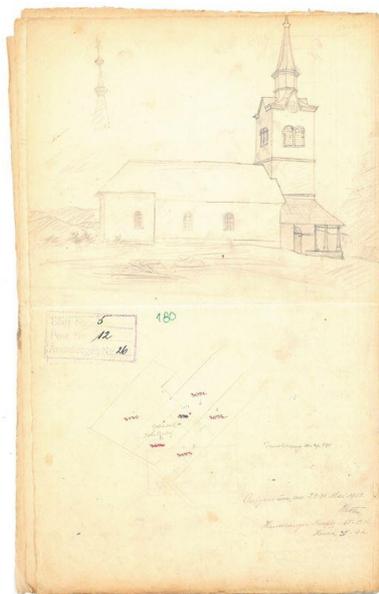


Illustration 12: A field sketch from 1912 where the same document contains a drawing of a church building (source: GURS).

## 9. CONCLUSION

The project of digitisation of archived documents of the land cadastre, building cadastre, and national spatial plans was completed in Slovenia in 2019. The documents are accessible to all administrative and technical-engineering users. The digitisation of the archives of cadastral surveying reports is also one of the pillars of information reconstruction of the real estate records, as it depends on the other stages of renovation of the real estate information system. The project will directly facilitate the implementation of administrative procedures, and facilitate the efficiency of the public sector. Throughout the project, the entire archive was

inspected, and many documents that were thought to be lost were found misplaced or incorrectly filed. Only the archive of the register of spatial units (house numbers) remained in non-digital form. This is a specific record, for which a specific methodology for digitisation and its digital connection between records, is currently under preparation.

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## **BIOGRAPHICAL NOTES**

Boštjan Pucelj graduated at the Faculty of Civil and Geodetic Engineering of University of Ljubljana in 2004. Since then he is employed at the Regional Surveying and Mapping Authority in Novo mesto, where he manages administrative procedures of land cadastre, building cadastre and positional accuracy improvement of land cadastre. He actively takes part in temporary or permanent projects of the Surveying and Mapping Authority of the Republic of Slovenia. These are projects of digitization and maintenance of the archive of the land cadastre and building cadastre, maintenance of cartographic and topographic base and elimination of errors in evidence.

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