

CURRENT SITUATION AND PROSPECT OF 3D CADASTRE IN CROATIA

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INTRODUCTION

- ❑ Traditional cadastre is composed of land divided in 2D parcels.
- ❑ Extent of property rights on land is not limited to 2D parcel boundaries.
- ❑ Development of information technology and the demand of users of cadastral data show that 2D spatial representation with limited heights is insufficient and that objects of law should be further spatially defined.
- ❑ Changes in the social system (transition) and change in types of ownership rights in the Republic of Croatia
- ❑ Increase of activity in the area of land administration in Croatia.
- ❑ Existing projects have not yet focused on establishing a 3D cadastre, although numerous proposals come from professionals and businesses to more efficiently register buildings, bridges, tunnels, highways, and utility lines – the key elements for establishment of the 3D cadastre.

REGISTERS

- ▣ Cadastre

www.cadastre.hr

- ▣ Land books

<http://e-izvadak.pravosudje.hr/home.htm>

- ▣ Real property in Croatian real property law is a land surface parcel to include everything relatively permanently associated with this parcel on or below the land surface (primarily buildings, houses, etc.).
- ▣ Basic spatial unit of the real property cadastre is a cadastral parcel

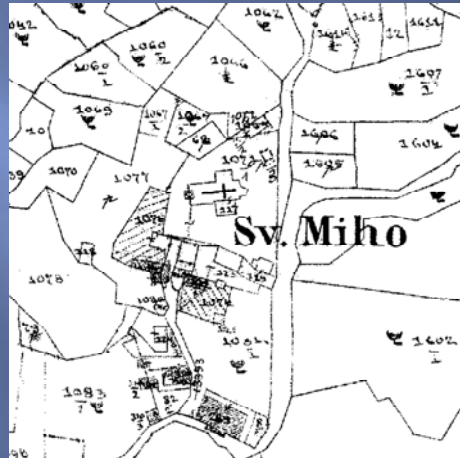
Cadastral

- ❑ Croatian cadastral system is based on the Germanic model of cadastre primarily because of its Austro-Hungarian heritage
- ❑ Law on State Surveying and Cadastre of Real Property defined the cadastre of real property as a register of land parcels, buildings and building parts, and other structures permanently on land or below the surface.

cadastral maps



middle of the 19th
century



beginning of the 20th
century



present day (electronic)

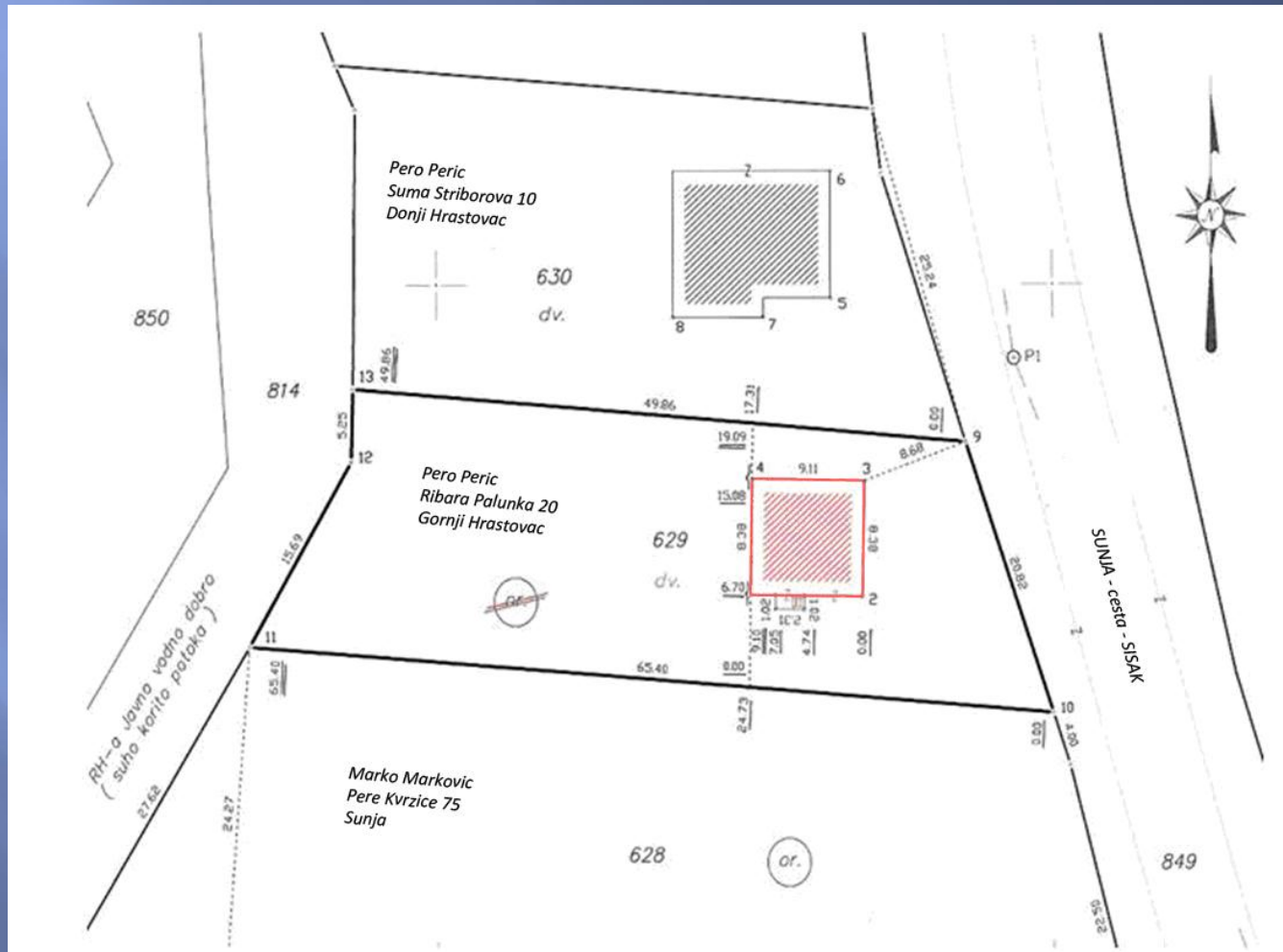
cadastral maps

- ▣ Cadastral maps originate from different time periods
- ▣ Scales: 1:2880, 1:1440 and 1:1000 from old Austro-Hungarian system
- ▣ Scales 1:500, 1:1000, 1:2000 and 1:2500 from later Yugoslavian and new Croatian system
- ▣ TODAY - the coordinate system of transverse Mercator (Gauss-Kruger) projection - HTRS96/TM with intermediate meridian 16° and the linear scale on the central meridian of 0.9999 determined by the projective coordinate system for the Republic of Croatia (for state cadastre and detailed topographic mapping).

Registration of buildings and other structures

- ▣ Buildings and other structures are registered in the cadastre with the following attributes: area, intended building use, building name, and house number.
- ▣ Land books adopt cadastral data and register listed two-dimensional data about real property parts.
- ▣ Real property may be further divided into common and particular parts and registered in the land book based on the report on partition of real property

Registration of buildings and other structures



Sketch of survey from a geodetic report for registration of a building in the cadastre

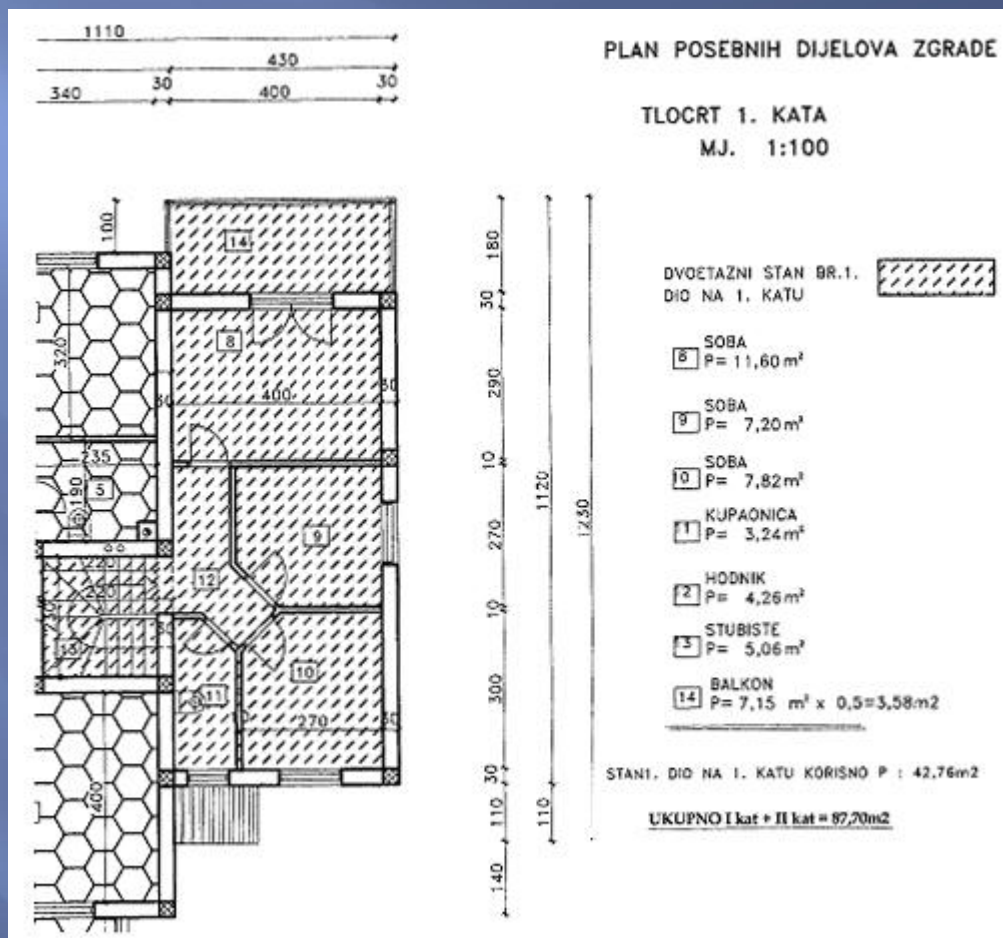
Land books

- ▣ Land books in present Croatia region have a long tradition.
- ▣ Imperial order was issued in 1850 initiating formation of land books in the Kingdoms of Hungary, Croatia, and Slavonia.
- ▣ Land books are in present day available public registers of legal status of real property.
- ▣ Full confidence in accuracy of the registered data is postponed till 2015 for irregular maintenance.

Registration of particular parts of real property

- ❑ Data about buildings are transcribed into land books based on the data delivered to the land books by the cadastral office.
- ❑ Ownership of a specific particular part of property (e.g. an apartment or office space) is realized through registration in land books.
- ❑ Registration of particular parts of real property in the land books is not possible without partition of real property, which in legal terms means retention of real property as a single body.
- ❑ Report on partition of real property establishes size and shape of common and particular parts of a single real property (apartment, office space, etc.) and draws connections for reference purposes against the real property as a unit.
- ❑ data about particular parts must be technically processed providing drawings of particular and common parts with required labels and areas of particular parts

Registration of particular parts of real property

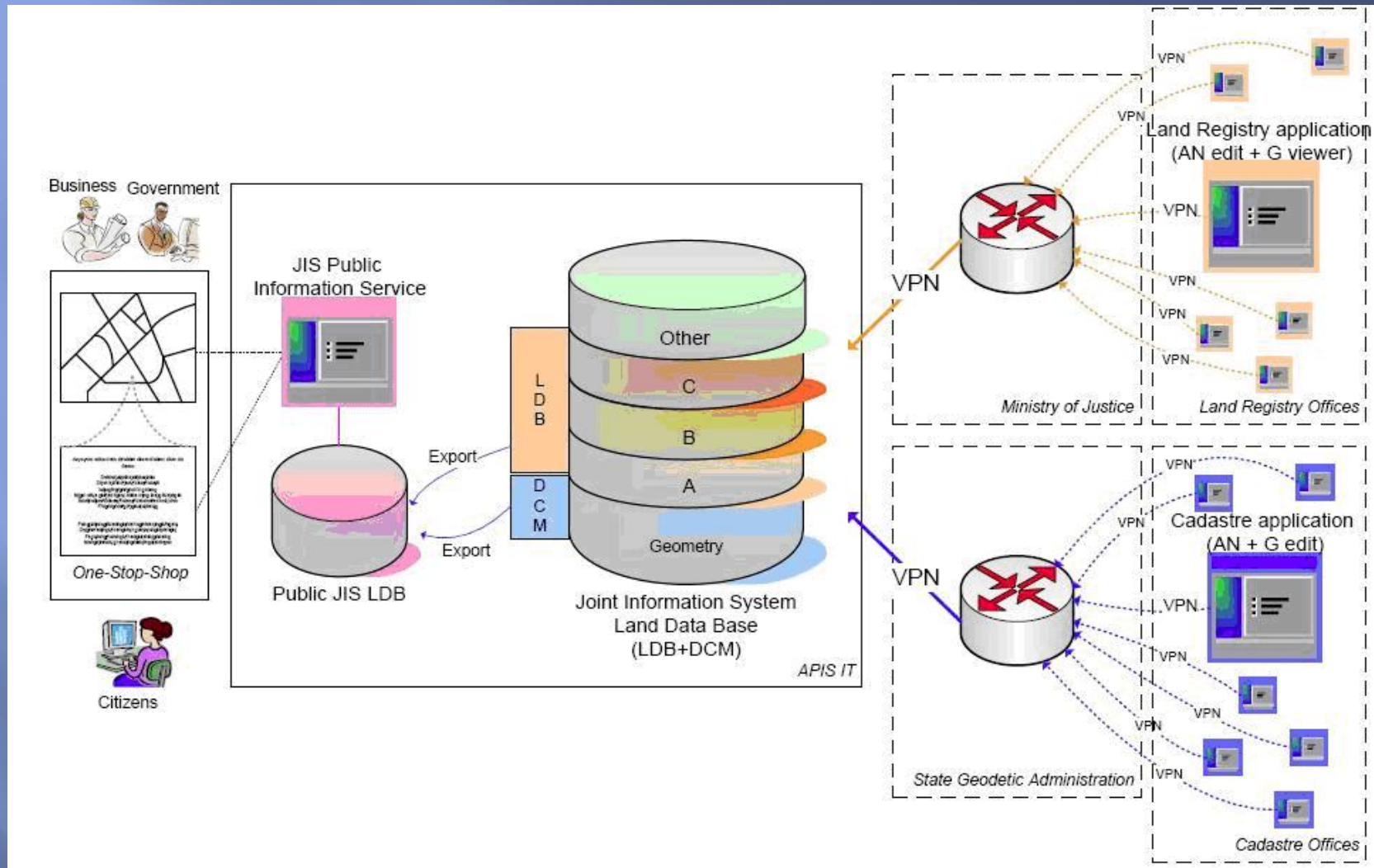


Part of a plan of particular building parts

REGISTERS

- ❑ The cadastre registers in the alphanumerical part of the cadastral record data on parts of real property (apartments, common areas) identical to those in land books.
- ❑ Separate management and transcription of real property data often causes redundancy.
- ❑ Development of the Joint Information System of Land Books and Cadastre is on-going in Croatia.
- ❑ Most important purpose of this system should be, that once real property data is synchronized in the cadastre and land books, they no longer diverge.

REGISTERS

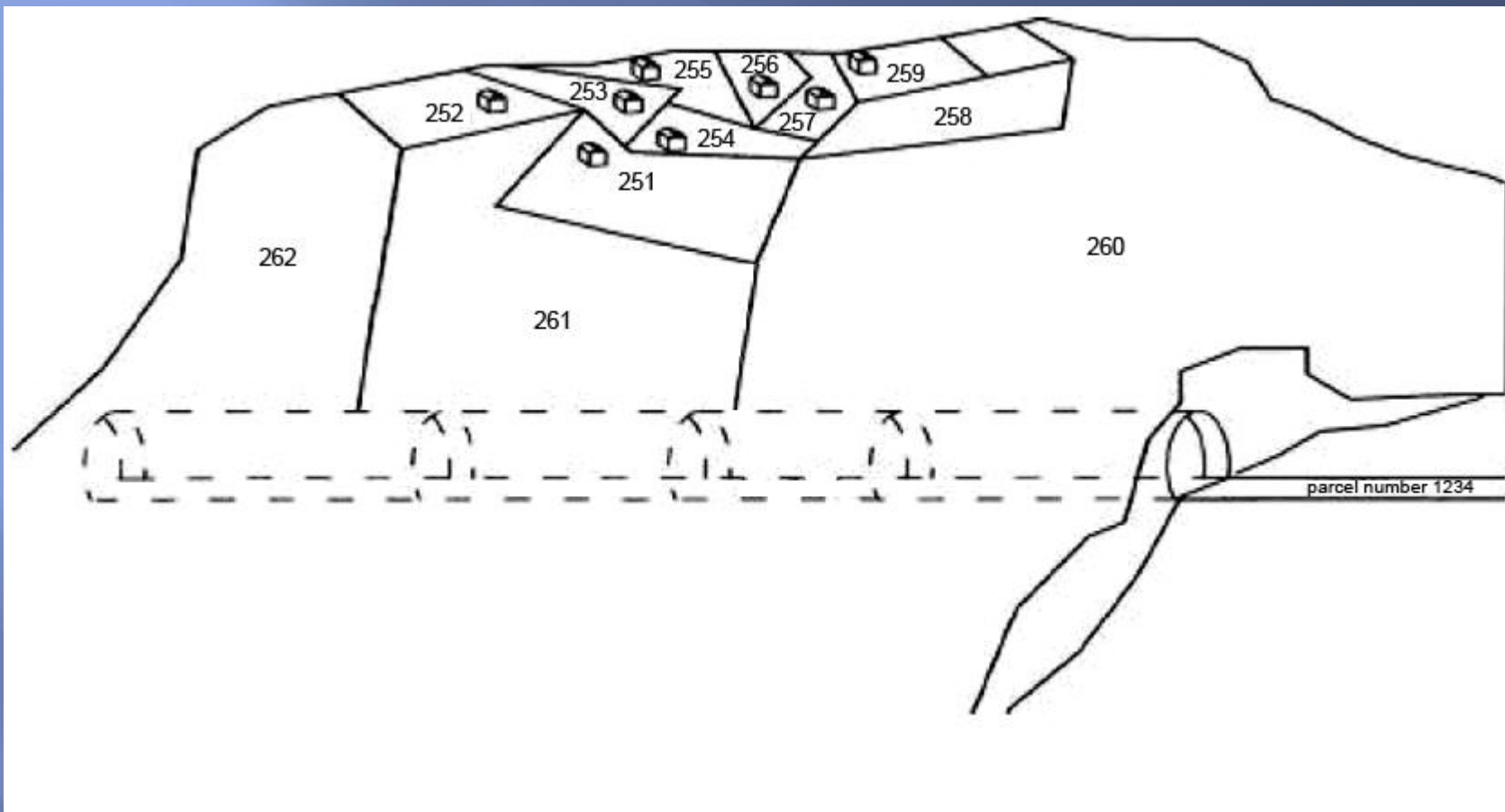


Joint information system concept chart

Registration of tunnels and bridges

- ❑ Tunnels and bridges in Croatia are integral parts of public land (roads, railways).
- ❑ Public land is not registered with sufficient detail in the cadastre and land books.
- ❑ Bridges, tunnels, and other structures are presented merely graphically (topographical signs) on the cadastral parcel where they stand.
- ❑ Bridges and tunnels are, as a rule, parts of the public land, but legislation does not differentiate bridges and tunnels as separate modes of use. Cadastral parcels above a tunnel are not permanently associated with that tunnel.
- ❑ The tunnel is permanently associated in a functional sense with the land where its entrance starts, and in a legal sense, the tunnel is the part of that real property. Tunnels are also not separately registered in cadastral plans which are two-dimensional .

Registration of tunnels and bridges



Registration of a tunnel in a cadastral map

PUBLIC UTILITIES

- ▣ Formation and management of the Utility Cadastre is responsibility of the local government bodies.
- ▣ Utility Cadastre contains data about type, purpose, basic technical features, and the location of built utility lines, and it lists the names and addresses of their managers.

Historical overview

- ▣ Representation of utility lines in geodetic maps and plans marks the beginning of the present day utility cadastre.
- ▣ Utility cadastre based on geodetic principles, is a legal obligation established when Bylaw on Surveying Methodologies of Underground Installations and Objects was published in former Yugoslavia in 1969.
- ▣ Laws of the republics and autonomous provinces of former Yugoslavia follow in the period from 1973 to 1977, and are further followed by applicable bylaws.
- ▣ These bylaws identified technical and technological foundation for surveying existing and future utility lines. Coordinates (X, Y, and Z) are established for the first time as constant data about spatial location of utility lines.

Current Situation of the Utility Cadastre in Croatia

Municipal cadastral offices established and managed the utility cadastre in all municipalities (of former Yugoslavia according to regulations of that period).

Municipal cadastral offices were transferred under the state jurisdiction, while responsibility to manage and maintain the utility cadastre was handed over to the local government bodies.

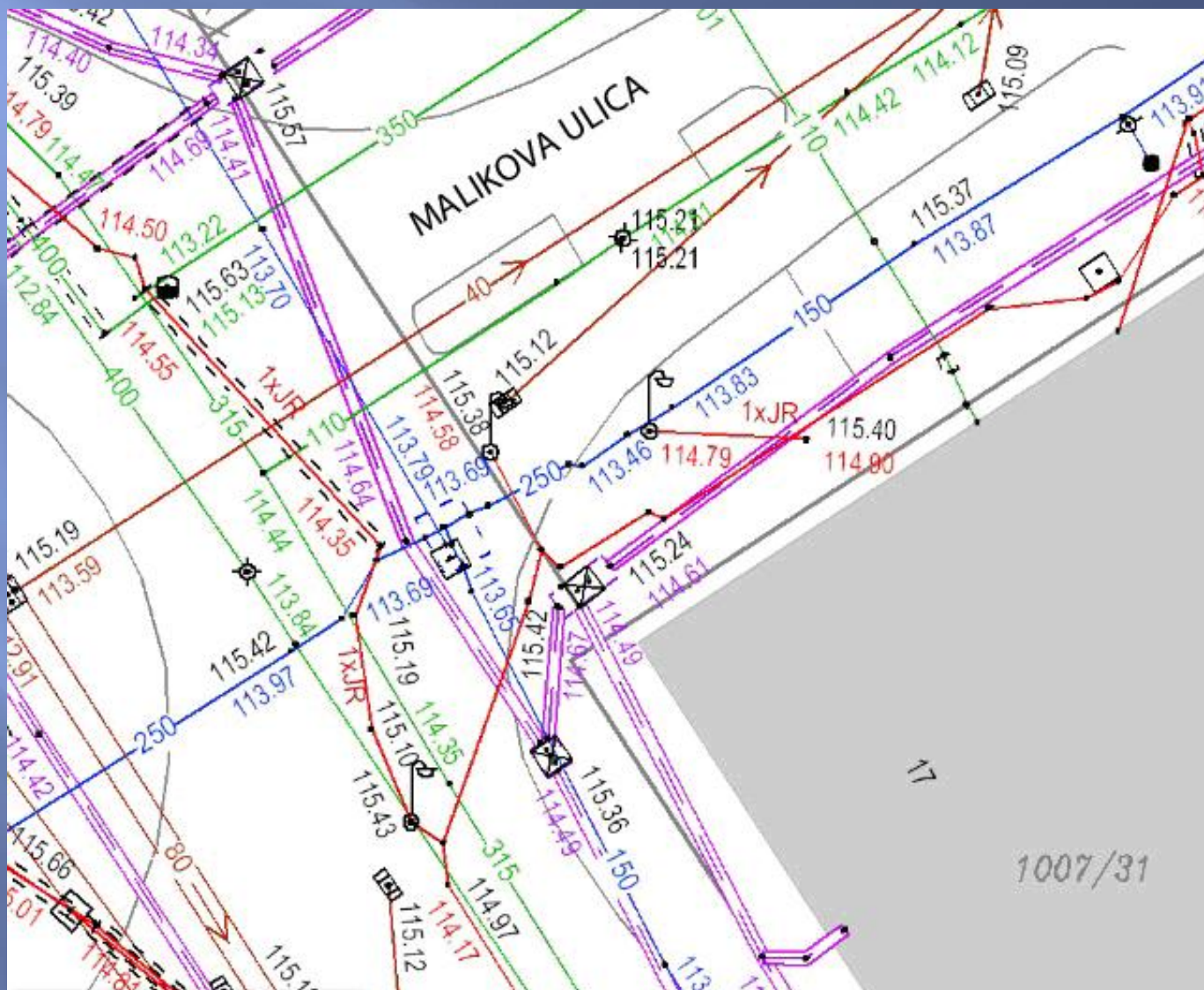


Water pipe perforated during survey activities for underground garage in Zagreb city centre – October 2010

Registration of Utility Lines

- ▣ Horizontal and vertical location of utility lines is surveyed using geodetic methodology.
- ▣ All utility lines in the area and other surrounding landmarks (poles, sewage pits, trenches, ducts, etc.) are measured while surveying a specific utility line.
- ▣ New utility lines are surveyed at an open trench, while existing unregistered utility lines are surveyed using visible external features.
- ▣ Surveyed lines are, as a next step, mapped in existing geodetic or cartographic maps – nowadays most commonly in the cadastral maps.

Registration of Utility Lines



View of public utility lines in a cadastral plan

Registration of Utility Lines

- ❑ Legal relations regarding utility lines are registered in land books - most commonly as an easement right on land where these lines are laid.
- ❑ An easement right is a real property right on the real property owned by another based on which authorized person may use this real property in a designated way.
- ❑ Registered data are sometimes unclear since method of registering three-dimensional legal relations remain undefined.

Translate to english:

Based on the easement right contract concluded between Ante Antic from Split and Vodovod AB d.o.o. Supetar on May 31st, 2006 and certified by the notary Ivo Ivic from Zagreb on May 31st 2006 under number OV-1111/06 the easement right is registered on the real property, identified as land parcel 1000/1, in the cadastral municipality of Šuma Striborova, since water and sewage pipelines lie there in favour of Vodovod AB d.o.o., in length of 15m in direction northeast-southwest from southwest side of the features constructed on the east side of the real property, and in length of 30 m in direction northeast-southwest from the north side of the features constructed on the west side of the real property

Particular part of real property – two-room apartment with total surface area of 49,84 m² (marked in blue color and with sign S121 on chart) – and auxiliary part – adjoined loggia with surface area of 10,49 m² (marked in blue and with number 35 on chart), building 1.


REPUBLIKA HRVATSKA
OPĆINSKI SUD U ŠUMI STRIBOROVJ
ZEMLJIŠNOKNJIŽNI ODJEL ŠUMA STRIBOROVA
Stanje na dan: 05.09.2011.

Katastarska općina: **ŠUMA STRIBOROVA** Broj uložka: 1000
Broj zadnjeg dnevnika: **POČETNO STANJE** **ETAŽNO VLASNIŠTVO S ODREĐENIM OMJERIMA**
Aktivne plombe: **Poduložak 7**

ZK uložak je verificiran

A
Posjedovnica
PRVI ODJELJAK

Redni broj	Broj zemljišta (kat.čestice)	Oznaka zemljišta	Površina u			Primjedbe
			m ²	jutra	čhv	
1.	1000/1	DV., ZGR., ZGR.	1783			
		DVOR.	1162			
		ZGR.	371			
		ZGR.	250			

DRUGI ODJELJAK

Redni broj	Upisi	Primjedbe
1.1.	Pred.9. lipnja 2006.god Z.1000/06 Temeljem Ugovora o pravu služnosti zaključenog između Ante Antica iz Splita i Vodovod AB d.o.o. Supetar zaključenog dana 31. svibnja 2006 god. ,ovjerenog kod Ive Ivica javnog bilježnika iz dana 31. svibnja 2006 god. pod br.OV-1111/06 uknjižuje se pravo služnosti na nekretnini označenoj kao čest. zem. 1000/1 K.O. Šuma Striborova radi postojanja vodovodnih i kanalizacijskih cijevi u dužini 15 m u smjeru sjever-jug uz istočnu granicu nekretnine, u dužini 15 m u smjeru sjeveroistok- jugozapad sa jugozapadne strane objekta koji je sagrađen na istočnoj strani nekretnine i u dužini 30 m u smjeru sjeveroistok-jugozapad sa sjeverozapadne strane objekta koji su sagrađeni na zapadnoj strani nekretnine u korist Vodovoda AB d.o.o.	

B
Vlastovnica

Redni broj	Upisi	Primjedbe
7. ETAŽA 60/1129		PODULOŽAK 172
1.	- posebni dio nekretnine - dvosobni stan ukupne netto površine 49,84 m ² (u prikazu označeno plavom bojom i oznakom S121), te - sporedni dio - pridružena loggia pov. 10,49 m ² (u prikazu označeno plavom bojom i br. 35), zgrada 1.	
1.	PERO PERIC, DUBLIN REPUBLIKA IRSKA 1/2	
2.	SANJA SANJIC, DUBLIN REPUBLIKA IRSKA 1/2	

C
Teretovnica

CONCLUSION – REAL PROPERTY

- ❑ 3D descriptions of land features are poor .
- ❑ Particular parts of real property are registered in 2D diagrams with indication of the floor where they are located
- ❑ One could consider this as a 2.5D approach
- ❑ it is necessary to develop spatial representation component in registration of 3D objects of law.
- ❑ Best solution would be to add 3D data in cadastral maps.
- ❑ This would facilitate registration and better description of particular structures (bridges and tunnels).

CONCLUSION – PUBLIC UTILITIES

- ❑ Utility lines are registered in separate registers with location identified and height indicated as an attribute.
- ❑ This register is merely technical since registered data do not have legal significance in comparison to utility lines that are registered in land books.
- ❑ Easement right is crudely registered in land books.
- ❑ Under development and incompleteness of the utility cadastre identifies demand for exploration of new approaches.
- ❑ Many small local government bodies have not established cadastres as they lacked capacities .
- ❑ Legislation changes are needed. Representation of data about utility lines with regard to land would become reliable if data was layered in cadastral maps.
- ❑ This would also ease registration of legal rights as data would become associated with respective land parcels.

THANK YOU FOR YOUR ATTENTION !

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