

The impact of Public Law Restrictions in the field of constructions

Impactul Restricțiilor de Drept Public în domeniul construcțiilor

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Abstract. Increasing population density in urban areas in recent decades has led to the need to develop the building environment in an accelerated way, being necessary for the construction of buildings and their vertical development for a higher percentage of occupancy of the population on a small area of land. Urban expansion has determined the need to impose restrictions on public law through laws and regulations, to reduce the negative impact on the environment and to increase the quality of life of the population. Integrating restrictions, rights and responsibilities into cadastral systems would be an important step in developing integrated real estate management systems. This article aims to monitor the impact of public law restrictions on buildings in the urban area and to present urban regulations and legislation in Romania with applicability in the field of construction through the study of case in which a 3D model of representation and visualization of the restrictions of public law of the buildings is developed.

Key words: Public Law-Restriction, 3D Cadastre, legislative framework, RRRs

1. Introduction

Most of Europe's major cities have been undergoing urban expansion in recent decades. Population growth in urban and metropolitan areas has led to the need to develop the built environment in these areas. This has led to the vertical development of buildings [1], necessitating the imposition of restrictions, rights and responsibilities (RRRs) in accordance with applicable technical regulations and specific legislation in force.

Public law restrictions in the field of construction are conditions set by authorities [2] through laws, regulations and standards, in order to limit the rights of land owners, for the protection of public interests [2]. For a better understanding of these restrictions it

would be necessary to visualize them in the form of 3D models [1], which leads to the need for the development of 3D cadastral systems [2].

Even if public law restrictions in the field of construction as well as in related fields, such as archaeology, environmental protection, mining, aviation, etc. can only be applied in 3D space [3], the current legislative framework in Romania only offers applicability in 2D space of these restrictions, rights and responsibilities.

The need to implement restrictions, rights and responsibilities on real estate owned by owners in an informational system is found internationally, being a current topic in scientific research [4], [5], [6], [7], [8].

So far there are several countries that have tried to develop information systems for the registration, management and 3D visualisation of public law restrictions, but in most of these systems public law restrictions could only be partially implemented [5]. Among these countries are Switzerland, Sweden, Norway, the Australian states of Victoria and Queensland, Austria, Canada etc [5].

As for the Cadastre of Public Law Restrictions in Switzerland, it has been implemented since 2012 and became operational in 2016, being considered a successful project [8]. This project aimed to develop 26 geoportals, one for each canton in Switzerland, in which there was information from the urban planning regulations for each canton [8]. At the moment of starting the project to implement the cadastre of public law restrictions there were 2D cadastral systems in almost all cantons, which included the following elements: measured cadastral data, roads, natural hazards, data related to spatial planning [8].

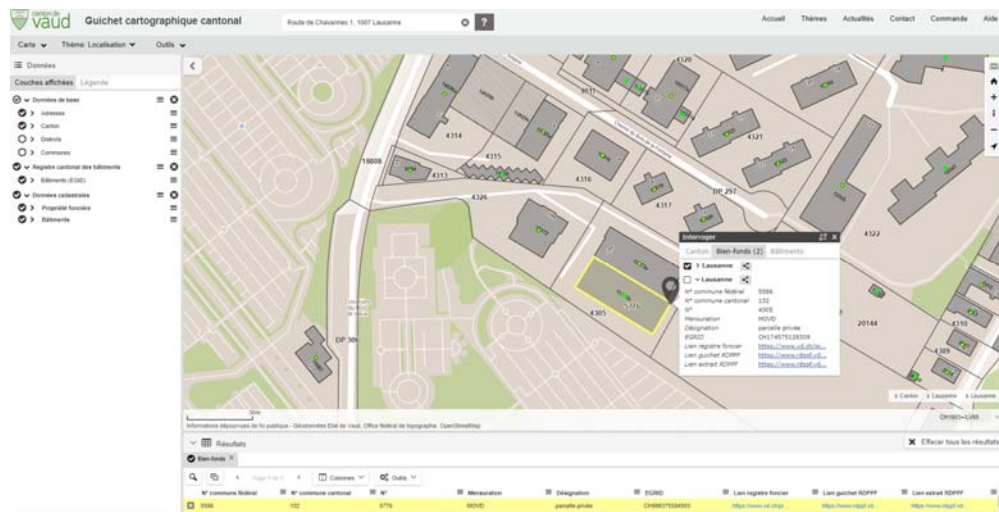


Fig. 1. Cadastral records system, Vaud, Switzerland [9]

Within the development project of the public law restrictions cadastre information system, data from the existing cadastral system was used, supplemented with the restrictions applied to each building according to the zoning regulations and the legislation in force [8]. For each building, a digital report can be generated from the

The impact of Public Law Restrictions in the field of constructions

public law restrictions cadastre, in which all restrictions applicable to that building are highlighted, including the legal basis of these restrictions [8].



Fig. 2. Cadastral system of public law restrictions Vaud, Switzerland [10]

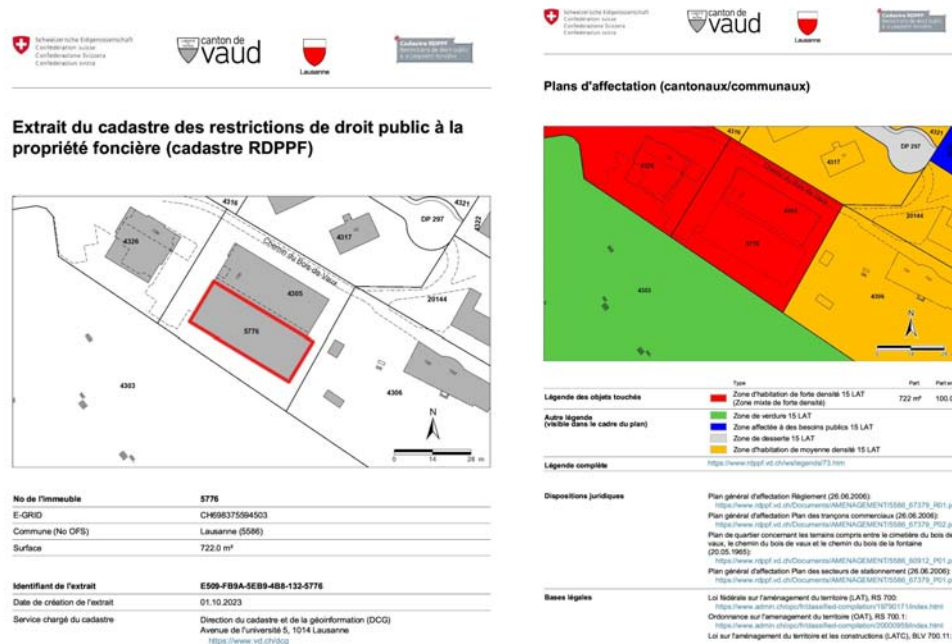


Fig. 3. Digital report of the cadastral system of public law restrictions Vaud, Switzerland [10]

Through this article we aim to create a 3D model for the visualization of public law restrictions in the field of construction in the studied area. The restrictions, rights and responsibilities presented in the paper are found in the national legislation through the laws issued by the Romanian Government and the regulations adopted by the local administrations.

The public law restrictions are initiated by the Romanian legislative apparatus and transposed to the European Union directives. This article aims to support the need for

the development of an information system for the registration, management and visualisation of public law restrictions applied to the built environment.

2. Materials and methods

This section presents the existing public law restrictions in the urban planning and building regulations that apply in Romania, highlighting the need to develop the 3D cadastre by integrating restrictions, rights and responsibilities in the field of construction. These restrictions will be visualized in the case study on the extension of a condominium building on the horizontal and vertical. ArcGIS Pro software, version 2.5, was used to create the 3D model. Through the 3D model of the studied area it will be possible to observe the public law restrictions that apply in the field of construction and the need to modify the current legislation in order to implement and visualize the restrictions in a 3D space.

2.1. Regulations in construction domain

The aim of building regulations is to establish a high level of quality in the design and execution of construction works, leading to the protection of human life, society and the environment [11], [12].

The law that underpins building regulations in Romania is Law 10 of 18 January 1995 on quality in construction, issued by the Romanian Parliament.

In order to obtain quality buildings, it is mandatory to maintain the following requirements throughout the life of the construction: mechanical strength and stability, fire safety, hygiene, health and environment, safety and accessibility in operation, noise protection, energy saving and thermal insulation, sustainable use of natural resources [12]. All these fundamental requirements are applied according to the category of importance of the building through regulations and technical building standards [12].

2.2. Urban planning regulations

Urban planning regulations impose 3D restrictions on real estate. Public law restrictions resulting from urban planning activities impact on land use, infrastructure and implementation of special economic policies, transportation, education, energy consumption, public investment, environmental conservation and traditional architecture [7].

The law that regulates urban planning provisions in Romania is Law 350 of 6 July 2021 on spatial and urban planning, issued by the Romanian Parliament. The main objectives of urban planning regulations are balanced spatial development in which the expansion of built-up areas is controlled, the protection of natural and built heritage and the improvement of the quality of life in urban and rural areas [13] [14].

Also, in spatial planning activity, the request for public participation in the decision-making process is mandatory in all phases of the elaboration or update of the urban and spatial planning process[13].

Restrictions, rights and responsibilities in urban planning are outlined in the urban planning certificate, which is issued by the county or local public administration authority [13]. This informative act establishes the legal, technical and economic regime according to the specific regulations of each area of interest [13].

The urban planning regulations in the field of construction lead to public law restrictions on the minimum and maximum height of the building depending on the surface of the land on which a certain percentage of occupation and use is imposed according to the destination and location of the building.

By applying the public law restrictions imposed in urban planning regulations, the main physical dimensions of a building are determined: surface area and volume. In the integrated cadastre and land registration system in Romania, buildings are represented in a 2D space, being known only their surface area.

Even if most of the restrictions, rights and responsibilities have applicability in 3D space being characterized by three-dimensional data, such as the volume of a building, the legislation in force does not allow the implementation and visualization of these restrictions in a 3D cadastre information system.

2.3. How to register in the integrated cadastre and land registration system in Romania

At present, the registration in the integrated cadastre and land registration system of real estate is carried out in accordance with the Law no.7 of 13 March 1996, on cadastre and real estate registration issued by the Romanian Parliament and based on the Regulation of reception and registration in the cadastre and land registration records approved by Order 600 of 8 February 2023 issued by the National Agency for Cadastre and Real Estate Registration.

The integrated cadastre and land registration system includes the technical, economic and legal records of the real estate in the same administrative-territorial unit: commune, town and municipality [15], [16]. The cadastre information system through which ANCPPI manages the cadastre and land registration of Romania is called "e-Terra".

The registration of data on real estate in Romania is carried out by natural or legal persons authorized by National Agency for Cadastre and Land Registration of Romania (ANCPPI). Thus, access to the integrated cadastre and land registration system is only through a user account provided by ANCPPI.



Fig.4. Interface of the integrated cadastre and land registration system in Romania [17]

For the registration of the buildings in the existing cadastral system, the creation of a new documentation and the selection of the type of technical documentation according to the specifics of each building is initiated.

The cadastral information system requires the selection of the county and the administrative-territorial unit in which the building is located for which the spatial and non-spatial data are to be registered in order to load the map of the studied area.

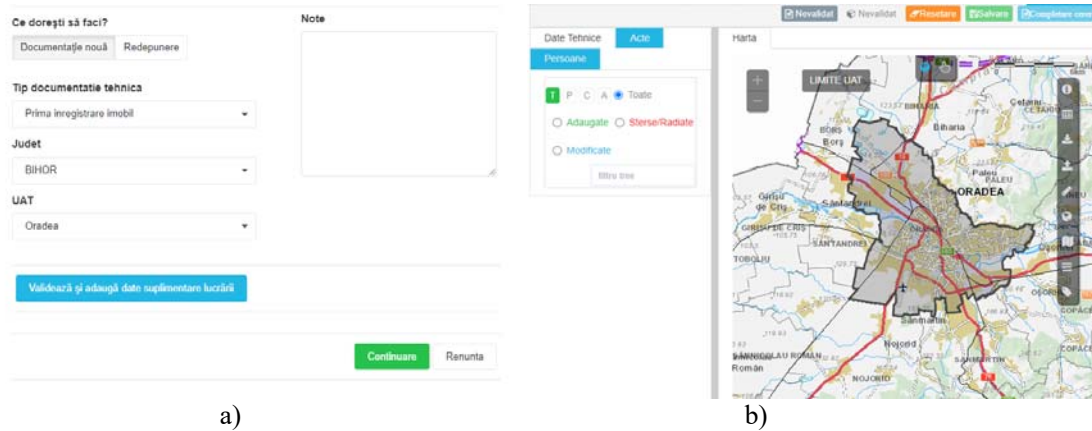


Fig. 5. a) Initiation of new documentation for the registration of buildings in the integrated cadastre and land registration system [17]; b) Map generated following the registration of new documentation in the integrated cadastre and land registration system

Within the cadastral information system, 2D vector spatial data of the closed polygon type are recorded with associated textual data.



Fig. 6. Date spatiale vectoriale de tip poligon inchis din zona studiata in cadrul acestui articol Closed polygon spatial vector data from the area studied [17]

The impact of Public Law Restrictions in the field of constructions

Editare date textuale CONSTRUCTIE - 175541-C1

Construcție

Nr. cadastral (vechi) / Nr. cadastral (necchi) / Destinație construcție: construcții industriale și edilitare

Nr. carte funciara (vechi) / Nr. carte funciara (necchi) / Valoare impozabila: 152600

Numar topografic / Numar topografic / Se conciese suprafața?: Da

Numar nivel: 1 / Suprafața: 38 / Suprafața din acte: 38

Numar unitati individuale: 1 / Suprafața totala construita / Suprafata totala construita

Documente

Are acte? Nu / Tip CF construcție: CF colectiva / CF grupa / CF apart.

Parti comune: Parti comune

Observatii: Spatiu comercial din beton si caramida 2008

Fig. 7. Textual data associated with the construction studied [17]

After completing the registration of the property data and saving the documentation, the application starts working, being checked and solved by the ANCPI specialized staff. Thus, following the solution of the application, the property is associated with a unique cadastral number and is registered in the land register.

Individuals and legal entities authorized by ANCPI can view and download land registers from all over Romania, only for information purposes and not for use in the civil circuit.

Carte Funciara Nr. 175541 Comuna/Oraș/Municipiu: Oradea
Anexa Nr. 1 La Partea I

Teren			
Nr. cadastral	Suprafața (mp.) [*]	Observații / Referințe	
175541	45		

^{*} Suprafața este determinată în planul de proiecție Stereo 70.

DETALII LINIARE IMOBIL

Date referitoare la teren							
Nr. Crt	Categorie folosință	Intra vilan	Suprafața (mp.)	Taria	Parcelă	Nr. topo	Observații / Referințe
1	curți constructii	Da	45	-	-	-	

Date referitoare la construcții					
Crt	Număr	Destinație construcție	Supraf. (mp)	Situație juridică	Observații / Referințe
A1.1	175541-C1	construcții industriale și edilitare	38	Cu acte	Nr. niveluri: 1; S. construita la sol: 38 mp. Spatiu comercial din beton și caramida 2008
A1.2	175541-C2	construcții industriale și edilitare	7	Cu acte	Nr. niveluri: 1; S. construita la sol: 7 mp. Extindere spatiu comercial din 2010

Fig. 8. Land register extract from the integrated cadastre and land registration system for the studied property, Romania [17]

Regarding the development of a cadastral information system to record and manage restrictions, rights and responsibilities on real estate in Romania, the cadastre of public law restrictions developed in Switzerland can be a best practice model that can be applied in Romania.

Even if we cannot talk about a 3D cadastre in terms of the public law restrictions cadastre developed in Switzerland, where spatial data are still represented and visualized in a 2D space, 3D public law restrictions can be successfully applied to 2D spatial data.

2.4. Case study

In this article we have chosen as a case study for highlighting the need to implement public law restrictions in the field of construction in a 3D cadastre, a condominium building in Oradea, Bihor county, over which partially overlaps vertically a body of the adjacent building.



Fig. 9. a) Building in the study area, main facade [18]; b) Building in the study area, top view [18]

In this article, I have presented the general legal framework for the application of the provisions in the field of urban and spatial planning, for the building studied I will present the restrictions, rights and responsibilities according to the local urban planning regulation of the municipality of Oradea related to the general urban plan of the municipality of Oradea.

In order to find out the public law restrictions applied to the studied area, the general urban plan (PUG) was studied with the regulations of the territorial unit of reference, information that is published on the local public administration website. According to the general urban plan, the studied building is subject to restrictions in the area of public institutions and services constituted in independent assemblies.

According to the local urban planning regulations, the merging of land with neighbouring buildings for the purpose of building extension is allowed, with a setback from the alignment of 10m [19].

Also, the maximum permitted height of buildings must not exceed 18m [19] and the height of the existing buildings in the alignment must be taken into account when

constructing or extending a building. The volumetric configuration of the buildings will be established in exceptional conditions by the detailed urban plan (PUD) or by the zoning urban plan (PUZ) [19].

The maximum percentage of land occupation for the studied area must not exceed 60% and the maximum land use coefficient must not exceed 2.8 [16]. For these restrictions presented, derogations from the local urban planning regulations may be applied by PUD or PUZ depending on the urban context [19].

3. Results

In order to apply the public law restrictions on the building, it was necessary to carry out measurements and to draw up a more detailed topographical study to determine the maximum height of the building and the horizontal extension, compared to the topographical study currently required for registration in the national integrated cadastre and land registration system.



Fig. 10. Integration of geospatial data into a database of the studied area using ArcGIS Pro software

The symbolism used in figure 5, represents the studied building in purple colour, the red colour highlights the extension of the studied building, the green colour represents the volume of the neighbouring building which partially overlaps the studied building and imposes restrictions on the studied building and its extension and the blue colour represents the neighbouring buildings in the study area.

A 3D model was generated to visualize and manage the public law restrictions applied to the studied building.

Public law restrictions are textual data that cannot be materialised on the ground, but which impose certain restrictions, rights and responsibilities in the field of construction. The representation of these restrictions in a 3D space by means of specialised software makes it possible to understand the need to apply these public law restrictions on buildings.

In the case study, the public law restrictions affect the maximum height of the studied building, and a maximum height of 2.75 m is imposed to which the extension of the studied building can be realized. This restriction is imposed by the building body which is superimposed above the studied building at a height of 3.10 m and by the existing interior installations in the area to be extended which are located at a height of 2.75 m. Following the application of these restrictions the footprint of the extended building and its volume are imposed.

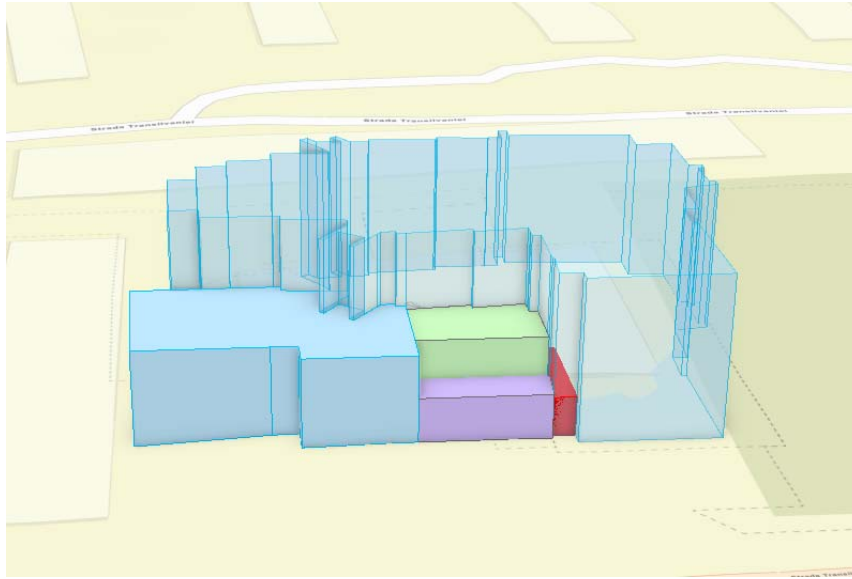


Fig. 11. 3D Public law restrictions in the study area highlighted using ArcGIS Pro software

These restrictions, rights and responsibilities have a legal but also a technical impact on the field of construction, as certain building limits are imposed. They cannot be visualized and managed at the moment in the national cadastral system, because the integrated cadastre and land registration system in Romania only provides the representation of plots and buildings in 2D space together with the property rights applicable in 2D space, without any reference to the imposed urban planning restrictions.

The current Romanian legislation does not offer the possibility of integrating 3D public law restrictions into the national cadastre system, as parcels and buildings located on the Romanian territory are represented as 2D entities.

The realization of the 3D model of the public law restrictions applied to the studied buildings required the study of several legal documents with different sources, this can lead to the hindrance of the development of the cadastre of the public law restrictions, by the significant changes of the legislative documents and the need to trace them in several sources.

The implementation of 3D models of public law restrictions allows detailed representation of the legal space in which the restrictions apply, contributing to the accurate presentation of the rights over real estate [7].



Fig. 12. a) 3D model of public law restrictions in the study area using ArcGIS Pro software;
b) The studied area registered in the integrated cadastre and land registration system in Romania [19]

The 3D model generated in the case study shows major differences from the national cadastral system in the delimitation of each building through its representation in 3D space, being generated the volume occupied by each building and the height regime according to the regulations imposed in the national legislation.

4. Conclusion

In this paper the public law restrictions in the field of construction, through urban planning regulations according to the legislation in force and their importance in the development of the built environment have been highlighted.

Even if these public law restrictions applied in the field of construction exist and are regulated in national legislation, they are not integrated in the integrated cadastre and land registration system in Romania.

Real estate represented by parcels and buildings are currently registered in the integrated cadastre and land registration system in a 2D space by means of closed polygon vector spatial data and non-spatial, textual data. Through these closed polygons only the total ground area of each building is determined, not the total built-up area or the volume of the building, because the national cadastral system allows the registration, management and visualisation of the data in a 2D space and for the determination of the volume of the building and the representation of its built-up area a 3D cadastral system needs to be developed. Thus, at the moment the public law restrictions applied in the field of buildings cannot be managed by 2D cadastral systems because the lack of legislation supporting the stratification of buildings in a 3D space allows partial application of 3D restrictions, rights and responsibilities.

The development of the cadastre of public law restrictions requires the registration and management of 3D geospatial data together with the restrictions applied to each real estate property, thus achieving a fully operational system for the management of public law restrictions on the built environment.

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