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MULTIFUNCTIONAL GARDEN PLANNING

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Abstract
The land whose development proposal is the subject of this paper is part of the village of Călacea, whose geographical coordinates are 45.9516° N, 21.1482° E. The landscaping of the area and the paths included in this project aims to create a multifunctional space where, taking advantage of the generous surface and the quality of the soil, trees and ornamental perennials, fruit trees and shrubs, areas for growing vegetables and aromatic plants, and relaxation areas in the form of pergolas will find their place, a glass-walled hut, storage areas for tools and plant waste, a solarium, a pond built to create a biotope to encourage specific biocenosis, a decorative fountain, paths and walkways to facilitate access between the elements of the landscape and a lighting system that wants both practical and decorative.

Keywords: arrangement, relaxation, landscaped areas

1. INTRODUCTION

The importance of green spaces is manifold. Vegetation purifies the atmosphere and reduces pollutants, improves physical health and mental state, provides an appropriate framework for practicing sports, tourism and recreational activities and, last but not least, enriches the landscape. The activities carried out by humans in the outer space are accompanied by perceptions, sensations, emotions, and the landscape must have certain characteristics that are consistent with the ideal conditions required by each of them (Poșta, 2015). The creation of new green areas, the protection, preservation and expansion of the existing ones, is an important means of combating the action of polluting factors and improving people's living environment. (Preda et al. 1973; Iliescu, 2003). Green spaces contribute to improving the quality of human life by creating an environment and framework favorable to public or private recreation in the open air, by improving and beautifying the human environment, in which man lives and works, positively influencing his mental and physical state. Some green spaces have a special scientific importance: botanical gardens, zoological gardens, reserves, national parks, historical gardens, museum gardens, exhibition gardens (Tomescu, 2007). Another element imported into a park are the waters through: the smooth and shiny surface, the play of light and shadow of the neighboring objects, the feeling of refreshment and freshness, of movement (Marcus, 1958). The location of Călacea, where the multifunctional garden will be set up, is located in the northern part of Timiș County, 24 km from

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Timișoara, located in the Vingăi Plain. The Vingăi Plain, the oldest and largest of the plains of Mureș (Traia, 2006). The climate is moderate continental temperate and is influenced by oceanic masses coming from the west (Azores Anticyclone) and subtropical masses (Mediterranean cyclones). The annual average air temperature is 110C. The precipitation regime is dependent on the circulation of air masses that ensure high annual amounts of around 550-650 mm (Văduva, 2004). The weight of the winds from the south is higher (10-17%), the winds from the north are somewhat less (10-11%) and those from the west have a much smaller influence (4%) because they manifest themselves more at height, bringing oceanic influences (Mahara, 1979). In the Banat Plain, the soils are extremely varied, complexity generated by pedogenetic conditions. They are mostly soils with high fertility. The hydrographic network is rich in deep and surface waters (Posea, 1997).

2. MATERIALS AND METHODS

The land with an area of 4256 m^2, whose development proposal is the subject of the work, is part of the urban area of the village of Călacea, whose geographical coordinates are 45.9516° N, 21.1482° E (Figure 1). The arrangement of the rectangular surface aims to create a multifunctional space, where taking advantage of the generous surface and the quality of the soil, trees (Vișoiu, 2004) and perennial ornamental plants (Băla, 2018), fruit trees and shrubs, will find their place. Areas for the cultivation of vegetables and aromatic plants, relaxation spaces in the form of pergolas, a house with glass walls, storage spaces for tools and plant residues, a solarium, a pond, a decorative fountain, paths and paths that will facilitate the access between the furnishing elements and a lighting system that is both practical and decorative. The arrangement will be made with own financial resources.

Figure1. Area layout plan

3. RESULTS AND DISCUSSIONS

The multifunctional garden (Figure 2) will have three areas, namely: in the first area there will be the house, built on one level, the second area will be developed around a decorative fountain, and the third area will be fruit-bearing, landscaped and cared for both for own consumption and to

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create an environment sought after by birds, butterflies and pollinators. The design and construction of the pond will be done by a landscaping company.

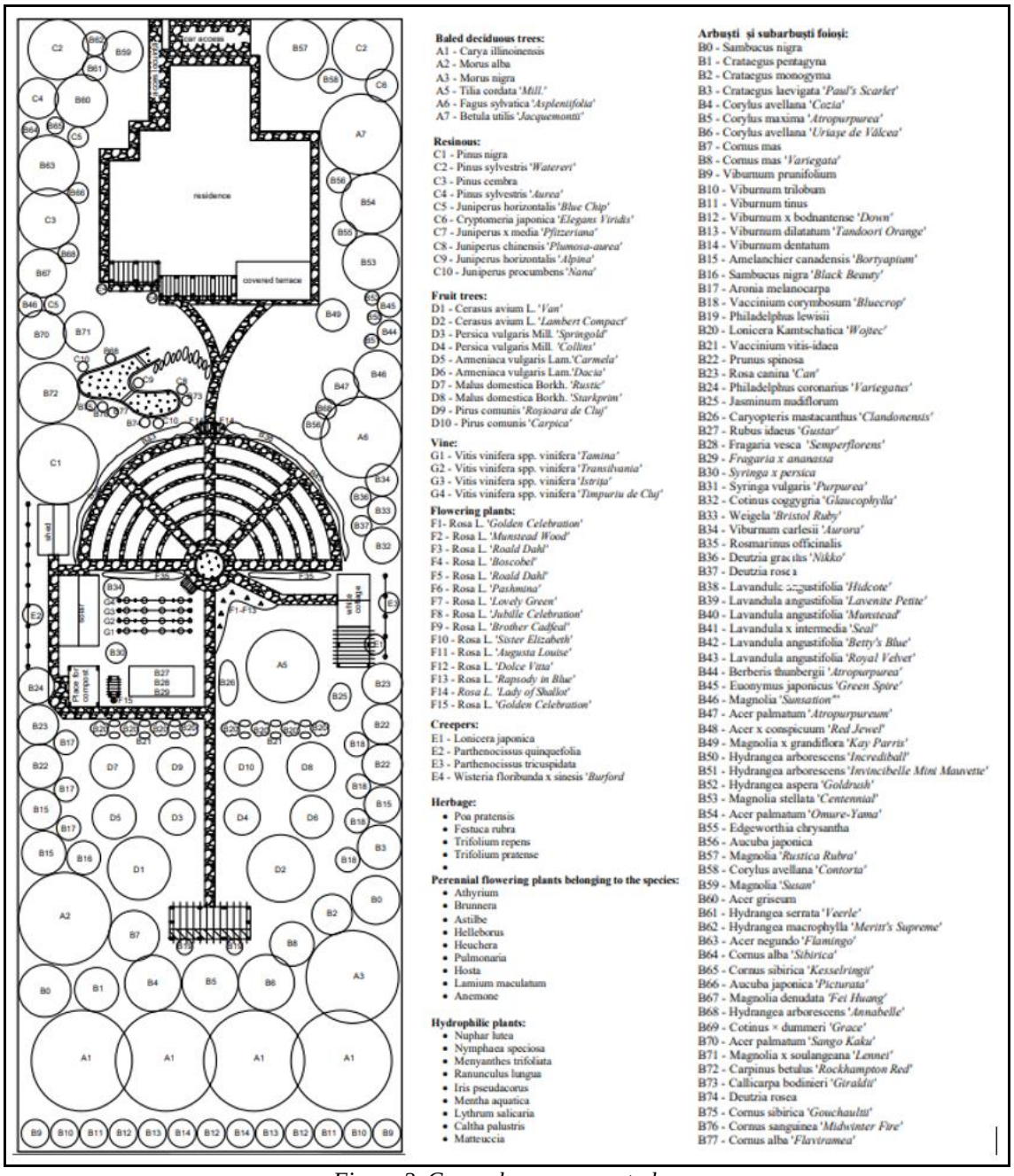

Figure 2. General arrangement plan

In the following, tables 1-5 related to landscaping will be presented.

Surface balance

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Table 1. Calculation notes for surfaces

Destination of surfaces	Surface m²	% from the total area
Total area	**4.256**	**100%**
Built area	**889**	**21%**
• House	319	7%
• circulation in the house project	130	3%
• circulation in the landscaping project	228	5%
• parking	48	1%
• decorative, utilitarian constructions	164	4%
Water surfaces (well, pond)	**40**	**1%**
Area covered with vegetation:	**5.258**	**124%**
• with trees	1.058	25%
• with shrubs	970	23%
• with fruit trees	200	5%
• with subshrubs	92	2%
• with vines	32	1%
• with roses	30	1%
• with vines	63	1%
• with hydrophilic plants	33	1%
• with flowers	80	2%
• the grassy/grassy surface	2.700	63%
Urban furniture:		
• the bank	1	
• table	2	
• seat	14	
• armchair	4	
• sofa	2	
• table	2	

Table 2. List of planting material

No. crt	Planting material category	Species/Variety/cultivation	No. Each	Unit value lei	Total amount RON
1	Resinous trees	Pinus nigra	1	70	70
2	Baled deciduous trees	Betula utilis *'Jacquemontii'*	1	150	150
		Fagus sylvatica *'Aspleniifolia'*	1	200	200
		Tilia cordata *'Mill.'*	1	70	70
		Morus alba	1	40	40
		Morus nigra	1	40	40
		Carya illinoinensis	4	70	280

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No. crt	Planting material category	Species/Variety/cultivation	No. Each	Unit value lei	Total amount RON
3	Resinous shrubs	Pinus sylvestris *'Watereri'*	2	300	600
		Pinus cembra	1	350	350
		Pinus sylvestris *'Aurea'*	1	350	350
		Juniperus horizontalis *'Blue Chip'*	2	40	80
		Cryptomeria japonica *'Elegans Viridis'*	1	50	50
		Juniperus x media *'Pfitzeriana'*	1	40	40
		Juniperus chinensis *'Plumosa-aurea'*	1	30	30
		Juniperus horizontalis *'Alpina'*	1	35	35
		Juniperus procumbens *'Nana'*	1	40	40
4	Bale deciduous shrubs	Magnolia *'Rustica Rubra'*	1	150	150
		Magnolia *'Susan'*	1	150	150
		Magnolia stellata *'Centennial'*	1	80	80
		Magnolia *'Sunsation'*	1	150	150
		Magnolia x grandiflora *'Kay Parris'*	1	170	170
		Magnolia x soulangeana *'Lennei'*	1	140	140
		Magnolia denudata *'Fei Huang'*	1	150	150
		Corylus avellana *'Contorta'*	1	120	120
		Acer palmatum *'Omure-Yama'*	1	60	60
		Aucuba japonica '*Picturata'*	1	50	50
		Aucuba japonica	1	50	50
		Acer palmatum *'Sango Kaku'*	1	60	60
		Acer negundo *'Flamingo'*	1	60	60
		Acer griseum	1	250	250
		Acer palmatum *'Atropurpureum'*	1	60	60
		Acer x conspicuum *'Red Jewel'*	1	60	60
		Edgeworthia chrysantha	1	150	150
		Euonymus japonicus *'Green Spire'*	1	30	30
		Berberis thunbergii *'Atropurpurea'*	1	30	30
		Hydrangea arborescens *'Incrediball'*	1	100	100
		Hydrangea arborescens *'Invincibelle Mini Mauvette'*	1	80	80
		Hydrangea aspera *'Goldrush'*	1	80	80
		Hydrangea serrata *'Veerle'*	1	70	70
		Hydrangea macrophylla *'Meritt's Supreme'*	1	120	120
		Hydrangea arborescens *'Annabelle'*	1	80	80
		Carpinus betulus *'Rockhampton Red'*	1	150	150
		Cotinus × dummeri *'Grace'*	1	120	120
		Cornus alba *'Sibirica'*	1	20	20
		Cornus sibirica *'Kesselringii'*	1	20	20
		Cornus sibirica *'Gouchaultii'*	2	30	60
		Cornus sanguinea *'Midwinter Fire'*	2	30	60
		Cornus alba *'Flaviramea'*	2	30	60

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No. crt	Planting material category	Species/Variety/cultivation	No. Each	Unit value lei	Total amount RON
		Callicarpa bodinieri *'Giraldii'*	2	30	60
		Deutzia rosea	1	30	30
		Syringa vulgaris *'Purpurea'*	1	200	200
		Cotinus coggygria *'Glaucophylla'*	1	40	40
		Weigela *'Bristol Ruby'*	1	40	40
		Viburnum carlesii *'Aurora'*	1	25	25
		Deutzia gracilis *'Nikko'*	1	35	35
		Sambucus nigra	2	25	50
		Crataegus pentagyna	1	25	25
		Crataegus monogyna	1	30	30
		Crataegus laevigata *'Paul's Scarlet'*	1	30	30
		Corylus avellana *'Cozia'*	1	40	40
		Corylus maxima *'Atropurpurea'*	1	40	40
		Corylus avellana *'Uriașe de Vâlcea'*	1	40	40
		Cornus mas	1	25	25
		Cornus mas '*Variegata'*	1	30	30
		Viburnum prunifolium	2	20	40
		Viburnum trilobum	2	20	40
		Viburnum tinus	2	25	50
		Viburnum x bodnantense *'Down'*	3	20	60
		Viburnum dilatatum *'Tandoori Orange'*	2	40	80
		Viburnum dentatum	2	30	60
		Amelanchier canadensis *'Bortyapium'*	3	25	75
		Sambucus nigra *'Black Beauty'*	1	60	60
		Aronia melanocarpa	3	20	60
		Vaccinium corymbosum *'Bluecrop'*	4	30	120
		Philadelphus lewisii	2	30	60
		Lonicera Kamtschatica *'Wojtec'*	1	20	20
		Lonicera Kamtschatica *'Karina'*	1	20	20
		Lonicera Kamtschatica *'Morena'*	1	20	20
		Vaccinium vitis-idaea	12	15	180
		Prunus spinosa	3	20	60
		Rosa canina *'Can'*	1	20	20
		Rosa canina *'Brașov 2'*	1	25	25
		Philadelphus coronarius *'Variegatus'*	1	30	30
		Jasminum nudiflorum	1	30	30
		Caryopteris mastacanthus *'Clandonensis'*	3	20	60
5	Suffruticous	Lavandula angustifolia *'Hidcote'*	6	30	180
		Lavandula angustifolia *'Lavenite Petite'*	6	30	180
		Lavandula angustifolia *'Munstead'*	6	30	180
		Lavandula x intermedia *'Seal'*	6	30	180

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No. crt	Planting material category	Species/Variety/cultivation	No. Each	Unit value lei	Total amount RON
		Lavandula angustifolia *'Betty's Blue'*	6	30	180
		Lavandula angustifolia *'Royal Velvet'*	6	30	180
		Rosmarinus officinalis	17	20	340
		Salvia officinalis	6	20	120
		Fragaria grandiflora Ehrh *'Premial'*	15	10	150
		Fragaria grandiflora Ehrh *'Coral'*	15	7	105
		Fragaria vesca *'Semperflorens'*	15	7	105
		Rubus idaeus *'Gustar'*	4	15	60
		Rubus idaeus *'Opal'*	4	15	60
6	Table vines	Vitis vinifera spp. vinifera *'Tamina'*	4	25	100
		Vitis vinifera spp. vinifera *'Transilvania'*	4	25	100
		Vitis vinifera spp. vinifera *'Istrița'*	4	25	100
		Vitis vinifera spp. vinifera *'Timpuriu de Cluj'*	4	25	100
7	Fruit trees	Cerasus avium L. *'Van'*	1	20	20
		Cerasus avium L. *'Lambert Compact'*	1	20	20
		Persica vulgaris Mill. *'Springold'*	1	20	20
		Persica vulgaris Mill. *'Collins'*	1	20	20
		Armeniaca vulgaris Lam.*'Carmela'*	1	20	20
		Armeniaca vulgaris Lam.*'Dacia'*	1	20	20
		Malus domestica Borkh. *'Rustic'*	1	15	15
		Malus domestica Borkh. *'Starkprim'*	1	15	15
		Pirus comunis *'Roșioara de Cluj'*	1	20	20
		Pirus comunis *'Carpica'*	1	20	20
8	Thea hybrida roses with bale	Rosa L. *'Munstead Wood'*	2	130	260
		Rosa L. *'Roald Dahl'*	2	130	260
		Rosa L. *'Boscobel'*	2	130	260
		Rosa L. *'Pashmina'*	2	130	260
		Rosa L. *'Lovely Green'*	2	130	260
		Rosa L. *'Jubille Celebration'*	2	130	260
		Rosa L. *'Brother Cadfeal'*	2	130	260
		Rosa L. *'Sister Elizabeth'*	2	130	260
		Rosa L. *'Augusta Louise'*	2	130	260
		Rosa L. *'Dolce Vitta'*	2	130	260
		Rosa L. *'Rapsody in Blue'*	2	130	260
9	*Roses mule*	*Rosa L. 'Lady of Shallot'*	*2*	*120*	*240*
		Rosa L. *'Golden Celebration'*	1	120	120
10	Creepers	Lonicera japonica	1	15	15
		Parthenocissus quinquefolia	2	15	30
		Parthenocissus tricuspidata	2	15	30
		Wisteria floribunda x sinesis *'Burford'*	2	50	100
11	Herbage	Poa pratensis	5kg	40	200

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No. crt	Planting material category	Species/Variety/cultivation	No. Each	Unit value lei	Total amount RON
		Festuca rubra	5kg	40	200
		Trifolium repens	5kg	40	200
		Trifolium pratense	5kg	40	200
12	Perennial flowering plants belonging to the species:	Athyrium	10	35	350
		Brunnera	10	35	350
		Astilbe	10	40	400
		Helleborus	10	70	700
		Heuchera	10	40	400
		Pulmonaria	10	35	350
		Hosta	10	35	350
		Lamium maculatum	10	35	350
		Anemone	10	35	350
13	Hydrophilic plants	Nuphar lutea	2	70	140
		Nymphaea speciosa	2	70	140
		Menyanthes trifoliata	2	30	60
		Ranunculus lingua	2	30	60
		Iris pseudacorus	2	30	60
		Mentha aquatica	1	30	30
		Lythrum salicaria	1	30	30
		Caltha palustris	1	30	30
		Matteuccia	1	30	30
TOTAL					**18.310**

Technical-economic estimate

Table 3. Preliminary measurements and cost evaluation

No. crt.	Materials	U/M	Amount	Unit price (RON)	Total (RON)
1	Slate in polygonal slabs for the alleys that are part of the project	mp	240	300	72.000
2	bower	m2	67	250	16.750
3	lighting objects	buc	116	150	17.400
4	the bank	buc	1	500	500
5	table	buc	2	650	1.300
6	seat	buc	14	250	3.500
7	armchair	buc	4	350	1.400
8	sofa	buc	2	700	1.400
9	table	buc	2	300	600
10	Fertile soil	l	1.500	15	22.500

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11	Construction of the pond belongs to the company KIMPIAN CONSTRUCT SRL	buc	1	45.000	45.000
12	Ornamental fountain materials	buc	1	3.000	3.000
13	Storage box materials	buc	1	4.000	4.000
14	Solar vegetable garden	buc	1	3.700	3.700
15	Glass-walled cottage materials	buc	1	5.000	5.000
16	Compost construction materials	buc	1	1.000	1.000
17	Vine support materials	m	32	40	1.280
18	Water supply system materials	buc	2	3.500	7.000
19	Irrigation/watering system materials	buc	1	40.000	40.000
Total cost					**247.330**

Table 4. Centralizing table with works specific to green spaces

Name of the work, materials	Total Cost	
	RON	EUR
Planting material	RON 18.310	€ 3.662
Materials	RON 247.330	€ 49.466
Workmanship	RON 112.489	€ 22.498
Final cost of the arrangement	RON 377.999	€ 75.600

Table 5. Estimate for landscaping works of green spaces

No. crt	Title of the work	U.M	Amount	workmanship /U.M.(RON)	Total(RON)
1	Landscaping by seeding with a mixture of grasses and clovers. Soil prepared to a depth of 20 cm, shredded, leveled, seeded, rolled, watered	m3	2.700	9	24.300
2	Planted deciduous trees with a diameter of up to 10 cm, with a bale, with the addition of topsoil in the planting pits	buc	6	11	66
3	Plan Planted resinous trees with the addition of topsoil in the planting pits	buc.	1	11	11
4	Planted deciduous shrubs with the addition of topsoil in the pits	buc.	101	8	808
5	Planted resinous shrubs with the addition of topsoil in the pits	buc.	11	8	88
6	Planted subshrubs with the addition of topsoil in the pits	buc.	112	7	784
7	Planted vines for the table with the addition of topsoil in the pits	buc.	16	7	112
8	Planted fruit trees with the addition of topsoil in the pits	buc.	10	8	80
9	Planted roses with the addition of topsoil in the pits	buc.	25	7	175
10	Planted lianas with the addition of topsoil in the pits	buc	7	5	35
11	Planted perennial flowering plants with the addition of topsoil in the pits	buc.	90	5	450
12	Planted hydrophilic plants	buc.	14	5	70
13	Construction of paths that are part of the garden project	m2	240	40	9.600
14	Ornamental fountain construction	buc.	1	3.000	3.000
15	Pond construction	buc.	1	4.900	4.900

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16	Installation of the lighting fixture powered by the electricity network	buc.	16	100	1,600
17	Installation of solar lighting	buc.	100	40	4.000
18	Pergola construction	m2	67	250	16.750
19	Installation of vine support system	m	32	40	1.280
20	Building a composter	m2	12	40	480
21	Solar installation garden	buc.	1	500	500
22	Construction of storage shed	buc.	1	2.700	2.700
23	Building a small house with glass walls	buc.	1	2.700	2.700
24	Water supply system installation	buc.	2	1.500	3.000
25	Irrigation/watering system installation	buc.	1	35.000	35.000
TOTAL WORK COST					**112.489**

4. CONCLUSIONS

Even if the arrangement seems to contain a large number of plants, they will fill the space without crowding it, leaving room for a few constructions with an ornamental or utilitarian role.

The constructions will be carried out by specialized companies, as well as the construction of the electric current circuits with the related installations, outside, and a company will build the decorative fountain and the pond with the two water falls. The horticultural works will be executed by an experienced team, coordinated by a horticultural engineer. The irrigation system will be made by the specialized company.

The work is extensive, but good coordination and collaboration will limit any delays that may occur.

Finally, the garden, even if it will require maintenance effort, will always provide a feeling of joy and relaxation through image, light, fragrance, air, sound and color.

The benefits will be complete when the plants approach maturity and the three areas that seem so different form a unified ecosystem.

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