

THE INVESTMENT PREPARATION DOCUMENTATION FOR PILOT ACTION IN LIPTOVSKÝ MIKULÁŠ

D.T3.4.2

Version 1
09 2020





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Preparation for the implementation of pilot projects on urban environmental acupuncture, which began in April 2019 and lasted until October 2020, began with the selection of sites without large demands on large areas and the optimal selection of interventions aimed at transforming these areas with green acupuncture. The selection of intervention sites was proceeded in particular by the identification of starting points such as selection criteria and the identification of available options across the full range of benefits of green acupuncture. The application of the concept of environmental acupuncture has created visions of its implementation in the urban environment. Based on them, it was possible to propose the planned measures. After selecting potential sites, it was possible to define specific goals. In the preparation of pilot projects, opportunities were also used to involve the public in the preparation of the SALUTE4CE project. This created motivational stimuli for the interest of the population in the environment in which they live. Purpose of these efforts was to provide project documentation for the implementation of four pilot proposals. The implementation of the urban green proceeds in the following steps:

Phase 1: Criteria for selection sites

Conditions for the suitability for a pilot investment in green acupuncture:

- site or building ownership
- close accessibility for residents
- making abandoned spaces more attractive
- low cost maintenance

Phase 2: Benefits of green interventions

The general benefits of green acupunctures were taken into account for the selection of sites:

- offering a nature-friendly solution to the problems of the built-up area
- gaining a more positive identity of the city
- increasing the multifunctionality of public spaces
- creating sites for spending free time and increasing the social integration
- visual enrichment of spaces in the city through elements of blue and green infrastructure
- availability of quality areas of public greenery and creation of a green network in the urban structure
- mitigate the impacts but also the causes of climate change
- mitigating the effect of urban heat islands
- a positive effect on rainwater runoff
- creating conditions for biodiversity
- improving air quality and microclimate in the urban environment
- requires relatively low costs outcomes
- provides a long-term effect



Benefits of green acupuncture by type of investment:

- the revitalization of the public space in the central zone can increase its social character and the new aesthetic quality of this important space by using design elements, effective water elements and attractive children's elements
- in the case of green walls, in addition to ecological positives, it is also possible to protect the building against overheating of the facade in summer and excessive cooling in winter, humidification, protection against smog, capture and filtration of flying dust and pollutants, CO2 binding and oxygen production, rainwater capture in the exterior and reducing the outflow into the sewer, increasing the diversity of plant species in the city, protecting the facade against graffiti.
- in the case of internal block spaces of apartment houses, it is possible to create community spaces as the only type of collective space within mass housing construction and compensation of the green deficit and lack of small functional areas with a pleasant microclimate and attractive green environment.
- The garden on the school area has an educational character

Phase 3 Site selection

Based on the analysis of starting points and local knowledge of the urbanized area of the city, 4 localities were selected that needed improvement in terms of visual, functional and ecological aspects. The necessary interventions have been proposed for these areas. Two locations in important public spaces in the city center were selected, namely Námestie mieru square and the Dom Kultúry-House of Culture. Another location was chosen in Podbreziny - the largest city estate in the town of Liptovský Mikuláš and in the unused part of the primary school complex in Palúdzka district.



Description of selected localities:

COURTYARD IN THE PODBREZINY HOUSING ESTATE

GPS coordinates: N 49 ° 4.87635 ', E 19 ° 38.97733'.

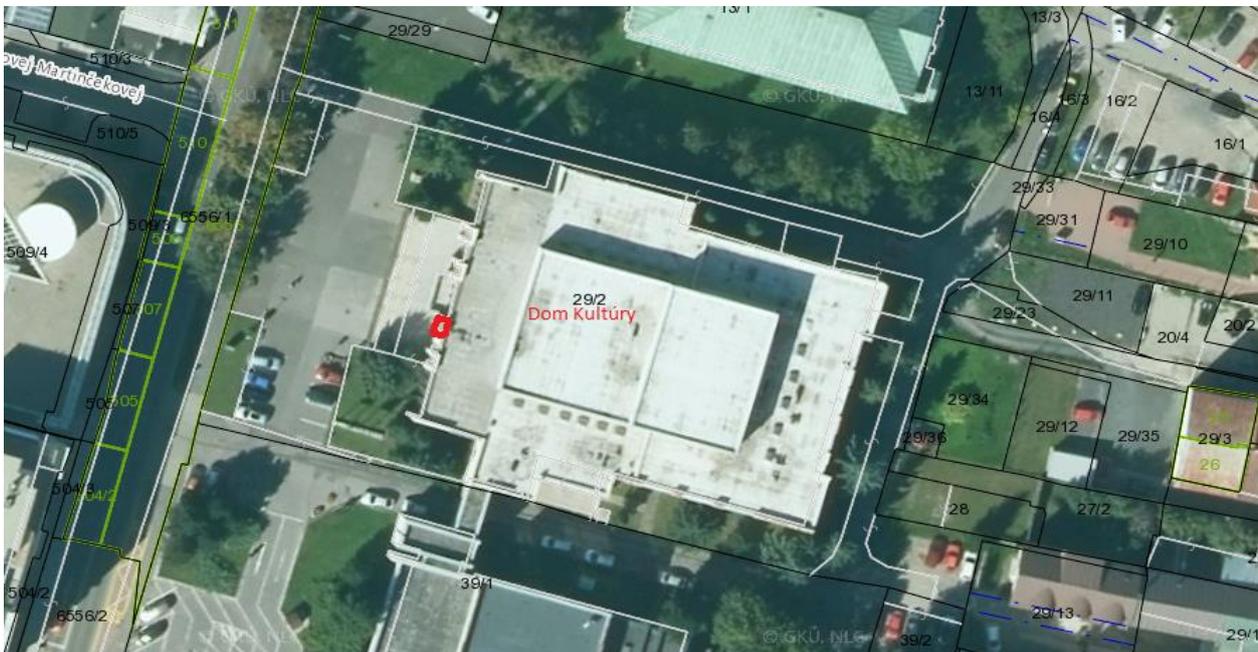
The locality is bordered on three sides by apartment buildings and on the east side by a cycle path, near corridor of a brook- Smrečianka watercourse. It is an old grassy area with paved sidewalks planted with several coniferous trees. There are also elements of a playground, which were installed during the construction of the housing estate. It is an uncomfortable cold space that causes shading by apartment buildings on three sides of the world. A positive element of this area is the Smrečianka watercourse with diverse greenery.



HOUSE OF CULTURE (DOM KULTÚRY)

GPS coordinates: N 49 ° 5.05458 ' , E 19 ° 36.62723'.

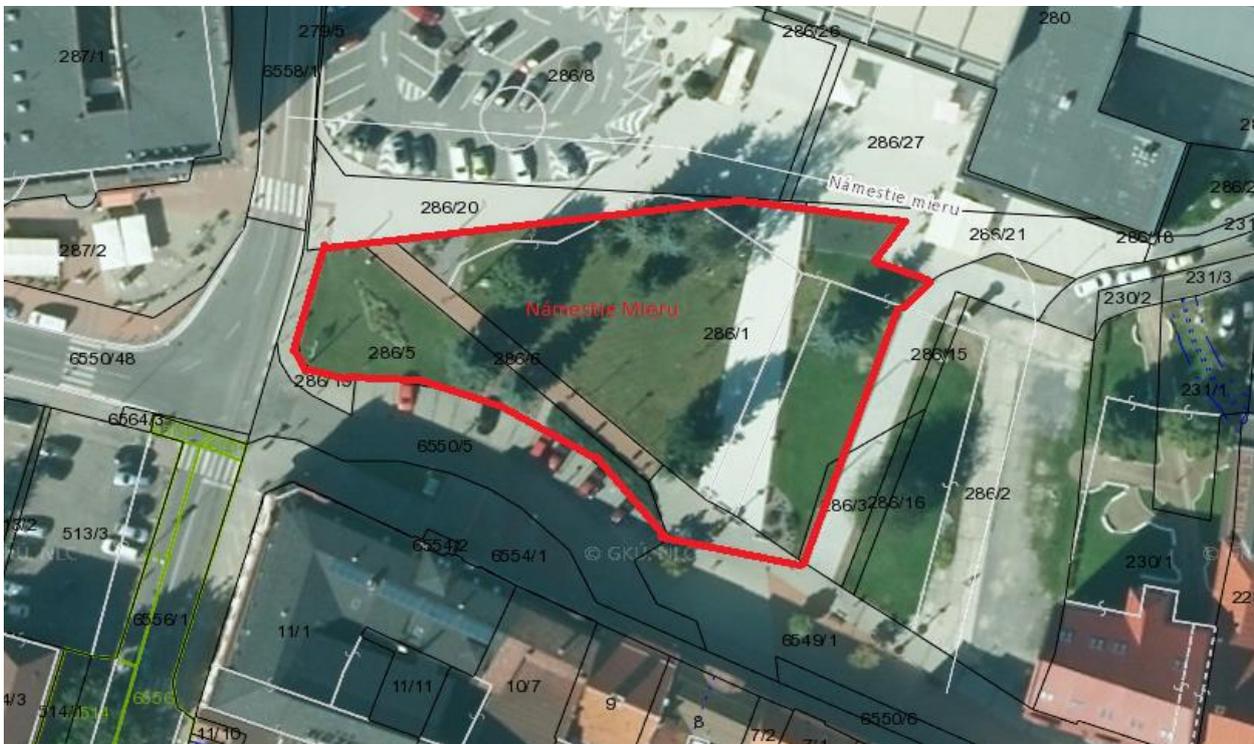
The location is in the central part of Liptovský Mikuláš. These are marble-clad buildings with part of the roof. The facade of the building has construction niches. At the entrance to the building, there is an asphalt area used as an entrance space to the building. The greenery around the building consists only of trees lining the adjacent road and flower planting in several concrete containers.



NÁMESTIE MIERU SQUARE

GPS coordinates: N 49 ° 5.12637 ', E 19 ° 36.69143'.

It is located near the House of Culture and is directly adjacent to the parking lot of the Central department store, with a bicycle path, roads to the historical part of the city, to the train and bus station. The park is mostly conifers, several of them are no longer in good conditions. In its northern part, there is an area for the installation of a fountain, which was removed for the purpose of building a parking lot. There are two interactive gameplay elements. This place does not serve as a social space in the city center.



GRANDMAMA'S GARDEN

GPS coordinates: N 49 ° 5.08790 ' , E 19 ° 36.05367'. The investment is to be implemented in the premises of the Primary School with a kindergarten on Demänovská Street in the Palúdzka district. The defined area is bounded on three sides by a fence. There is a school garden with flower beds for growing vegetables and herbs. At present, the land is without trees.





Phase 4: Defining goals in selected localities

Expected results in selected locations:

Regeneration of the housing estate in the inner area of Podbreziny - the aim is to adapt the urban environment to climate change by planting quality greenery and creating space for leisure and socialization for different age categories in the inner area of the housing estate Podbreziny in Liptovský Mikuláš. In this desolate place, there is also a presumption of increasing urban biodiversity.

Exterior vertical vegetation wall at the House of Culture - the aim is to improve the microclimate, reduce overheating of the facade and thermal fluctuations of the perimeter wall, economic benefits of increasing the value of real estate and last but not least to create visual appeal of the House of Culture in Liptovský Mikuláš.

Revitalization of the park on Námestie Mieru - the aim is to build elements of green and blue infrastructure and reduce the overheating of paved areas, make the microclimate of the outdoor environment more pleasant and create an attractive space for relaxation for both adults and children in the central part of the city zone in Liptovský Mikuláš. There will also be a deepening of the spatial connection with the recreation areas at the neighboring shopping center.

Grandmama's Garden - the goal is to build a rural orchard, which was in the past part of rural gardens and farmsteads, on suitable land on the school premises. The project, its design, implementation and sustainability, is part of the educational process of all subjects and all students of the school. It conditions the development of children's personalities in the perception of the country as a source of livelihood, contact with history, joy and pride in the results of their own work.

Phase 5: Summary of requirements for the elaboration of project documentation within the framework of public procurement and creation of conditions for the involvement of citizens in the creation of green acupuncture

At the meeting with citizens on November 21, 2019, during the presentation of the study of **The courtyard in Podbreziny housing estate**, creative possibilities of design were created so that the participating citizens could create functional areas in a clean drawing of the courtyard by selecting designed elements (greenery, sidewalks, workout and playground) and their location.

The vegetation wall of the House of Culture - The following requirements have been applied to the vegetation wall: it must be visually attractive all year round, designed so that it can be dismantled due to the possible thermal insulation of the building and easy to maintain. For the irrigation design, the requirement was to design an economically advantageous method of irrigation. In addition to the existing practice, it was a condition for the developer of the project documentation to make a visualization with three variant solutions of species planting in different colors. Visualizations of the



plant wall filling had to be submitted to the city at the stage of development of the project documentation. The contracting authority made it possible to comment on alternative solutions to the public from 3 September 2020 to 14 September 2020 via Facebook as well as in person by inserting a ballot paper into the ballot box in the entrance hall of the municipal office. The designer incorporated the result of the public comment into the final design.

Revitalization of the park on Náměstí míru - here too the requirement was applied that the project documentation should include visualization in three variant solutions. The processor was informed of the fact that the contracting authority will allow the public to comment on alternative solutions. The designer was obliged to incorporate the result of the public comment from the contracting authority into the final solution. The public voting on Facebook had an exceptionally large and positive response, the individual variant solutions of the green wall of the House of Culture and the revitalization of the park on Náměstí míru received a total of 2,900 votes.

Grandmama's Garden “Arboretum of native fruit trees” at Demänovská Elementary School garden, in order to involve the school's pupils in the process of preparation and creation of the project materials, it included this topic in the school's educational process. Through the pupils, the school was able to obtain as much information as possible about the use and management of the gardens in the time of the "grandmothers", about the processing of the harvest from them. In this way, we managed to obtain a lot of materials from parents, grandparents, living experts in the form of photos, articles from magazines, statements of experts, data on originally cultivated species of useful plants and fruit trees. Pupils of schools, under the guidance of their teachers in the preparatory phase of the project (school year 2019/2020) prepared designs and model studies of old gardens and orchards according to students' ideas, which also included making houses for insects, birdhouses and others.

Phase 6: Results of participation of the public

In November 2019, the local self-government allowed people who live in the **Podbreziny housing estate** to get involved in planning the change of the courtyard. Despite some concerns about whether the issue will appeal to citizens, we were pleasantly surprised by the active participation of the participants present. Their requirements and ideas were included in the conditions for the preparation of project documentation.

Public Presentation of the Architectural Proposal of revitalisation on November 21, 2019 in Podbreziny: citizens specified where exactly they want to place the trees, benches, etc. The presentation was led by our knowledge partner - IURS - Inštitút pre udržateľný rozvoj sídiel from Ostrava (CZ):

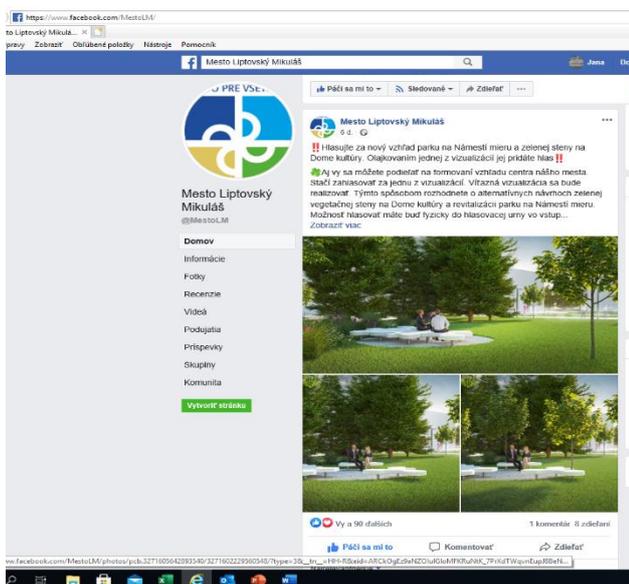
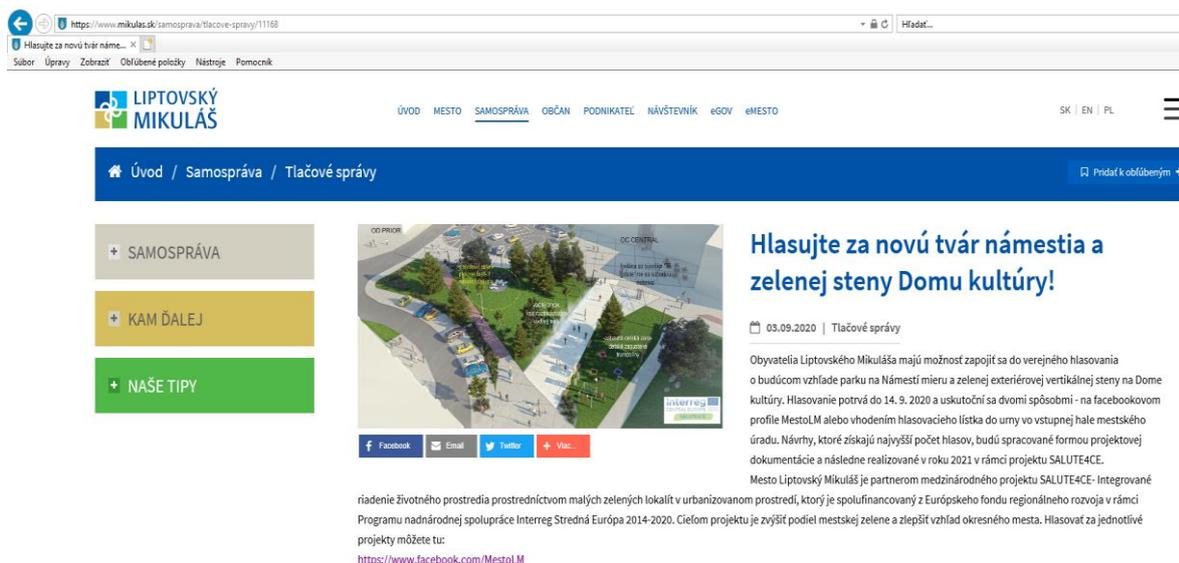


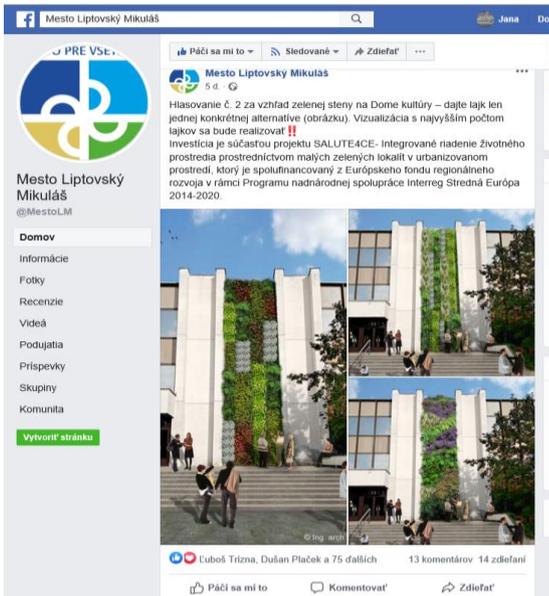
For the **Revitalization of the Park on Námestie mieru square** and the **Exterior Vegetation Wall at the House of Culture**, variant solutions were proposed to be commented for the public, which were published on Facebook.

Examples of a call for public voting to select design of:

- Revitalization of the park on Námestie Mieru
- Exterior vertical vegetation wall at the House of Culture

Selected architects (based on public procurement) prepared 3 alternative proposals (visualizations) of investment sites. Citizens (public) had the chance to vote for preferred proposal in form of voting on FB (just to give a “like”) and in form of voting paper in foyer of Municipality office of the City of Liptovský Mikuláš.





Public voting by citizens in foyer of municipality office of the City of Liptovský Mikuláš:



Public voting by citizens - RESULTS

EXTERIÉROVÁ VERTIKÁLNA VEGETAČNÁ STENA DOMU KULTÚRY	Variant 1	Variant 2	Variant 3	POČET HLASUJÚCICH PODĽA FORMY HLASOVANIA
Počet hlasov v urne vo vestibule radnice	6	5	21	32
Počet hlasov cez Facebook	228	148	1300	1676
POČET HLASOV ZA VARIANTY CELKOM	234	153	1321	1708

REVITALIZÁCIA PARKU NA NÁMESTÍ MIERU	Variant 1	Variant 2	Variant 3	POČET HLASUJÚCICH PODĽA FORMY HLASOVANIA
Počet hlasov v urne vo vestibule radnice	1	9	22	32
Počet hlasov cez Facebook	10	193	958	1161
POČET HLASOV ZA VARIANTY CELKOM	11	202	980	1193

During the elaboration of the design of **Grandmama's garden**, some students applied the acquired knowledge according to their own ideas of the solution of revitalization of the determined area in the form of drawings and scale models.

Submitted information was processed in writing in the form of poems, short stories, etc. The obtained materials were exhibited by the school in the school lobby in the form of an exhibition and are processed in a video, which was published on the Internet and on the local television TV LIPTOV.

Students' suggestions on the topic "Grandmama's Garden":





Phase 7: D.T3.3.1 Evaluation of soil and climatic conditions for 4 small sites with plant recommendations

Physico-chemical characteristics of the soil found during a field survey in cooperation with the advisory expert IURS - Institute for Sustainable Development of Settlements Ostrava:

Basic climatic parameters

	Mean temperature (° c)	min. Temperature (° c)	max. Temperature (° c)	rainfall (mm)
jan	-3,8	-7,8	0,5	7
feb	-2,3	-6,5	2,7	6
mar	1,5	-2,8	7,1	7
apr	6,4	1,3	12,1	8
may	11,9	5,7	18,0	10
jun	14,8	8,6	20,9	12
jul	16,3	10,0	22,6	10
aug	15,6	9,4	22,8	8
sep	11,6	6,3	18,1	8
oct	6,7	2,2	12,9	8
nov	1,4	-1,9	5,5	8
dec	-2,5	-5,9	1,3	9

Soil characteristics Values are mean ± SE (n=5)	Podbreziny	Námestie mieru	ZŠ Palúdzka
Soil texture	Sandy Clay Loam	Sandy Clay Loam	Sandy Clay Loam
pH (H2O)	7.69 ± 0.06	7.47 ± 0.09	7.34 ± 0.11
pH (KCl)	7.32 ± 0.06	6.97 ± 0.11	6.68 ± 0.16
EC (µS cm ⁻¹)	227 ± 8	224 ± 13	180 ± 23
OM (%)	5.20 ± 0.68	8.10 ± 0.53	6.86 ± 0.31
N (%)	0.17 ± 0.02	0.26 ± 0.02	0.23 ± 0.02
P (mg 100g ⁻¹)	0.05 ± 0.00	0.72 ± 0.26	3.61 ± 0.44
K (mg 100g ⁻¹)	12.9 ± 1.9	18.0 ± 3.5	29.8 ± 6.0

By selection of the localities for interventions we considered results of soil characteristics, climatic conditions and proposed type of admissible land use.

Knowledge partner - The Institute for Ecology of Industrial Areas (IETU) in Katowice (Poland) proposed following kind of plants, that could be used by realization of 4 pilot investments:

Revitalization of the courtyard in Podbreziny

For the lawn, a standard grass mixture for a recreational lawn was recommended (Lolium perenne, Festuca rubra, Poa pratensis, Festuca ovina). Grass Lawn can consist of : Agrostis capillaris, Anthoxanthum odoratum, Deschampsia caespitose, Festuca rubra komutát, Festuca rubra, Festuca rubra trichophylla, Festuca rupicola, Festuca trachyphylla, Koeleria macrantha, Koeleria pyramidata, Poa pratensis.



Flowers: *Agrimonia eupatoria*, *Agrimonia procera*, *Achillea collina*, *Achillea millefolium*, *Anthemis tinctoria*, *Berteroa incana*, *Betonica officinalis*, *Carum carvi*, *Centaurea cyanus*, *Centaurea jacea*, *Centaurea scabiosa*, *Cichorium intybus*, *Coronilla varia*, *Daucus carota*, *Dianthus carthusianorum*, *Dianthus deltoids*, *Echium vulgare*, *Galium album*, *Galium verum*, *Helianthemum grandiflorum*, *Hypericum perforatum*, *Knautia arvensis*, *lavandula angustifolia*, *Leontodon hispidus*, *Leucanthemum vulgare*, *Linum perenne*, *lotos corniculatus*, *Lychnis coronaria*, *Lychnis viscaria*, *Marrubium vulgare*, *Matricaria chamomilla*, *Origanum vulgare*, *Papaver rhoeas*, *Plantago lanceolata*, *Potentilla argentea*, *Potentilla recta*, *Prunella vulgaris*, *Pyrethrum corymbosum*, *Pyrethrum parthenium*, *Salvia pratensis*, *Salvia verticillata*, *Sanguisorba minor*, *Saponaria officinalis*, *Scabiosa ochroleuca*, *Silene nutans*, *Silene vulgaris*, *Succisa pratensis*, *Thymus pulegioides*, *Veronica teucrium*, *Vicia cracca*, *Vicia villosa*

Odporúčané kríky: *Euonymus europaeus*, *Euonymus verucosus*, *Hippophaë rhamnoides*, *Ligustrum vulgare*, *Lonicera xylosteum*, *Potentilla fruticosa*, *Prunus spinosa*, *Rosa canina*, *Cornus alba*, *Cotoneaster lucidus*, *Potentilla fruticosa*, *Pyracantha coccinea*, *Salix purpurea*, *Sambucus racemosa*, *Syringa vulgaris*, *Viburnum lantana*, *Viburnum opulus*.

Trees: *Acer campestre* („Nanum“, „Elsrijk“, *Acer platanoides* („Globosum“), *Betula pendula* („Fastigiata“, „Obelisk“), *Crataegus monogyna* („Stricta“, ‘Compacta’/‘Variegata’), *Crataegus × media* (‘Paul’s Scarlet’, ‘Rosea Plena’), *Carpinus betulus* („Columnaris“, „Frans Fontaine“, „Fastigiata“), *Sorbus intermedia* („Brouwers“), *Sorbus aucuparia* „Fastigiata“, „Fingerprint“, *Quercus robur* („Fastigiata“), *Tilia cordata* („zelená Globe“, „Grüne Kugel“, „Pev Kronenberg“), *Fagus sylvatica* („Dawyck“, „Dawyck Purple“).

The original species of perennials in the northern part of Slovakia were recommended for the rock garden in the low stone wall: *Ajuga reptans*, *Aurinia saxatilis*, *Campanula carpatica*, *Carex* sp., *Cymbalaria murowa* (*Cymbalaria mularis*), *Dianthus deltoids*, *Dianthus plumarius*, *Dryas octopetala*, *Festuca* sp., *Geranium sanguineum*, *Geum coccineum*, *Glechoma hederacea*, *Koeleria glauca*, *Lysimachia ummularia*, *Origanum vulgare*, *Potentilla neumanniana*, *Primula* sp. - *Pulsatilla vulgaris*, *Sagina subulata*, *Saxifraga* sp. (pôvodný druh), *Sedum Sempervivum*, *Sesleria albicans*, *Thymus serpyllum*, *Thymus vulgaris*, *Veronica prostrata*, *Vinca minor*, *Viola odorata*

Revitalization of the park on Námestie mieru square with a water mist vaporizer

Recommended plants: Grass: *Festuca ovina* Recommended flowers: *Achillea millefolium*, *Allium schoenoprasum*, *Campanula rotundifolia*, *Dianthus carthusianorum*, *Dianthus deltoids*, *Euphorbia cyparissias*, *Hieracium pilosella*, *Hypericum perforatum*, *Linaria vulgaris*, *Linum perenne*, *Origanum vulgaria reflexo*, *Priane pulegioides*, *Thymus serpyllum*

Green wall at the House of Culture

It was recommended to use plants on a free-standing green wall: *Hedera helix*, *Visteria* sp., *Parthenocissus* sp., *Lonicera caprifolium*, *Clematis vitalba*.

Grandmama's Garden

You can choose only those varieties of fruit trees that are traditionally grown in Slovakia, adapted to the local climate. Preference is given to trees that do not reach large dimensions and fruits that are harvested outside the school holidays): *Malus domestica* (apple): solivar noble, batul, virgin Czech, Sudeten reneta, *Pyrus communis* (pear): president mas, brine, eliska *Prunus cerasus* (cherry): Vanda, Karesova, Techlovan. Fruit bushes that can be used: *Corylus avellana* (hazelnut), *Ribes grossularia* (gooseberry), *Ribes rubrum* (red currant) *Ribes nigrum* (black currant)

Phase 8: Documentation of investment preparation and project elaboration

In June 2020, the city, as a public contracting authority, carried out public procurement for processors of project documentation. The requirements set out in the description of Phase 5 were applied in the description of the contracts. Based on the results of the public procurement, three bidders were selected - three architectural studios. Contracts for work were concluded with these applicants on the basis of the relevant provisions of related regulations, which were published on the Internet portal of the information system of the municipality of Liptovský Mikuláš. The project documentation prepared by the winning bidders was delivered during September 2020.

Locality no. 1

Exterior vertical vegetation wall on the House of Culture

The old town is characterized by a deficit of greenery due to lack of vacant space. The project addresses the exterior overhanging vertical vegetation wall, including the irrigation system. The vegetation wall will be located on the western facade of the House of Culture in Liptovský Mikuláš. The design addresses the space of the niche in the perimeter wall on the right side of the main entrance to the building. This year-round green wall is also intended to serve as a water retention measure to improve the climatic conditions of the urban environment. Plant species that are suitable for the western orientation were used for planting and will be planted in plant boxes in order to create various areas where different shapes and colors of leaves will be used. Individual plants are irrigated using automatic irrigation (the accumulation tank for excess water will be discreetly located under the stairs).

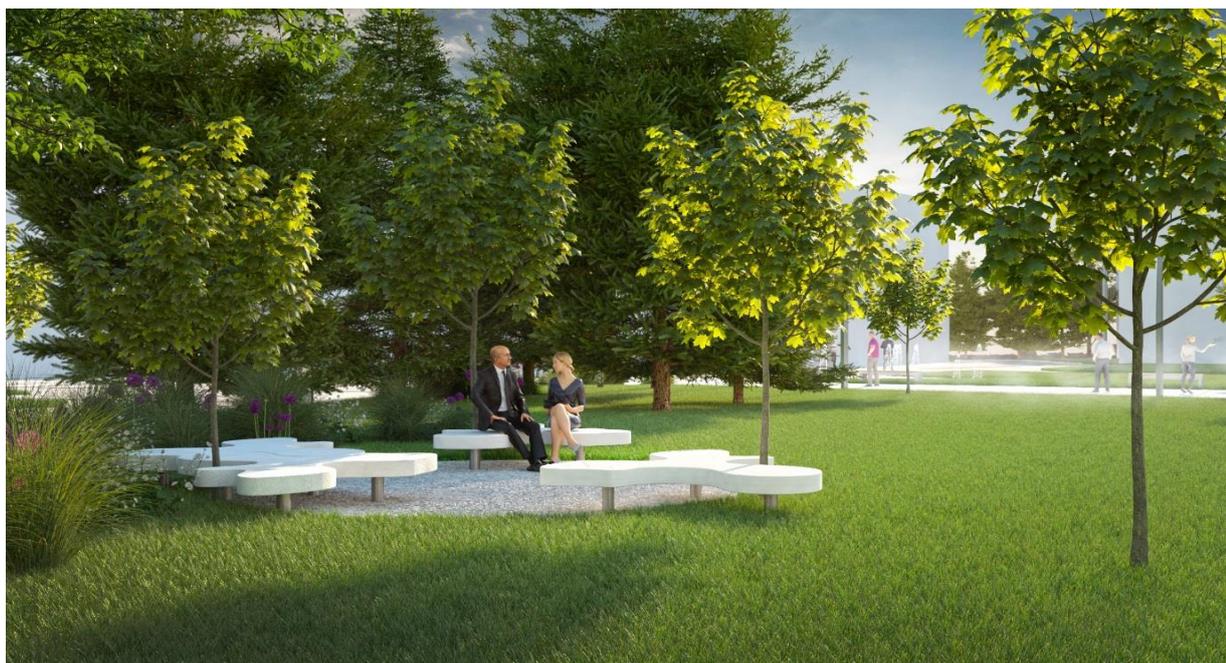


Locality no. 2

Revitalization of the park on Námestie mieru square

As part of the revitalization of the Pedestrian Zone North - part of Park Námestie mieru, an effective element will be a system of water jets with a high-pressure spray system, which will spew out water vapor. This system is very favorable for the local microclimate and air improvement. The proposed furniture consists of placing four benches in the central space of the park in a compositional set supplemented by newly planted trees. An attractive composition of benches can be created by benches in which the seating area creates the shape of a puzzle. This rest area will be located in the shade of trees. By installing recessed trampolines, a space will be created for the little ones, which will support

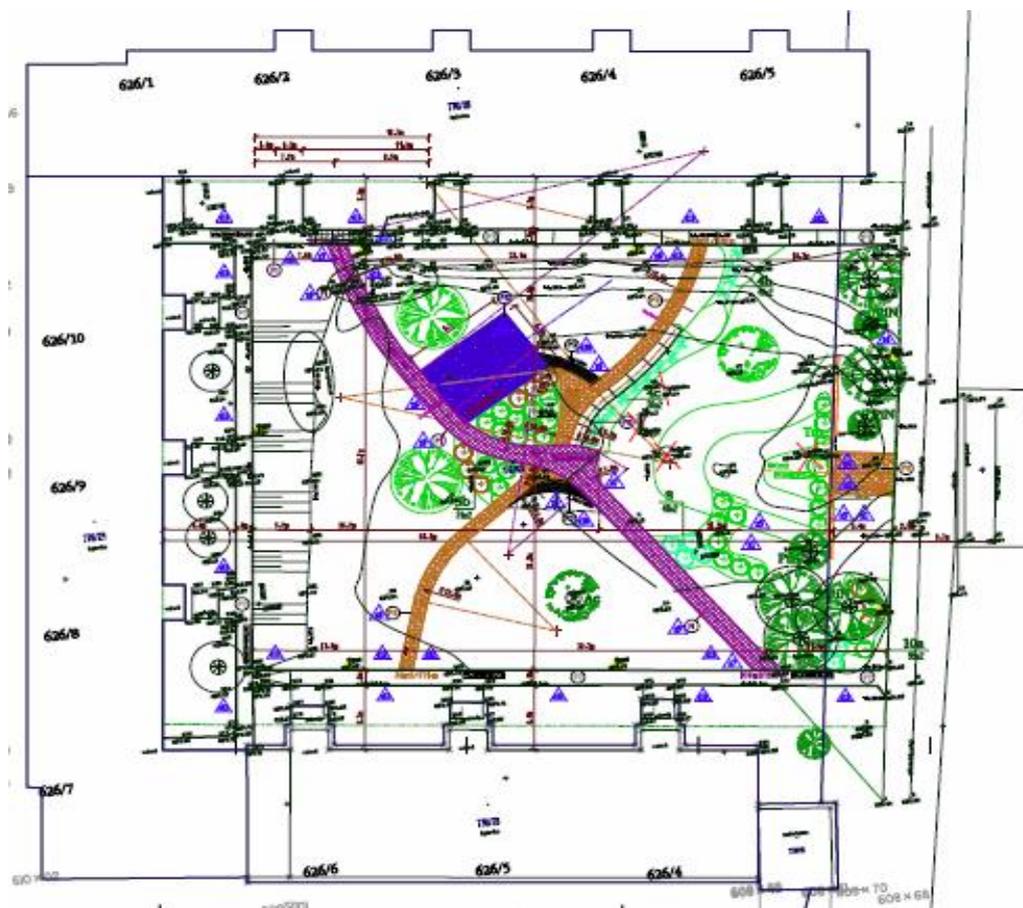
the digestion of children and their companions outdoors. Recessed trampolines will be installed in the eastern part of the area between the cycle path and the main pedestrian corridor. In this part, there are already game elements of the Genius Park project, so we will naturally support the zone for children's visitors. As part of the new planting, nine pieces of deciduous trees will be planted and ornamental beds with grasses, perennials and annuals will be planted.



Locality no. 3

Regeneration of the courtyard at the Podbreziny housing estate

The construction deals with the cultivation of outdated public space, which is defined by apartment buildings on the streets Senicka, Hradišská and Jefremovská in the largest housing estate in Liptovský Mikuláš - Podbreziny with an emphasis on improving the environment with emphasis on greenery and creating recreational areas - playground and artificial hill for children ie for active leisure time of the inhabitants. Separation of the inner block space from the adjacent cycle path is achieved by creating an artificial hill by laying the soil, which will end in a wall towards the cycle path. In the courtyard, a lawn will be sown on the shaped terrain. Towards the courtyard, the new terrain will be reduced to the original level. The current greenery of the courtyard will be preserved. In the center of the courtyard it will be possible to place seating with benches. The shape and composition of the sidewalks will be adapted to this function. The inner block space will be complemented by shrub and flower planting, which is currently completely missing. The design includes a massage (acupressure) sidewalk, where the individual fields are filled with various tread material (sand, gravel, cones, stone pebbles).



Locality no. 4

Grandmama's Garden

Originally unused garden thanks to the activities of pupils and teachers from primary school with kindergarten Demänovská street has the potential to create the first arboretum presenting traditional and typical trees, plants and flowers for the Liptov region - the so-called Grandma's garden. The shape concept of the architectural design consists in tracing the gravel sidewalk in the shape of a leaf and to create orchards on which various types of herbs, cereals, ornamental flowers typical of Liptov will be grown and presented in the spirit of the old mama garden. From the north side, the sidewalk will be lined with an orchard. In the northeast corner of the orchard will complement the still life created from the bushes of small berries. From the south side, a leaf-shaped sidewalk surrounds the shrub orchard. The sidewalks will lead to a terrace that will fulfill a multifunctional character. It provides space for immediate instruction directly in the grandmother's garden, offers space for small music meetings or yoga exercises during the summer months.



Conclusion:

These steps could also be implemented on the basis of knowledge and experience of the leading partner of the project - the Institute for Ecology of Industrial Areas-IETU Katowice and the project coordinator of the Institute for Sustainable Development of Settlements-IURS Ostrava. Support for our local government was provided by these organizations in the form of consultations, where they provided us with their knowledge and experience in using various methods and tools for faster efficiency and implementation of activities in environmental management.