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# AGRICULTURAL SCIENCES

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## PROJECT PROPOSALS FOR GREENING OF THE DEMONSTRATION SECTION OF THE PARK ZONE IN THE VINNYTSA NATIONAL AGRICULTURAL UNIVERSITY

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### Abstract

An analysis and project proposals for landscaping of the park zone of VNAU were made. On the basis of the conducted inspections project works on formation of system of gardening of the given territory (territory of a temple) in the following sequence are offered: a stage of preparation, a stage of project search, a stage of an estimation, a stage of detailed designing. The result of the analysis of the initial situation is the selected material for landscaping. Taking into account the exploratory design for the organization of the structural element of the landscaping system, the functional use of this area as a recreational area with the specification of greenery, typical of the given conditions, was determined.

At the evaluation stage, a comparative analysis of project options was conducted and the best option was selected and approved. An analysis of the potential of the adopted option was carried out in order to ensure the planning continuity and completeness of the assigned functions. The Realtime Landscaping Architect 2013 design program was used to compile a detailed master plan with dendroplan elements. shrubs, which adds aesthetic appeal to the site.

**Keywords:** project, park zone, landscape design, demonstration site, compositions, taxonomic composition, decorative properties, dendroplan.

**Problem statement.** Landscaping is one of the urgent problems of modern construction and design, which includes a number of measures to improve the sanitary and hygienic conditions of housing, equipping them with the necessary equipment, improving the urban environment through landscaping, as well as sanitation. With its help the favorable living environment with providing comfortable conditions for all types of activity of the population is created. Landscaping of the site, landscaping and landscaping are becoming increasingly important [2].

In modern conditions, landscaping of cities and towns play the role of the most important means of regulation, protection and optimization of the human environment and the biosphere as a whole. In order to protect the human body, a system of sanitary and hygienic norms and requirements for sources of pollution is being put into practice. A significant place in these activities belongs to the development of green building, the creation of different types of parks and green areas for various institutions, including educational [3].

Green plantations of cities and towns are the greatest wealth, which combines artistic and aesthetic qualities with sanitary and social functions. Plantations are the most important factor in the human living environment, work, leisure and culture. They are designed to protect human health, increase their employment, educate and meet cultural needs in communication with nature [5].

**The purpose** of our research was to create a landscape project of the park zone of Vinnytsia National Agrarian University. The project envisages improving

the appearance of the area near the university church due to new plantings of ornamental plants. The project plans to use new technologies for landscaping, providing optimal conditions for growth and development of planting material.

The task of the project regarding the landscaping of the VNAU territory is to improve its aesthetic appeal with a clear division by functional zones.

On the basis of the conducted inspections it is offered to carry out design works on formation of system of gardening of the given territory with use of the broken territories in its structure in the following sequence: a stage of preparation, a stage of project search, an assessment stage, a stage of detailed designing [4].

The input information for the analysis of the existing situation regarding the design object is the design task, reference plan, regulatory data, recommendations, design conditions. The result of the analysis of the initial situation is the selected material for landscaping.

**Materials and methods of the research.** The main research methods were: analysis, comparison, forecasting, modeling and graphic design. The source information was a preliminary sketch, data from preliminary calculations, proposals that meet the requirements of rational functional zoning of the city in terms of protection from pollution, noise and dust.

At the final stage of the project process, search design was performed to organize the structural element of the landscaping system in the disturbed area, indicating the chosen direction of functional use of recreational or general health purposes with specification of greenery typical of the conditions.

At the evaluation stage, a comparative analysis of project options was conducted and the best option was selected and approved. An analysis of the potential of the adopted option was also carried out in order to ensure the planning continuity and completeness of the assigned functions [4].

The Realtime Landscaping Architect 2013 design program was used to compile a detailed master plan with dendroplan elements. The assortment composition of plants presented in this program allows to reproduce the idea of the created project as realistically and qualitatively as possible. The ability to visit the projected area in real time allows the customer to check all the nuances and creates the effect of presence. Realtime Landscaping Architect 2013 is designed to develop a variety of landscape design projects and offers ample opportunities for specialized planning [1].

**Results of the research.** The area in front of Vinnytsia National Agrarian University is a public object. The square is located in front of the school and serves as the main entrance to the building and is formed as a regular style object.

A significant area is occupied by the lawn, which is currently in satisfactory condition. Decorative compositions of evergreen plants are placed on separate sections of the lawn. The compositions are evenly spaced. Currently, the square performs several utilitarian functions, the main of which is the main entrance to the school building, through which a large number of students pass daily.

Road dust does not get in large quantities to the areas in front of VNAU due to the planting of trees on the north side. This has a positive effect on the growth and development of plants in the area. On the north side of the central building, in area, there is a road that separates the territory of VNAU from the temple area.

The object to be landscaped is represented by a rectangular area covered with an abandoned garden lawn. The construction of the temple on the area of 0.05 hectares is carried out on the site.

In this area, the existing plantation has lost its aesthetic appearance over the years and is subject to reconstruction. There is no bush layer at all.

The natural vegetation of this area is not preserved. At present, the state of landscaping and landscaping of the study area of Vinnytsia National Agrarian University requires certain measures to improve the aesthetic appearance and ensure the proper level of functioning.

At formation of plantings it is offered to apply two types of landings:

1. Ordinary planting, performed on both sides of the tracks, which divides the landscaping area into functional zones;

2. Group planting in the amount of 3,5 trees and shrubs, which add aesthetic appeal to the site.

Ordinary landing performs a utilitarian function, protects from noise, dust and absorbs harmful substances from the air. Trees with a pyramidal crown are planted in ordinary planting (Fig. 1).



*Fig. 1. Ordinary landing along the alley*

Group planting is used in the accents of the sites, in places of local landscaping. Combined plants that have seasonal and permanent crown color.

Single trees are used only with decorative crowns, unusual color of leaves and abundant flowering.

The selection of the range of woody, shrubby and herbaceous plants is made taking into account their biocological characteristics. Along the main alley it is proposed to plant a hedge imitating a small labyrinth in the middle of which the accents are evergreen cypress with a pyramidal shape of the crown.

According to the project of landscaping and improvement of the object, the plot is divided into a visiting area and a walking area. To the right of the main alley there is a cozy walking area in the form of a circle surrounded by a hedge, which will allow visitors to enjoy the decorativeness of the main composition without distracting their attention from other elements of landscaping. On the left - a quiet recreation area is created, the feature of which is a decorative fountain, the jets of which create unforgettable impressions and complement the visual perception with the feeling of the sounds of nature (Fig. 2).



*Fig. 2. The use of evergreen plants in the projected area*

Against the background of the lawn formed group plantings, to increase the expressiveness of the composition used only highly ornamental species and varieties of woody and shrubby vegetation. Virgin magnolia will add charm and mystery to the object of landscaping in the spring, and boxwood evergreen and juniper horizontal will not lose its aesthetic appearance in the winter.

Both single and group plantings of evergreen plants were used throughout the territory to preserve the continuity of landscaping. About ten groups with different breed composition have been created, among

them there are high-altitude and planar compositions, thanks to the topiary haircut the hedge emphasizes the decorativeness of some groups (Fig. 3).

Assortment list of species used in landscaping, formed from eighteen species of trees and shrubs. Among them are Japanese maple, hanging birch, Lavalier hawthorn, and common oak form solitary plantings. A complete list of plants used in the design is presented in Table 1.



*Fig. 3. Example of using a molding hedge*

It is thanks to the plants, successful zoning of the territory and using all the advantages of the terrain, it was possible to hide the shortcomings of the territory.

Figures 4 and 5 show the design solutions in the form of a master plan with elements of the dendroplan and detailing the main compositional solutions.

Assortment of trees and shrubs

Назва виду	Кількість
<i>Acer japonicum</i>	1
<i>Berberis thunbergii</i>	37
<i>Betula pendula</i>	1
<i>Buxus sempervirens</i>	10
<i>Crataegus Lavallei</i>	1
<i>Cupressus sempervirens</i>	2
<i>Hydrangea arborescens</i>	22
<i>Hydrangea macrophylla</i>	7
<i>Juniperus chinensis</i>	4
<i>Juniperus communis</i>	8
<i>Juniperus horizontalis</i>	25
<i>Magnolia virginiana</i>	3
<i>Picea pungens</i>	2
<i>Quercus robur</i>	1
<i>Rhododendron</i>	4
<i>Spiraea japonica</i>	4
<i>Taxus baccata</i>	5
<i>Thuja occidentalis</i>	8
18	145

According to the assortment information, which is compiled in accordance with the dendroplan of the demonstration area of the park zone of VNAU, the most common shrub plants are Thunberg's barberry, tree hydrangea and horizontal juniper. The woody vegetation

is mostly represented by the magnolia of Vergin. This species composition is justified by the decorative qualities of the presented plants and the compliance of their growing conditions to the area.

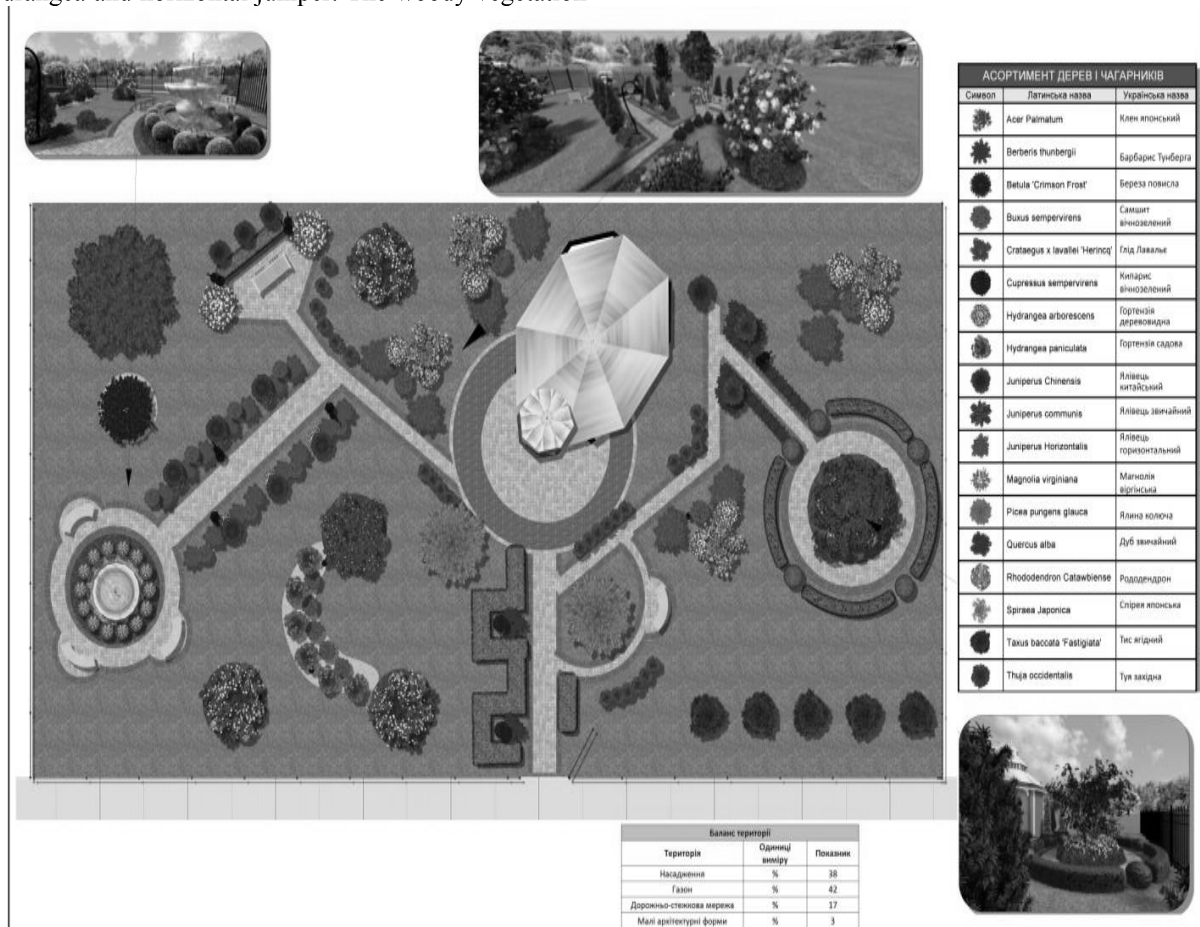


Fig. 4. Master plan with dendroplan elements and object detailing

The general plan with elements of the dendroplane reflects all the structural elements of the projected area. These include a road network, small architectural forms, existing buildings, shrubs and lawns.



Fig. 5. Visualization of the dendroplan of the demonstration area in the park zone of VNAU

Table 2 shows the need for lawn grass seeds to create a normal garden lawn on the territory of the object

Table 2

#### The need for lawn grass seeds

The composition of the herbal mixture	The content of the species in the mixture, %	Norm sowing, kg/ha	Square lawn, ha	The need for seeds, kg
<i>Poa pratensis</i>	60	40	0,03	0,72
<i>Lolium pratensis</i>	40	120	0,03	1,44
Total	100			2,16

The calculation of the estimated cost of construction of a garden and park facility and works on its care is carried out and systematized in tables 3-6.

The calculation of the balance of the territory includes:

- total area of the landscaping object;
- area, which is allocated for small architectural forms;
- the area of plots that are designed for greenery;

- area for lawn arrangement;
- the area of paths and platforms of different function.

To create the designed garden lawn, we use data on the balance of the territory of the object and the required number of seeds for its creation. The data obtained are shown in Table 3. The area of the lawn depends on the area of landscaping minus the area occupied by trees and shrubs.

Table 3

#### Calculation of the cost of lawn grasses

№ in order	The composition of the herbal mixture	Lawn area, ha	Unit measurement	Quantity	Cost	
					per unit, hrn.	total, hrn.
1	<i>Poa pratensis</i>	0,03	kg	0,72	170,0	122,4
2	<i>Lolium pratensis</i>	0,03	kg	1,44	135,0	194,4
Total:						<b>316,8</b>

Table 4

**Calculation of the cost of trees and shrubs used in landscaping**

№ in order	Name of planting material	Unit	Quantity	Cost	
				per unit, hrn.	total, hrn.
1	<i>Acer japonicum</i>	piece	1	4200,0	4200,0
2	<i>Berberis thunbergii</i>	piece	37	140,0	5180,0
3	<i>Betula pendula</i>	piece	1	260,0	260,0
4	<i>Buxus sempervirens</i>	piece	10	70,0	700,0
5	<i>Crataegus Lavalleyi</i>	piece	1	3299,0	3299,0
6	<i>Cupressus sempervirens</i>	piece	2	339,0	678,0
7	<i>Hydrangea arborescens</i>	piece	22	140,0	3080,0
8	<i>Hydrangea macrophylla</i>	piece	7	190,0	1330,0
9	<i>Juniperus chinensis</i>	piece	4	445,0	1780,0
10	<i>Juniperus communis</i>	piece	8	299,0	2392,0
11	<i>Juniperus horizontalis</i>	piece	25	325,0	8125,0
12	<i>Magnolia virginiana</i>	piece	3	760,0	2280,0
13	<i>Picea pungens</i>	piece	2	550,0	1100,0
14	<i>Quercus robur</i>	piece	1	2500,0	2500,0
15	<i>Rhododendron</i>	piece	4	350,0	1400,0
16	<i>Spiraea japonica</i>	piece	4	115,0	460,0
17	<i>Taxus baccata</i>	piece	5	315,0	1575,0
18	<i>Thuja occidentalis</i>	piece	8	160,0	1280,0
Total:			<b>145</b>		<b>41619,0</b>

In order to reduce the cost of transportation of planting material were selected outlets located within a radius of 20 km from the object under study. The calculation of the cost of planting material was carried out according to the dendroplan (Table 4).

The purchase of construction materials necessary for the improvement of the demonstration area of the

park zone of Vinnytsia National Agrarian University must be carried out immediately before the start of work. Since the cost of building materials is a variable unit, the calculation is relevant only for 2020 and the total cost may change depending on the level of market prices. The estimated cost of building materials and small architectural forms are presented in tables 5,6.

Table 5

**Calculation of the cost of small architectural forms**

№ in order	The name of the architectural form	Unit	Projected quantity	Cost	
				for 1 piece, hrn.	всього, hrn.
1	Urns	piece	9	300,0	2700,0
2	Benches	piece	5	1500,0	7500,0
3	Garden lanterns	piece	15	600,0	9000,0
Total:					<b>19200,0</b>

On the territory of the landscaping object, in addition to the existing asphalt roads, we design the creation of paths from paving slabs.

Table 6

**Calculation of the cost of materials for road construction according to the project**

Tiled floor	Unit	Project area	Cost	
			per unit, грн.	total, грн.
paving slabs	м <sup>2</sup>	85	125,0	10625,0
sand	т	13,2	160,0	2112,0
screening	т	3,8	60,0	228,0
cement	т	0,9	1250,0	1125,0
crushed stone	т	17,8	180,0	3204,0
Total				<b>17294,0</b>

Along with the accrual of the salary fund, business entities are also obliged to accrue and make contributions to the pension and social insurance funds.

Due to the seasonal nature of work in green building, it is advisable to plan the required number of workers on a monthly basis. It should be noted that the same workers after the end of one job can be used for other

jobs, the execution time of which does not coincide with the previous ones.

During the calculations and economic substantiation of design decisions, the average cost at the proposed prices of outlets relevant in Vinnytsia region was used. The total estimate of the proposed landscaping and improvement of the demonstration area of the park



zone of Vinnytsia National Agrarian University, at 2020 prices, is 8565 thousand uan.

#### Conclusions.

1. The location of the study area is favorable for the growth and development of greenery and visitors, as the area is remote from industrial structures, it is characterized by a low level of traffic and, accordingly, a low level of gassiness and dust in the air.

2. The project envisages the appropriate use of the territory in accordance with the requirements of functional zoning. According to the project of landscaping and improvement of the object, the plot is divided into a visiting area and a walking area.

3. The species composition of the species used during landscaping includes eighteen species of shrubs. The selection was carried out taking into account the biological and ecological characteristics of each species, taking into account the soil and climatic conditions of the area and provides an aesthetic appearance and continuity of the compositions throughout the year.

4. During the project implementation it is necessary to adhere to the basic technological and agrotechnical methods, as well as to pay special attention to compliance with the recommendations for planting plant material.

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### ECOLOGICAL ASSESSMENT OF THE ENVIRONMENTAL NATURE ENVIRONMENTS UNDER THE INFLUENCE OF LIVESTOCK FARM ACTIVITIES

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#### Abstract

The article raises the issues of assessing the environmental nature environments under the influence of livestock farm activities.

**Keywords:** the environmental nature, farm activities.

In connection with the deep transformation of the natural environment that is under the influence of anthropogenic impact, reaching global level, escalate and become urgent problems of preserving the ecosystem and biosphere as a whole.

According to the European Charter on environment and health everyone has the right to an environment that would facilitate the highest level of health.

Regulation of relations in the field of protection, use and reproduction of natural resources, ensuring ecological safety, prevention and liquidation of negative impact of economic and other activities on the natural environment, conservation of natural resources, genetic Fund of wildlife, landscapes and other natural complexes is the main goal of the laws of Ukraine "On

environmental protection", "On protection of atmospheric air" and "On ensuring sanitary and epidemic wellbeing of the population".

The study of the level of influence of economic activities of modern livestock farms of Ukraine of different areas of production on the environment: soil, groundwater and surface waters, the air space is important for timely implementation of the necessary measures to improve the ecological state as a whole and facilitate the production of quality livestock products.

The growth rate of the sector for the production of livestock products of livestock in the world is the highest among other branches of agriculture. Livestock in global agricultural production is 40 %.

Environmental problems of livestock production must be viewed from multiple sides associated with an