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TOPO-CADASTRAL WORKS FOR THE EXECUTION OF A ZONAL URBAN PLAN

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Abstract: Topo-cadastral works conducted for the preparation of a Zonal Urban Plan for the development of a residential area with complementary functions, facilities, and public services were carried out in the village of Urseni, Moșnița Noua Commune, Timiș County. The property is bounded to the north by arable land, to the south by a communal road, to the west by a European road, and again to the east by arable land.

The Zonal Urban Plan (PUZ) is the urban planning document that regulates land use and the organization of space for a specific area, serving to complement the General Urban Plan (PUG).

For field measurements, Real Time Kinematic (RTK) surveying was employed, using a GPS receiver capable of receiving real-time corrections from the TIM1 station in Timisoara, equipped with a GPRS connection module. The receiver is a dual-frequency Trimble R6 Receiver, model TRM_R6, which is compatible with multiple GNSS networks, including GPS, GLONASS, Galileo, and BeiDou, allowing for extensive coverage and increased precision. The TRM_R6 is an advanced piece of equipment designed for precision measurements in the fields of geodesy, topography, and mapping applications.

Key words: eTerra, GNSS, Topography, Mosnita Noua, PUZ, Stereographic 1970 .

• Introduction

The purpose of developing a Zonal Urban Plan is to ensure sustainable, balanced urban development that is adapted to the requirements and specifics of the area. It is created by urban planning specialists, following extensive field research, and it must be approved by the local council responsible for the property in question, taking into account, of course, the interests of the local community. If necessary, the PUZ can be modified according to the needs of the community or in line with future development projects [Smuleac et al. 2020].

• Material and method

The land discussed in this topographic-cadastral report is private property and is located in the village of Urseni, Moșnița Nouă Commune, in Timiș County. It is situated in the extravilan (outskirts), in the southwestern part of the administrative territory of Moșnița Commune. The plot under study, with the topographic number 408726, borders to the southwest with Hcn 552, to the north and east with Hcn 569, to the west with De 583 - 4m, and to the southeast with plot A584/1/2. Access from Timișoara is via the north-south direction on Calea Urseni, next to the Water Treatment Plant, until the city limits. The route continues along the county road DC 98 Timișoara-Urseni in the east-west direction, and from there, across a small bridge to the parcels within the studied PUZ. The communal road is paved and is in good condition. [mosnita.ro].

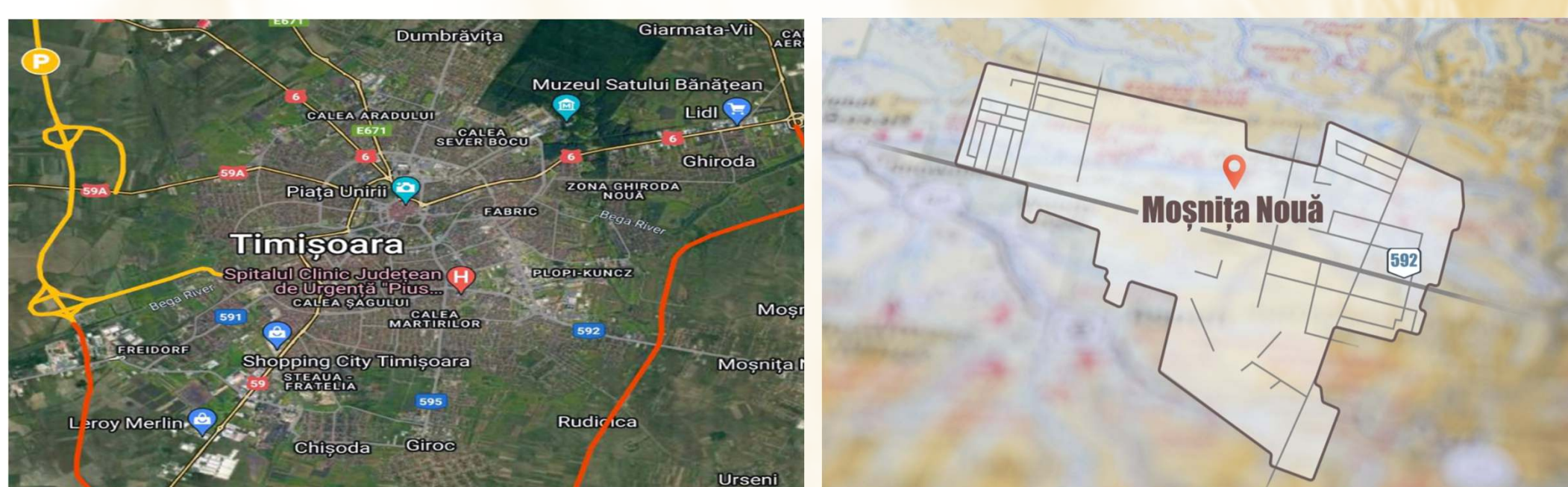


Figure 1. Presentation of adjacent areas

The topographic survey of contour points using the "Real Time Kinematic" (RTK) method is an advanced technique used in geodetic measurements that allows for obtaining very precise positioning data in real-time. RTK is based on Global Navigation Satellite Systems such as GPS, GLONASS, Galileo, and BeiDou. These systems provide global coordinates, but the signal can be affected by atmospheric errors, multipath interference, or satellite geometry. This system requires a fixed reference station that knows the exact coordinates and receives signals from the satellites. It then transmits correction data to a mobile receiver, in our case, the dual-frequency Trimble R6 GPS receiver. The rover receives the correction signals from the reference station and applies these corrections in real-time, allowing for an accuracy of under 2 cm under ideal conditions [Bălan, 2009; Herbei et al., 2018].



Figure 2. Trimble R6 GPS receiver

• Results and discussions

The creation of the topographic support necessary to prepare a Zonal Urban Plan involves several important steps. Here is an overview of these steps:

1. Identification of the land
2. Analysis of the documents specified in the work start notice issued by OCPI (National Agency for Cadastre and Land Registration);
3. Obtaining the coordinates of the boundary points of the properties in the respective block, which have undergone cadastral works and are registered in the OCPI database
4. Creation of the land boundary for the area covered by the Detailed Urban Plan (PUD) and its identification on-site;
5. Establishment of a support and topographic survey network required to carry out the topographic measurements;
6. Performing field measurements using GNSS technology to capture the elements that will be included in the subsequent documentation. (Săndulescu, 2017).

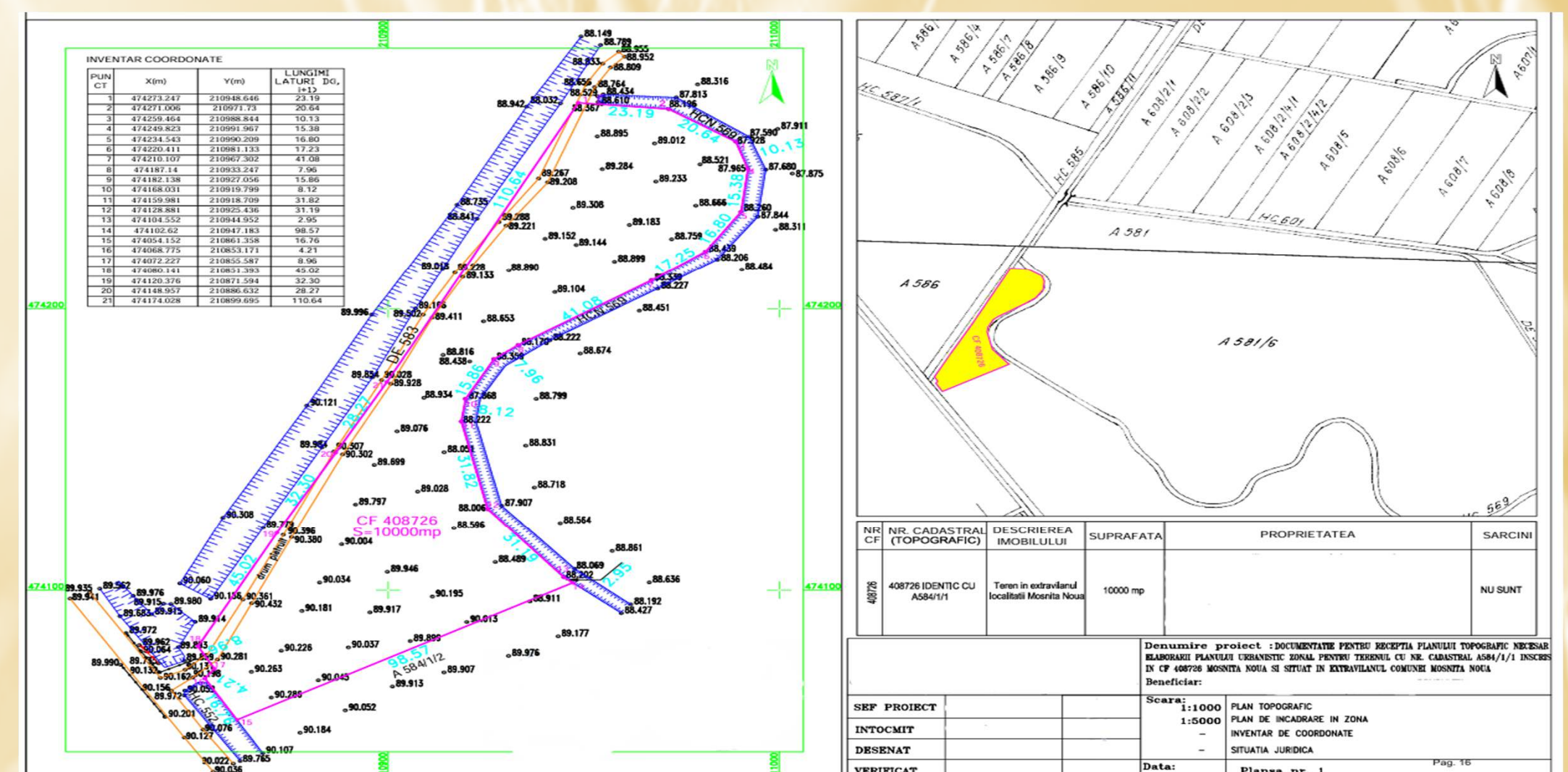


Figure 11. Zoning Location Plan

The objective is to develop the necessary topographic and cadastral support for the development of the Zonal Urban Plan. To achieve this, the following activities are required: land analysis, review of the documents mentioned in the work commencement notice issued by OCPI, obtaining the coordinates of the boundary points of properties in the respective block that have undergone cadastral work and are registered in the OCPI database, outlining the land subject to the Detailed Urban Plan and identifying it on-site, establishing the support network and the elevation network required for conducting topographic measurements, and carrying out on-site measurements using GNSS technology to obtain the necessary data for the subsequent documentation. The measurement processing will be performed using the "Trimble Total Control" topographic calculation software. (Roxana et al., 2020; Paunescu et al., 2020; Pascalau, 2021).



Figure 12. PUZ Regulatory Plan

• Conclusions

The development of the Zonal Urban Plan was carried out in accordance with the Guide regarding the methods for implementation and the content of the PUZ, approved by the Ministry of Public Works and Territorial Development through Order no. 176/N/2000, while respecting the applicable legislation.

In conclusion, the purpose of a Zonal Urban Plan is to regulate land use and organize urban development in a coherent and sustainable manner. The PUZ facilitates the integration of residential, commercial, and service functions, while ensuring environmental protection and compliance with legal standards. By establishing a clear framework for urban planning, the PUZ contributes to the creation of well-structured communities that meet the needs of citizens and promote harmonious urban space development.