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STUDIES REGARDING THE IMPROVEMENT OF THE URBAN ENVIRONMENT IN PIATRA NEAMȚ MUNICIPALITY, BY PLANNING A PUBLIC GARDEN

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Abstract

The land where the landscaping will be realized is situated in the city of Piatra Neamt, 151 Izvoare street - Speranta district, it has the surface of 2,000 m^2 and it is a public property registered according to Land Registry no. 64562 Territorial Administrativ Unit, Piatra Neamt. The main objectives pursued by the re-systematisation of the site are landscaping and creating recreational and leisure areas for the community while ensuring the improvement of environmental factors and living conditions in the urban environment and enhancing the urban layout of the city. At the moment, the land is unused being degraded and abandoned. The project envisages the setting up of a green area consisting of park and garden for unlimited public access. On the green space, 10% of its area, will be occupied by buildings consisting of: sanitary facilities / changing rooms and an administrative annex and pedestrian walkways, urban furniture, cheerful seating area, a children's playground.

Key words*: urban environment, landscaping, public garden.*

INTRODUCTION

The project contributes to the achievement of the strategic objectives of sustainable urban development by expanding green areas, which will lead to the improvement of the environmental conditions and the quality of urban life. Also, the setting up of a public garden satisfies the need for peace and relaxation and supplies the inhabitants of the area with conditions for outdoor movement, contributing to the embellishment of the urban aspect of the city and the preservation of the health of the inhabitants (Berg, 2004 and Nowak, 1999).

Also, at drafting, we have complied with the provisions stipulated in 21 rules and regulations, including Law no. 350/2001 on Landscape Planning and Urbanism, republished, with up-to-date updates (O.U.G. no.7/2011, Law no. 162/2011, Law no. 221 / 2011), and O.U.G. no.195/2005 on environmental protection, with subsequent amendments and completions.

The project foresees the perimeter enclosure of the green space, the installation of a video surveillance system, a Wi-Fi system in the public space, as well as other utilities necessary for the functionality of the objective. The green area is intended to be planted with trees, shrubs, flowers, etc. and with grassing the remaining areas and their automatic irrigation**.**

MATERIALS AND METHODS

The green area system of the city PIATRA NEAMT consists of different categories of facilities, with locations that have various sizes scoping to perform certain functions.

Thus, the green area associated with the street Izvoare from the 151 Speranta district falls into the category of recreational landscapes due to their public design. This category must comply with certain norms and standards, such as those relating to the green area of 9-13 square meters per each inhabitant of cities that do not exceed 100.000population rate, according to existing laws (Panțu, 2009). In order to preserve nature within the city, bushy and tree vegetation has been carefully located at the site level for maintenance and eventual correction where applicable so as not to pose a threat to the inhabitants (Stănică, Dumitraşcu and Peticilă, 2008).

By rehabilitating the green area, this space will give to this place functionality and vitality to re-establish the connection between man and nature.

Thus, by following the design principles, the beneficiary will not be aware of the final forms of the plan, instead he will be happy by the pleasant relationships created by the projected ambiance (Dascălu, 2006).

Taking into consideration the analysis of the current situation, the following main interventions are proposed in vegetation:

- Clearing out the incomplete lawn area that does not meet the landscape requirements,
- Cleaning the entire surface of plant debris,
- Installing an automatic irrigation system,
- Planting trees and shrubs,
- Land preparation works for the installation of lawn consisting of rolls, by milling and smooth levelling.

The proposed lawn area for clearing out is part of the category of heavily degraded spaces with no decorative value in terms of landscape, as it can be observed in Figure 1.

Figure 1. Proposed lawn area for clearing out

The plant species included in this project (Table 1) are also suitable for early spring planting, but much better results can be obtained by planting autumn trees in the period of October 1 - end of November, maybe even later, but not less 15-20 days until the snow comes.

Table 1. List of proposed tree species and shrubs and quantity required

Number	Species	Container type	Size (cm)	Pieces.
1	*Ailanthus altissima*	Bale	250-300	91
2	*Gleditsia triacanthos*	Bale	10/12	82
3	*Elaeagnus angustifolia*	Flower pot	100-150	90
4	*Prunus cerasifera 'Nigra'*	Bale	10/12	53
5	*Betula pendula*	Bale	12/14	160
6	*Robinia pseudoacacia* 'Frisia'	Flower pot	250-300	17
7	*Cotinus coggygria*	Flower pot	100-150	167
8	*Ligustrum vulgare*	Flower pot	60-80	238
9	*Berberis vulgaris*	Flower pot	80-100	198
10	*Mahonia aquifolium*	Flower pot	30-50	1100
11	*Ajuga reptans*	Flower pot	10-20	5111
12	*Cotoneaster dammeri*	Flower pot	40-60	723
13	*Santolina chamaecyparissus*	Flower pot	20-40	162
14	*Hosta plantaginea*	Flower pot	20-30	147
15	*Pinus sylvestris*	Bale	250-300	88
16	*Cornus alba*	Flower pot	80-100	51
17	*Taxus x media*	Bale	60-80	151
18	*Taxus baccata*	Bale	60-80	87

The idea used in designing the project is a cutting-edge working tool for designing gardens and green spaces. In view of this fact, the landscaping programs have contributed considerably to achieving the green space site concept in the Speranța neighborhood.

One of the programs used in the conceptual idea was Total 3D pro landscape architecture, which is a software that offered total freedom in reproduction of any built environment, regardless of its nature, using mesh hi / low poly tools. In this software everything is editable, starting with the 3D model, materials, textures, light and last and vegetation.

The biggest advantage of the landscape architecture programs used in the development

project is the freedom they offer as well as the extensive database that can easily generate 3D hi / low-poly vegetation models (floral species, trees and ornamental shrubs).
Another powerful creation software used to realize the project was 'Adobe Flash Professional' which offered the opportunity to create animation and multimedia content.

A very important part in designing the planning concept was the virtual introduction of the data available from the site to be landscaped.
To produce a faithful replica of the site, a number of metrics have been used, such as topometric studies (figure 2).

Figure 2. *Example of Prunus cerasifera 'Nigra' . And Robinia pseudoacacia* 'Frisia' *designed in a database supplied by Adobe Flash Professional*

Therefore, the strength of Flash, which led to its use in conceiving the design project, was that it provided a powerful system to create animation for the Web.
To better control de model both 2D (2 dimensions) and 3D (3 dimensions) were rendered in the virtual environment.
The most important part in designing the project was reproducing as closely as possible to reality by creating and using universal databases, used from one software to another, each of them having the possibility to import and export 3d models.
The method of realizing the project using design software had the advantage of being able to play and visualize within a three-dimensional virtual frame the ideas of space design, highlighting or shading certain species using different textures, lights or shadows (figure 3).

RESULTS AND DISCUSSIONS

The project including the design of the public garden from Neamt county, city Piatra Neamț, Speranța district, 151 Izvoare street (Figure 2) aims to create an landscaping arrangement that supports both the street alignment and its completion with the volumes of proposed vegetation, as well as the green fields of the garden-park, following the below aspects:

- To Develop a delimitation on the street esplanade of the road and on the path along this street to create an indoor microclimate;
- Planting trees, shrubs and floral species in this area to create a special setting regardless of the season;
- Making shrub alignments to mark the street esplanade.

For landscaping the green space, several criteria were taken into account:

1. A dominant species was chosen for the unity of the plantation.
2. The canopy need to be ordered.
3. Suitable height at maturity of approx. 7 to 12 m.
4. To have the best viability and to ensure sustainability.
5. To ensure rapid growth and development.
6. Not to require very expensive maintenance after the planting.

7. No annual intervention and planting of dendrological material needed (Rose and Wang, 1998 and Stănescu, 2008).

In view of the achievement of this goal implying the elaboration of the modernization project, we followed the principles of contemporary landscape design (Harris, Clarck and Matheny, 2004). Considering the creation of this diserantum were applied these principles in the creation of vegetal compositions, and choosing the species and their location in the general plan.

These principles were essential both in developing color schemes and when considering the succession of flowering as can be seen in Figure 3.

Figure 3. Systematization of the green space for the inhabitants of SPERANŢA district no.151, located in County NEAMŢ, city of PIATRA NEAMŢ

Over time, different landscape designers have tried to develop a formula for designing this pleasant order called composition. Clement (2004) has developed universally valid principles such as sequencing, unity, equilibrium and accentuation, principles that have been used to design this landscape project in SPERANŢA.

Mass, line, rehearsal, texture, frame, rhythm, colour, species were the key elements for the working methods used in conceiving the plant design and vegetal compositions (Negrea and Zlati, 2011) for which it was chosen in the arrangement of the garden-park in SPERANŢA district (Figure 4).

The slow lines and curves as well as the horizontal ones perceived as resting were used with great care for conceiving the arrangement, while the diagonal or vertical lines were used in excess to create more enthusiasm and tension.

The scope of bringing the *Betula pendula* (multi-strain) and *Acer Crimson King* species into the park of the SPERANŢA district was desired to define and accentuate the space for both winter and summer decorations. The shapes in this arrangement are defined by lines and is what we see first when looking at the distance.

Figure 4. The proposal for the green space for the inhabitants of SPERANŢA no. 151, found in County NEAMŢ, city of PIATRA NEAMŢ

Every plant that enters the arrangement of this space has a different way of growth, forming a mass and a unique volume, changes as the plant grows.

These forms of crown used, whether they are pyramidal, spherical, shallow and columnar or displayed, compartmentalize and define the space.

Some forms are more dramatic than others and have been used to attract such attention.

Location of *Prunus* trees blocks the sight in the setting in the green area of the playground perimeter, unlike the rest of the plants that are located in order to open the panorama and change the view according to age, growth mode, displayed or compact. These plant qualities change quite often with the seasons and restructure the lines in this garden, providing dynamism. They were chosen to avoid monotony. The shape of selected plants located in the setting was essential to create dynamic, attractive, comfortable and captivating spaces.

In addition, their texture creates emotion, being a visual stimulus in the green spaces located in the garden-park area located in the SPERANŢA district, which is perceived as a

mass with bark, leaves or flowers and changes according to the daylight and of the season.
On a close look, the size and shape of the leaves and branches become the predominant textural elements of each plant. From a distance, the effect of light and shadow appears on the whole arrangement, different intensity of light and darkness transpose into texture within this garden. The harsh textures of the *Buddleja* and *Pinus* specimens have a tendency to create a mood and are visually dominant, which is why they have been used, while the smooth textures of the *Wisteria sinensis* and *Syringa vulgaris* are associated with formal, elegant, discreet attitudes, and visually are more passive, which is why they have been introduced into the setting.
The specimens of *Hortensia* sp. and fine-textured *Buxus sempervirens* Glob are visually perceived as being farther in spite of the fact that they are placed in the proximity of alleys, for which they have been used to provide a sense of perspective in the smaller strip of blocks in front of the blocks and not in the last row to make the space look bigger. On the other hand, the predominance of rough-textured plants such as *Hibiscus* and *Lavandula* in the center of the garden-park make the space seem smaller so as not to create too much disparity between this space and the street alignment.
Strong textured contrasts of the used species add intensity to the arrangement and create interest. The bark of the specimens of *Betula pendulum* and *Pinusmugo* Mops and the leaves of *Paulownia tomentosa* and *Cotinus coggygria* Royal Purple are ways to add textural interest to the space, complemented by spring flowers that embellish both texture and color (Vezzosi, 1998 and Vilmorin, 2008).
The fragrance of flowers in this arrangement was very rigorously taken into account by the use of *Lavandula* and other *Robinia pseudoacacia* 'Frisia' species with fragrant flowers that bring extra charm to the whole street by expanding sensory awareness.
The tree and shrub groups were placed in such a way that, apart from the decorative purpose (Holdrege, 2005), they also serve other purposes, such as sanitary, defense against dominant wind, masking of certain areas, visual and sound insulation of the pedestrian front of the carriageway surface and last but not least for highlighting a certain compositional point and for establishing the link between the pedestrian area and the park garden (Figure 5).
For diversity in some areas, it was chosen to place inverted species so that those with darker foliage have a more obvious outline, and the eyes are attracted by the species that make up the background lighter.
Another special effect was also obtained by combining in the same group the specimens of different heights and ages, without the homogeneity of the ages and heights being indicated in a group.
In addition to the revitalizing effect of the landscape, another great advantage of these types of groups of ornamental species is the fact that the old or debilitated specimens of various causes can be replaced without being aware of their absence. Making the association of flowers and ornamental shrubs in these groups aimed taking into account the psychic influence of the crown shape on the passers-by.
Thus, compact groups of trees and shrubs wanted to impart order, sobriety and determination, those made of species with a pyramidal or conical port to give the impression of stability and height, the groups made of specimens with spherical, tubular or umbrella crown to inspire feelings of calm and tranquility, being located in areas for passive rest, in which many banks are present.
For the realization of the vegetal compositions, odd numbers were used and their arrangement was made according to various irregular geometrical shapes such as triangles, quadrilaterals or pentagons, placing the copy or the highest specimens in the area of the center of interest and the smallest to the corners of the shape (Donadieu, 2002).
In the case of groups of plants with large differences in height, the balancing of the volume was achieved by using in the center of the woody plants groups of the large size, followed around by large shrub shaped specimens, then by the small ones, having *Lavandula* groups, all of which are located on a wide, well-groomed lawn.

Figure 4. Systematization of the green space for the inhabitants of SPERANŢA NR. 151, found in NEAMŢ County, city of PIATRA NEAMŢ

Figure 5. The hedge with the gabions insertions that perimeters the garden

For lawn areas there was a roller lawn and a layer of 20 cm vegetal soil that should ensure good development and maintenance of the lawn in time.

All surfaces that will be planted with grass will be prepared for installing the grass rolls. The ground will be 2 cm below the upper edge of the edges in order to avoid the migration of the earth outside the green space, thus avoiding the dirty or paved surfaces being dirty.

For proper development and growth, the dendrological material will be provided with the necessary water and nutrients throughout the year.

As a perimeter solution, a hedge with gabion inserts was used (Figure 5).
Small plants have been used to ensure visibility to all areas of the garden.

CONCLUSIONS

Public access and evacuation routes are dimensioned in accordance with the rules and regulations for designing such spaces and with respect to the quality and safety requirements in service.
The land, which is the subject of the project, can be accessed pedestrianly from the Nordic, Southern and Western sides of the site. From the common access road NCP 558, pedestrian access as well as the emergency one will be made, the exact indications being marked in the situation plan.
From the street alignment and from the boundaries of the district properties will be in compliance with the requirements of the Urbanism Certificate, following the recommendations of all the advisors involved.
In the case of groups consisting of only two specimens, they were balanced as a height and in the case of the difference in height, the balancing of the volume was achieved.
A group with a special effect was obtained by using at its center the arboricolles of the I-size, followed around by large arbustive specimens, then by the small ones, beside which were placed groups of *Lavandula* (lavande) , all of which are located on a wide, well-groomed lawn.
All surfaces that will be covered with grass will have the ground before the rolls are mounted 2 cm below the upper edge of the edges in order to avoid the migration of the earth outside the green space, thus avoiding the dirty or paved surfaces being dirty.
The planting of trees, shrubs, floral plants and lawns will take into account the optimal conditions for these works to ensure the highest possible planting success.
The dimensions for dendrological material are included in the standard ones, namely:
- for trees have a well-formed crown of 2.00 m high and a trunk diameter of at least 5 cm in thickness;
- for shrubs to have at least 5-7 well-developed branches and a width of at least 40 cm.
These rules are valid with certain exceptions in the plant growing season and apply only to deciduous species.

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