

STUDIES ON GREEN AREAS DESIGN IN BELIN COMMUNE, COVASNA COUNTY

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Abstract

This article presents a practical study realized when preparing the technical project for landscaping, by realizing green areas in Belin commune, Covasna County. The project involves the arrangement of new green areas which are currently not arranged and the increase of the green areas surface in Belin locality, the endowment with street furniture of such arrangements in order to improve and rehabilitate the urban public infrastructure and the execution of a playground. By complex and appropriate interventions, thus land of over two hectares shall be arranged as Public Park, with endowments addressing persons of all ages, an opportunity for meetings and relaxation in the said area (HG 321/2005). Such aims shall be achieved by means of rest areas in a planted space, appropriate for walks and relaxation and for the execution for children playgrounds.

Key words: areas, green, landscaping, environment

The project “Execution of green areas in Belin Commune, Covasna County” was prepared in order to execute an eco-friendly park on the public domain of Belin commune, in order to increase the surface of green areas for the inhabitants in this locality (Law 24/2007) and, implicitly, to increase the environmental quality (Talen, Anselin, 1996). The residential areas shall also benefit of the new park by providing the entertainment functions and playgrounds nearby (Luke R. et al. 2008).

MATERIAL AND METHOD

The green areas in the study are located in Belin commune, Covasna County, on a public land and it was not characterized by large level differences.

The technical project prepared and the execution details are included in a complex documentation study (Order no. 863/2008). It consists of a volume of written parts comprising memoirs, bill of quantities, lists for the categories of works, general list, material resources excerpts, manpower, machines, transport, endowment list and a volume of drawings for all specialties.

The land on which the park is to be established has a surface of 3115,6 sqm, currently being a empty land, with spontaneous vegetation, with decorative value. The area shows no land systemization nor urban endowments: it has no alleys, trees and bushes, as well as no type of street furniture.

The green areas shall consist of 5 land lots located as follows:

- Area 1 location: land located in front of the elementary school and dispensary, with the surface of 683.07 m²;
- Area 2 location: land located in the center of Belin locality at approximately 100m of the Town Hall, with the surface of 561 m²;
- Area 3 location: land located in the center of Belin locality at approximately 100m of the Town Hall, near the statue of Boloni Farkas, at 30 m of the Unitarian Church, with the surface of 380.36 m²;
- Area 4 location: land located in the center of the locality, with the total surface of 646.28m².
- Area 5 location: land located along the medieval fortified city and footway alley with the length of 200m and the width of 2.5m with the total surface of 844.89 m².

The climate in the territory where Belin commune is located is continental-moderated with summers relatively rich in terms of rainfalls and cold winters with rare blizzards. The general air circulation is characterized by the high frequency of temperate-oceanic air currents from west (especially during the warm season), and by frequent protrusions of the eastern temperate-continental air (especially during the cold season, however reaching highly altered by relatively frequent invasions of the tropical-maritime air from south-east and south), by rare protrusions of the arctic air from north and by very rare protrusions of the tropical-continental air from south-east and south .

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From a geo-morphological point of view, the area studied frames into the features of the region located in the south-eastern side of Covasna County, in Sfântu-Gheorghe depression, a depression of tectonic origin, sided by Olt River, Negru River and Bodoc Mountains. From a geological point of view, the depression is filled by Levantine-Quaternary deposits consisting of fine clay sands and coal layers, over which alluvial-torrential sands and gravels superimpose. The area features alluvial processes and lateral erosion in the valleys, clogging on the depression margins, and, due to the flat or slightly inclined surfaces, pluvial flooding processes and surface washing occur with the formation of large pluvial-alluvial layers. Short term and slight swamps form here and there due to the drainage caused by the sand and gravel layers comprised in the soil. From a structural point of view, the soil composition is, generally, represented by dusty clays, sometimes loessoid clays, brown or red brown and plastic. The location area has a general and local fine stability and it is not subject to flooding or water inrushes.

The seismic conditions are analyzed and calculated according to STAS 11100/1-77 correlated with Norm P100/92 resulting, for Covasna County, and implicitly for the area of the location, in a seismic area "E" and the corner period $T_c=0,7$, and the frost depth according to STAS 6054/85 for the location is of 1.00-1.10m.

The bills of quantities were established by means of measurements on the project situation plan and afferent calculations. On grounds of such quantities, the measurement for the works bills of quantities was prepared. Within the bill of quantities, the designer completed the columns containing the quantities measured and the technological process articles.

RESULTS AND DISCUSSIONS

The arrangements provided include, at the level of green areas, the planting of bushes, hedge and grass in order to improve the environmental quality and to stabilize the degraded soil.

- Area 1: park with existing scenery lined by hedge of *Berberis* sp on three sides and the front side facing the county road shall be protected by a iron fence;
- Area 2: entertainment park and playground lined by hedge of *Ligustrum* on three sides;
- Area 3: green area near the statue of Boloni Farkas Sandor, lined by hedge of *Ligustrum*;
- Area 4: a series of three green areas located in the center of the locality, of which two shall only be planted and one area shall include a circle alley with street furniture;

- Area 5: green area along the medieval fortified city near the footway alley; a hedge of *Berberis* of proposed to be planted.

The project prepared proposes the execution of green areas arrangement by planting arboretum material consisting of 12 laminate trees, 94 bushes of which 74 laminate and 20 coniferous, 4000 perennial plants and cotoneaster, hedge of laminate bushes, *berberis* and *ligustrum* (2000 pieces) as well as the arrangement of 2694 m² of grass. The functional lights were proposed by mounting 6 posts connected to the electric network and 6 posts provided with photovoltaic panels. The endowments provided by the project consist of two fountains and two hydrants and a hose to wet the green areas, both facilities being connected to the communal water network. The street furniture proposed consists of 18 benches and 12 trash bins. The children playground shall be endowed with various modular equipments for the children playing and rest areas on sand with the total surface of 562 m². The design provides that the park circulation and access be possible by constructing a gravel alley with the total surface of 292.5 m².

The necessary works for the green areas arrangement shall include:

- Land preparation, soil cleaning of wastes and their selection, incorporation of solid, non-biodegradable waste, biodegradable waste loading and their transport to the pit, waste recycling of such waste appropriate for such process. Planting of quality laminate and coniferous trees and bushes meeting the functional and esthetic requirements in the area. Their selection was made on grounds of the environmental conditions and in order to create a pleasant, attractive ambiance. For such planting to be performed, the subsoil shall be improved by an addition of vegetal soil;
- Planting of hedge of laminate bushes;
- Grass planting with seeds of grass (*Lolium perenne*).

The plants provided for the new arrangement need minimum maintenance and are naturally resilient to the physical-chemical factors in the location aimed, resilient to entropic aggressiveness, and within 3 years as from installation in radial system extend rapidly into the soil in order to provide for tolerance against soil compaction. Such plants feature no additional risks in the area in terms of allergies by pollen production and fructification or by attracting insects, nor are they toxic. In general, the selected

species of bushes provide for shadow short time after being planted and the esthetic and social impact in the designated landscape is optimal on medium and long term.

The arboretum selected to arrange and realize the green areas in Belin commune, Covasna County, consists of:

- Tress, bushes and perennial plants presented in table 1.

Table 1

Proposed plant species		
No. crt.	Type / Species	Quantity
	DECIDUOUS TREES	
1	<i>Acer Platanoides</i>	12 pcs.
	RESIN SHRUBS	
2	<i>Picea Pungens</i>	20 pcs.
	DECIDUOUS SHRUBS	
3	<i>Prunus Cerasifera Pissardii</i>	34 pcs.
4	<i>Budleja Davidii– Liliac de Vara /0.6M</i>	20 pcs.
5	<i>Tamarix Tetandra</i>	20 pcs.
	PERENNIALS	
6	<i>Cotoneaster frigidus</i>	552 pcs.

- Hedge (5 pcs./lm), laminate bushes species *Ligustrum vulgare* 235 lm, *Berberis thunbergii* 208 lm according to the vegetation table.
- Grass of type *Lolium perenne* 2694.8 m².

In selecting the species of plants provided for the execution of the arrangement inside the locations, the analysis of specific conditions in this area was considered: climate, soil, sunlight, dominant winds, number of days with soil frost, entropic factors, the need to meet the architectural-ambience requirements specific to the arrangement project (pleasant ambience, shadow in certain areas, growing speed, colors, contrast effects, creation of connection elements between the spaces and the unit in the area), biodiversity, etc.

In order to solve such requirements, besides the architectural criteria, the biological and ecological aspects were also considered most appropriate for the species of plants to be used to the best advantage for the potential in the area and the specific climatic conditions.

The general arrangement plan governing the landscaping works in the green areas are the ones presented in Picture 1. Inside the arrangement, the street furniture shall be located according to the designed plan, and such furniture shall improve the local comfort and hygiene. The street furniture provided for mounting consists of light posts with photovoltaic panel's wooden benches on metallic structure, picnic tables and trash bins, playing equipments for children, information panels for the park visitors.

The alleys shall be executed in sustainable system, however at low costs, by natural stone

plating, lined by narrow rims made of concrete and having the sizes 50/10/15 cm.

The specifications and recommendations comprised in the technical project prepared are not limitative and the contractor may take all measures deemed as necessary and efficient observing the project provisions, the legal norms in force (OUG nr. 15/2009), in order to provide for or increase the quality of the works by consulting the Designer and the beneficiary of the works. During the works execution, the quality control schedule shall be observed as regards the works on site (HG 1408/2007).

CONCLUSIONS

This project aims to positively impact the life quality for the inhabitants and to enhance the growth of biodiversity in the area.

This project also aims to create optimal spaces in terms of functionality and aesthetics with positive impact on the environment and social environment and to improve the environmental quality (Negrea R., 2010) according to the general objectives of the Environmental quality improvement program by realizing green areas in localities (HG 321/2005). By arranging the green areas to a higher quality, the improvement of environmental quality is pursued by means of pollution reduction and CO₂ absorption, as well as to enhance the ambience and thermal comfort in the area.

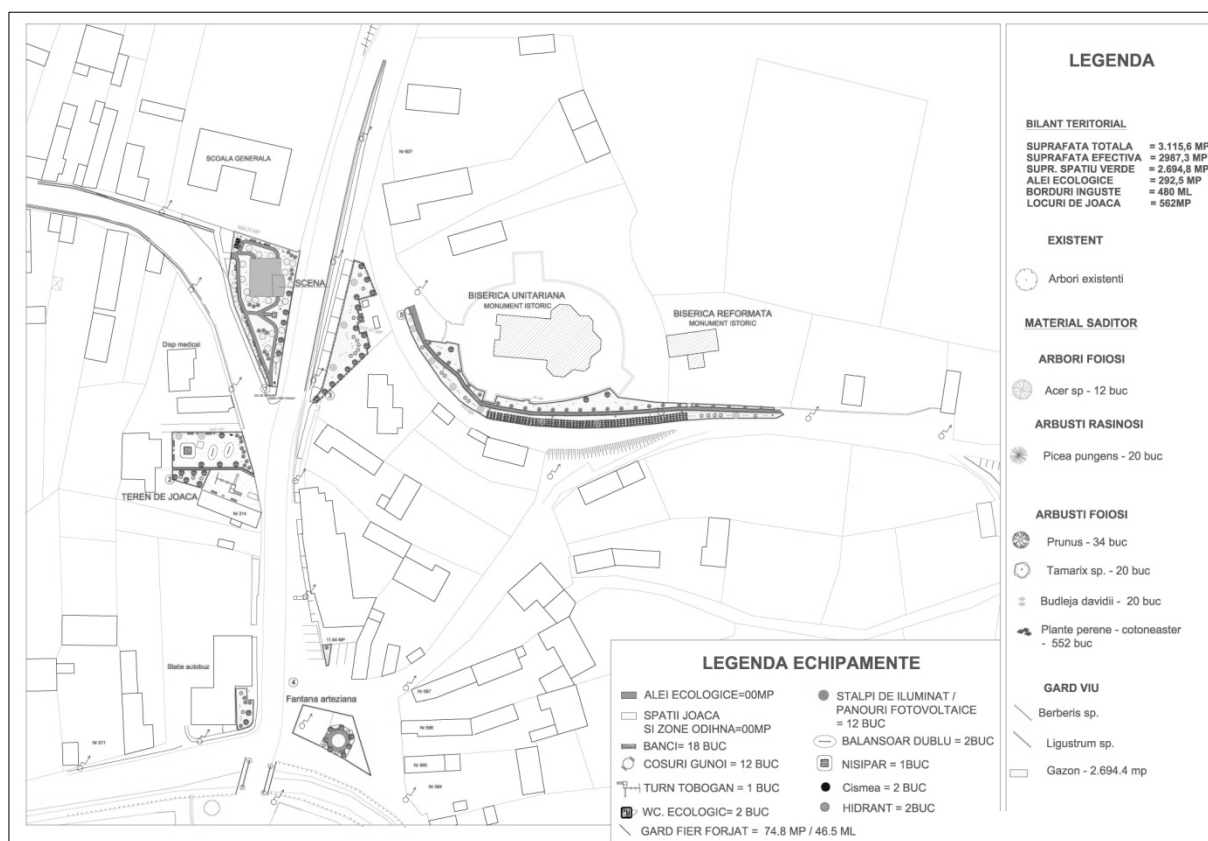


Figure 1 Proposed situation plan

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