Tactile landscape compositional solutions for creating an accessible environment

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Abstract. The paper presents a project of a tactile square with an assortment of woody and herbaceous plants non-standard for landscaping Siberian cities. Plants were selected based on the environmental conditions of the future place of growth, as well as according to the aromatic and textural characteristics of plant parts.

The modern urban space is updated by the issue of accessibility for various categories of citizens, which led to the formation of the concept of Accessible Environment, i.e. the environment is open to everyone, whether it be a child or a person with disabilities. The term Accessible Environment implies the equal participation of people with disabilities in the complex of social worlds, in all spheres of society. In urban conditions for people with disabilities, especially visually impaired, there are difficulties in spatial orientation [1].

To solve this problem, monitoring of foreign and domestic experience in the formation of a comfortable urban environment was carried out. A similar experience already exists in the world. These are places such as the Inclusive Park in the Dnieper, the Krkonoše Mountains in the Czech Republic, the table Mountains National Park in Poland. In Russia, there are also a number of such already implemented projects, including the Inclusive Playground (Arsenyev city), the world of touch (Smolensk city), the Sixth Sense tactile garden (Moscow) and many others. In the Krasnoyarsk Territory on the basis of the State Nature Reserve Stolby there is a tactile White Path equipped with tactile stands with information about the reserve, which provides the blind with a unique opportunity not only to get acquainted with the reserve, but also with its flora and fauna. However, blind and visually impaired people faced the problem of independently visiting this territory, it is impossible to reach it without an accompanying person. In the city of Krasnoyarsk there is no outdoor leisure space for blind and visually impaired people, and not all dance floors, museums and theaters are available. Consequently, there is a need to create an inclusive space adapted for most citizens.

A specialized library is the main communication platform for visually handicapped. However, the surrounding area is not intended for their unhindered movement. Also in this territory there are no comfortable recreation zones necessary for an inclusive space [2]. To solve this problem it is necessary to have an ecological core with areas of landscape improvement; developed road and trail network; reduced urban tension by landscaping; communicative space for cultural and educational activities. The idea of creating a minipark arose in 2014, when the Restavratsiya company turned to the Krasnoyarsk State Art Institute to develop a concept for landscaping the territory of the new microdistrict. There were
6 concepts in total, of which one was selected. In the initial version of the project, there were 4 zones that reflected 4 seasons – summer, spring, autumn and winter. In the process, these zones were constantly changing, new ideas were born, amendments were made based on the feedback and desires of visually impaired and local residents. As a result, we have 4 zones: the central zone, the laboratory of knowledge, the territory of games and sports and the territory of quiet rest and intellectual games, which are interconnected by paths. This concept meets the requirements for urban park zones [3]. Svetly minipark – the name was born back in 2017, when the first small shifts took place in the project: the main ideas were expressed in a logo with the name.

The uniqueness of the project is confirmed by the analysis from the competitive environment, it can be noted the absence of a tactile minipark located in the courtyard of the residential quarter. Since the minipark will be located near the library for the blind and visually impaired (it is the only one in Krasnoyarsk), the number of target audience is increasing. Within the framework of the national project Housing and Urban Environment, annual improvement measures are envisaged as provided for by state (municipal) programs for the formation of a modern urban environment. The design of the tactile park corresponds to this program in terms of creating a comfortable urban environment. As part of the implementation of the program objectives, there is outlined the task of ensuring equal access for people with disabilities to priority facilities and services of the priority areas of life of people with disabilities and other low-mobility groups. The presence of this minipark allows us to form a positive attitude of the population to the problems of people with disabilities. The project team developed a questionnaire in which a tactile square plan was presented, as well as the purpose of its creation and the planning of cultural and educational events. The survey was attended by residents (more than 600 people) of the microdistrict where the library is located. After the survey, local residents understood the meaning of the tactile minipark and changed their attitude towards it, which is confirmed by the survey results. For example, to the question “How do you feel about the construction of a tactile square?” 79% of respondents fully supported the idea of creating it. Also, to the open question “What events would you like to see and what to learn?”, The main answers were: gardening, floriculture, master classes in clay modeling, etc.

It should be noted that one of the ideas of the tactile minipark is openness, it means the openness of visually impaired people themselves to those who see and vice versa; openness of the space, as the accessibility of the environment, to provide pedestrian access to it from the nearest bus stops. This is very important, especially for children, mothers with strollers, and low-mobility groups of the visually impaired. It is this openness that will contribute to the socialization of the visually impaired, through an inclusive space in which they can interact with the residents of the district, and this will remove barriers to communication between different groups of the population.

The primary target audience is blind and visually impaired people (all age categories). Secondary target audience: residents of the neighborhood (all age categories). Expected results of the project: remove barriers in communication between different groups of the population; create a comfortable environment for relaxation: intellectual, dance and tactile platforms. People will have the opportunity to leave their house and immediately get into the green space.

The social significance of the project is due to the promotion of the green idea in the public consciousness and the upbringing of the younger generation on the example of close-knit labor when creating and maintaining the minipark. Creating a special inclusive space for the target audience will improve their quality of life.

Considering the needs of the target audience, landscaped compositional solutions were developed for the tactile minipark with woody and herbaceous plants with the following properties: pronounced aroma and texture (surface character) of plant parts (table 1). For people with visual impairments such plant compositions can not only enrich the environment, but also serve as landmarks.

For visually impaired people landscape compositional solutions have been developed with the participation of fragrant woody and herbaceous plants located on the turns of paths and in accent areas of the minipark [4]. In the assortment of flowering and aromatic woody and herbaceous plants it is proposed to use such types of trees, shrubs and vines as small-leaved linden (Tilia cordáta), Nedzvetsky
apple tree (Malus niedzwetzkyana), Virgin bird cherry (Padus virginiana) and ordinary bird cherry (Prunus prenus), Amur lilac (Syringa amurensis), bluepipe (S. vulgaris), Japanese spiraea Goldfire (Spiraea japonica Goldflame), Billard’s spiraea (S. billardii), birch-leaf spiraea (S. betulifolia), schizonotus (Sorbaria Sem), coronet moth (Philadelphus coronarius), Siberian clematis (Clematis sibirica).

Table 1. Assortment of plants.

| Trees                    | Bushes                      | Lianas                        | Grassy                        |
|--------------------------|-----------------------------|-------------------------------|-------------------------------|
| Tilia cordata Mill.      | Syringa amurensis Rupr.     | Clematis vitalba L.           | Tagetes patula L.             |
| Malus niedzwetzkyana Dieck ex Koehne | Syringa vulgaris L. |                  | Lobularia maritima (L.) Desv. |
| Padus virginiana (L.) Mill. | Spiraea japonica L.        |                  | Paeonia lactiflora Pall.      |
| Padus racemosa (Lam.) Gilib. | 'Goldfire'                  |                  | Monarda didyma L.             |
|                          | Spiraea betulifolia Pall.  |                  | Phlox paniculata L.           |
|                          | Sorbaria sorbifolia (L.)   |                  | Ocimum basilicum L.           |
|                          | A. Braun 'Sem'              |                  | Petroselinum crispum (Mill.) Fuss |
|                          | Philadelphus coronarius L.  |                  | Thymus vulgaris L.            |
|                          |                             |                  | Melissa officinalis L.        |
|                          |                             |                  | Origanum vulgare L.           |
| Betula pendula Roth.     | Tagetes patula L.           |                  | Calamagrostis × acutiflora (Schrad.) DC. |
| Ulmus pumila L.          | Lobularia maritima (L.) Desv. |                  | Veronicastrum virginicum (L.) Farw. |
| Salix                    | Paeonia lactiflora Pall.    |                  | Paeonia lactiflora Pall.      |
|                          | Monarda didyma L.           |                  | Monarda didyma L.             |
|                          | Ocimum basilicum L.         |                  | Melissa officinalis L.        |

The flowering periods of these plants gradually replace each other, providing an aromatic effect over almost the entire growing season (May-September) and helping people to orient themselves on the ground.

The fragrance alley will serve both for transit traffic and for walks around the minipark [5]. It is planned to plant small-leaved Linden (T. cordàta) along it. This is a tree of the first growth, giving the necessary scattered shadow in summer when moving along the alley. In addition, linden has an unusually pleasant aroma during flowering in June. When designing plants a favorable insulation regime in the minipark was taken into account, allowing walks even on hot summer days.

In the second tier, plantings of Siberian apple trees (M. baccata) and Nedzvetsky (M. Niedzwetzkyana), blooming in May, Ledebur willow (Salix ledebouriana) and bird cherry of the cultivar Schubert (P. virginiána Shubert) are planned.

The third tier is proposed to fill the alternating planting of cereals (acutiflora (Calamagrostis acutiflora), rustling in the wind and decorative shrubs fragrantly flowering from June to August (spirea Billar (S. billardii), Japanese (S. japonica) and herbaceous perennials (monarda twofold (Monarda didyma), Canadian solidago (Solidágo canadénsis). On the corners of the alley, an array of hybrid peony (Paeonia hybrida) blooming in late May-June and cereals are projected.
Birch (Bétula péndula), small-leaved elm (Ulmus parvifolia), Juniperus Sabina (Juniperus sabina), a girl’s grapes quinata (Parthenocissus quinquefolia), snap willow (Sálix fragílis), magenta NANA (S. purpurea Nana) and Ledebour (S. ledebouriana) will help people feel the different texture and shape of the leaves.

Along with aromatic plants will be planted so called sounding plants and those plants that can cause different sensations in contact with human hands (smooth, fluffy, or rough). Tactile sensations are one of the forms of interaction with the world [6]. All these plants will serve as landmarks for people with visual impairments in the first place. In the future it is planned to organize regular watering and washing of plants and coverings of paths and sites in order to ensure tactile contact of people with plant and inert materials (paving or dumping).

The idea of the minipark lies in the fact that all elements of plants would serve the approximation of nature. When the minipark is built people will not have to go far or travel outside the city, nature itself will be within walking distance for the residents of this microdistrict.

In the future minipark it is planned to hold educational practical classes on the grounds of the Apothecary garden in the laboratory of knowledge. Joint planting and caring for plants will introduce residents of the microdistrict to the improvement of their yard, and will set an example for the younger generation.

The laboratory of knowledge zone includes an Apothecary garden with specially equipped raised ridges for the convenience of people approaching in a wheelchair.

In the ridges it is planned so wing and planting of garden spice plants (garden basil (Ocīnum basilīicum), curly parsley (Petroselinum crispum), fragrant celery (Apium graveolens) and aromatic medicinal herbs such as medicinal sage (Sālvia officinālis), thyme (Thýmus serpýllum), goose-tongue (Melissa officinalis), oregano (Oríganum vulgáre), and calendula officinalis (Caléndula officinális) — which also have aroma-therapeutic qualities.

Work in such laboratory gardens helps the fastest healing of physiological and social ailments.

The project provides for the creation of landscape compositions with herbaceous perennials. The entire range of woody and herbaceous plants was selected taking into account their resistance to climate conditions and the ecology of the place.

The abundance of herbaceous plants will also complement the square with pleasant, memorable aromas and sounds. In May flowering hybrid peony (P. hybrida) begins. In the second half of the summer the next plants bloom: panicked phlox (Phlox paniculata), double monarda (M. didyma), Veronicastrum virginianum (Veronicastrum virginicum), acorniflora (C. acutiflora), deviated marigolds (Tagetes patula), sea alissum (Alyssum mariaium or Lobularia maritime).

Tactile minipark is an excellent solution to reduce urban tension among urban residents, it is an opportunity to change the consciousness of the younger generation in understanding the importance of maintaining a green environment in the city [7].

Creating a tactile square involves not only the possibility of contact between people and nature, but also closer communication between people with different capabilities. As London architect Peter Fink said: "Cities need a collective approach to creating quality of life support."

It is the collective work in the implementation of the project of the minipark and the joint work of residents and the administration of the microdistrict with further care for plants in the minigarden, educational practical exercises at the pharmacy garden in the knowledge laboratory, all this will increase the civil responsibility of each person. The existence of the minipark will help to promote the green idea in the public consciousness [8]. In addition, it is very important to educate the younger generation on the example of close-knit labor when creating and maintaining the minipark.

It should be noted that during the implementation of the project the integration of residents of the microdistrict and their active participation both in planting and in caring for them is expected. This will allow the residents of the mikrodistrict to be involved in the improvement of their yard, and they will also set an example for the younger generation. Thus, the identification and marking of urban space as their own home and garden by specific residents can be made.
After the creation and commissioning of the square, it is planned to conduct regular educational workshops, seminars and master classes on its territory.

Tactile minipark is not only an additional object of recreation and landscape architecture of the city of Krasnoyarsk, but also an experimental site for testing and expanding the range of woody and herbaceous plants taking part in the formation of the city’s green areas.

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