D3.6: Reports on the sketched Solutions

VARCITIES | Work Package 3, Task 3.3

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15-03-2022	V.08	Denia Kolokotsa, Katerina Lilli	Final

Contents

Abbreviation list

Term	Description
B/C	Benefit-Cost Ratio
CA	Contracting Authority
CBA	Cost-Benefit Analysis
CEA	Cost-Effectiveness Analysis
CS	Consumer Surplus
CUA	Cost-Utility Analysis
CV	Compensating Variation
DPB	Discounted Pay Back
EC	European Commission
EIA	Environmental Impact Assessment
EU	European Union
EV	Equivalent Variation
GDP	Gross Domestic Product
GPP	Green Public Procurement
H&WB	Health and Well-Being
ICER	Incremental Cost-Effectiveness Ratio
IRR	Internal Rate of Return
IoT	Internet of Things
KPI	Key Performance Indicator
LCA	Life Cycle Assessment
NCFF	Natural Capital Financing Facility
NBS	Nature Based Solution
NPV	Net Present Value
OECD	Organization for Economic Co-operation and Development
PBP	Pay Back Period
PESTLE	Political, Economic, Social, Technological, Legal, Environmental
PPP	Public Private Partnership
PQQ	Pre-Qualification Questionnaire
SDG	Sustainable Development Goal
SPP	Sustainable Public Procurement
SPV	Special Purpose Vehicle
SROI	Social Return On Investment
SWOT	Strengths, Weaknesses, Opportunities, Threats
UN	United Nations
VfM	Value for Money
VS	Visionary Solution
WP	Work Package
WTA	Willingness To Accept
WTP	Willingness To Pay

Executive Summary

This Deliverable gives an extensive report of the sketched VARCITIES Visionary Solutions. E2ARC as leader of Task 3.3 "Sketch of a set of solutions based on multiple benefits approach (cost-effective solutions) linked to KPIs", coordinated the partners responsible for each pilot (Pilot representatives & Pilot experts), guiding them through the co-identification and co-design process for the sketching of their Visionary Solutions. The sketching of the Visionary Solutions was based on T3.2 "Knowledge base creation: Understanding of pilot needs, challenges, barriers and drivers" for a precise and holistic understanding of the pilot needs and challenges. The elaboration process during the co-identification & co-design phase was characterised by a process of ideas development (joint competition of ideas) consisting of phases of individual work and phases of workshop conversations, as well as intermediate presentations and discussions. It involved the description of the solutions to the relevant STKs and consisted of a sequence of workshops during which a PESTLE analysis was also performed (T3.2). The cooperation process set by WP4 guaranteed proper feedback among the proposed solutions and the involved STKs. E2ARC guided the Pilots through a step-by-step procedure outlined in a roadmap for co-creation and co-design. The results of the co-identification and co-creation process are the sketched Visionary Solutions reported and visualised in this deliverable. For every pilot, the site and the Masterplan (city's actions) are introduced starting from the existing situation to the final concept for every visionary solution. The sketched solutions are transcribed under a feasibility, managerial, and financial perspective through the Annexes provided within D3.5 "Guidelines for sketching of solutions". During the co-identification & the co-design phase of the VSs, the main issues, available funding, roles and responsibilities were defined, along with a first approach on governance. Initial business models were also drafted for the realisation of the Visionary Solutions into viable projects. Annexes A, B, C, D, E, F, G of D3.5 were used for the collection of this information from each pilot in a concise manner and per VS. The filled in templates (Annexes of D3.5) presented in this Deliverable 3.6 consist of the following information: Summary & Description of the VS, Main contacts, Summary of Components, Stakeholders, Strategic Planning & Assessment, Economic / Financial Analysis & Business Model Canvas. This information in fact constitutes initial implementation packages for the Visionary Solutions. As part of the Annexes of D3.6, information is provided regarding the specifications of the digital components, corresponding to the different VSs per pilot. Due to the large diversity of digital components, a template was created to facilitate the collection of this information in a uniform manner. The specifications of the digital components were collected by the pilots on a voluntary basis and the level of detail provided in it was determined by the pilots.

Introduction: reports of sketched Visionary Solutions

Within WP3, the visionary ideas were further developed into feasible actions by following a participatory co-design process involving local stakeholders and assuming a "multiple benefits" perspective. The co-identification and co-creation process involved:
a) the organisation of an initial workshop dedicated to interrogate the problem at hand: revisiting value systems, available knowledge and skills, which all impact what is perceived as a problem and the ultimate design of the solution;
b) individual work carried out by design groups;
c) a new intermediate presentation of the planned solutions adjusted with careful consideration of the previous feedback; and
d) a final presentation of the solutions.
This is how VARCITIES exploited the knowledge acquired in T3.1 and T3.2 to plan and achieve the best possible solution for each pilot. The entire process was supported by WP4. Specifically, in Task 4.1 the relevant STKs were selected for the joint competition of ideas (i.e. composed by a reasonable number of local technical experts, involved citizens and consortium members) whereas Task 4.2 supported the joint competition of ideas for the correct development of the whole process. and will thus also rely on the deployment of WP5.
Deliverable 3.6 builds on D3.5 which provided guidelines for sketching effective VSs to be implemented in urban contexts. D3.5 aimed to serve as a guidance not only for VARCITIES pilot leaders and their local partners, but also for cities and communities willing to develop similar solutions for citizens' H&WB. To ensure that the same level of information was provided from all pilots, the overview of the sketched solutions was linked to the contents and in particular in Annexes of D3.5 Guidelines for sketching of solutions. The Annexes of D3.5 were therefore used as templates ensuring a uniform representation of the sketched solutions: the descriptive text, explaining step by step the refinement procedure combined with Annexes: information sheets for the visual representation, management, and appraisal of the VS.

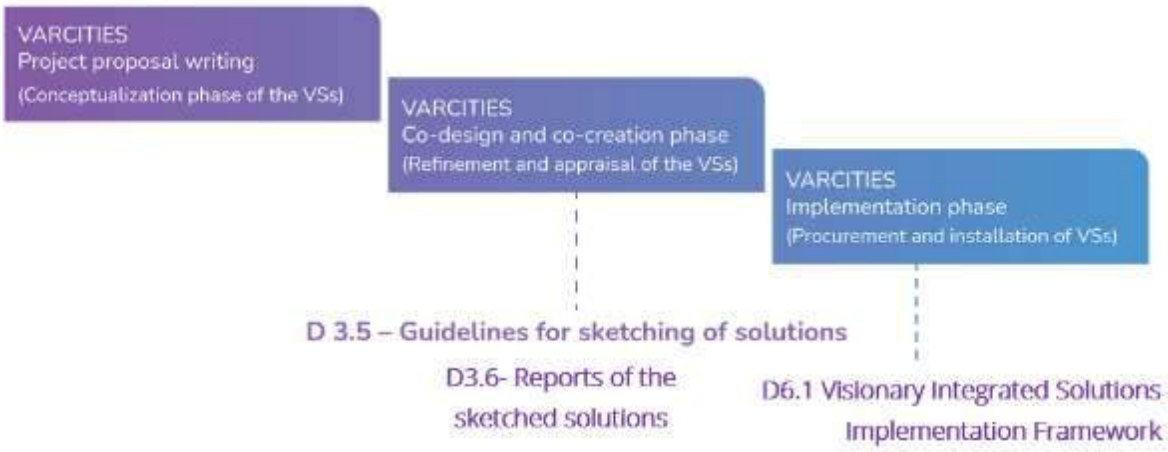


Figure 1: Positioning of D3.6 within the VARCITIES project Work Package Structure

Roadmap: From suggestions to feasible projects- step by step procedure for delivering effective Visionary Solutions

Within WP3, visionary ideas were further developed into feasible actions by following a participatory co-identification and co-design process involving local stakeholders and assuming a "multiple benefits" perspective. The purpose of sketching the solutions has been to gather all relevant information required to assess each project in a simple and fast way, under the feasibility, managerial and financial perspective. Sustainability and smartness objectives were converted into sound implementation packages facilitating the drafting of business models that allow pilots to implement and maintain the VS along their lifetime. By clearly explaining and communicating the main issues, roles, and responsibilities, also the most appropriate governance structure for each VS became clearer and future possibilities to access funding for involved municipalities/local authorities and partners are more evident.

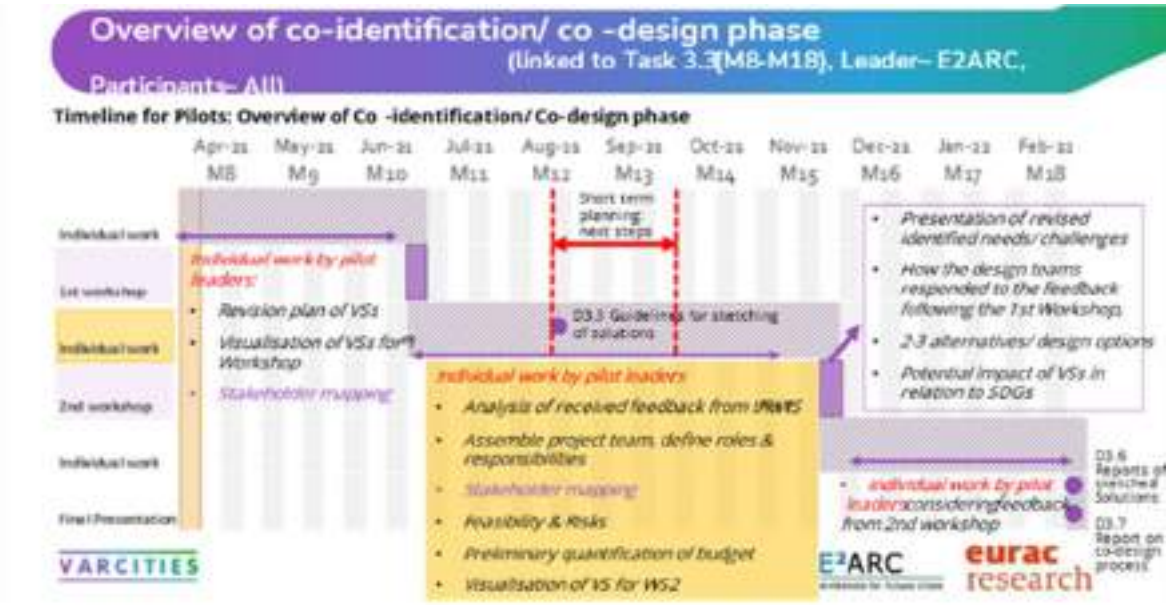


Figure 2: Timeline presented to pilots giving an overview of the co-identification and co-design phase

Figure 2 presents the timeline of Task 3.3 related to the sketching of a set of solutions for each of the 8 VARCITIES pilots. This task started in April '21 and run until February 2022 with the submission of 2 deliverables: D3.6 reporting the sketched solutions and D3.7 reporting the co-design process. The co-identification and co-design process entailed 3 phases of individual work by the pilot leaders and 2 intermediate co-creation workshops. With this roadmap and using deliverable D3.5 "Guidelines for sketching of solutions" as a reference, the pilots were guided through the co-creation process and for the completion of the Co-design phase of the different Visionary solutions.

Annexes A, B, C, D, E, F, G of D3.5 were used for the collection of this information from each pilot in a concise manner and per Visionary Solution. The filled in Annexes presented in D3.6 "Reports on the Sketched Solutions" consist of the following information: Summary and Description of the VS, Main contacts, Summary of Components, Stakeholders, Strategic Planning and Assessment, Economic and Financial Analysis, Business Model Canvas and Social Return on Investment. The collection of this information constitutes initial implementation packages for the Visionary Solutions. The further development and refinement of this information along with detailed Workplans (Annex I), will fully address the requirements for successful implementation. Deliverable 6.1 "Visionary Integrated Solutions Implementation Framework" therefore builds on D3.5 and on D3.6, further supporting the need to meet the final objectives of each pilot maximising benefits, setting milestones and highlighting possible risks.

Annex A provides a clear summary of each VS. Information like targeted area and scale of interventions was expected as well as an overview of objectives. As a first approach we expected to receive information regarding the total investment planned as well as regarding funding sources (possibly also outside the project). The KPIs used to evaluate the impacts are listed, as well as the expected contribution to the SDGs.

Annex B collects the main contacts of each Visionary Solution. Not just the representatives of the pilots, but any experts or consultants that were involved in the design and implementation of a given solution.

Annex C complements Annex A, with a general description of the context and rationale of each Visionary Solution as well as any supporting actions required. The components of each Visionary Solution are presented here.

Table A of Annex C lists all components of a given VS, a table similar to the excel files that the pilots were asked to fill in during for the Revision Plan of their VSs in the past months.

Annex D has been set up to facilitate the visual representation of the Visionary Solutions and the co-creation process. It is structured in such a way to provide a clear overview of the state-of-the-art in a given (featuring maps and masterplans, as well as representative photos of the existing situation). Moreover, it presents the City's objectives along with the H&WB links, as well as the different Visionary Solutions are foreseen. Opportunities for co-creation are highlighted and sources of inspiration are provided.

Annex E is the stakeholder analysis with a description and the possible role of the stakeholders and their envisaged engagement strategy. This is further developing the work done by WP4.

Annex F facilitates the pilots in reporting the results of PESTLE and SWOT analysis; The PESTLE analysis provides the pilots with a structure that shows the context in which the organization operates. The SWOT analysis studies Strengths/Weaknesses/ Opportunities and Threats of the planned Visionary Solutions.

Table B of Annex G has been to help the pilots in creating a Business Model Canvas in order to report the results of an economic and financial analysis

Result of the process: reports of the sketched solutions

In this deliverable and for every pilot separately the same structure is followed to report the sketched solutions with the following information provided:
With reference to the Visualisation of the VS (Annex D) as it was presented in the co-creation workshops, the following introductory information is presented:

- General Intro
- The Pilot Area, the existing situation of the site
- The City Actions: presented through a general Masterplan
- The Objectives / health & well-being link
- The visionary solutions on the Masterplan

Every visionary solution is then described in detail and the following information is provided:

- Key information regarding each Visionary Solution regarding the type of VS, the planned components and the challenges addressed.
- Final design of the sketched solution (annex D)
- Annexes A, B, C, E, F, G and tables A, B

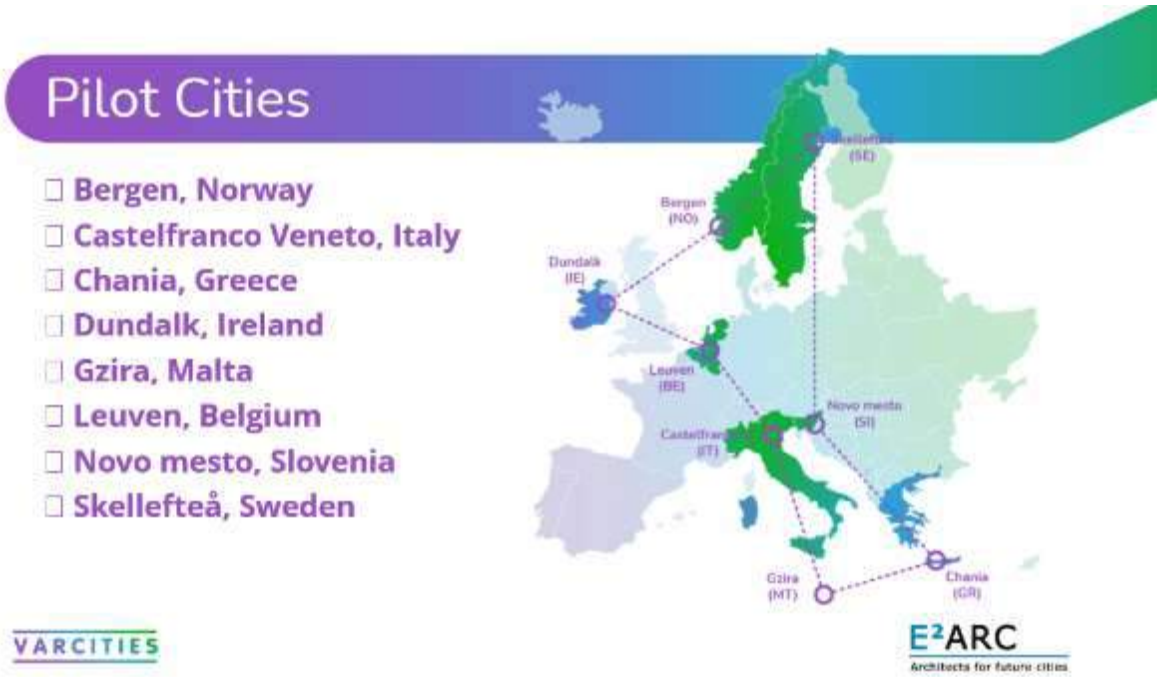


Figure 3: The VARCITIES pilot cities

1 Castelfranco (IT): A “Healing Garden” for elderly and people suffering from Alzheimer

Overview of the pilot area and the VSs

Annex D: Castelfranco pilot area

Annex D: Castelfranco existing situation

Annex D: Castelfranco- the pilot site

Annex D: Castelfranco- the masterplan

Annex D: Castelfranco- Objectives/ H&WB link

Annex D: Castelfranco- the Visionary Solutions on the Masterplan

Castelfranco: Overview of the sketched solutions

VS1- Creation of garden access routes to ensure an improved access according to the needs of the garden users

VS1 Summary (Annex A)

Title	Renovation of the access road to the garden and adaptation of the paths within the garden based on the mobility needs of the users
Motto	This Visionary Solution will ensure an improved accessibility to the target users of the garden (visitors, elderly people and elderly people affected by Alzheimer's disease)
Location of the planned investment	Inside and outside the Villa Revedin Bolasco historic garden
Municipality/local authority/main partners	Municipality of Castelfranco Veneto and local Hospital
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☑ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☑ Sustainable district and built environment ☐ Integrated infrastructure processes ☐ For others, please specify ☐
Overview and objectives of the planned Visionary Solution	The VS 1 consists in the renovation of the already existing access route to the garden, enhancing the accessibility of pedestrians and cyclists and facilitating the access to people with special mobility needs. Similarly, the internal already existing network of paths are going to be adapted in terms of pavement to allow for a wider accessibility.

Total investment planned	EUR[1] [redacted]		
Funding sources	*Requested funding (EU contribution)*	EUR [redacted]	
	Own funding	-	
	Other sources [please specify] Funding notice published by the Ministry of the Interior Department - Internal and Territorial Affairs Central Directorate for Local Finance.	EUR [redacted]	
Estimated costs and revenues	*Total operating cost (year)*	EUR [redacted]	
	Total revenues (year)	0	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	4.3 Recreational (number of visitors, number of recreational activities) or cultural (number of cultural events, people involved, children in educational activities) value of green spaces	Increased recreational or cultural value of green spaces	Number of visitors; number of recreational activities; number of cultural events; people involved; children in educational activities;
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	8.10 Accessibility of open public spaces and buildings for families with baby carriages and individuals with restricted mobility	Greater inclusion of families with babies and individuals with restricted mobility	N° of access/year
Contribution to SDGs	*SDG n° and name*	Expected impact	
	SDG 11 SUSTAINABLE CITIES AND COMMUNITIES (11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities – 11.7.1 Average share of	11.7 – Direct Impact / local scale = 2 11.7 – Direct Impact / urban scale = 1	

[1] All values incl. VAT, if not reclaimable.

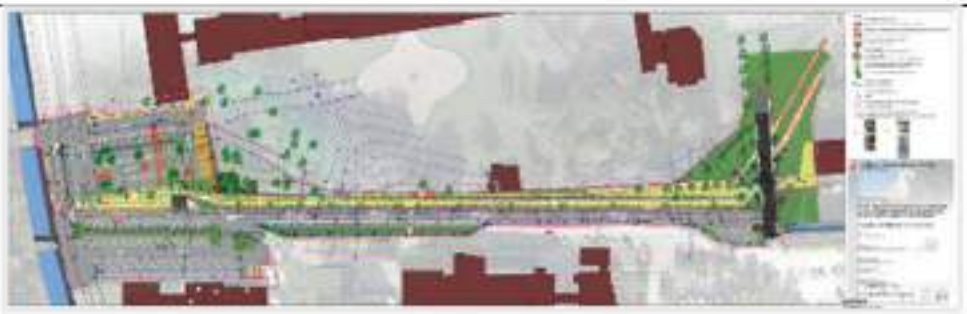
	the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities)	
	SDG 3 GOOD HEALTH AND WELL-BEING (3.6 reduce deaths and injuries from road traffic accidents)	3.6 – Direct Impact / local scale = 1 3.6 – Indirect Impact / urban scale = 1

VS1 Main Contacts (Annex B)

Lead Organization	
Organization name	**Municipality of Castelfranco Veneto**
Contact person	[redacted]
Department	Settore Tecnico
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	designer of the new road
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	Municipality of Castelfranco Veneto
Contact Person	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS1 Description (Annex C)

Objectives of the Visionary Solution
This Visionary Solution will improve the external and internal accessibility for target users (visitors, elderly people and people with special mobility needs). The new road and the improvement of the internal paths will allow a direct, safe and comfortable access to the Villa Revedin Bolasco historic garden, in general. It is expected an increase of the number of visitors and visits to the garden and an improved beneficial experience of the visit. The project includes the design of the construction works, the search for funding, the bureaucracy activity to ensure the construction of the road, the assignment of the work to a construction company, the coordination of all the work and the related administrative procedures.
Overview of Visionary Solution leader and partners
The leader of this visionary solution is the Municipality of Castelfranco Veneto. The design, construction and maintenance of the external road are activities coordinated by the technical staff of the Municipality. The University of Padova is the responsible for the renovation works on the internal network of paths. The neighbouring Hospital has granted a portion of land to build the road with an agreement already concluded, since the hospital itself is interested in improving the access to the hospital. The nearby Centre "Domenico Sartor" for elderly people and people with disability too is interested in the development of a better access to the garden, since the guests of the Centre might profit of the beneficial effects of the green and blue areas of the garden.
General project background, context, and rationale
The new design will allow the access to people with wheelchairs, strollers and aids for an improved mobility. The VS is well integrated in the local policy which promotes sustainable mobility, actions for physical activity and well-being of people and services for the population of elderly people living in the area. In addition, it was also considered the need to upgrade the area in a more liveable, more functional and more decent context with trees, flower beds that will be able to give feelings of physical and psychological well-being to citizens. It was estimated that the number of people who will use the road will be much greater and will encourage the use of bicycles with the reduction of vehicle traffic. The enhanced road and path network, therefore, becomes an asset to promote social and physical well-being of people who are treated in institutions in the area and for all citizens of the municipality.
Supporting actions required
For the renovation of the road it is necessary to involve the technical staff of the Municipality and external professionals. It will be necessary to find the financial funds, for this project we participated in a call for funding from the Ministry. Further procedures concern the tender for the renovation contract. The tender will be carried out by the municipal office or support can be requested from the tender office of the Province of Treviso. Several documents will have to be prepared for the call for tenders, for the identification of the company that will do the work, for the awarding of the contract and also for the procurement and anti-corruption regulations. The citizens will be informed about the development of the procedure and the entrusted works will be checked daily.
Description of the Visionary Solution
The VS aims to the renovation of the access road to the garden, and therefore, construction works are needed. A total of 10.000 m^2 are going to be renovated in total in the external area to the garden.



A new inclusive footpath and a cycling path are planned, in order to connect the different part of the town (i.e. the town historical centre, the hospital and the homecare) to the garden and increase the possible visits.

At the same time, the VS will improve the internal accessibility and will provide for the renovation of the paths' network, adapting the type of pavement to the different mobility needs.

The road allows for more convenient access to the garden and to encourage more visits by citizens to this green lung within the city.

Summary of VS components

VS component(s) are briefly summarized in Table A.

Replication and/or up-scaling potential

The project promotes sociality and a better state of physical and psychological well-being not only of t people belonging to the target categories considered in the VS, but also, of citizens in general.

The model and the materials for the implementation of the VS 1 are applicable to other situations and realities.

VS1 Summary of Visionary Solution Components (Table A)[2]

VS1 Creation of access paths to the historic garden in relation to the mobility needs of users						
#[3]	Visionary Solution component[4]	Brief description of the component	Unit[5]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Renovation of the access road to the garden	Construction and renovation works are applied to the already existing work in order to make it accessible to a wider array of users, as a cycling path and inclusive pedestrian paths are planned	10000 m²	Lack of inclusiveness in the main communication routes of the territory; limited accessibility to the garden for categories of people with special mobility needs	4.3, 8.10	0 [The funds for this component are going to be provided by the Municipality of Castelfranco Veneto]
2	Renovation of the internal paths' network	The pavement and the status of the paths within the garden will be renovated and materials and design which allow for an improved and inclusive accessibility are going to be applied	4942 m²	Limited accessibility within the garden for categories of people with special mobility needs	4.3, 8.10	[redacted]
3	All terrain wheelchair	Purchase/renting of an all-terrain wheelchair which will ensure the accessibility to the people with special mobility needs in the period before the internal paths are renovating, in order to guarantee the implementation of the VS 2 activities.	1	The renovation of the road and the paths is a time demanding process and it is not possible to guarantee the end of the works before the experimental phase of the VS 2	4.3, 8.10	[redacted]
TOTAL						[redacted]

2 All values incl. VAT, if not reclaimable.
3 The number of rows can be adjusted as required.
4 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
5 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

VS1 Visualisation (Annex D)

VS2- Analysis and monitoring of the psychological and physiological well-being of the elderly and people with Alzheimer's visiting the historic garden

VS2 Summary (Annex A)

Title	Analysis and monitoring of the psychological and physiological well-being of the elderly and people with Alzheimer's visiting the historic garden
Motto	VS2 provides the effects of natural environments on well-being, behaviour and physiological states in elderly and people with dementia, which could be useful over and beyond the project to design green spaces and to foster nature-based psychological and clinical interventions.
Location of the planned investment	Inside the Villa Revedin Bolasco historic garden
Municipality/local authority/main partners	Municipality of Castelfranco Veneto, Padova Neuroscience Center (University of Padova), Department of General Psychology (University of Padova)
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☐ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☐ For others, please specify Sharing knowledge and integrated interventions on the effects of nature in elderly and people with dementia ☑
Overview and objectives of the planned Visionary Solution	**Description.** VS2 concerns the collection of evidence about behaviour, physiological state, psychological well-being, and quality of life of the elderly and people with Alzheimer's visiting the historic garden. Then, VS2 will contribute to design and develop nature-integrated solutions and training to monitor users' Health& Well-Being during the VARCITIES project and beyond. **Aims.** The main objectives are the i) examination the effects of immersive navigation and direct exposure to green and blue spaces within the garden on the psychological well-being (e.g., affective status) and quality of life of the people and older adults with Alzheimer's, and ii) monitoring and investigation of the relationships between behaviour, physiological signals and exposure to natural environment in older adults with Alzheimer's visiting the garden. **Measures.** A series of psychological measures such as self-reported questionnaires, cognitive tests. Moreover, behavioural and physiological

	measures obtained by wearable tools (i.e., eye tracker and electroencephalograph system) are included to monitor psychological and psychophysiological states in people with dementia.		
Total investment planned	[redacted] EUR[6]		
Funding sources	*Requested funding (EU contribution)*	EUR [redacted] / 100%	
	Own funding	-	
	Other sources [please specify]	-	
Estimated costs and revenues	*Total operating cost (year)*	EUR [redacted]	
	Total revenues (year)	EUR [redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	1.3 Reduced urban temperature/improved human comfort	Reduced urban temperature / Improved human comfort	°C
	4.9 Increased use of green public space facilities	Increased use of green public space facilities	No. of people year-1 / min per capita
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no. /% of individuals/participants
	8.5 Fair participation to project activities	Fair participation to project activities	No. of people per category
	8.8 Greater inclusion of people with functional disabilities	Greater inclusion of people with functional disabilities	No. of individuals / year
	9.7 Improved psychological well being	Improved psychological well being	Total score and/or subscales scores
	9.8 Increased quality of life	Improved quality of life	Scales' scores
	9.9 Reduced Loneliness	Reduced loneliness	Scales' scores
	9.10 Improved Cognitive Abilities	improved cognitive abilities	Scales' scores
	9.12 Improved individual's feeling of the restorative value of natural environments		Scales' scores
	9.13 Increased residential attachment and satisfaction	Increased residential attachment and	Scales' scores

[6] All values incl. VAT, if not reclaimable.

		satisfaction	
	9.14 Reduced behavioural and psychological symptoms in dementia	reduced behavioural and psychological symptoms in dementia	Test scores and sub scores
	9.27 Reduction in anxiety levels	Reduction in anxiety levels	Scales' scores
	9.28 Increased psychological well-being and/or quality of life: improved positive emotions; reduced negative emotions	Increased psychological well-being and/or quality of life: improved positive emotions; reduced negative emotions	Scales' scores
	10.7 Increased impact of the project	increased impact of the project	No. of people year-1 / min per capita
Contribution to SDGs	*SDG n° and name*	Expected impact	
	SDG 3 GOOD HEALTH AND WELL-BEING (3.4 by 2030 reduce by one-third pre-mature mortality from non-communicable diseases (NCDs) through prevention and treatment, and promote mental health and wellbeing) + (3.5 strengthen prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol)	3.4 – Direct Impact / local scale = 1 3.4 – Direct Impact / urban scale = 1 3.4 – Indirect Impact / local scale = 1 3.4 – Indirect Impact / urban scale = 1 3.5 Indirect Impact / local scale = 1 3.5 Indirect Impact / urban scale = 1	
	SDG 11 - SUSTAINABLE CITIES AND COMMUNITIES (11.7 The VS provides g access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.)	11.7 Direct Impact / local scale = 2 11.7 Direct Impact / urban scale = 1 11.7 Indirect Impact / local scale = 2 11.7 Indirect Impact / urban scale = 1	
	SDG 10 REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES (10.2 by 2030 empower and promote the social, economic and political inclusion of all irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status)	10.2 Indirect Impact / local scale = 1 10.2 Indirect Impact / urban scale = 1	

VS2 Main contacts (Annex B)

Lead Organization	
Organization name	University of Padova
Contact person	[redacted]
Department	Department of General Psychology (DPG) Padova Neuroscience Center (PNC)
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	Consultancy Support
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	Director
Telephone	[redacted]
E-Mail	[redacted]

VS2 Description (Annex C)

Objectives of the Visionary Solution
The Visionary Solution aims to provide data on the positive effects of natural environments on well-being, behaviour and physiological states with a focus on elderly and people with dementia. The outcomes could be useful for both researchers, healthcare professionals and caregivers over and beyond the project to design green spaces and to foster nature-based interventions.
Overview of Visionary Solution leader and partners
The University of Padova (UNIPD) is the leading organization of the project, which will be implemented thanks to the involvement of the Department of General Psychology (DPG) and the Padova Neuroscience Center (PNC). The Residential Care Center 'Domenico Sartor' is a partner organization which will support UNIPD in the implementation of VS2.
General project background, context, and rationale
According to the recent global report of aging (WHO; 2021), the number of older people worldwide is slightly more than 1 billion (about 13.5% of the global population). By 2030, 1 in 6 people will be 60 years of age or older. Aging, even in the absence of pathologies, is associated with several changes in different life domains (e.g., cognition; Schaie, & Willis, 2010), and a higher risk of developing chronic health conditions that interfere with older adults' functioning in daily life (Ward, Schiller & Goodman, 2014). It has also been recently estimated that among the causes of death in the aging population, 13.6% can be attributed to dementia (Stokes et al., 2020), with important implications also for government finances and policies. On the one hand, it is noteworthy to understand and identify factors that could preserve and sustain health from age-related decline and promote well-being (both physical and psychological) and quality of life in older adults. On the other hand, cities need infrastructure changes to deal with the ageing society. The scientific literature has recently suggested the existence of a link between exposure to green spaces, such as urban green spaces, and well-being not only in childhood, but also in older age. Studies have pinpointed a potential role for the natural environment in reducing the risk of cognitive decline and maintaining emotional functioning in aging. One possibility is related to investments in urban green areas, such as parks and green spaces, that could become 'healing spaces' for citizens. However, the specific relationship between green spaces exposure, psychological well-being and quality of life, and physiological conditions in older adults is still a matter of debate, and a more in-depth assessment of cognitive/emotional and neurophysiological factors in adults and patients with dementia should be addressed (de Keijzer et al., 2016). The VS2 designed by the University of Padova (Italy) in the Villa Revedin Bolasco garden (Castelfranco Veneto) is specifically aimed at shedding light on this issue. Castelfranco Veneto is a middle-sized city located in the central area of the Veneto region. The site is centered around Villa Revedin Bolasco and its 8-hectare garden with a lake, owned by the University of Padova (UoP), recently restored. Next to this compendium is the rural property named "Casa Rebellato". Furthermore, the garden borders the main city hospital and a dedicated house for the elderly and an Urban Day Care Center for people affected by Alzheimer's disease, opened in 2016. The garden has received a prize as best Italian garden in 2018 and is famous internationally. A first study will be carried out with the main goal of analysing and monitoring psychological well-being and quality of life of healthy individuals (young and older adults), and physiological changes in people suffering from dementia (e.g., Alzheimer's disease). The second study will consider the "psychological" properties/characteristics (e.g., well-being and affective status) associated with the green and blue areas and will be carried with a series of tests with young and older people visiting in the historic garden. Both the studies will enable the collection of data for target users, and allow for the design & development of integrated solutions and associated training to monitor H&WB of users during the VARCITIES project and beyond.
Supporting actions required
Please describe if any additional type(s) of support is required in the preparation or will be needed during the implementation of the investment project (e.g. technical expertise, legal advice, procurement preparation, financial structuring, audits, business plans, surveys, crowdfunding/awareness creation campaign, etc.).

Description of the Visionary Solution
The implementation of the VS2 will combine the use of psychological, cognitive, behavioural and physiological techniques to investigate the effects of the exposure to the natural environment in healthy adults, and people with dementia. To do this, two devices will be used to record behavioural and neurophysiological signals (i.e., wearable eye tracker and a portable electroencephalograph system) in people with Alzheimer's disease (AD). Moreover, a series of questionnaires and cognitive tasks will also be administered to healthy adults and people with AD to capture the effect of the exposure to a natural environment.
Summary of VS components
VS component(s) briefly summarised in Table A.
Replication and/or up-scaling potential
The outcomes of VARCITIES could be helpful to foster the replication of the project in different contexts. For instance, VARCITIES implementation could help in the identification of useful information about key properties of the natural environment that have positive psychological and physiological effects on healthy adults and people with dementia. This could represent the starting point for a large-scale implementation of sensor-based studies of the relation between environment and human brain, thus critically contributing to the new emerging field of environmental neuroscience.

VS2 Summary of Visionary Solution Components (Table A)[7]

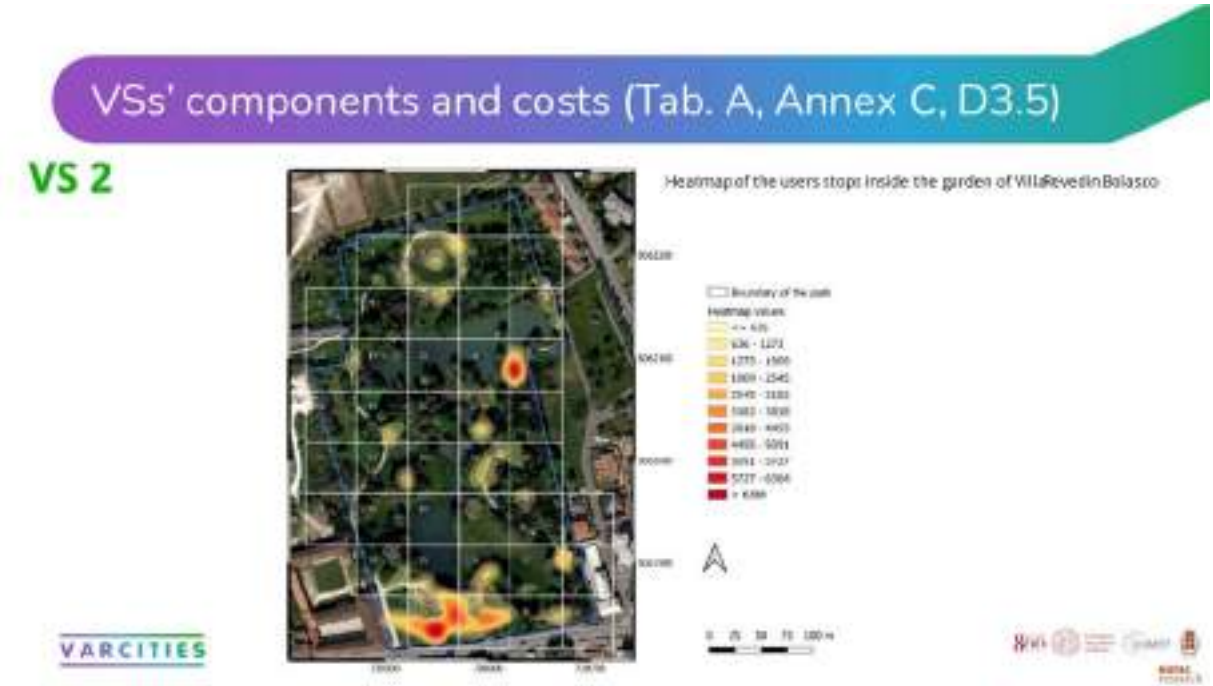
VS2 Analysis and monitoring of the psychological and physiological well-being of the elderly and people with Alzheimer's visiting the historic garden						
#[8]	Visionary Solution component[9]	Brief description of the component	Unit[10]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Questionnaires and cognitive tests;	Questionnaires: Self-reported instruments for assessing the individual's perception of several subjective outcomes (e.g., well-being, affective status, restorativeness) Cognitive tests: Standardized neuro-psychological scales for assessing cognitive abilities	Total score and/or subscales scores	Questionnaires: Assessing the effects of exposure to nature on psychological well-being and quality of life in young and older people and people with Alzheimer's disease (AD) visiting the historical garden. Cognitive tests: Assessing the effects of exposure to nature on cognitive performance in young and older people and people with Alzheimer's disease (AD) visiting the historical garden.	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]
2	Portable eye-tracker	Wearable eye tracker: a device for capturing real-time eye movements during visual exploration of the surrounding environment, also in mobility (i.e.,	Metrics related to eye-movements	Monitoring of spontaneous eye-movements dynamics and correlation with neurophysiological signals	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]

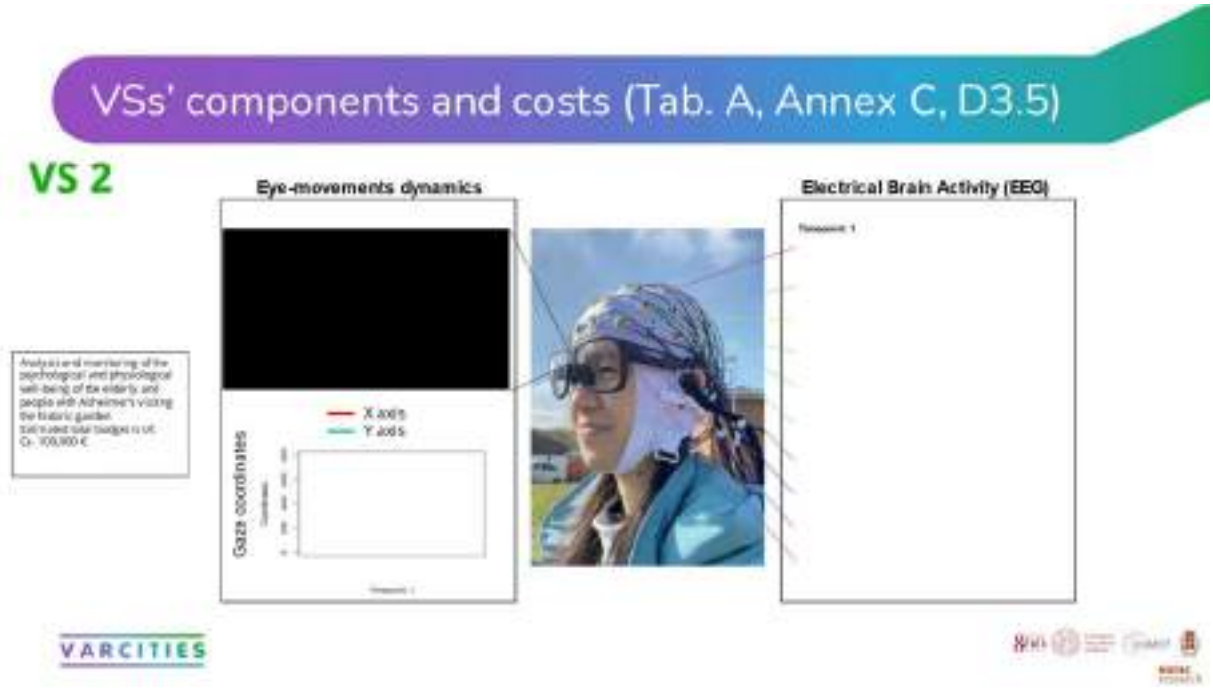
7 All values incl. VAT, if not reclaimable.
8 The number of rows can be adjusted as required.
9 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
10 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		participants are free to move within a real environment);	events (e.g., fixations, saccades)	(EEG) and health-related variables in people with Alzheimer's disease (AD) visiting the historical garden.		
3	Portable electroencephalography system (EEG)	This is a 4-channel tool-kit designed to for physiological signal acquisition (e.g., electrical activity of the heart) in real - dynamic- conditions	Metrics related to different properties of EEG signal in different bands (alpha, beta) s	Monitoring neurophysiological signals and correlation with eye-movements dynamics and health-related variables in people with Alzheimer's disease (AD) visiting the historical garden	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]
4	Portable physiological measures (e.g., ECG, EDA, LUX, EMG)	This is a 4-channel tool-kit designed to for physiological signal acquisition (e.g., electrical activity of the heart) in real - dynamic- conditions	ECG, EDA, LUX, EMG metrics	Monitoring psychophysiological signals (i.e., all wearable included in the kit) in healthy older adults and/or people with Alzheimer's disease (AD) visiting the historical garden.	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]
5	Actigraphy	This is non-invasive method of monitoring human rest/activity cycles (i.e., motor activity, sleep parameters) in real conditions	Motor and sleep metrics	Detecting motor activity (also sleeping waking patterns) using a small wearable movement-detecting device in healthy older adults and/or people with Alzheimer's disease (AD) visiting the historical garden	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]
6	Virtual reality headsets: Oculus Quest 2	Two virtual reality headsets (VR) designed to deliver VR experiences (e.g., images of natural and restorative places) in safe and comfortable places in older adults	Jointly applicable with questionnaires and tests or physiological measures	Monitoring the subjective experiences of VR exposure of natural places in older adults	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]

7	Smartphone	Two smartphones to take photos of the garden and record the GPS of the participants visiting the garden during the experiment	Number of photos and GPS track	Taking photos of the most restorative places in the garden (preparatory issue for study design) and tracking GPS of young and old people visiting the garden	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]
8	Computational units	High-performance computational units for analysis of simultaneous EEG+ eye tracking data. PC-related tools (e.g., monitors) Storage units	NA	The purchase of at least n.2 high-performance computational units would allow to manage the analysis and storage of EEG and eye tracking data. The analysis of such data, in combination with the use of machine-learning algorithms, is computationally intensive and requires *ad hoc* hardware and software.	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7.	[redacted]
9	Virtual reality + eye-tracking headset	n.2 HTC vive pro eye	Metrics related to eye-movements while exploring virtual environments.	Acquiring eye-movements while exploring natural environments without the need of taking the subject (e.g., Alzheimer's patient) outside, thus allowing data collection also during winter time.	1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]
TOTAL					1.3, 4.9, 8.5, 8.8, 9.7, 9.8, 9.9, 9.10, 9.12, 9.13, 9.14, 9.27, 9.28, 10.7	[redacted]

VS2 Visualisation (Annex D)





VS3- Monitoring of the microclimatic and environmental conditions in the different areas of the garden (forest area, open area, lake area)

VS3 Summary (Annex A)

<table>
<tr><td>Title</td><td>Monitoring of the microclimatic and environmental conditions in the different areas of the garden (forest area, open area, lake area)</td></tr>
<tr><td>Motto</td><td>VS3 provides all the data and information about the site in order to carry out an assessment of the effect of green and blue areas on elderly people and people with Alzheimer over the medium-term period in order to evaluate the potential of green areas on health and well-being of frail categories of people</td></tr>
<tr><td>Location of the planned investment</td><td>Inside the Villa Revedin Bolasco historic garden</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Municipality of Castelfranco Veneto, Department of Land, Environment, Agriculture and Forestry (University of Padova)</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table><tr><td>Buildings Scale Interventions</td><td>☐</td></tr><tr><td>Public Spaces Interventions</td><td>☑</td></tr><tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr><tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr><tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☑</td></tr><tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr></table>
Smart city / digital solutions
<table><tr><td>Sustainable urban mobility</td><td>☐</td></tr><tr><td>Sustainable district and built environment</td><td>☑</td></tr><tr><td>Integrated infrastructure processes</td><td>☑</td></tr></table>
For others, please specify
<table><tr><td>knowledge sharing</td><td>☑</td></tr><tr><td>baselines, performance indicators and metrics</td><td>☑</td></tr><tr><td>open data governance</td><td>☑</td></tr></table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>The VS consists in the monitoring of a set of environmental and site-related variables which have been demonstrated to be relevant and influential to the experience of the green and blue areas by users. In this case the Nature Based Solution consists in supporting and increasing the delivery of a range of ecosystem services in a more inclusive way in the cities. The garden of the pilot site is considered already an established nature-based solution of which efficacy we want to test and assess.

It is well recognised that nature has a general beneficial effect on people exposed to green and blue areas (Berman et al., 2008; Kaplan & Kaplan, 1989; Ulrich 1981; 2001; 2002). Through the implementation of VS 3 we would like to contribute to fill the gap and assess in details to which extent the different environmental variables might influence the health and wellbeing of users of the garden used as experimental area. In particular, the VS 3 is going to</td></tr>
</table>

	address the measurement of the micro-climatic and solar radiation conditions of the site, since it is been demonstrated that these influence the thermal comfort of people exposed to green and blue areas (Xue & Xiao, 2016; Zong et al., 2019; Xiong et al., 2020). The quality of the air, intended as the levels of air pollution, is going to be measured too, since it is expected that the presence of blue and green areas in the pilot site have a positive effect on its air quality regulation (Mabahwi et al., 2014; Simoni et al., 2015; Marques et al., 2020). Similarly, the noise levels, that are expected to be less disturbing where the vegetation is present (Smith, 1989; Goines & Hagler, 2007; Jariwala et al., 2017; Russel et al., 2018), are going to be assessed during the day and at different locations within the study site. Besides noises, the soundscape can strongly influence the experience of blue and green areas, therefore (Moscoso et al., 2018; Aletta et al., 2019; Jaszczac et al., 2021), the VS will apply ecoacoustics methodology to describe it and assess it. Considering one of the targets of the study, such as people with dementia, it has been demonstrated that both the light conditions and the perfumes are relevant to the experience of blue and green areas (Chu & Downes, 2000; van hoof & Kort, 2006; Tischler & Clapp, 2020). In general, it will be interesting to carry out an analysis of the landscape, since, with its specific characteristics such as the volumes and shapes and colours of the different vegetation's components of the garden, it is expected to differently influence the perception of people in the pilot site (Grahn & Stigsdotter, 2010; Thompson, 2011; Tuohino, 2013; Liu & Opdam, 2014). The data are going to be collected through the implementation of a hybrid system, consisting in a network of wireless devices (IoT) and other instruments. Such data will be correlated to the information gathered by the colleagues of the Department of General Psychology and the Padova Neuroscience Center (University of Padova), regarding the health and well-being status of young, elderly people and people with Alzheimer disease visiting the garden. The aim is to assess the effect of blue and green areas on the health and wellbeing of people visiting the garden. Aletta, F., Oberman, T., Mitchell, A., Erfanian, M., Lionello, M., Kachlicka, M., & Kang, J. (2019). Associations between soundscape experience and self-reported wellbeing in open public urban spaces: a field study. The Lancet, 394, S17. Berman, M.G., Jonides, J., Kaplan, S. (2008). The cognitive benefits of interacting with nature, «Psychological Science», 19(12), 2008, pp. 1207-1212. Chu, S., & Downes, J. J. (2000). Odour-evoked autobiographical memories: Psychological investigations of Proustian phenomena. Chemical senses, 25(1), 111-116. Goines, L., & Hagler, L. (2007). Noise pollution: a modem plague. South Med J, 100(3), 287-94. Grahn, P., & Stigsdotter, U. K. (2010). The relation between perceived sensory dimensions of urban green space and stress restoration. Landscape and urban planning, 94(3-4), 264-275. Jariwala, H. J., Syed, H. S., Pandya, M. J., & Gajera, Y. M. (2017). Noise pollution & human health: a review. Noise and Air Pollutions: Challenges and Opportunities, Ahmedabad: LD College of Eng. Jaszczak, A., Pochodyła, E., Kristianova, K., Małkowska, N., & Kazak, J. K. (2021). Redefinition of park design criteria as a result of analysis of well-being and soundscape: The case study of the Kortowo Park (Poland). International journal of environmental research and public health, 18(6), 2972. Kaplan, R., & Kaplan, S. (1989). The experience of nature: A psychological perspective, Cambridge University Press, Cambridge 1989. Liu, J., & Opdam, P. (2014). Valuing ecosystem services in community-based landscape planning: introducing a wellbeing-based approach. Landscape ecology, 29(8), 1347-1360. Mabahwi, N. A. B., Leh, O. L. H., & Omar, D. (2014). Human health and wellbeing: Human health effect of air pollution. Procedia-Social and Behavioral Sciences, 153, 221-229. Marques, G., Miranda, N., Kumar Bhoi, A., Garcia-Zapirain, B., Hamrioui, S., & de la Torre Díez, I. (2020). Internet of things and enhanced living environments: measuring and mapping air quality using cyber-physical systems and mobile computing technologies. Sensors, 20(3), 720. Moscoso, P., Peck, M., & Eldridge, A. (2018). Systematic literature review on the association between soundscape and ecological/human wellbeing. Russell, M. L., van Teeffelen, A. J., & Verburg, P. H. (2018). Quantifying urban ecosystem services based on high-resolution data of urban green space: an assessment for Rotterdam, the Netherlands. Journal of Applied Ecology, 52(4), 1020-1032. Simoni, M., Baldacci, S., Maio, S., Cerrai, S., Sarno, G., & Viegi, G. (2015). Adverse effects of

	outdoor pollution in the elderly. Journal of thoracic disease, 7(1), 34. Smith, A. (1989). A review of the effects of noise on human performance. Scandinavian Journal of Psychology, 30(3), 185-206. Thompson, C. W. (2011). Linking landscape and health: The recurring theme. Landscape and urban planning, 99(3-4), 187-195. Tischler, V., & Clapp, S. (2020). Multi-sensory potential of archives in dementia care. Archives and Records, 41(1), 20-31. Tuohino, A. (2013). The potential of lakes and lake landscape in the concept of nordic wellbeing. Polish Journal of Natural Sciences, 28(2), 267-81. Ulrich, R.S. (1981) Natural versus urban scenes: Some psychophysiological effects, «Environment and Behavior », 13(5), 1981, pp. 523-556 Ulrich,R.S. (2001). Effects of healthcare environmental design on medical outcomes, in Design and health: Proceedings of the second international conference on health and design, Svensk Byggtjanst, Stoccolma 2001, pp 49-59. Ulrich, R.S. (2002) Health Benefits of Gardens in Hospitals, paper per la conferenza Plants for People, International Exhibition Floriade, 2002. van Hoof, J., & Kort, H. S. M. (2006, June). Healthy living environments for older adults with dementia. In HB2006: Proceedings of the 8th International Conference Healthy Buildings (Vol. 3, pp. 89-93). Xiong, Y., Zhang, J., Xu, X., Yan, Y., Sun, S., & Liu, S. (2020). Strategies for improving the microclimate and thermal comfort of a classical Chinese garden in the hot-summer and cold-winter zone. Energy and Buildings, 215, 109914. Xue, S., & Xiao, Y. (2016). Study on the outdoor thermal comfort threshold of Lingnan Garden in summer. Procedia Engineering, 169, 422-430. Zong, H., Liu, Y., Wang, Q., Liu, M. L., & Chen, H. (2019). Usage patterns and comfort of gardens: a seasonal survey of internal garden microclimate in the aged care homes of Chengdu City. International Journal of Biometeorology, 63(9), 1181-1192.		
Total investment planned	EUR[11] [redacted]		
Funding sources	*Requested funding (EU contribution)*	EUR [redacted]	
	Own funding	-	
	Other sources [please specify]	-	
Estimated costs and revenues	*Total operating cost (year)*	EUR [redacted]	
	Total revenues (year)	EUR [redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	*Expected Impacts*	*Unit*
	1.3 Improved thermal human comfort in relation to the perceived and real air and surface temperature and local microclimate conditions (Indicator 1.3)	Reduced urban temperature / Improved human comfort	°C
	4.3 Recreational (number of visitors, number of recreational activities) or cultural (number of cultural events, people involved, children in educational activities) value of green	Increased recreational or cultural value of green spaces	n° of people

[11] All values incl. VAT, if not reclaimable.

	spaces		
	4.19 Increase of singing birds in green zones	increased urban biodiversity/ improved environmental conditions / increase in bird presence	N° of species and species composition
	5.5 Physical air quality indicators: temperature, humidity, etc.	improvement of local climatic conditions	Various depending on the variable measured
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	9.4 Noise reduction rates …. A replicable module of green area structure and composition will be assessed in order to ensure a reduction of noise rates due to the proximity to a main road	Reduced noise level	Db
	10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	definition of parameters for (re)designing green public spaces based on the well-being of users	NA
Contribution to SDGs	*SDG n° and name*	*Expected impact*	
	SDG 11 SUSTAINABLE CITIES AND COMMUNITIES (11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management) + (11.7. by 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities) + (11.7.1 by 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities).	11.6 Direct Impact / local scale = 1 11.6 Indirect Impact / local scale = 1 11.7 Direct Impact / local scale = 2 11.7 Direct Impact / urban scale = 1 11.7 Indirect Impact / local scale = 2 11.7 Indirect Impact / urban scale = 1	
	SDG 6 ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL (6.6 By 2020, protect and restore water-related ecosystems, including	6.6 Indirect Impact / local scale = 1 6.6 Indirect Impact / urban scale = 1	

	mountains, forests, wetlands, rivers, aquifers and lakes)	
	SDG 13 CLIMATE ACTION (13.1 strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries) + (13.2 Integrate climate change measures into national policies, strategies and planning) + (13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning)	13.1 Direct Impact / local scale = 1 13.1 Direct Impact / urban scale = 1 13.1 Indirect Impact / local scale = 1 13.1 Indirect Impact / urban scale = 1 13.2 Direct Impact / local scale = 1 13.2 Direct Impact / urban scale = 1 13.2 Indirect Impact / local scale = 1 13.2 Indirect Impact / urban scale = 1 13.3 Direct Impact / local scale = 1 13.3 Direct Impact / urban scale = 1 13.3 Indirect Impact / local scale = 1 13.3 Indirect Impact / urban scale = 1
	SDG 15 LIFE ON LAND (15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements) + (15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally) + (15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species) + (15.8 by 2020 introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems, and control or eradicate the priority species) + (15.9 by 2020, integrate ecosystems and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts) + 15a + 15b.	15.1 Indirect Impact / local scale = 1 15.1 Indirect Impact / urban scale = 1 15.2 Indirect Impact / local scale = 1 15.2 Indirect Impact / urban scale = 1 15.5 Indirect Impact / local scale = 1 15.5 Indirect Impact / urban scale = 1 15.8 Indirect Impact / local scale = 1 15.8 Indirect Impact / urban scale = 1 15.9 Direct Impact / local scale = 1 15.9 Direct Impact / urban scale = 1 15.9 Indirect Impact / local scale = 1 15.9 Indirect Impact / urban scale = 1 15a + 15b Indirect Impact / local scale = 1 15a + 15b Indirect Impact / urban scale = 1
	SDG 9 BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALISATION AND FOSTER INNOVATION (9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020)	9.c Direct Impact / local scale = 1 9.c Direct Impact / urban scale = 1 9.c Indirect Impact / local scale = 1 9.c Indirect Impact / urban scale = 1

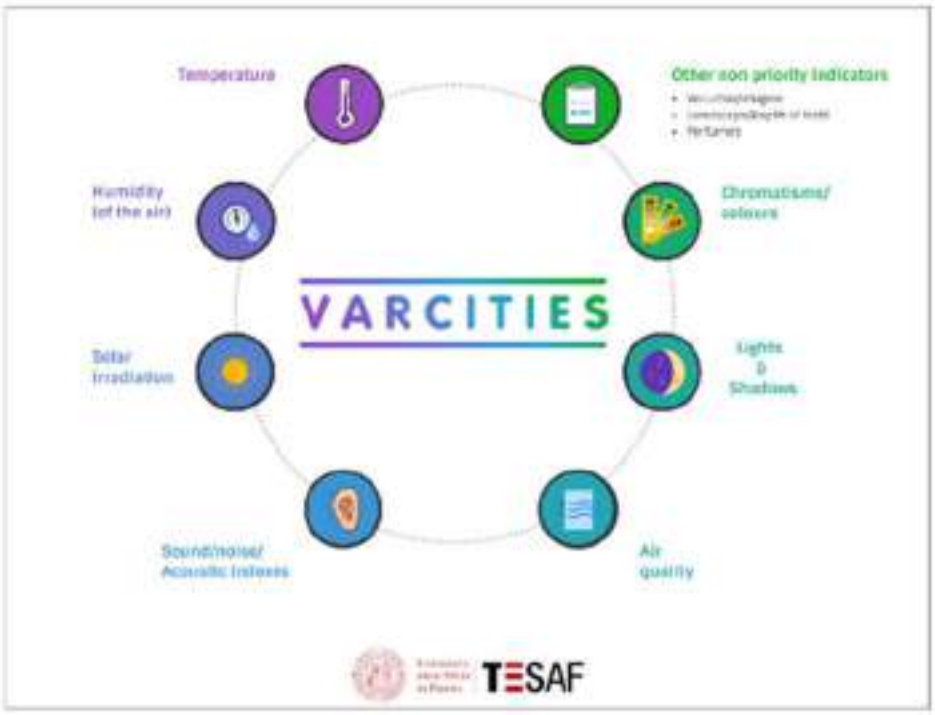
VS3 Main Contacts (Annex B)

Lead Organization	
Organization name	University of Padova
Contact person	[redacted]
Department	Dept. TESAF
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert The external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Sensedge d.o.o.
Role	Development and customization of sensors for reliable and quality environmental data acquisition
Address	[redacted]
Telephone	-
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	TEDXCastelfrancoVeneto
Contact person	[redacted]
Professional title	Licensee
Telephone	[redacted]
E-Mail	[redacted]

VS3 Description (Annex C)

Objectives of the Visionary Solution
Monitoring of the microclimatic and environmental conditions in the different areas of the garden (forest area, open area, lake area) in order to assess to which extent, the environmental and site-related variables influence the health and wellbeing of the users in the garden
Overview of Visionary Solution leader and partners
The Visionary Solution leader is the Department of Land, Environment, Agriculture and Forestry (TESAF) of the University of Padova, and the contact person is Prof. Raffaele Cavalli. The research and development activities of the department are strongly oriented to the study, conservation, effective management and sustainable use of agricultural, forest and natural resources. The Department has extensive experience of international and European research projects. The expertise in the survey design, environmental data collection and elaboration of information related to the climate and site conditions make the TESAF Department a suitable leader of the VS3.
General project background, context, and rationale
• The total surface of green spaces is of 500 km2 in total for 33544 inhabitants, which means 15.2 m2 of green spaces per capita. The population is quite densely distributed over the municipality's territory (655 inhabitants/km2). New shopping and residential areas are built, which may affect the extension and distribution of green spaces and rural areas. We report that at the municipal level there is a building regulation that regulates the technical-aesthetic, hygienic-sanitary, safety and liveability requirements of buildings and their appurtenances. The population trends are declining, as birth rate is rather decreasing, and deaths exceed births by a relevant 1.8 units per 1000 people per year. Indeed, we report a very high life expectancy (about 84 years old). This indicates a strongly ageing process taking place in the local population, with considerable challenges for their health. In facts, when assessing average health conditions, life expectancy only gives a partial picture, as it is not an indicator of the quality of life of individuals or of their actual health conditions. In particular, health conditions of elderly people can be quite problematic in their last years and even lead to bad quality of life despite a rather extended life duration. The main causes of death are neoplasms of the respiratory system. Such information gives a rough idea of the incidence and severity of the health conditions on which the change in life habits and the improvement of the urban environment quality foreseen in VARCITIES could impact in the pilot cities, and hence of the potential of VARCITIES actions. • Looking at the health and well-being from a broader point of view, we report that indicators like life satisfaction or perception of own health status or mental well-being score quite bad in Italy. • Moreover, Castelfranco Veneto is the pilot city presenting the most unfavourable thermal comfort conditions (hottest temperatures, intense UHI, long periods of strong thermal stress) during summertime. Here the monitoring of the impacts of the VSs on the regulation of the micro-climate will be of particular interest. • Finally, limited experience in both Smart Cities innovation and NBS is recorded for Castelfranco Veneto, except for tree planting activities and community gardens creation.
Supporting actions required
As a technical support for the identification and selection of the sensors, Sensedge d.o.o. has been consulted. Before the actual deployment of the sensors network, a preliminary survey through pilot sensors (prototype) is needed in order to assess and better organise the data collection phase.
Description of the Visionary Solution
The VS will be implemented in the historic garden of Villa Revedin Bolasco, for a total of 7.6 ha (of which 1.6 ha are covered by a lake). The garden includes open areas, woodland cover and paths. The VS consists in the monitoring micro-climate, air quality, landscape characteristics, noise and sound variables, light conditions, and other site features-related indicators (see the figure below, which summarises

the set of variables that are going to be measured in VS 3). The data are going to be collected through the implementation of a hybrid system, consisting in a network of wireless devices (IoT) and other instruments. The data are going to be periodically collected (over specific time intervals) and stored in a database which will be open for consulting to the VARCITIES projects partners and they will also be used for the creation of the digital twin (mock up) of the garden. Finally, such data will be correlated to the information gathered by the colleagues of the Department of General Psychology and the Padova Neuroscience Center (University of Padova), regarding the health and well-being status of elderly people and people with Alzheimer disease visiting the garden. Therefore, the present VS is strictly related to VS2 and VS5.



For public/private buildings: number and type of buildings, surface areas managed, current energy consumption, technology options proposed, etc. For public/private areas: surface areas managed, land use, etc.For infrastructure: foreseen energy efficiency improvement, ownership of installations, etc. For NBS description of species, functionalities, For services: number of users, etc. The VS will be implemented in the historic garden of Villa Revedin Bolasco, for a total of 7.6 ha (of which 1.6 ha are covered by a lake). The garden includes open areas, woodland cover and paths.

The VS consists in the monitoring micro-climate, air quality, landscape characteristics, noise and sound indicators, light conditions, and other site features-related indicators. The data are going to be collected through the implementation of a hybrid system, consisting in a network of wireless devices (IoT) and other instruments. The data are going to be periodically collected (over specific time intervals) and stored in a database which will be open for consulting to the VARCITIES projects partners and they will also be used for the creation of the digital twin (mock up) of the garden. Finally, such data will be correlated to the information gathered by the colleagues of the Department of General Psychology and the Padova Neuroscience Center (University of Padova), regarding the health and well-being status of elderly people and people with Alzheimer disease visiting the garden. Therefore, the present VS is strictly related to VS2 and VS5.

Summary of VS components

VS component(s) are briefly summarised in Table A.

Replication and/or up-scaling potential

The data collection activity is going to be repeated also after the implementation of the project for a continuous gathering of information in the future, as the system of sensors is going to be permanent.

The VS is replicable as the system of sensors and the methodology of data collection can be applied also to other green spaces, public or not, to allow for a detailed assessment of the environmental and site conditions for an enhanced experience of the users.

Possibly, such system might be implemented in the future by municipalities, green areas, gardens and parks managers, or in the courtyards and gardens of clinics, hospitals, and home cares.

VS3 Summary of Visionary Solution Components (Table A)[12]

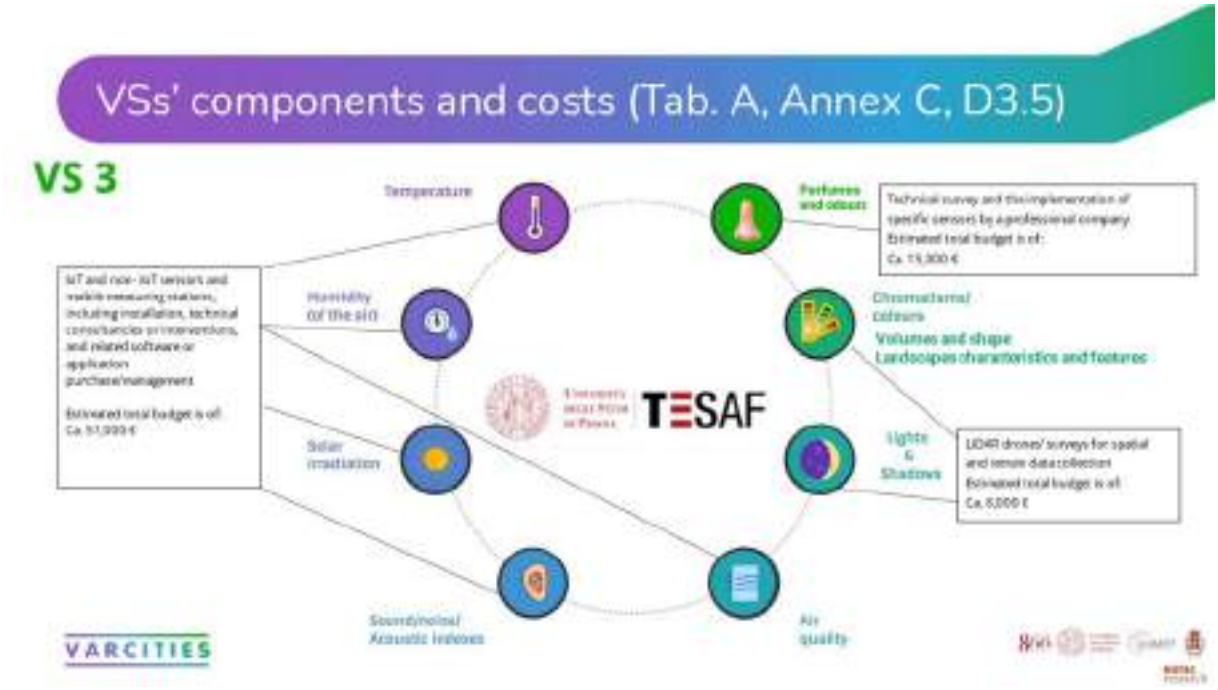
VS3- Monitoring of the microclimatic and environmental conditions in the different areas of the garden (forest area, open area, lake area)						
# [13]	Visionary Solution components[14]	Brief description of the component	Unit[15]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Devices and wireless sensor network for key data gathering (IoT microclimatic + air quality + solar radiation + noise sensor + wind speed/direction; gateway; and related accessories)	A number of stationary sensors, which will be connected through an Internet of Things network, while deployed in different parts of the garden to collect real-time and continuous information to give an overall, detailed and complete picture of the site	several	Lack of knowledge about the environmental and site conditions and characteristics which is needed to estimate the response in terms of health and wellbeing of the users of the garden	1.3, 5.5, 9.4, 4.3, 10.5	[redacted]
2	Installation of the gateway	A professional company will install the devices which cannot be installed by University's staff	NA	Need of technical, qualified, and professional service for the implementation of the gateway	1.3, 5.5, 9.4, 4.3, 10.5	[redacted]
3	Integrated system for the gathering, analysis, processing, and visualisation of the data collected with the IoT sensors applied in the VS3	Software and data repository are going to be used to allow for the analysis and storing of data	To be defined	Lack of approaches for the interpretation and elaboration of data and lack of a system allowing for a database storing long time series of data	1.3, 5.5, 9.4, 4.3 and 4.19, 10.5	[redacted]

12 All values incl. VAT, if not reclaimable.
13 The number of rows can be adjusted as required.
14 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
15 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

						[redacted]
4	LiDAR drones' flights for spatial and terrain data collection	Spatial and terrain data collection through drone-borne laser flights operated by a professional company. Such data contributes to the assessment of the environment in which the sensors and devices will be applied to gather information about the site's environment	2 flights	Need of a detailed terrain model and spatial data to be acquired during different seasons (different vegetational cover)	1.3, 5.5, 9.4, 4.3 and 4.19, 10.5	[redacted]
5	Wireless autonomous ground and water mobile measuring stations equipped with specific sensors and accessories	Autonomous ground drone and surface water drone, operated either by a remote controller or by an integrated GNSS system. Both the drones are provided with devices for monitoring environmental condition during operation, and, therefore, simulating the experience of a user visiting and exploring the garden.	To be defined (most likely 2 rovers plus a number of additional sensors and accessories)	Lack of knowledge about the environmental and site conditions and characteristics which is needed to estimate the response in terms of health and wellbeing of the users of the garden	1.3, 5.5, 9.4, 4.3 and 4.19, 10.5	[redacted]
6	Fix recording devices (non IoT) and related accessories	Devices which allow for the collection of information about the soundscape to assess the bird species diversity and the related biodiversity levels, which are known to have an influence on the experience of green and blue areas visited by users	4	Need to map soundscape, bird species diversity and acoustic indexes assessment, to be related to the health and well-being of the users of the garden	4.19, 10.5	[redacted]
7	Software licence and technical professional support for the audio files and acoustic indexes analysis and elaboration	Implementation of an advanced specific software for the analysis of the soundscape and the related biodiversity which requests also for training and technical guidance.	1 license for 4 years (until the duration of the project) and professional,	Need to assess the characteristics of the soundscape which the health and well-being of the users of the garden	4.19, 10.5	[redacted]

			support			
8	Assessment of the odours and perfumes characteristics of the site	Assessment of the sources and characteristics of odours and perfumes in the garden though a technical survey and the implementation of specific sensors by a professional company	2 field visits, installation and maintenance of 1 or 2 sensors according to the results of the preliminary field survey	Need to evaluate the perfumes and odours perceived in the garden that have an impact on the experience of the users	5.5, 4.3, 10.5	[redacted]
TOTAL						[redacted]

VS3 Visualizations (Annex D)



VSs' components and costs (Tab. A, Annex C, D3.5)

VS 3

VARCITIES

VS4- Development of a best-practices manual for the (re)design of green public spaces in relation to human health and wellbeing and establishment of the Local Landscape Observatory with a focus also on the therapeutic effects of green and blue areas.

VS4 Summary (Annex A)

<table>
<tr><td>Title</td><td>Development of a best-practices manual for the (re)design of green public spaces in relation to human health and wellbeing and establishment of the Local Landscape Observatory with a focus also on the therapeutic effects of green and blue areas</td></tr>
<tr><td>Motto</td><td>This Visionary Solution will be based on the outcomes of the other VS (1, 2, 3, 5) and will contribute to the further development of the town of Castelfranco Veneto and its surroundings promoting a new concept of urban green spaces centred on health and wellbeing principles.</td></tr>
<tr><td>Location of the planned investment</td><td>The Local Landscape Observatory will be based in 'Casa Rebellato', a historical building located at the entrance of the garden. The best-practices manual will be delivered both in the digital and paper format, under the supervision of the Local Landscape Observatory.</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Municipality of Castelfranco Veneto</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>☑</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☑</td></tr>
</table>
For others, please specify
<table>
<tr><td></td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>The overall aim of the VS 4 is to allow for the dissemination of the results and of the practices implemented in the pilot site of Castelfranco Veneto, in order to raise awareness about the value of green and blue areas for the health and wellbeing of users. Moreover, the VS 4 will guarantee the replicability of the</td></tr>
</table>

	interventions entailed by the other VS of Castelfranco Veneto pilot site. Both the components of the VS 4 (the best-practices manual and the Local Landscape Observatory) will equally contribute to the achievement of such aims.		
Total investment planned	EUR[16] [redacted]		
Funding sources	*Requested funding (EU contribution)*	EUR [redacted]	
	Own funding	EUR [redacted]	
	Other sources	-	
Estimated costs and revenues	*Total operating cost (year)*	EUR [redacted]	
	Total revenues (year)	EUR [redacted]	
Expected impacts (based on those identified in the monitoring framework)	***Impact name***	Expected impact	Unit
	7.1 Openness of participatory processes	*Increased and improved participation*	*No. of people / year*
	7.3 Social learning concerning urban ecosystems and their functions/services	*increased awareness of urban ecosystems*	*No. of learning supporting units*
	7.4 Perceptions of citizens on urban nature	*increased awareness of urban ecosystems*	*number of visitors*
	7.5 Social values for urban ecosystems and biodiversity	*increased awareness of urban ecosystems*	*number of visitors*
	7.6 Inter-departmental collaboration leading to NBS designs for multi-functionality	*increased governance coordination for NBS*	*No. persons/entities*
	7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.9 Institutional learning concerning acquisition of knowledge and understanding	*increased institutional capacity*	*N/A*
	7.11 No/share of individuals that knows the execution, the contents & the project's objectives	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Social background (education level, profession etc.) of people who have participated in the activities carried out under the project	*Fair participation to project activities*	*no. of people per category*
	8.8 Participation of individuals with	*Greater inclusion of people with*	*No. of individuals / year*

[16] All values incl. VAT, if not reclaimable.

	functional disabilities	*functional disabilities*	
	10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	*definition of parameters for (re)designing green public spaces based on the well-being of users*	*N/A*
	10.6 Replication of solutions		*N/A*
	10.7 Number of elderly health care institutions involved in 5 years	*increased impact of the project*	*No. of institutions involved*
	10.9 Public Private Investments after 5 years	*increased public private investments*	*Euros*
Contribution to SDGs	***SDG n° and name***	Expected impact	
	SDG 11 SUSTAINABLE CITIES AND COMMUNITIES (11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries, 11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically), + 11.4, 11.6, 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities 11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities) 11a, 11b	11.3 Indirect Impact / local scale = 1 11.3 Indirect Impact / urban scale = 1 11.4 Direct Impact / local scale = 1 11.4 Direct Impact / urban scale = 1 11.4 Indirect Impact / local scale = 1 11.4 Indirect Impact / urban scale = 1 11.6 Indirect Impact / local scale = 1 11.6 Indirect Impact / urban scale = 1 11.7 Indirect Impact / local scale = 2 11.7 Indirect Impact / urban scale = 2 11.a + 11.b Direct Impact / local scale = 2 11.a + 11.b Direct Impact / urban scale = 211.a + 11.b Indirect Impact / local scale = 2 11.a + 11.b Indirect Impact / urban scale = 2	
	SDG 12. ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS (12.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels)	12.b Indirect Impact / local scale = 1 12.b Indirect Impact / urban scale = 1	

	SDG 13. Take urgent action to combat climate change and its impacts (13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries) + (13.2 Integrate climate change measures into national policies, strategies and planning) + (13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning)	13.1 Direct Impact / local scale = 1 13.1 Direct Impact / urban scale = 1 13.1 Indirect Impact / local scale = 1 13.1 Indirect Impact / urban scale = 1 13.2 Direct Impact / local scale = 1 13.2 Direct Impact / urban scale = 1 13.2 Indirect Impact / local scale = 1 13.2 Indirect Impact / urban scale = 1 13.3 Direct Impact / local scale = 1 13.3 Direct Impact / urban scale = 1 13.3 Indirect Impact / local scale = 1 13.3 Indirect Impact / urban scale = 1
	SDG 15. PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION (15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements) + (15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally) + (15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species) + (15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species) + (15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts) + 15.a + 15.b	15.1 Indirect Impact / local scale = 1 15.1 Indirect Impact / urban scale = 1 15.2 Indirect Impact / local scale = 1 15.2 Indirect Impact / urban scale = 1 15.5 Indirect Impact / local scale = 1 15.5 Indirect Impact / urban scale = 1 15.8 Indirect Impact / local scale = 1 15.8 Indirect Impact / urban scale = 1 15.9 Direct Impact / local scale = 1 15.9 Direct Impact / urban scale = 1 15.9 Indirect Impact / local scale = 1 15.9 Indirect Impact / urban scale = 1 15.a.+ 15.b Indirect Impact / local scale = 1 15.a.+ 15.b Indirect Impact / urban scale = 1
	SDG 6. ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL (6.6	6.6 Indirect Impact / local scale = 1 6.6 Indirect Impact / urban scale = 1

	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes)	
	Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development (17.17)	17.17 Direct Impact / local scale = 2 17.17 Direct Impact / urban scale = 2 17.17 Indirect Impact / local scale = 2 17.17 Indirect Impact / urban scale = 2

VS4 Main Contacts (Annex B)

Lead Organization	
Organization name	**Comune di Castelfranco Veneto**
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Contact Person	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS4 Description (Annex C)

Objectives of the Visionary Solution
Development of a best-practices manual for the (re)design of green public spaces in relation to human health and wellbeing and establishment of the Local Landscape Observatory with a focus also on the therapeutic effects of green and blue areas
Overview of Visionary Solution leader and partners
The project is developed by the Municipality of Castelfranco Veneto. The Local Landscape Observatory is a working group accredited by the Veneto Region and is supported in its activities by the University of Padova. It is composed of 6 municipalities in the surroundings of the Castelfranco Veneto area, a water management authority, and the University of Padova. The activity programme of the Local Landscape Observatory is planned every two years, and it concerns different topics related to the landscape and it will ensure the involvement of the population in the activities for the protection and management of the environment. The Local Landscape Observatory will act also as an information hub for the local population on the tackled issues. The Municipality has prepared an agreement with the Veneto Region and the other partners, has identified the next two-year program and has written a Regulation for the functioning of the working group. Since the best-practices manual summarises the results of most of the activities entails in the Castelfranco Veneto VS, it will be drafted involving all the pilot site's VS leaders and partners.
General project background, context, and rationale
Please describe the general context and rationale of the planned Visionary Solution, referring to info gathered on D3.2, e.g.: - General framework conditions, incl. relevant (local, national, Eurostat, etc.) statistics regarding the investment territory, population etc.; and a social perspective on the context of the implementation of the project; - Relevant (enabling) policy framework, including political objectives and/or commitments **e.g.** Sustainable Energy and Climate Action Plans, etc.); - The social context in which the investment project is going to be developed (e.g. neighborhood with particular social connotations or relevant urban functions), if relevant; - Other relevant municipal infrastructure projects by the project promoter(s) that would be running in parallel to the Visionary Solution, if any. Please describe the preparatory assessments and studies carried out in the course of the Visionary Solution development and attach any (summaries of the) performed analyses to the concept. The local policy is already oriented to the development and conservation of a healthy urban environment, so it is in favour of promoting initiatives and actions to protect and manage the landscape according to such principle. The territory of Castelfranco Veneto is characterise by several water courses and it is mainly defined as a countryside area submitted to a dynamic continuous transformation. The project combines the environmental and social welfare objectives of the regional policy with the local one. It is important to underline that the current one is a favourable moment to tackle and bring to the general attention the issues related to the importance and the value of green urban areas. Indeed, there are the first signs of an increased sensitivity to the topics related to the environment. Moreover, after the Covid-19 pandemic there is an increased awareness of the importance of the connection with nature to improve the health and wellbeing of people. Finally, the territory of Castelfranco Veneto and its surroundings lack of a uniformity of vision and management for the green urban areas, and, therefore, there is a need to find a unique and shared approach.

Both the best-practices manual and the Local Landscape Observatory will contribute to deepen such issues.

Supporting actions required

Please describe if any additional type(s) of support is required in the preparation or will be needed during the implementation of the investment project (e.g. technical expertise, legal advice, procurement preparation, financial structuring, audits, business plans, surveys, crowdfunding/awareness creation campaign, etc.).

The implementation of the VS 4 Local Landscape Observatory will require the collaboration of other experts of the local administration and of the surrounding municipalities. The development of the Local Landscape Observatory requires the advice and support of the Veneto Region offices, professionals from outside the municipality and local experts.

The designing, printing and diffusion of the best-practices manual is going to be subcontracted to external professionals.

Description of the Visionary Solution

Please describe the envisaged Visionary Solution project, incl. the technical or social measures planned.

In this context, please provide details of the underlying technical or social analysis (e.g. results from audits conducted for the project, assessment of suitable technology options, questionnaires and surveys distributed before the intervention, etc.), and refer to the targeted areas including details for instance, to:

- For public/private buildings: number and type of buildings, surface areas managed, current energy consumption, technology options proposed, etc.
- For public/private areas: surface areas managed, land use, etc.
- For infrastructure: foreseen energy efficiency improvement, ownership of installations, etc.
- For NBS description of species, functionalities,
- For services: number of users, etc.

Please also describe the approach for aggregation/bundling of various Visionary Solutions, if relevant.

The description should be consistent with the visualization

The Local Landscape Observatory consists in a working group composed of the main municipalities of the territory to which Castelfranco Veneto belongs to, the University of Padova and local authorities responsible for the management of blue and green areas. The main aims are to develop and conserve a healthy urban environment, to promote initiatives and actions to protect and manage the landscape according to such principle, to raise awareness about the therapeutic value of blue and green areas, foster the participation of local stakeholders, and to promote a unique and shared approach among the municipalities of the territory for the management of the urban natural and semi-natural areas. The Local Landscape Observatory will have a physical seat near the garden, it will act as an information hub and will entail periodical meetings and events.

The outcomes of the activities carried out in the frame of the VSs of Castelfranco Veneto pilot site will be summarised, thanks to the collaboration of the main pilot partners, in a best-practices manual, in order to allow for the replicability of the solutions envisaged.

Summary of VS components

Please briefly summarise the VS component(s) in Table A.

Summary of expected impacts and benefits (based on those identified in the monitoring framework)

Please fill the table below with the results expected from the implementation of the Visionary Solution.

Please refer to the Monitoring and Evaluation Framework for details of the calculation, including relevant assumptions, baselines, conversion factors, etc.

Replication and/or up-scaling potential
The concept of the establishment of a working group for the management of urban green and blue areas is at its experimental phase, but it could be easily replicated in other realities, territories and situation with the due adaptations. The manual will itself be an instrument to allow for the replication of most of the activities entailed in the pilot site.

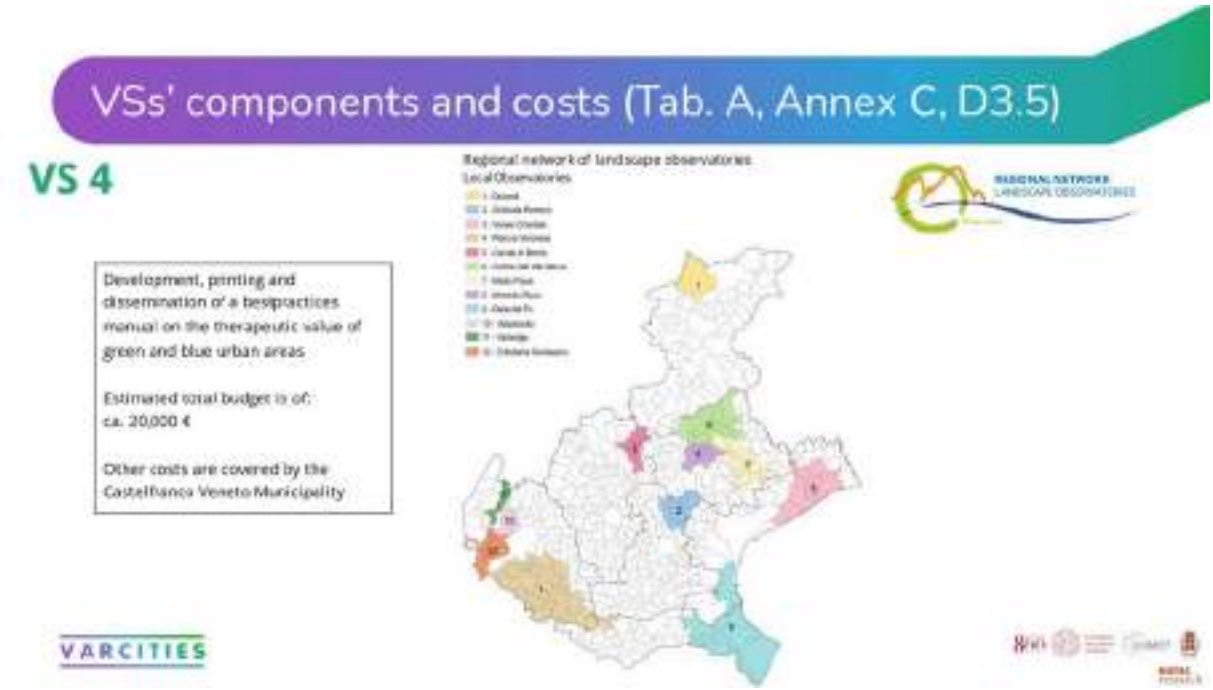
VS4 Summary of Visionary Solution Components (Table A)[17]

VS4 - Development of a manual for the (re)design of green public spaces and creation of the Local Landscape Observatory with a focus also on the therapeutic effects of green and blue areas						
# [18]	Visionary Solution components[19]	Brief description of the component	Unit[20]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Development, printing and dissemination of a best-practices manual on the therapeutic value of blue and green urban areas	The best-practice manual will summarise the outcome of the VS implemented for the Castelfranco Veneto pilot and it will identify the practices that can be replicated in other contexts	1 in terms of concept, many in terms of physical outputs	There is a need for further investigation of the effectiveness of Nature Based Solutions in relation to health and wellbeing	7.3,7.4, 7.5, 7.6, 10.5, 10.6	[redacted]
2	Establishment of a Local Landscape Observatory	Establishment of a working group focused on several shared topics for the management of the landscape	NA	The territory of Castelfranco Veneto and its surroundings lack of a uniformity of vision and management for the green urban areas, and, therefore, there is a need to find a unique and shared approach.	7.1, 7.3, 7.4, 7.5, 7.6, 7.8, 7.9, 8.5, 8.8, 10.5, 10.6, 10.7, 10.9	[redacted]
3	Development and dissemination of informative and communication material and events for promotion initiatives concerning therapeutic effects of green and blue areas	Specific initiatives are to be defined	NA	Awareness raising and information dissemination on the value of blue and green areas for the health and wellbeing of people	7.1, 7.3, 7.4, 7.5, 7.6, 7.8, 7.9, 8.5, 8.8, 10.5, 10.6,	[redacted]

17 All values incl. VAT, if not reclaimable.
18 The number of rows can be adjusted as required.
19 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
20 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

TOTAL					[redacted]

VS4 Visualisations (Annex D)



VS5- Implementation of ICT tools to support a rewarding experience of garden users and for the assistance of visitors with disabilities with the aim of increasing safety during the visit to the garden

VS5 Summary (Annex A)

<table>
<tr><td>Title</td><td>Implementation of ICT tools to support a rewarding experience of garden users and for the assistance of visitors with disabilities with the aim of increasing safety during the visit to the garden</td></tr>
<tr><td>Motto</td><td>The Visionary Solution provides accessible and rewarding experiences to visitors with disabilities over the long-term period in order to increase accessibility, inclusiveness and safety during the visit to the garden</td></tr>
<tr><td>Location of the planned investment</td><td>Villa Revedin Bolasco historic garden</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Municipality of Castelfranco Veneto.</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>☑</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☑</td></tr>
</table>
For others, please specify
<table>
<tr><td>Citizen focus</td><td>☑</td></tr>
<tr><td>Integrated planning and management</td><td>☑</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>The main goal is to use technology (i.e., sensors, smartphones and apps) to ensure an increased safety and enjoyability of the visitors in the garden. Therefore, the implementation of the VS will make the garden more accessible to any category of visitors, including also people with a certain level of disability.</td></tr>
</table>

Total investment planned	EUR[21] [redacted]		
Funding sources	*Requested funding (EU contribution)*	EUR [redacted]	
	Own funding	-	
	Other sources [please specify]	-	
Estimated costs and revenues	*Total operating cost (year)*	EUR [redacted]	
	Total revenues (year)	EUR [redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Value	Unit
	9.21 Level of physical activity in distances covered and average calories burned	*Increased outdoor physical activity*	*Km and Kcal (tracked through app)*
	4.9 The different needs of visitors (mainly of those with special needs) in term of accessibility and possibility to enjoy the visit to the garden will be met	*Increased use of green public space facilities*	*No. of people year-1 / min per capita*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	8.10 Accessibility of open public spaces and buildings for families with baby carriages and individuals with restricted mobility	*Greater inclusion of families with babies and individuals with restricted mobility*	*N ° of people*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	SDG 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE (9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020)	9.c Direct Impact / local scale = 1 9.c Direct Impact / urban scale = 1 9.c Indirect Impact / local scale = 1 9.c Indirect Impact / urban scale = 1	

[21] All values incl. VAT, if not reclaimable.

	SDG 11 SUSTAINABLE CITIES AND COMMUNITIES (11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities)	11.7 Direct Impact / local scale = 2 11.7 Direct Impact / urban scale = 2 11.7 Indirect Impact / local scale = 2 11.7 Indirect Impact / urban scale = 1
	SDG 10. REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES (10.2 by 2030 empower and promote the social, economic and political inclusion of all irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status)	10.2 Indirect Impact / local scale = 1 10.2 Indirect Impact / urban scale = 1

VS5 Main Contacts (Annex B)

Lead Organization	
Organization name	University of Padova
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Korona
Role	
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	TEDx Castelfranco Veneto
Contact person	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS5 Description (Annex C)

Objectives of the Visionary Solution
The Visionary Solution provides accessible and rewarding experiences to visitors with disabilities over the long-term period in order to increase accessibility, inclusiveness and safety during the visit to the garden. The VS consists in monitoring visitors' behaviour via sensors and Android devices that also provide the means for improved safety interactions like calls to specific emergency numbers. The data are going to be collected in a server through the smartphone WiFi / data stream. Such data will be shown in a map in real time, and location data will be used in case of emergency, but also for understanding which part of the garden is more or less visited, correlating with data from VS3.
Overview of Visionary Solution leader and partners
The Visionary Solution leader is the Department of Land, Environment, Agriculture and Forestry (TESAF) of the University of Padova, and the contact person is Prof. Francesco Pirotti. The research and development activities of the department are strongly oriented to the study, conservation, effective management and sustainable use of agricultural, forest and natural resources. The Department has extensive experience of international and European research projects. The expertise in the field of the Geographic Information System and collection and elaboration of spatial data makes the TESAF Department a suitable leader of the VS5.
General project background, context, and rationale
• The total surface of green spaces is of 500 km² in total for 33544 inhabitants, which means 15.2 m² of green spaces per capita. The population is quite densely distributed over the municipality's territory (655 inhabitants/km²). New shopping and residential areas are built, which may affect the extension and distribution of green spaces and rural areas. We report that at the municipal level there is a building regulation that regulates the technical-aesthetic, hygienic-sanitary, safety and liveability requirements of buildings and their appurtenances. • The population trends are declining, as birth rate is rather decreasing, and deaths exceed births by a relevant 1.8 units per 1000 people per year. Indeed, we report a very high life expectancy (about 84 years old). This indicates a strongly ageing process taking place in the local population, with considerable challenges for their health. In facts, when assessing average health conditions, life expectancy only gives a partial picture, as it is not an indicator of the quality of life of individuals or of their actual health conditions. In particular, health conditions of elderly people can be quite problematic in their last years and even lead to bad quality of life despite a rather extended life duration. • The main causes of death are neoplasms of the respiratory system. Such information gives a rough idea of the incidence and severity of the health conditions on which the change in life habits and the improvement of the urban environment quality foreseen in VARCITIES could impact in the pilot cities, and hence of the potential of VARCITIES actions. • Looking at the health and well-being from a broader point of view, we report that indicators like life satisfaction or perception of own health status or mental well-being score quite bad in Italy. • Moreover, Castelfranco Veneto is the pilot city presenting the most unfavourable thermal comfort conditions (hottest temperatures, intense UHI, long periods of strong thermal stress) during summertime. Here the monitoring of the impacts of the VSs on the regulation of the micro-climate will be of particular interest. • Finally, limited experience in both Smart Cities innovation and NBS is recorded for Castelfranco Veneto, except for tree planting activities and community gardens creation. • The access to the garden in the past was limited to specific events that were programmed for the guests in the homecare (Centro Sartor) only. The rationale is to expand accessibility to a wider audience (inclusiveness) keeping a high level of safety for fragile subjects.
Supporting actions required
The App that will collect location data will be tested by VS 2 as the data is of interest to them as well. They will

support testing the app.
Description of the Visionary Solution
• The VS consists in the monitoring of the activity of people with different levels of disabilities visiting the garden through the use of smartphones provided to visitors by the VS 5 itself. As first, the VS 5 will develop a spatial tracking app, which together with the accelerometer sensor inbuilt in the smartphones, will monitor the movements, position, and status of the person walking in the garden. The app will be added with a tool that allows to ask for help in case of need during the visit, so that the person is feeling safe without the need of continuous supervision by other people. Moreover, specific IoT sensors will applied to the seating locations to assess not only the enjoyability and the value of certain areas of the garden, but also the effectiveness of the seating locations in providing for safe and comfortable resting areas during the visit for people with limited mobility. • The VS aims to allow people to profit of the experience of the visit to the garden. Specifically: this VS does not have a physical space of implementation but consists in a solution implemented at the digital level as a digital twin and an app will be developed The digital twin will allow access to environmental data from devices allowing to see and analyse past and present environmental information and correlating with location data collected from the app • A number of smartphones will be available for visitors that can pick them up during their visit – between 5 to 10 smartphones are expected to be available to collect location data through the app • The app will collect timestamp and coordinates and send it through WiFi to a central server for storage and visualization; the app start/stop will be done by the personnel that provides the app, without requiring the user to interact with the phone, unless an emergency request is needed • Emergency request consists in a single (big) button that the user can press if intervention is required by personnel in the garden
Summary of VS components
Please briefly summarise the VS component(s) in Table A.
Summary of expected impacts and benefits (based on those identified in the monitoring framework)
Please fill the table below with the results expected from the implementation of the Visionary Solution. Please refer to the Monitoring and Evaluation Framework for details of the calculation, including relevant assumptions, baselines, conversion factors, etc.
Replication and/or up-scaling potential
- The app is intended for internal use to the garden, but can easily be replicated in other scenarios - Scaling to more functionalities can be done using the smartphone integrated sensors and added to the app.

VS5 Summary of Visionary Solutions' Components (Table A)[22]

VS5 Implementation of ICT tools to support a rewarding experience of garden users and for the assistance of visitors with disabilities with the aim of increasing safety during the visit to the garden						
# [23]	Visionary Solution component[24]	Brief description of the component	Unit[25]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Devices (smartphones) and related accessories)	The smartphones are going to be equipped with the due accessories and app and will be provided to the users of the garden.	20 smartphones	The need to widen the accessibility to the garden also to categories with special needs. The need for a higher level of safety during the visit of people with special needs	4.9, 8.10, 9.21	[redacted]
2	Development of app and creation of learning algorithms to process historic and real time data of geo-localization of visitors	Development of an app which allows for the tracking of the visitors' path along the garden, which is installed in a smartphone provided by the Villa Revedin Bolasco before the visit. An automatic definition of preferred locations for visitors and correlation with environmental factors collected in VS3 is provided.	App development by 1 professional; Algorithm created by 1 professional	Increase understanding of behaviour of visitors to improve the experience of the visits and include different aspects	4.9, 8.10, 9.21	[redacted]
3	Ergonomic benches	Deployment of benches designed for people with limited mobility in the areas of the garden with	4	The need of effective and comfortable seating	4.9, 8.10	[redacted]

22 All values incl. VAT, if not reclaimable.
23 The number of rows can be adjusted as required.
24 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
25 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		higher value		locations in the garden in order to improve the experience of the visit in terms of safety, health and wellbeing		
4	Sensor for the use of the bench	An IoT occupancy sensor will be applied to each bench in order to assess the use and effectiveness of the seating locations	4	The need of effective and comfortable seating locations in the garden in order to improve the experience of the visit in terms of safety, health and wellbeing	4.9, 8.10	[redacted]
TOTAL						[redacted]

VS5 Visualisations (Annex D)

VS6- Adaptive and intelligent information system for visitors

VS6 Summary (Annex A)

Title	Adaptive and intelligent information system for visitors
Motto	A Virtual window on the garden
Location of the planned investment	Nearby the historic garden of Villa Revedin Bolasco (location at the southern wall to be confirmed)
Municipality/local authority/main partners	Municipality of Castelfranco Veneto
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☑ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☑ For others, please specify ☐
Overview and objectives of the planned Visionary Solution	The adaptive and intelligent information system will be constituted by a digital (interactive) screen, located outside the walls of the garden, which: • will show images and videos of the garden, and will (eventually) share sounds, to stimulate the curiosity of citizens and visitors, to inform them on what is hidden behind the external walls and its cultural and natural value, and to allow them to perceive the benefits provided by the nature; • will interactively visualize monitored data, to inform on the conditions and peculiarities of the garden and their contribution e.g. to human thermal comfort; • will inform on the advantages of a visit to the garden for elderly population, sharing the results of the involvement of the patients of the nearby homecare.

Total investment planned	EUR[26] [redacted]		
Funding sources	*Requested funding (EU contribution)*	EUR [redacted]	
	Own funding	-	
	Other sources [EURAC]	EUR [redacted] (testing & monitoring)	
	Other sources [UNISMART]	EUR [redacted] (testing & monitoring)	
	Other sources [CVV]	EUR [redacted] (Communication materials)	
Estimated costs and revenues	*Total operating cost (year)*	EUR [redacted]	
	Total revenues (year)	EUR [redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected Impact	Unit
	7.3 Participatory planning and governance	*increased awareness of urban ecosystems*	*N° of learning supporting units*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE: 9C Significantly increase access to information and communications technology - 9.c.1 Proportion of population covered by a mobile network, by technology	9.4 Indirect Impact / local scale = 1 9.4 Indirect Impact / urban scale = 1 9.5 Indirect Impact / local scale = 1 9.5 Indirect Impact / urban scale = 1 9.c Indirect Impact / local scale = 1 9.c Indirect Impact / urban scale = 1	

[26] All values incl. VAT, if not reclaimable.

	11 SUSTAINABLE CITIES AND COMMUNITIES (11.7 by 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities)	11.7 Direct Impact / local scale = 2 11.7 Indirect Impact / local scale = 2

VS6 Main Contacts (Annex B)

Lead Organization	
Organization name	EURAC Research
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	ISOCARP Institute
Contact person	[redacted]
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	Biblioteca Civica di Castelfranco Veneto
Contact person	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS6 Description (Annex C)

Objectives of the Visionary Solution
The Visionary Solution aims to be a "virtual window" to the garden. For the duration of the project and beyond, it will provide interactive information about the historical garden and its environmental conditions to people passing by, in order to increase their awareness about the beauty and peace of the place, attracting them to explore it.
Overview of Visionary Solution leader and partners
The VS consists in installing outside to the historical garden (likely along the southern wall, facing the street "Borgo Treviso") one or more devices, aiming to provide people passing by (i.e., tourists, citizens, commuters, etc.) with various interactive information, stimulating their willingness to know more about what is hidden behind the wall and to explore the garden. The infrastructure, depending on implementation costs and available budget, might encompass: • LCD screen 55'' = 1211.6 x 682.4 mm or 75'' = 928.26 x 1650.24 mm o to display real time or recorded video from the garden (in case of real time images, a webcam is needed; while in case of pre-recorded videos, a set of seasonal records is needed under different weather conditions); o to display real time microclimate data or statistics, and related wellbeing messages (e.g., difference between the summer temperature outside or inside the garden, stressing the relevance of urban green surfaces); o to display statistics on visits, feedbacks from visitors, info on events, info on VARCITIES AR/VR videos, etc. Data should as well consider the H&WB dashboard; o To display data on electric power production from existing PV system on Villa Bolasco; o viewpoints, data and messages should consider the results of the psychologic, neurologic and environmental studies conducted by UNIPD in VS2, VS3, and VS5. • LCD touch screen (as above, but with the possibility for the user of direct interaction). • Webcam/presence sensor to recognize presence of users, and provide target actions or messages: o Presence or not of individuals, thus switching on/off the systems or switching from sleep/low consumption mode; o Typology of individual approaching the system (gender, age, vehicle – bicycle, wheelchair, car). • Sound system, to provide environmental sounds enhancing the perception of the garden or voice messages. • Wall rack/standing cabinet, to ensure protection of the infrastructure from outdoor conditions and possible thefts/vandalisms, logo and visual advertising of the project VARCITIES. Size and weight: 55'' = 842 x 1370 x 169.5 mm, 103 Kg; 75'' 1048 x 1880 x 175 mm, 200 Kg o Accessibility of the infrastructure for people on wheelchair or with physical impairments should also be considered Further possibilities to be considered include the integration of a PV system to provide power (LCD screen max power consumption is: 55'= 550W, 75' = 1000W), e.g., an on-site PV system on the southern wall. Some solutions to provide aesthetic integrations are available, as for example billboards integrating PV (could be designed with the VARCITIES logo) – (250Wp - 1x1,65 mt). The Visionary Solution leader is EURAC, Institute for Renewable Energy, and the contact person is Adriano Bisello. EURAC has previous experience on similar smart info points and indoor displays, gained through EU smart city projects. The development of the solutions requires strong interaction and collaboration with UNIPD (scientific departments for local research activities, data management and digital platform, management office for touristic info and management), Municipality of Castelfranco Veneto (building permits, technical coordination, use of public space, general touristic info), Unismart (scouting of technology providers). VARCITIES project partners also involved could include IES, KORONA, SENSEDGE, DARTEK.
General project background, context, and rationale

- After decades of abandonment, the 8-ha historic garden has been completely restored and opened to the public in 2015. The garden is actually open to public visits only 2 days per week, during weekends. It is managed by the office of University of Padova, the same managing the well-known botanic garden in Padova. During the week, the garden is used by nearby health care facilities to allow elderly and people affected by Alzheimer taking short walks and outdoor exercise. It is also used by UNIPD for conducting psychological tests on individuals, and environmental/spatial analyses. It used to host some cultural and musical events before COVID-19 outbreak.
- The historical garden attracts around 1400 visitors per year (in 2019, 2500 residents and 11500 non-residents). Residents and disabled can enter for free, while other visitors pay a 3 € full ticket (or a 10 € family ticket). After some months of closure during the COVID-19 outbreak, now it is again open.
- The garden is recognized as a relevant element of the local green and environmental infrastructure by the local urban strategic masterplan (PAT) and operational plan (PI). It is located very close to the city centre (old medieval castle).
- The garden is enclosed by a high surrounding brick wall that, although part of the historical compendium, hides the beauty of the garden from the external view. The southern side runs along a street, Borgo Treviso, with sidewalks and bus stop. People coming from the train station to the city centre arrive in Borgo Treviso. However, it is not possible to enter the garden from there. The path to the entrance, located on the western side of the garden, is quite long and not well signalled. Indeed, the entrance gate is located at the end of a parking area, on a pedestrian path (to be redesigned by VS1) in the west-north corner, close to the abandoned building that should host the "Landscape Observatory" (VS4). The northern side of the garden faces the Hospital and a pedestrian/cycling path; while the eastern side runs along a residential district and a small public green area.
- According to the results of a recent on-line survey, conducted in June 2021), the overall perception of residents is that the entrance of the garden is not easy to reach, and the presence of the wall makes the garden isolated from the surrounding urban context (someone even suggested to dismantle it). The responders also suggested that the gardens should be open more days, also to attract more tourists. Furthermore, residents, which were asked about possible smart installations, showed to be interested on them. The street "Borgo Treviso" is considered not too much safe for cycling.
- The municipality is going to implement the plan for the elimination of architectural barriers to people movement, by redesigning public spaces and sidewalks as wheel chair and strollers friendly.

Supporting actions required

Market survey (October 2021) returned:

- LCD display 55" outdoor with self-standing, single layer:
  - [redacted]
  - optional technology PCAP Touchscreen: [redacted]
  - transport, installation, software development, and maintenance not included
- LCD display 75" outdoor with self-standing, single layer:
  - [redacted]
  - optional technology PCAP Touchscreen: [redacted]
- PV panels billboard like, with battery storage
  - PV panels billboard like + battery storage
  - [redacted] x1,65 mt PV panel, 250W

Budget allocated to UNIPD should follow procurement rules of this entity. The same for EURAC, UNISMART and CCV.

The images/data/messages to be displayed should follow the development of VS2, VS3 and VS4, to integrate their results; however, the infrastructure can be installed even before.

Description of the Visionary Solution

- The VS aims to enhance the knowledge of residents/tourists on what is hidden behind the wall, why the garden is important and deserves a visit, and what the VARCITIES project is about. This VS has a physical

space of implementation, likely on the southern wall; however, this could change if a more interesting location emerges, or the precondition for installing the LCD screen (i.e. electric power, data connection, foundations or similar) are present in a different sites. The solution is also implemented at the digital level, as the sequence of video, messages, etc., and the visualization of monitored data require the development of a software solution (see also digital twin on VS5).

- The idea has been developed based on the results of a public on-line survey (June 2021), and of the brainstorming of local partners.
- The suggested LCD technology is well known and largely used in public space advertising.
- 1 LCD display with some additional features will be installed
- The VS6 is included among the "complementary actions" to be developed on the local demo site (i.e., VS1, VS5, and VS6), to complement the "backbone" solutions (VS2 and VS3), and to contribute to the dissemination and knowledge transfer of VS4.

Summary of VS components

Please briefly summarise the VS component(s) in Table A.

Summary of expected impacts and benefits (based on those identified in the monitoring framework)

Please fill the table below with the results expected from the implementation of the Visionary Solution.

Please refer to the Monitoring and Evaluation Framework for details of the calculation, including relevant assumptions, baselines, conversion factors, etc.

Replication and/or up-scaling potential

The VS6 has a high replication potential, as:

- digital (and interactive) screens are becoming even more familiar in public spaces, transit stations, exhibitions etc.;
- Interaction with users is make easy by availability of connected devices with cameras/QR code reader
- Digital literacy of people is increasing.

Possible replication and/or scale-up activities might include:

- Replication of the interactive system in other relevant locations within the city (e.g. municipality, tourist info-point, elderly home);
- Creation of similar multimedia contents for other historical gardens and/or relevant sites hidden from the sight of the population.

Commercial products development:

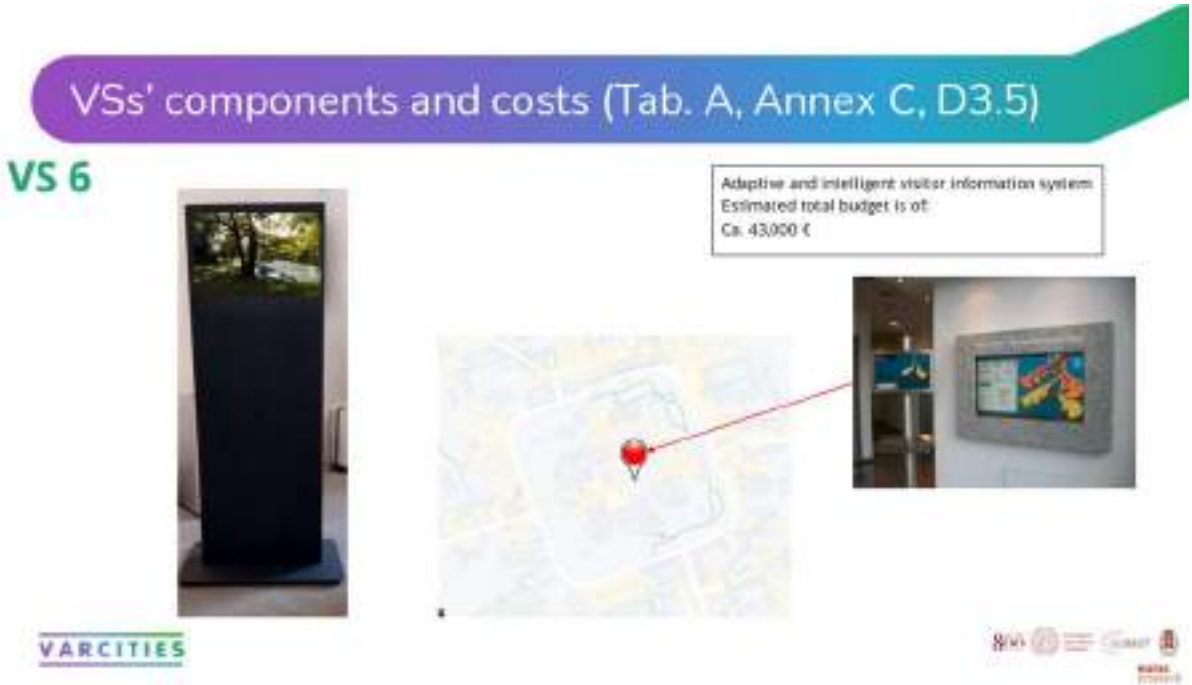
- Multimedia contents for other health facilities / waiting rooms / relax areas.

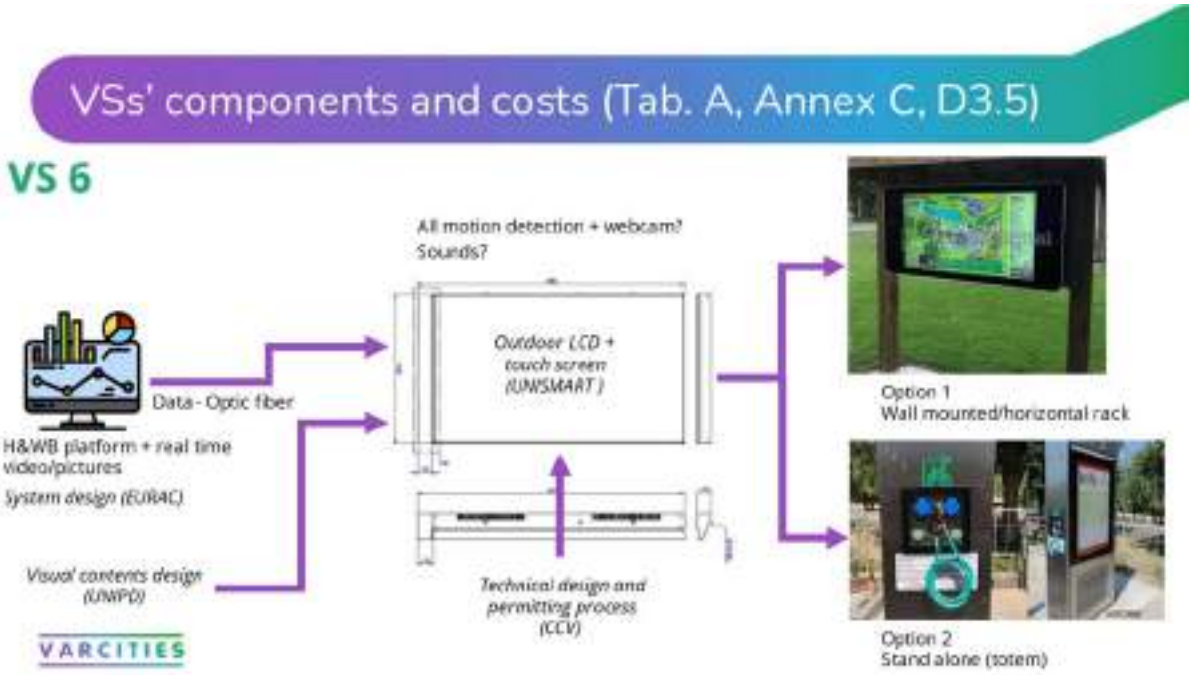
VS6 Summary of the Visionary Solution's Components (Table A)[27]

VS6 Adaptive and intelligent information systems for visitors						
# [28]	Visionary Solution component[29]	Brief description of the component	Unit [30]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Installation and commissioning	Installation of the screen, power supply, and connection to the data network	1	Provision of power, data connectivity, site preparation/foundations permitting, etc.	7.3	[redacted]
2	PV systems	Analysis of the power produced by the solar system on site and estimation of its contribution to the self-sufficiency of the system	1	Reduction of power consumption from the grid, contribution to power self-sufficiency of the system	7.3	[redacted]
3	Visual and sound systems for interactive information to visitors and citizens	Screen showing images and videos of the garden, and visualizing data and information, and sound system. The system should allow the interaction with the user.	1	Technical system provision	7.3	[redacted]
4	Software development	Development of a tool and user interface for the real-time analysis and visualization of the data acquired by the monitoring systems in the garden	1	Interface with sensors and databases	7.3	[redacted]
5	Contents development	Creation of the interactive/multimedia contents to be shown on the screen; this includes photo and video of the garden (virtual tour?), different results from the project and the other VS developed in Castelfranco Veneto, and monitored data.	1	Communication materials for visualization	7.3	[redacted]
TOTAL			5			[redacted]

27 All values incl. VAT, if not reclaimable.
28 The number of rows can be adjusted as required.
29 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
30 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

VS6 Visualisation (Annex D)





VS1 - 2 - 3 – 4 - 5 – 6 Stakeholders (Annex E)

Stakeholder analysis

The stakeholders that participated to the workshops belonged mainly to the H&WB sector (home-care operators and managers and psychotherapists), others were mainly involved in social development activities (association for the support and care of people with disabilities or syndromes/illnesses), or NBS and environment-related activities (mainly in the sector of green spaces), while only one could be defined as having a governmental role (consultant for the local observatory for the landscape) and one working in the education, research and communication area (community-based organisation for communication and dissemination of cultural events).

They will have an important role in consulting and feedback-giving during the ongoing assessment of the VARCITIES project's VS implementation.

The two main points on which most of the stakeholders showed interest and expressed their expectations were mainly related to the accessibility to and in the garden, the integration of the garden into the life and activities of the Castelfranco Veneto urban area and the enhancement of initiatives for the improvement of wellness in relation to green spaces.

At the current situation the support of the mentioned stakeholders is mainly at the consultation level. Their inputs are precious for an improved implementation of the VS.

The future engagement could be ensured through update meeting or dissemination events and other kind of consultative participatory approaches that involve the stakeholders.

Please:

- describe further stakeholders (civil society, economic stakeholders, etc.) and their possible role for the success of the investment project;
- highlight their needs and expectations from the proposed investment project;
- indicate their current level of support; and
- describe the future envisaged engagement strategy, using the following table.

This is further developing the work done by WP4.

Type of stakeholder	Current status of engagement	Future engagement activities	Instruments/channels for dissemination and interaction
H&WB	Participated to the workshop and had a consultive role.	Participation to update meeting and dissemination events, but also to ad hoc workshop-based consulting, consulting role for the good practices' handbook, development of agreements for the testing of the NBS implemented in the site.	Workshops, dissemination events, consulting/update meetings, ad hoc meetings.
Social Development	Participated to the workshop and had a consultive role.	Participation to update meeting and dissemination events, consulting role for the good practices' handbook, but also to ad hoc workshop-based consulting, and development of agreements for the testing of the NBS implemented in the site.	Workshops, dissemination events, consulting/update meetings, ad hoc meetings.
NBS & Environment	Participated to the workshop and had a consultive role.	Participation to update meeting and dissemination events,	Workshops, dissemination events, consulting/update meetings, ad hoc meetings.

		but also to ad hoc workshop-based consulting.	
Government	Participated to the workshop and had a consultive role.	Participation to update meeting and dissemination events, but also to ad hoc workshop-based consulting, active role in the development and implementation of the Local Observatory for the Landscape, and therefore an active interaction with the citizens).	Workshops, dissemination events, consulting/update meetings, ad hoc meetings, meetings and initiatives for the development of the Observatory and the implementation of its activities.
Education, Research & Communications	Participated to the workshop and had a consultive role	Participation to update meeting and dissemination events (possibly having also a role in their organisation and promotion), but also to ad hoc workshop-based consulting.	Workshops, dissemination events, consulting/update meetings, ad hoc meetings.

VS1 - 2 - 3 – 4 - 5 – 6 Strategic Planning and Assessment of the VS (Annex F)

Results of PESTLE analysis

The PESTLE analysis provides you with a structure that allows you to investigate the context in which your organization operates, it prompts you to ask yourself what the external factors of greatest impact on the organization are and to discuss their likely implications.

How you categorize each issue raised is not important when using the PESTLE technique because the purpose of this tool is simply to identify as many factors as possible.

For example, it is not important to classify an upcoming government regulation as a political or legal issue. The only thing that matters, in the end, is that it is identified as potentially having an impact on your organization.

Political factors affecting the planned Visionary Solutions

What are the key political factors?

VS1	VS2	VS3	VS4	VS5	VS6
No relevant factors identified	No relevant factors identified	No relevant factors identified	Improve the existing manual issued by the Veneto Region on the design and enhancement of public green spaces with therapeutic and inclusive purposes	No relevant factors identified	No relevant factors identified

Economic factors affecting the planned Visionary Solutions

What are the most important economic factors?

VS1	VS2	VS3	VS4	VS5	VS6
No relevant factors identified	No relevant factors identified	No relevant factors identified	No relevant factors identified	No relevant factors identified	No relevant factors identified

Social factors affecting the planned Visionary Solutions

What are the most important social and cultural aspects?

VS1	VS2	VS3	VS4	VS5	VS6
• "Intergenerationally": which age groups or frailty categories could be included and what challenges can emerge from their inclusion • Open the	No relevant factors identified	No relevant factors identified	• Foster the communication among different communities to give rise to a shared use of the spaces • Raise awareness in the community in	• Prevent the malfunction of ICT devices and systems providing health and safety in the garden through the involvement of human resources	• Insert simple explanatory panels in the garden that can guide people through the visit, also as tools for exercise (reading, identification,

access to the place, in terms of both different categories but also in terms of free access (for improving the enjoyment of the garden and understanding its value) • Training the assistants accompanying people with disabilities • Consider all kind of sensorial disabilities while planning any modifications to the garden accessibility, to improve opportunities of stimulation			order to understand the importance and potential of the observatory	ready to intervene in case of need	etc.) for people with learning difficulties or people with Alzheimer • Solutions to export the well-being generated from the garden to Alzheimer patients in the recreational center

Technological factors affecting the planned Visionary Solutions

What technological innovations could occur?

VS1	VS2	VS3	VS4	VS5	VS6
• "Intergenerationally": which age groups or frailty categories could be included and what challenges can emerge from their inclusion • Open the access to the place, in terms of both different categories but also in terms of free access (for improving the enjoyment	No relevant factors identified	No relevant factors identified	• Implement a IoP (Internet of People) and not only an Internet of Things (IoT) • Measure the social impact of the guidelines and define in detail what they intend to "affect"	• Create different devices for people in relation to their abilities with technological tools (e.g., smartwatches, different applications, headphones with natural sounds while exploring, etc.), allowing an increased experience of the garden • Development	• Place a virtual 'window' on the health care facility to transmit the images, sounds and outputs of the project and of the garden in the interior spaces • The interactive screens should be located closed to the garden, but also in some specific and strategic places in the

of the garden and understanding its value) • Training the assistants accompanying people with disabilities • Consider all kind of sensorial disabilities while planning any modifications to the garden accessibility, to improve opportunities of stimulation				of devices that can send a request for help or implement a sort of a radar or detector if any problems happen while people are in the garden • Reproduction of a virtual hospital environment for people who cannot access the outdoor open spaces	city, in order to better integrate the garden into the municipality • Installation of interactive screens if possible indoor and not out on the streets, to avoid breakages (for updates and maintenance) • Possibility of spreading even odorous perceptions from the screens?

Legal factors affecting the planned Visionary Solutions

What current and upcoming legislation could affect the sector?

VS1	VS2	VS3	VS4	VS5	VS6
• The garden is part of a historical and cultural place, so there may be obstacles to possible changes in its appearance and structure	No relevant factors identified	No relevant factors identified	No relevant factors identified	No relevant factors identified	No relevant factors identified

Environmental factors affecting the planned Visionary Solutions

What are the environmental considerations we should bear in mind?

VS1	VS2	VS3	VS4	VS5	VS6
• Presence of stationary points and rest points along the route, not only in terms of adding benches, but thinking about the logistic value they could have	No relevant factors identified	No relevant factors identified	• Consider green spaces not only as public spaces but also as environments that provide ecosystem services	• Implement benches (the ones that are there now are not enough, not safe and not near)	No relevant factors identified

with respect to the natural properties of the garden • Barriers to protect the open channel on the right side of the garden entrance could be natural barriers in terms of plants with the function of risk prevention (e.g., bushes)					

Results of SWOT analysis

Strengths affecting the planned Visionary Solutions

Please describe the endogenous factors that can favour the pursuit of VS objectives.

VS1	VS2	VS3	VS4	VS5	VS6
• Training the assistants accompanying people with disabilities • Monitor how many people use the garden at the same time • Consider all kind of sensorial disabilities while planning any modifications to the garden accessibility, to improve opportunities of stimulation • Designing streets where it could be possible to go on foot or with facilitator (wheelchair, …) considering to smooth the	No relevant factors identified	No relevant factors identified	• Improve the existing manual issued by the Veneto Region on the design and enhancement of public green spaces with therapeutic and inclusive purposes • Raise awareness in the community in order to understand the importance and potential of the observatory • Implement a IoP (Internet of People) and not only an Internet of Things (IoT)	• Create different devices for people in relation to their abilities with technological tools (e.g., smartwatches, different applications, headphones with natural sounds while exploring, etc.), allowing an increased experience of the garden • Development of devices that can send a request for help or implement a sort of a radar or detector if any problems happen while people are in	No relevant factors identified

corners between the grass and the path by placing barriers to prevent falling or approaching water bodies • Consider the use of wood and natural material (integration with the surrounding environment avoiding the use of concrete)				the garden • Reproduction of a virtual hospital environment for people who cannot access the outdoor open spaces	

Weaknesses factors affecting the planned Visionary Solutions

Please describe the endogenous factors that can hinder or delay the VS implementation process.

VS1	VS2	VS3	VS4	VS5	VS6
• "Facilitators" to improve accessibility to the Villa should be electric and not bulky • Protection of the open channel on the right side of the garden entrance by adding barriers or fences (e.g., handrail) • The garden is part of a historical and cultural place, so there may be obstacles to possible changes in its appearance and structure	No relevant factors identified	No relevant factors identified	• Measure the social impact of the guidelines and define in detail what they intend to "affect"	• Prevent the malfunction of ICT devices and systems providing health and safety in the garden through the involvement of human resources ready to intervene in case of need • Implement benches (the ones that are there now are not enough, not safe and not near)	No relevant factors identified

Opportunities affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect positively the VS implementation.

VS1	VS2	VS3	VS4	VS5	VS6
• "Intergenerationally": which age groups or frailty categories could be included and what challenges can emerge from their inclusion • Open the access to the place, in terms of both different categories but also in terms of free access (for improving the enjoyment of the garden and understanding its value)	No relevant factors identified	No relevant factors identified	• Foster the communication among different communities to give rise to a shared use of the spaces • Consider green spaces not only as public spaces but also as environments that provide ecosystem services	No relevant factors identified	• Insert simple explanatory panels in the garden that can guide people through the visit, also as tools for exercise (reading, identification, etc.) for people with learning difficulties or people with Alzheimer • Solutions to export the well-being generated from the garden to Alzheimer patients in the residential centre • Place a virtual 'window' on the home assistance to transmit the images, sounds and outputs of the project and of the garden in the interior spaces • The interactive screens should be located closed to the estate, but also in some specific and strategic places in the city, in order to better integrate the garden into the

					municipality • Installation of interactive screens if possible indoor and not out on the streets, to avoid breakages (for updates and maintenance) • Possibility of spreading even odorous perceptions from the screens?

Threats affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect negatively the VS implementation.

VS1	VS2	VS3	VS4	VS5	VS6
• Presence of stationary points and rest points along the route, not only in terms of adding benches, but thinking about the logistic value they could have with respect to the natural properties of the garden • Barriers to protect the open channel on the right side of the garden entrance could be natural barriers in terms of plants with the function of risk prevention (e.g., bushes)	No relevant factors identified	No relevant factors identified	No relevant factors identified	No relevant factors identified	No relevant factors identified

Risk and mitigation measures				
Please outline the critical risks that can affect the Visionary Solution implementation, their likelihood to occur and potential impact on the project as well as corresponding mitigation measures planned to meet the objectives, by using the table below. Please refer to PESTLE and SWOT analysis results (examples of risks include legislative changes, regulatory issues, upcoming elections, financing risks, demand risks, approval risks, unavailability of necessary expertise, etc.).				
Risk (description)	**Probability (Unlikely – Likely – Very likely)**	**Impact (Low – Moderate – High)**	**Risk level (Low - Medium – High – Extreme)**	**Mitigation measures (description)**
Delays in the renovation work due to contingent and covid-19 situation-related factors	Likely	High	High	Purchase/rent of all-terrain wheelchair to ensure at least the activities of VS2
Impact of the Covid-19 pandemic on the recruitment of older participants with Alzheimer's disease. In the Italian context, residential care homes have limited the access of visitors (including experimenters), and suspended the majority of traditional activities delivered to frail older residents (including some external visits, such as visiting the public areas). At the time of writing, the state of emergency in Italy has been prolonged until March 31, 2022 (and could be further extended).	Likely	High	High	The recruitment of healthy older adults with normal aging (e.g., without dementia), and autonomous - then non-resident in nursing homes.
The recruitment of older participants with Alzheimer's should also include the involvement of formal caregivers (i.e., health care professionals working in the residential care home) supporting the patient if some needs arise (eg, in the case of neurobehavioral symptoms during the experiment in the garden). Another risk related to the pandemic situation could, in fact, be that these caregivers may be quarantined and then not available during recruitment.	Likely	High	High	In line with previous mitigation, the recruitment of healthy older adults could allow us to avoid this risk.

Delay or substitution of the devices/software envisaged, selected and/or bought for the data gathering	Likely	High	High	Opening negotiation with other producers of similar sensors; starting/continuing to collect data with the sensors that are available (the type/number of data might then be reduced respect to what was planned)
Breaking or malfunctioning of the devices/software	Likely	High	High	Opening negotiation with other producers of similar sensors; starting/continuing to collect data with the sensors that are available (the type/number of data might then be reduced respect to what was planned)
Delays or obstacles in the implementation of the VS from which the input will be taken to write the best-practices manual	Likely	Moderate	Medium	In itinere production of information and dissemination material and events in order to communicate partial outcomes during the project
Difficulties of running the meetings and the events related to the activities of the Local Landscape Observatory due to contingent and covid-19 related issues	Likely	Moderate	Medium	Enhance online and innovative participatory approaches
No people available to test and collect data for this VS (mainly in relation to COVID-19-related restrictions)	Likely	High	High	Change the target of the VS and the pilot's project (not anymore elderly people with medical issues but opening to young and elderly people with typical aging)
Denial of installation permit from the Superintendence for Architectural Heritage and Landscape required for installing the southern side of the external wall of the garden (area subjected to landscape or heritage protection)	Likely	High	High	Plan in advance alternatives for the installation of the interactive screen in other relevant sites in proximity to the historic garden of Villa Revedin Bolasco

Delays in the provision of the technical components	Likely	Moderate	Medium	Thorough planning and choice of alternative technical providers
Delays in other activities that might affect the interactive visualization (e.g. monitoring)	Likely	Moderate	Medium	Design of a first level of interactive information about the garden and its features, which does not require data provided by other activities and can be subsequently updated.
Incompatibility between different communication/data storage/monitoring systems	Likely	High	High	Joint development of activities for data monitoring, visualization and communication
Underestimation of costs	Likely	High	High	Extensive and detailed market research

VS1 - 2 - 3 – 4 – 5 - 6 Economic and Financial Analysis of the VS (Annex G)

Ownership of assets and management structure

The realization of all Visionary Solutions is a joint effort, requiring collaboration of four project partners and external provides/experts, as the overall budget is shared among these entities, to develop as many different components of the VSs.

The development of the VSs is carried out through a continuous conversation with the partners of the Pilot Site and mainly between the Municipality Representatives and the University of Padova departments, since they might consider the application of the methods and result obtained in other parts of the territory.
Some VS (i.e., VS2, VS3) were not directly addressed during the workshops organised within the VARCITIES project with the local population, since they consist mainly in academic research activity, however, what emerged from the stakeholders during these events validated the importance and the value of considering some of the variables already entailed in the design.
For some specific Visionary Solutions (e.g., VS3) the development and implementation is also based on the collaboration and exchange of information with some other partners of the VARCITIES consortium such as Korona and Sensedge.
The decision-making processes for the implementation of the VS consists in a choral activity that involved all partners of the pilot site since the objective was to identify the best set of equipment, methods and approaches in order to assess the information useful to the project aims.
The final ownership of the asset will be luckily taken by the University of Padova, as it is managing the compendium of Villa Revedin Bolasco and the visiting of the garden, following a legal agreement with the Municipality of Castelfranco Veneto (owning the compendium of Villa Revedin Bolasco).

Procurement structure

The implementation of all Visionary Solutions will partially follow a public procurement scheme and related legislation:

- The University of Padova is a public body, following the public legislation
- The Municipality of Castelfranco Veneto is a public body, following the public legislation
- UNISMART is a private not-for entity, it does not follow the public legislation -> H2020 rules on purchases should be observed
- EURAC is a private not-for profit entity, it does not follow the public legislation -> H2020 rules on purchases should be observed

Estimated costs and revenues

Please specify:

- The estimated costs per cost category, differentiating between CAPEX and OPEX (equipment and installation cost, staff costs, external subcontracting, maintenance costs, etc.);
- Cost savings and other revenues.

Please summarise these costs and revenues[31] in the table below. Please provide a more detailed forecast (depicting the costs per investment component) on the cash flow development over the lifetime of the investment project in the Annex.

CAPEX (major expenditures foreseen over the long term for the implementation of the VS)	**Vs1**	**Vs2**	**Vs3**	**Vs4**	**Vs5**	**Vs6**
The estimated cost of planning processes						[redacted]

31 All values incl. VAT, if not reclaimable.

The estimated cost of installation	[redacted]		[redacted]			[redacted]
Estimated equipment cost	[redacted]					
External Services	[redacted]					
Other(s) [contents developments]	[redacted]					
Total investment cost	[redacted]					
OPEX (day-to-day expenses need to ensure the VS operation)	**Vs1**	**Vs2**	**Vs3**	**Vs4**	**Vs5**	**Vs6**
Estimated maintenance cost (10 years)	[redacted]					
Estimated staff cost (10 years)	[redacted]					
Estimated external sub-contracting (10 years)	[redacted]					
Other(s) (10 years)	[redacted]					
Total operating cost *(10 years)*	[redacted]					

Financing approach and funding sources	
Please describe in detail the envisaged financing approach, including the different funding sources (e.g. own funds, grants from VARCITIES project, soft loans, (bank) loans, guarantees, external investments, etc.) and the stage of commitment (i.e. consulted, ongoing, negotiations, contracted). Please indicate the planned funding sources for the investment in the table below[32], including requested funding.	
Total investment cost	[redacted]
Own funding of the promoter / local cluster	[redacted]
VARCITIES project	[redacted]
Other sources [please specify]	[redacted]

32 All values incl. VAT, if not reclaimable.

VS1 - 2 - 3 – 4 – 5 - 6 Table B – Business Model Canvas

<table>
<tr>
<td>Key activities

Preliminary activities:
- Analysis and monitoring of the psycho-physiological well-being of elderly people and AD's patients;
- Analysis and monitoring of the natural environment (microclimatic and environmental condition).
Complementary activities:
- Improve the accessibility of the historic garden (new access and renovated pathway within the garden);
- Create intelligent digital systems to facilitate the visit experience especially those with disabilities. (safety and assistance, entertainment).
Knowledge transfer activities:
- Development of guidelines for the (re)design of urban public spaces;
- Creation of a local Observatory on the therapeutic effects of green areas and waterways.</td>
<td>Key resources

VARCITIES budget, Own budget, Input from citizens and local stakeholders, Experts (University, Medical, Environmental/Forestry, etc.), historic garden and Villa Revedin Bolasco, Devices and sensors (LED monitor, eye tracking glasses, micro-climatic and environmental sensors, software and applications, etc.), Collected data, Researchers from university.</td>
<td colspan="2">Value proposition

Developing a nature-based solutions that integrate environmental data, psychological and medical evaluations to define replicable and scalable best practices to improve the health and well-being conditions of citizens with a specific focus on aging neurodegenerative diseases.</td>
<td>Key partners

University of Padova, Municipality of Castelfranco Veneto (Planning and Environmental Departments), Technical partners (Eurac and UniSMART), Suppliers of external services for the VSs implementation, Engaged citizens and local stakeholders.</td>
<td>Key beneficiaries

Associations (patients-related, elderly, students, health), Patients and their families, Care-givers, Nursing home "Centro Sartor", Citizens, Tourists.</td>
</tr>
<tr>
<td colspan="3"></td>
<td colspan="2">Governance structure

University owns the Villa and the garden, Municipality provides the access to the garden, technical partners (EURAC and UniSMART) provide external support to the project development.
The University and the Municipality will share the governance of the local observatory (VS4)</td>
</tr>
<tr>
<td colspan="2">Cost structure

CAPEX: Costs of Planning processes [redacted], Installation ([redacted]), Equipment [redacted]), External services [redacted]), Others [redacted].
OPEX: Yearly costs of Maintenance [redacted], Staff [redacted]), Sub-contracting [redacted]), Others [redacted]</td>
<td colspan="2">Channels

Dissemination materials (e.g., health and well-being handbook)
Events
Garden's accessibility improvement
Stakeholders' engagement activities (solutions' co-development)
Social media and website
Network creation of local partners (e.g., associations, cooperatives, etc.)

Cost reduction

Active involvement of local stakeholders in co-developing activities (e.g., volunteering, cooperatives, etc.)
Awareness and health prevention of citizens on aging and neurodegenerative diseases
Promotion of healthy life-styles
Reduction of drugs and treatments costs for AD patients
Scalable and replicable best practices</td>
<td colspan="2">Capturing value

Revenues generation through Consultancies, Training, Data monetization, Public/private partnerships (e.g., User's Fee payment, events creation), Advertising.</td>
</tr>
</table>

2 Chania (GR): Creation of a Mobile Urban Living Room in open public spaces

Overview of the pilot area and the VSs

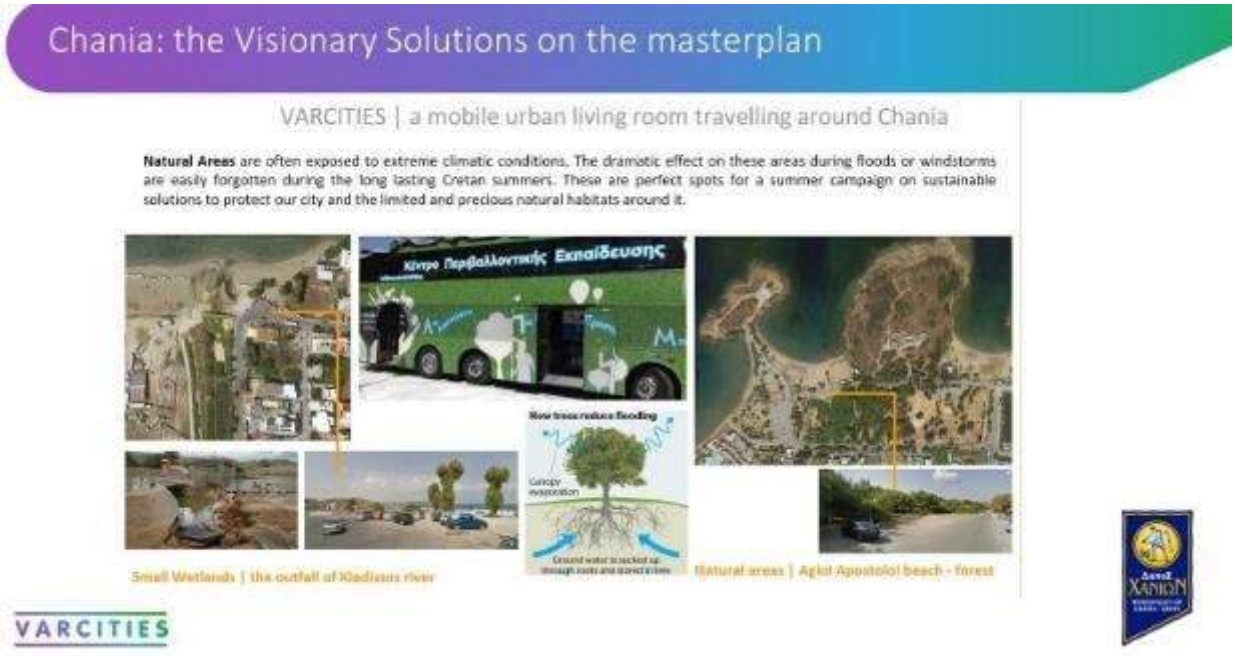
Annex D: Chania- the Pilot area

Annex D: Chania- the existing situation

Annex D: Chania- the pilot site

Annex D: Chania- Objectives/H&WB link

Annex D: Chania- the masterplan



Chania: Overview of the sketched solutions

VS1- Mobile Urban Living Room

VS1 Summary (Annex A)

<table>
<tr><td>Title</td><td>Mobile Urban Living Room (acronym: MULaR)</td></tr>
<tr><td>Motto</td><td>The Mobile Urban Living Room upgrades the public spaces by increasing the social and cultural value in order to bring citizens to nature, thereby the improvement of Health & Well Being.</td></tr>
<tr><td>Location of the planned investment</td><td>Municipal public spaces in urban/ peri urban/rural areas:
Natural Areas (e.g. The Municipal Garden and the Peace & Friendship Park, Agioi Apostoloi park/forest, small wetlands: the outfall of Kladissos river, close to Natura 2000 sites)
Squares (e.g. Souda Square, Chalepa Square etc)
Schoolyards
Neighbourhoods</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Municipality of Chania (CHANIA)- KEPPEDIH-CAM, Telecommunication Systems Institute (TSI), Cyclopolis LTD (CLP)</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions<table><tr><td>Buildings Scale Interventions</td><td>☐</td></tr><tr><td>Public Spaces Interventions</td><td>☐</td></tr><tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr><tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr><tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr><tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr></table>Smart city / digital solutions<table><tr><td>Sustainable urban mobility</td><td>☐</td></tr><tr><td>Sustainable district and built environment</td><td>✓</td></tr><tr><td>Integrated infrastructure processes</td><td>☐</td></tr></table>For others, please specify<table><tr><td>Public Spaces Interventions</td><td>✓</td></tr><tr><td></td><td>☐</td></tr></table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>The mobile urban living room is a convertible construction that can travel to various public spaces creating inviting points in order to revitalize them. Educational, social, awareness activities and cultural pop-up events, will take place in and around the MULaR, addressing to all ages, designed and implemented to be fully accessible.
This multifunctional space will consist a strategic mobile point in the city for</td></tr>
</table>

	raising the citizens' excitement through hosting plenty of events and contributing to the data gathering and the exploitation of the project results. Specifically, through various sensors that will be installed in MuloR to monitor air pollution, noise exposure, microclimate conditions etc., data will be gathered from all neighbourhoods that it is about to travel. Through hosting of the local events that will take place in the MULoR the citizens will be encouraged to provide self-perceived health & well-being data by filling questionnaires/surveys. The main objectives are to integrate green spaces into the everyday life of citizens, to increase the sense of respect for public spaces, to raise citizens and visitors' awareness on environmental and climate change issues, to increase urban interaction, to develop a healthy green mindset for children and to present technological innovations, nature-based solutions and healthy habits that can improve everyday life. Inviting citizens to participate in public events and monitoring their ideas and needs will establish a new approach in the way public spaces are used and designed.		
Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	*Expected Impact*	*Unit*
	4.3 Recreational (number of visitors, number of recreational activities) or cultural (number of cultural events, people involved, children in educational activities) value of green spaces	Increased recreational or cultural value of green spaces	No. of visitors year-1 / No. of recreational activities year-1
	4.7 Green-related social service provided to population	Increased Green-related social service provided to population	n/a
	5.5 Physical air quality indicators: temperature, humidity, etc	Data gathering of local climatic conditions, Citizens ' awareness	°C or %relative humidity
	5.6 Chemical air quality indicators	Air pollution data gathering, Citizens ' awareness	µg/m3

[33] All values incl. VAT, if not reclaimable.

	6.8 Access of residents/employees by foot to open space: sports centre, recreation area, or green space	increased accessibility of sport and recreation facilities	km / min
	6.9 Access of residents to cultural facilities on foot	Increased accessibility of cultural facilities	km / min
	7.4 Perceptions of citizens on urban nature	Increased awareness of urban ecosystems	n/a
	7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	No. of people / year
	8.5. Profession/job position/expertise of people who have participated in the activities carried out under the project	Fair participation to project activities	No. of people / year
	9.4 Exposure to noise pollution	Noise pollution data gathering, Citizens ' awareness	dB(A)
	9.16 Number / share of people being physically active (min. 30 min 3 times per week)	Increased outdoor physical activity	No of people / %
	9.20 Smoke cessation due to sports activities in green areas	Reduced smoking	No of people / year
	10.1 No. of jobs created; gross value added	increased job opportunities	No. of jobs created; euro
	10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	definition of parameters for (re)designing green public spaces based on the well-being of users	n * Z [(n° jobs) (€/m2)
	10.6 Replication of solutions	Replication of VARCITIES VS outside pilot cases	n/a
	10.8 Saved healthcare spending	Savings in healthcare spending	Euros per year / %
	10.9 Public-Private Investments after 5	Increased public-	Euros

	years	private investments	
Contribution to SDGs	*SDG n° and name*	Expected impact	
	SDG 3: Good Health and Well-Being	- Reduction of illnesses from hazardous air - Strengthen the local capacity for early warning, risk reduction and management of health risks - Adoption and integration local policies and plans towards H & WB	
	SDG 11: Sustainable Cities and Communities	-Support positive, social and environmental links between urban, peri-urban and rural areas - Reduction the adverse per capita environmental impact of Chania, including by paying special attention to air quality - Access to sustainable transport systems - Expansion of public transport with special attention to the needs of those in vulnerable situations	
	SDG 16: Peace, Justice and Strong Institutions	- Responsive, inclusive, participatory and representative decision-making - Public access to information - Relevant co-operation for building capacity	

VS1 Main Contacts (Annex B)

Lead Organization	
Organization name	Municipality of Chania (CHANIA)
Contact person	[redacted]
Department	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	1. Telecommunication Systems Institute (TSI), 2. Cyclopolis LTD (CLP)
Role	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	KEPPEDIH-CAM
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS1 Description (Annex C)

Overview of Visionary Solution leader and partners

Municipality of Chania (CHANIA), as the pilot representative, supervises the Pilot and is in charge of implementing the VS. Specifically, provides access to local citizen observatories and implements on the local STK engagement strategy, reviews the sketches and prepares the procurements of all infrastructure. CHANIA contributes also to data analysis tasks according to monitoring, evaluation and the reporting process.

Telecommunication Systems Institute (TSI), as the Pilot Expert, has the role to coordinate the actions needed from the Municipality of Chania. Specifically, TSI has already developed conceptual designs and part of the sketches for MULαR. TSI is also responsible to review the VS sketches, supervise and support the implementation and testing of the solutions, contribute to all data analysis tasks according to monitoring, evaluation and reporting process, support in the development of the business plan and the overarching engagement strategy.

Cyclopolis Ltd (CLP), as the Technology Provider, has the role to coordinate the actions needed from the Municipality regarding the development of the VS ICT components. Specifically, CLP supervises and supports the implementation and testing of the ICT solutions, contributes to all data analysis tasks according to monitoring, evaluation and reporting process, supports in the development of the business plan and the overarching engagement strategy.

KEPPEDIH-CAM is the Public Benefit Enterprise of Environment and Culture of the Municipality of Chania.

General project background, context, and rationale

Based on the Sustainable Urban Development strategy of Chania, a new "stimulation" strategy is going to be designed and implemented with individual actions that will recode the relationship of the city with the society and the economy and will highlight as a common value the culture and the environment. The aim is to integrate actions that promote entrepreneurship, innovation, local economic development, social inclusion, environmental protection and tackling the effects of climate change.

Referring also in D3.2, the targets set for CO2 emission per capita, Chania 2030 targets lie in an intermediate range (between 5.0- and 5.8-tons CO2). See the Table below.

Table: Essential data from Sustainable Energy Action Plans (SEAPs), Sustainable Energy and Climate Action Plans (SECAPs) or analogous planning/strategy documents for all pilots. The symbol * indicates that the datum was retrieved from the EUROSTAT database (dataset: Greenhouse gas emissions per capita - Tonnes of CO2 equivalent per capita, online data code: T2020_RD300; https://ec.europa.eu/eurostat/databrowser/view/t2020_rd300/default/table?lang=en).

7. Chania		
Source document	SECAP - Covenant of Mayors	
Baseline year	2013	
Target year	2030	
	baseline	target
CO2 emissions per capita (ton CO2/year)	9.6*	-40% (5.8 ton)
Energy consumption per capita (MWh/year)	32.0	.....
Renewable share of energy consumption (%)	.....	.....

The SECAP of the Municipality of Chania is in progress. Several actions and projects have already been carried out according to the agreed action plan (e.g., bioclimatic upgrades of outdoor areas, energy upgrades of schools, etc.). Their results have not been measured yet to be presented as an achievement percentage or KPIs fulfilments.
Referring also to D3.2, there is also a list of the recent and most relevant experiences of participatory planning and governance for Chania city in paragraph 11.1.7, including:

- Public consultation and co-shaping the Sustainable Energy and Climate Action Plan.
- Public consultation of the Operational Program and Strategic Planning of the Municipality of Chania 2011-2014.

Following the Municipality's vision to become one of the smartest cities of Europe, except from VARCITIES project, Chania Municipality participates in various EU funding projects such as:

- Open Mall of the Municipality of Chania (Budget: 1.659.755,61€)
- Development of a green route and a bike lane through the axis of Chatzimichali Giannari,
- Skalidi and Piraeus Street in Chania (Budget: 2.703.085,76€)
- Rehabilitation of Tambakaria area (Budget: 2.732.060,50€)
- Energy saving of the Municipality of Chania' Naval Sports Center (Budget: 1.360.000,00€)
- Energy Saving of Agia Marina's kindergarten school, Municipality of Chania (Budget: 300.000,00€)
- Energy upgrading of the 6th Secondary School - 4th Lyceum of Chania (Amperia School Complex (Budget: 2.890.000,00)
- Redevelopment of Chania Municipal Garden (Budget: 1.486.000,00€)
- Energy upgrading of the 3rd and 4th Secondary Schools and the 3rd Lyceum of Chania (Koumpes School Complex) (Budget: 1.760.000,00€)
- Energy upgrading of the Secondary School of Souda, Municipality of Chania (Budget: 1.430.000,00€)
- Energy upgrading of the 2nd Professional Lyceum / Evening Professional Lyceum of Chania (Budget: 1.010.000,00€)

Based on the above, a Mobile Urban Living Room decided to be created in order to upgrade the public spaces by increasing the social and cultural value in order to bring citizens to nature, thereby the improvement of Health & Well Being. The various sensors will gather data from all neighborhoods that MULαR is about to travel. Through the data collection and various events, citizens will be informed and encouraged to adopt a healthier and more sustainable lifestyle.
In terms of the social context in which the investment project is going to be developed, the MULαR, as a mobile construction, can be installed in public places with different characteristics.

- Urban parks that are often vandalized
- School yards layered with concrete where vandalism and juvenile delinquency often occur
- Natural environments affected by severe weather conditions
- Rural settlements socially isolated

Supporting actions required

The preparation of both VSs need also market research, procurement procedures preparation and financial structuring. None of the above is final yet, but they all helped in shaping the ideas for both visionary solutions.

Description of the Visionary Solution

As reported in the previous sections, the mobile urban living room (MULαR) is a convertible construction that can travel to various public spaces creating inviting points in order to revitalize them. Educational, social, awareness activities and cultural pop-up events, will take place in and around the MULαR, addressing to all ages, designed and implemented to be fully accessible. This multifunctional space will consist of a strategic mobile point in the city for raising the citizens' excitement through hosting plenty of events and contributing to the data gathering and the exploitation of the project results. Specifically, through various sensors that will be installed in MulαR to monitor air pollution, noise exposure, microclimate conditions etc., data will be gathered from all neighborhoods that it is about to travel. Through hosting of the local events that will take place in the MULαR the citizens will be encouraged to provide self-perceived health & well-being data by filling questionnaires/surveys.

The Municipality of Chania in the context of the co-creative process has organized 3 workshops so far where visionary solutions were presented and discussed with the stakeholders. During the co-creation workshops, three main topics have been discussed and analyzed: suggested locations, uses and forms.

Based on the workshops' outputs, the preferable locations for MULαR in urban, peri urban and rural public areas are:

- Natural-Green Areas (e.g., The Municipal Garden and the Peace & Friendship Park, Agioi Apostoloi park/forest, small wetlands: the outfall of Kladissos river, close to Natura 2000 sites)
- Squares (e.g. Souda Square, Chalepa Square etc)
- Schoolyards
- Neighborhoods

In addition, concerning the MULαR's uses, five major categories of activities have been decided to be hosted:

1. Educational activities - Work:
    - Open School Classroom (Myths and tales about plants classification, construction workshops with natural materials, games based on plant species, etc.)
    - Library
    - Environmental education programs
    - Workplace
    - Conference Room
2. Social activities:
    - Strengthening interpersonal skills: Encouraging individuals to participate in activities that develop social relationships and create a sense of acceptance by the team, socialization, social inclusion
    - Green pop-up in neighborhoods motivating people to co-operate/co-create for improving devalued and neglected parts of their neighborhood
    - Athletic-Sports Activities
    - Stress management
    - Urban gardening
    - Blood donation
    - Santa Run kiosk
    - Children activities for sleeping outdoors: observation of night sky, birds, water course, lakes
3. Information and awareness actions:
    - Climate - Environment
    - Health & Well-being (Basic Life Support, minor accidents' basic knowledge, blood donation, prevention, vaccines, Nutrition, Sports, road accidents preventions)
    - Volunteering
    - GDEI
    - History & Culture
4. Cultural activities:
    - Performances, concerts and shows (Theatre, Dance, Music, Puppet Show etc.)
    - Cinema
    - Art & Book Exhibitions
    - Storytelling
    - Green Museum
    - Creta's Diet Cooking Classes
5. Promotional Activities:
    - Local Products Exhibitions
    - Advertising

Concerning the form of the MULαR, from the initial participatory process emerged the design of a converted container which, however, as it appeared from the observations of the second workshop, does not satisfy the needs and the vision of the STKs. The idea of a road show vehicle, a converted minivan, seems to meet to a much greater extent the stakeholders' requests. Both solutions are examined, analyzed and presented in the third workshop, where the final decision on which option will be implemented has been taken.

OPTION A: CONVERTED CONTAINER

Description:

A converted container is a creative design product with an original and unique form. The original industrial

container is used as a basic shape, two sides are reformed into opening surfaces unifying closed and open space. The converted container provides 14 m^2 of enclosed space and a 10 m^2 shaded area. If placed on the ground using a crane, it offers a sufficiently covered and semi-outdoor space in a single and accessible surface. The sides can be converted with many different materials and textures creating interesting facades that can also transform easily for each use. The construction itself can be supported with ecological and recyclable materials and pioneering technologies can be integrated.

Advantages:

1. Ability to combine many different materials on the sides of the shell with different shapes and textures.
2. Provides a larger (than a converted minivan) covered and enclosed space
3. If placed on the ground using a crane, it offers a sufficiently covered and semi-outdoor space in a single and accessible surface.
4. Possibility of stable operation in a specific space in its closed form
5. Creative design product with original and unique form
6. The construction itself can be supported with ecological and recyclable materials
7. Ability to integrate many pioneering technologies.

Disadvantages:

1. Transportation and installation costs with tractor and crane (~ 600 € per movement)
2. Difficult transport on small roads, impossible access to limited schoolyards or small squares. Off-city access is almost impossible due to the winding and narrow road network to the villages.
3. The construction is due to difficulty in transport and each time installation will move less and it is proposed to install it in one place for at least three months so that its management is economically viable. For long-term installation, a special permit might be required (archaeological zone, port zone, etc.)
4. High risk in the design and construction details to that the final container works properly and without construction failures. One cannot guarantee its proper operation in the long run
5. Increased likelihood of vandalism and damage during use
6. Need for specialized personnel for the installation and operation (from the transfer process to the special opening - closing and the integration of the mobile equipment each time)
7. The Municipality is required to provide storage and repair space
8. There is a history of processed containers that ended up in inactivity in the long run, due to difficulty and complexity in their handling.

OPTION B: CONVERTED MINI VAN

Description:

A converted minivan is produced and designed to host all relevant events that have already been described above (e.g., social, cultural etc.) A vehicle with a dynamic and stable presence in the city can cover all pilot's needs. Based on the market research a model of a 14,8 m/ 11,9 tn converted minivan seems to be the preferable choice. The event room has an effective area of approx. 12 m^2 and it is suitable for 10 people. It is air-conditioned with a large, glazed entrance area, accessible with a ramp. All-around insulation makes the minivan optimally equipped for cold winter or hot summer days. Large-scale glazing with a slide or swing door and a climate control system creates the right parameters for conducting workshops, training, presentations or surveys in a professional manner. The light and transparent interior also gives a very welcoming vibe. With a permissible total weight of 3.5 tons, the minivan can be driven with Class B driver license (vehicles up to 3.5 tons). The external surfaces can project VARCITIES elements and constructions specialized for each event can also be adapted in the shell. Technological equipment such as touch screens, computers, audio systems, and large projection screens can also be installed in the vehicle. A trailer can be used for the transport of movable elements such as shading, tables or technological equipment. The movement flexibility that provides this kind of construction allows the transfer into more inaccessible sites of interest.

Advantages:

1. A vehicle doesn't need to be stored; it can circulate in the city.
2. Flexibility in moving on narrow city streets and areas outside the urban center (requested by the stakeholders). In case of the converted container, there are several suggested locations that would be excluded (for instance: historic neighborhoods, small neighborhoods parks, rural and coastal

settlements). The minivan can circulate on the streets inside and outside the city, advertising the program and the activities that it will host each time.

3. It becomes a reference point and providing several equipment we can easily have a variety of events popping up around the city and the outskirts. As a vehicle, it approaches "difficult" areas such as the Venetian Harbor or archeological sites with simple procedures.
4. Result of 1 + 2: Intense and dynamic presence that advertises the program and the actions it contains constantly inside and outside the city.
5. Custom design of body graphics and features that promote the program.
6. Built-in large screen technology
7. Vehicle's body can include Thin Film Photovoltaics, power outlets, sensors and racks to adjust green walls, interactive sensory walls, extra lighting and sound systems, Wi-Fi antenna, projectors etc., as needed for each event.
8. Operates without the need for specialized installation by trained personnel. Drivers from the municipal staff, with an appropriate diploma.
9. No installation and transportation costs.
10. Many parking options -adequate protection from theft or vandalism, of all external equipment (screen, Wi-Fi antennas etc.).
11. Low risk of vandalism and wear during operation.
12. Simple and economical vehicle maintenance
13. Environmentally friendly: possibility to buy / convert engine with LPG system. LPG due to its perfect combustion is environmentally friendly and the emissions of pollutants, microparticles, hydrocarbons, nitrogen oxides, LPG engine are much reduced (40% -60%) compared to the corresponding emissions of gasoline or diesel engines.
14. Industrially produced products with a guarantee of construction and operation by the construction company.
15. Industrially produced interior with integrated technology.
16. The Municipality of Chania already successfully manages other types of vehicles (Interreg, mobile library).
17. The minivan will be connected to a specially designed trailer to transport equipment.

Disadvantages:

1. Vehicle shell with limited morphological flexibility.
2. Small interior, accessible only with a special installation (ramp, elevator, etc.)
3. Conventional operation of a vehicle with non-ecological fuel (the possibility and cost of electric drive will be investigated)

Following the unanimous decision of the STKs to proceed with the option of the converted minivan, the design process will be adapted taking into consideration the STKs needs.

Summary of VS components

The VS components briefly summarised in Table A.
Replication and/or up-scaling potential
Taking into account the multifunctionality of the mobile urban living room, it could be reproduced from various types of STKs that currently associated in the VARCITIES project, depending on the preferable hosted actions. For instance, it could be reproduced as an innovative educational space from educational institutions (such as the Green School, a charitable, non-profit association that provides environmental activities in the city of Chania e.g., creating gardens in schoolyards). In addition, it could be reproduced from the private sector for promoting activities about products/services and the interconnection between the primary and the tertiary sector. Municipalities, Regional units or Regions with similar demographic characteristics and common goals with Chania could be also interested in further replication or expansion of this visionary solution.

VS1 Summary of Visionary Solution Components (Table A)[34]

VS1 Mobile Urban Living Room						
#[35]	Visionary Solution components[36]	Brief description of the component	Unit[37]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Converted minivan	Vehicle with a dynamic and stable presence in the city. (Model of a 14,8 m/ 11,9 tn converted minivan)	1	Educational, social, cultural, awareness and promotional activities.	ID 4.7, ID6.8, ID6.9, ID7.4, ID7.8, ID7.11, ID8.5, ID9.16 ID9.20, ID10.1, ID10.5, ID10.6, ID10.8, ID10.9	[redacted]
2	Trailer	Transportation of mobile equipment	1	Creation of additional storage capacity.		[redacted]
3	Power generation equipment	Autonomous photovoltaic system, batteries, portable generator	2	Energy autonomy		[redacted]
4	Visual and audio systems	Interactive projector, smart screens, audio equipment for events (microphones, speakers etc), live stream equipment	Multiple	Equipment for the needs of the educational, social, cultural, awareness and promotional activities		[redacted]
5	ICT equipment	Tablets, laptop, robotics kit, WIFI	Multiple (~10, 2,	electronic devices for education, training, presentations		[redacted]

34 All values incl. VAT, if not reclaimable.
35 The number of rows can be adjusted as required.
36 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
37 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		access point, printer	1, 1, 1)			
6	AR/VR equipment	VR headsets, AR headsets	Multiple (~5,2)	Enable the visitor to engage with GoNature game		[redacted]
7	mobile and folding furniture and event equipment		Multiple			[redacted]
8	Other unforeseen expenses					[redacted]
9	Sensor kit	Pycom Board bearing the following sensors (SO2, NOx, O3, CO, NH3, Cl, CO2 levels, organic substances (including PAH) levels), GPS, batteries, WiFi Access Point	1	Monitoring of environmental conditions	ID5.5, ID5.6, ID9.4	[redacted]
10	Counting of visitor	Sensor developed by Sensedge (T5.3 Custom sensor development) using computer vision algorithms	2	Quantify the number of visitors, participation to events	ID4.3	[redacted]
TOTAL						[redacted]

VS1 Visualisation (Annex D)


VS1: Co-creation process
2st Workshop: Converted Container
VARCITIES

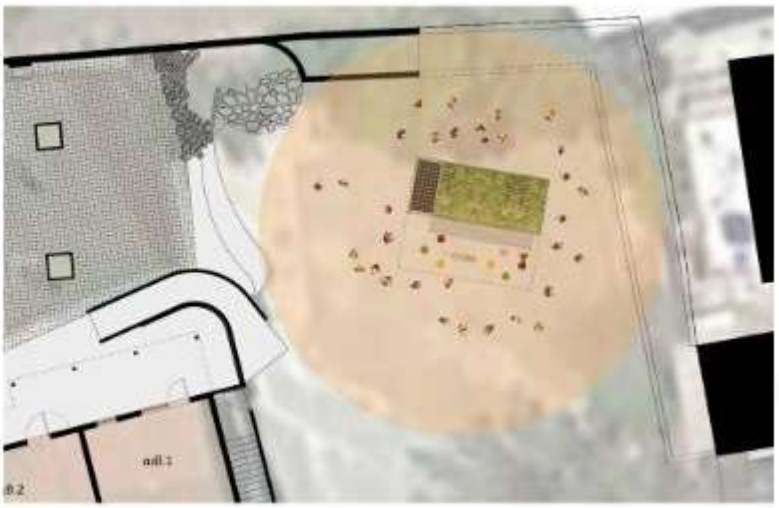

VS1: Co-creation process
2st Workshop: Converted Container / Converted Vehicle
Vehicle (semi-truck / van
Specials' vehicle need
ROAD SHOW
ROAD SHOW
VARCITIES

VS1: Co-creation process
2st Workshop: Education Container

VARCITIES

Natural materials | green wall | shading systems

Green roof 14 μ² | green wall 14 μ² | shaded space 28 μ²



VARCITIES

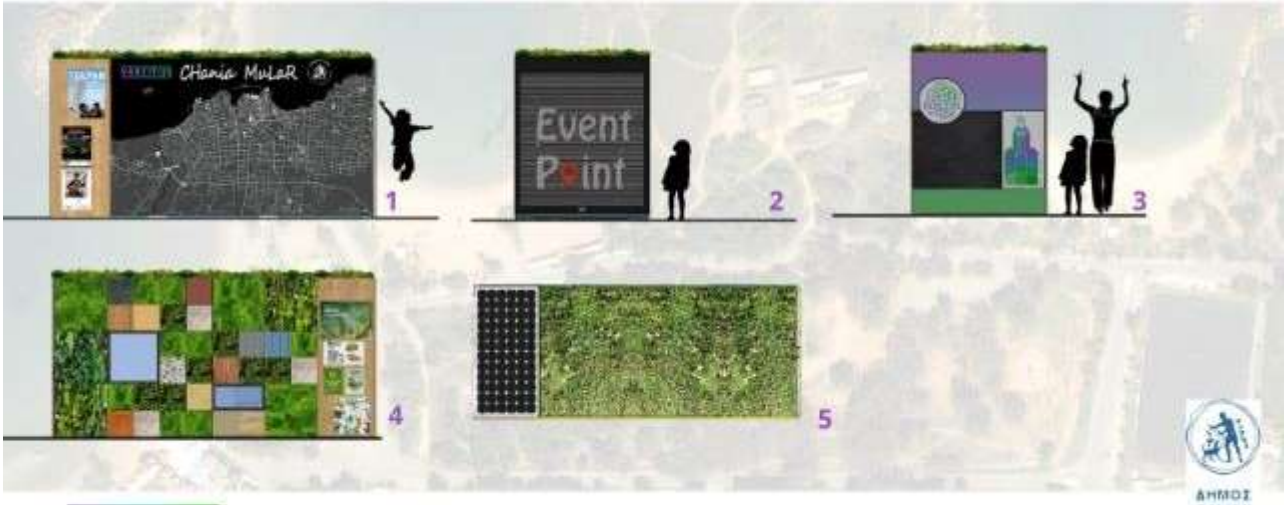
VARCITIES

VS1: Co-creation process
2st Workshop: Culture Container

Transportation of technological equipment safely

ΔΗΜΟΣ ΧΑΝΙΩΝ

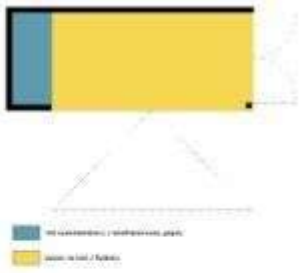
VARCITIES



ΔΗΜΟΣ ΧΑΝΙΩΝ

VARCITIES

Constant use in a central area in its closed version



VARCITIES

Shading Systems

ΔΗΜΟΣ ΧΑΝΙΩΝ

VS1 | OPTION A: CONVERTED CONTAINER

disadvantages

1. **Transportation and installation cost with tractor (~ 600€ per transport)**
2. **Difficulty in transporting it on narrow roads, impossible access to limited schoolyards or small squares. Off-city access is almost impossible due to the tortuous and narrow road network to the villages.**

VARCITIES

ΔΗΜΟΣ ΧΑΝΙΩΝ

VS1 | OPTION B: CONVERTED MINIVAN

A vehicle has a dynamic and stable presence in and out of the city .
The road show model covers most of the requirements of our Vision Solution.

VARCITIES

ΔΗΜΟΣ ΧΑΝΙΩΝ

VARCITIES

ΔΗΜΟΣ ΧΑΝΙΩΝ

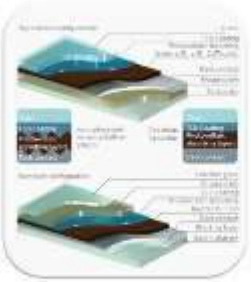
VS1 | OPTION B: CONVERTED MINIVAN — advantages

3. **It becomes a reference point and providing several equipment we can easily have a variety of events popping up around the city and the outskirts. As a vehicle , it approaches "difficult" areas such as the Venetian Harbor or archeological sites with simple procedures.**

VARCITIES

ΔΗΜΟΣ ΧΑΝΙΩΝ

7. **Vehicle's body can include Thin Film Photovoltaics , power outlets , sensors and racks to adjust green walls, interactive sensory walls, extra lighting and sound systems , Wi-Fi antenna, projectors etc. , as needed by each event.**



VARCITIES

ΔΗΜΟΣ ΧΑΝΙΩΝ

VARCITIES

ΔΗΜΟΣ ΧΑΝΙΩΝ

VS2- Sensors on bikes and bike stations

VS2 Summary (Annex A)

Title	Sensors on Bikes and Bike-stations.
Motto	VS2 provides monitors the air and ambient quality in order to improve Health & Well Being of Chania's citizens and visitors
Location of the planned investment	CHANIA's Bike Sharing System's Bicycles and Bike Stations
Municipality/local authority/main partners	Municipality of Chania (CHANIA), Telecommunication Systems Institute (TSI), Cyclopolis LTD (CLP)
Targeted area(s)	Smart city / digital solutions Sustainable urban mobility ✓ Sustainable district and built environment ☐ Integrated infrastructure processes ✓
Overview and objectives of the planned Visionary Solution	The main goals of the Visionary Solution are related to air/ambient quality and public health and wellbeing. The main components and measures planned are sensors on public and private bikes and bike stations, which will be collecting environmental and health data. They will be combined with weather station data and prediction models, bike sharing systems usage data, questionnaires, apps and data from statistical services and observatories. Indications and warnings about the environmental conditions will become available to Chania's citizens and visitors. The VS's main objectives: • Improve air quality and noise conditions (by preventing people to move in polluted areas) • Improve citizens' and visitors' Health & Wellbeing • Reduce healthcare spending • Reduce "environmental disparities" by providing vulnerable social groups (cyclists, pedestrian, children and the elderly) with information about certain pollutants, protecting them from exposure to hazardous environmental conditions • Improve social equality[38] • Advertise good air quality
Total investment planned	[redacted]
Funding sources	*Requested funding (EU contribution)* [redacted]

[38] "The triple jeopardy hypothesis states that low Socioeconomic Status communities face (1) higher exposure to air pollutants and other environmental hazards and (2) increased susceptibility to poor health (primarily as a result of more psychosocial stressors, such as discrimination and chronic stress, fewer opportunities to choose health-promoting behaviours and poorer health status) resulting in (3) health disparities that are driven by environmental factors". (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4626327/)

[39] All values incl. VAT, if not reclaimable.

	Own funding	[redacted]	
	Other sources [please specify]		
Estimated costs and revenues	*Total operating cost (year)*		
	Total revenues (year)		
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected impact	Unit
	5.5 Physical air quality indicators: temperature, humidity, etc.	Data gathering of local climatic conditions, Citizens ' awareness	°C or %relative humidity
	5.6 Chemical air quality indicators	Air pollution data gathering, Citizens ' awareness	µg/m3
	7.4 Perceptions of citizens on urban nature	increased awareness of urban ecosystems	n/a
	7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*No. of people / year*
	8.5. Profession/job position/expertise of people who have participated in the activities carried out under the project	*Fair participation to project activities*	*No. of people / year*
	9.16 Number / share of people being physically active	Increased outdoor physical activity	No of people / %
	9.19 Monitor walking and cycling in and around areas of interventions	Data gathering for citizens' outdoor physical activity	No of people / %
	9.4 Exposure to noise pollution	Noise pollution data gathering, Citizens ' awareness	dB(A)
	10.1 No. of jobs created; gross value added	Increased job opportunities	No. of jobs created; euro
	10.6 Replication of solutions	Replication of VARCITIES VS outside pilot cases	n/a

	10.8 Saved healthcare spending	Savings in healthcare spending	Euros per year / %
	10.9 Public-Private Investments after 5 years	Increased public-private investments	Euros
Contribution to SDGs	*SDG n° and name*	Expected impact	
	SDG 3: Good Health and Well-Being	• Reduction of illnesses from hazardous air • Strengthen the local capacity for early warning, risk reduction and management of health risks • Adoption and integration local policies and plans towards H & WB	
	SDG 11: Sustainable Cities and Communities	• Reduction the adverse per capita environmental impact of Chania by paying special attention to air quality • Expansion of public sustainable transport with special attention to the needs of those in vulnerable situations	

VS2 Main contacts (Annex B)

Lead Organization	
Organization name	Municipality of Chania (CHANIA)
Contact person	[redacted]
Department	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	1. Cyclopolis LTD (CLP) 2. Telecommunication Systems Institute (TSI)
Role	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	Kydon Municipal S.A.
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS2 Description (Annex C)

Overview of Visionary Solution leader and partners
Municipality of Chania (CHANIA) is in charge of implementing the VS. The Pilot's experts are Telecommunication Systems Institute (TSI) and Cyclopolis Ltd (CLP). TSI operates in the framework of the Technical University of Crete (TUC), a distinct Higher Education Institution of Greece placing emphasis on education, research and innovation. CLP designs, constructs, installs and operates bike sharing systems. Chania Municipality (CHANIA) owns and hosts a bike sharing system since 2015, provided and operated by Cyclopolis Ltd (CLP). KYDON Municipal S.A. is the Public Body which operates within the framework of the Municipality of Chania and manages the bike sharing system. CLP is developing a sensor kit, mountable on shared bicycles, that will be gathering data regarding certain air pollutants (PMx), temperature, humidity and noise. The data produced will be being enriched by: 1) health data regarding heart pulse, gathered by sensors attached on the bike's grips and 2) air quality data from open sources (i.e. the National Observatory Of Athens). The VS's focus is on certain pollutants (PM1, PM2.5, PM10, humidity, temperature, noise, GPS) that can be measured effectively ONLY on a local level (street, neighbourhood) and its scope is to give Chania's residents and visitors insight on air quality and noise data so as to avoid exposure and participate in the improvement of air quality by giving them suggestions on their mobility behaviour. The produced data will be feeding the H&WB Platform. Sensor kits will be mounted on bikes. Extended versions of them will be also mounted on the 4 bike sharing stations. The latter will be easier to mount (they will not be exposed to weather conditions and possible vandalism) and they will be bearing more sensors (SO2, NOx, O3, CO, NH3, Cl, CO2 levels, organic substances (including PAH) levels) so as to give insight on air quality variations between certain areas. The VS's overall scope is to improve citizens' H & WB.
General project background, context, and rationale
Based on the Sustainable Urban Development strategy of Chania, a new "stimulation" strategy should be designed and implemented with individual actions that will recode the relationship of the city with the society and the economy and will highlight as a common value the culture and the environment. The aim is to integrate actions that promote entrepreneurship, innovation, local economic development, social inclusion, environmental protection and tackling the effects of climate change. Referring also in D3.2, the targets set for CO2 emission per capita, Chania 2030 targets lie in an intermediate range (between 5.0- and 5.8-tons CO2). See the Table below.

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Source document	SECAP - Covenant of Mayors	
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Target year	2030	
	baseline	target

CO2 emissions per capita (ton CO2/year)	9.6*	-40% (5.8 ton)
Energy consumption per capita (MWh/year)	32.0	.....
Renewable share of energy consumption (%)	.....	.....

The SECAP of the Municipality of Chania is in progress. Several actions and projects have already been carried out according to the agreed action plan (e.g., bioclimatic upgrades of outdoor areas, energy upgrades of schools, etc.). Their results have not been measured yet to be presented as an achievement percentage or KPIs fulfilments.
Referring also to D3.2, there is also a list of the recent and most relevant experiences of participatory planning and governance for Chania city in paragraph 11.1.7, including:

- Public consultation and co-shaping the Sustainable Energy and Climate Action Plan.
- Public consultation of the Operational Program and Strategic Planning of the Municipality of Chania 2011-2014.
- Public consultation on the Local Waste Management Plan.
- Public Consultation on the Sustainable Urban Mobility Plan (SUMP) of the Municipality of Chania.

The Sustainable Urban Mobility Plan (SUMP) of the Municipality of Chania conforms with VARCITIES Chania Pilot. Phase 1: "Current situation analysis" and Phase 2: "Sustainable Mobility Project" have been completed and Phase 3: Implementation is yet to be studied.

Supporting actions required

The preparation of both VSs need market research, procurement procedures preparation and financial structuring. None of the above is final yet, but they all helped in shaping the ideas for both visionary solutions.

Legal advice concerning the data produced will be needed. First of all, CHANIA will be the owner of the data produced, but research should be carried out as to how they can be exploited (services developed upon them), their ownership and monetization opportunities. Secondly, given that each shared bicycle user is "named" and that we will be gathering heart pulse data during rides (sensors on each bike's grips), precautions should be taken regarding the protection of the user's personal information.

Description of the Visionary Solution

Sensors on public bikes and bike sharing stations, combined with weather station data and prediction models, bike sharing systems usage data, questionnaire and apps, and data from statistical services and observatories are planned.

There is a knowledge gap among the citizens regarding the hazardous effects of PMx and noise on human health. People are practically unaware about the quality of the air they breathe and the amount of pollution they are exposed to. Moreover, people expose more vulnerable social groups to poor air quality (elderly, children), e.g., by taking out grand parents and children for an outing in polluted areas. This should be addressed by an awareness campaign through local and hyper-local media and the authorities. Information should be given on the aspects of air quality, the available measurements, the means through which they become available to the public (web sites, apps), their value and their shortcomings (PMx cannot but be measured effectively only on a local level. Equally, the matter of noise pollution should be addressed.

Technical expertise should be needed for evaluating the produced data, compare with existing environmental data, explain possible variations and estimate possible effects on human health and well-being. Although Air

Quality standards exist, they are different for the WHO40 and the EU41. The VS must induce predictive models so as to conclude to a valuable social service: informing citizens on poor air quality not only ex post but also ex ante, i.e., foreseeing days, hours and certain areas with poor air quality and giving them information on how to protect themselves from being exposed to it. Alerts should be generated.

Bicycle Sensor-kits:
30 shared bicycles will be equipped with sensor-kits, along with Heart Rate & Oximeter sensors (on the handle grips; their measurements will be transformed to the sensor-kit, which in turn will take over for generating them to the H&WB Platform). Bicycle sensor kits will be providing geo-located (GPS) PM1, PM2.5, PM10, humidity, temperature and noise measurements. The kits will be storing the data and uploading them through the bicycle stations' Wi-Fi access point as soon as the bicycle returns to the station. The solution is expected to reveal urban "hot-spots" of high pollution rates, be it air or noise.
Stations' Sensor kits:
Four bicycle stations will also be equipped with sensor-kits. They will be measuring different pollutants from the ones measured by bicycles: SO2, NOx, O3, CO, NH3, Cl, CO2 levels, organic substances (including PAH) levels. The distinction between pollutants measured by moving (bicycles) and fixed means (bicycle stations) is drawn based on the nature of pollutants (measured effectively on a local or hyper-local level) and the respective cost. PM's and noise are measured effectively only at a local level; hence the bicycles are used. On the contrary, the rest of the pollutants are measured by fixed stations spread around town. Similarly, some sensors are of significant cost (e.g. an O3 sensor costs more than 200,00 € each), so it would be too expensive to deploy them on bicycles, even more so that measurements from fixed stations seem to give a good indication for the whole area (hyper-local coverage).
Data will be transferred to the H&WB platform. The VS envisages giving the public a service that will improve their health and well-being. The data produced and processed will be translated to air quality and noise levels and become publicly available. Thus, citizens will be able to know which areas they should avoid and which not in certain days and time periods. To do so, predictive models will be deployed, based on data produced from the sensor kits and from existing sources (weather stations). Alerts will be available for informing citizens along with a set of instructions at certain pollution levels.
VS2 is considering cooperation with existing air quality monitoring apps (i.e. the "European Air Quality Index" app, provided by the European Environment Agency) for multiplying its effects that can be mutually beneficial. The app presents no data at all for Chania. So, VS2 can be feeding, apart from the H&WB platform, this app too, under a certain data format and upon any necessary tests for their validity. In turn, the app presents us with the opportunity of already developed predictive models, alerts and notifications and the whole logic necessary for transforming air quality data to health precautions useful to the public. The cooperation is already under scrutiny and the National Observatory of Athens (the actor responsible for feeding the European Environment Agency (EEA) with data about Greece), have already expressed their interest in such a cooperation that can become a multiplier in several ways: better insight in air quality (blending data from fixed and moving means, enrich data from multiple sources, validity cross-check) and the dissemination of the VS' results with the app's penetration capacity (combine existing users bases of the app and Chania's bike sharing system users).
Furthermore, geolocated data concerning ridership can reveal popular routes, cyclists' needs and preferences and become a tool for further advancing and upgrading the bicycle network of Chania.
Kits will be equipped with a communication module, batteries (that –during their maintenance process- will be being swapped each time their level falls under a certain threshold) and an advanced power module so as to secure maximum uptime (near 100%).
Health effects of the VS can be documented by the use of the bike sharing system's existing ridership data, combined with the data of the VS. A good example is to see if, when an alarm is produced for a certain area, users are avoiding it, protecting themselves from high pollution levels.

During the Co-creation process, certain STKs have expressed their interest in having a sensor kit for their private bicycle. The idea is interesting as it can enhance data wealth and possibly cover areas of the city where a public bicycle might not have covered. Thus, another small number (15) of bicycle sensor kits will be produced and delivered to certain, "named" users (STKs). They can also provide a good test-bed for the technologies

[40] https://www.c40knowledgehub.org/s/article/WHO-Air-Quality-Guidelines?language=en_US
[41] https://ec.europa.eu/environment/air/quality/standards.htm

produced before full deployment on public bicycles.

Summary of VS components

The VS components briefly summarised in Table A.

Replication and/or up-scaling potential

Environmental sensor kits like the VS2 produces can be installed in all municipal vehicles so as to expand the "fleet of environmental scouts".
The Sustainable Urban Mobility Plan (SUMP) provides the city with more bike lanes, and consequently more environmental monitoring areas.

Up-scaling

There is internal up-scaling potential by mutual interaction between the Chania city's VSs. However, the most direct up-scaling opportunity arises from Chania's plan to expand the existing bike sharing system, which has been operating since late 2015 (6+ years) with considerable success. It bears 40 bicycles in 4 stations concentrated in the city centre around the Old Town. Within the following 1,5 year the following actions have been planned:

- The existing fleet of conventional bicycles will be replaced with new ones
- 2 more stations will be deployed within 2022
- until the middle of 2023 the system will have been expanded with 9 more stations serving both conventional and electric bikes

Consequently, the Bike sharing system by the end of 2023 will have 15 stations and more than 100 bicycles, both electric and conventional. It is envisaged to cover the wider area of Chania centre and all major parking areas (park & ride).

The BS's expansion plan provides VS2 with a ready infrastructure for up-scaling (equip more bicycles and BS stations with sensor kits). But, even without further investment in sensor-kits, the due expansion is already adding value to VS2's plan, as the bicycles that will be equipped with sensor kits are expected to:

1) be busier (rise of demand) as the system's geographical coverage will be expanding, serving more people, gathering all the richer data
2) cover all the wider area, gathering data for all the more parts of town

Likewise, the sensor kits deployed in each of the 4 existing stations, can be either multiplied so as to be deployed in all new stations or be regularly moved between stations so as to have measurements from several areas of the town.

The bike sharing system's expansion is expected to help people replace cars and other polluting vehicles with the bicycle (behavioural change), fostering improvement in air quality and noise conditions, something that is expected to show in the measurements gathered by VS2

Replication

As global citizens and policy makers become all the more aware of the hazardous effects of poor air quality to human health and well-being42, authorities will be looking for reliable solutions for increasing insight on certain pollutants (PMx and noise) and means to protecting their citizens. In urban scenarios, most European cities nowadays have bike sharing systems. If the solution proves its effectiveness, any city could equip its bicycles with the respective gear along with the necessary services that guarantee that both policy makers and citizens can be informed timely on poor air quality conditions through the appropriate means (mobile apps, smart city platforms, public announcements etc.).
What should be stressed here is that, because PMx pollutants cannot but be measured effectively on a local level, it can be extremely difficult to tackle the matter cost effectively. In other words, to give away sensors to each and every household is too expensive. VS2 gives a solution to this problem, since public bicycles can be on

[42] https://www.c40.org/declarations/clean-air-cities/

–nearly- constant move, covering most of a city's area and providing the authorities with valuable data on a low marginal cost. Public bicycles are on the move anyway.

VS2 Summary of Visionary Solution Components (Table A)[43]

VS2 Sensors on Bikes and Bike-stations						
# [44]	Visionary Solution components[45]	Brief description of the component	Unit[46]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Sensors on public and private (STKs') bikes	Pycom Board bearing the following sensors (PMx, acceleration, noise, temperature, humidity), GPS, batteries	30 + 15 Pcs (1 sensor kit per bike)	Air Quality, noise	ID5.5, ID5.6, ID9.4, ID9.16	[redacted]
2	Bike sensor kits combined with weather station data and prediction models	Heart Rate & Oximeter Sensor mounted on the bicycle's grips	30 pcs + 15 (1 sensor kit per bike)	Heart rate, pulse		[redacted]
3	Fixed stations sensor kits combined with weather station data and prediction models	Pycom Board bearing the following sensors (SO2, NOx, O3, CO, NH3, Cl, CO2 levels, organic substances (including PAH) levels), GPS, batteries, WiFi Access Point	4 bike stations	Air Quality, noise		[redacted]
4	Bike sharing systems usage data	Combine ridership data with the respective provided by the sensors. Compare with historical	NA			[redacted]

43 All values incl. VAT, if not reclaimable.
44 The number of rows can be adjusted as required.
45 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
46 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		data				[redacted]
5	Data from statistical services and observatories	Enrich the produced data with the existing from the weather fixed stations. Examine variations. Establish a collaboration with the National Observatory	NA			[redacted]
6	Data from activities		NA		ID7.4, ID7.8, ID7.11, ID8.5, ID10.1, ID10.6, ID10.8, ID10.9, ID9.19	[redacted]
TOTAL						[redacted]

VS2 Visualisation (Annex D)

Chania Pilot VS2: Smart Bike Grips

- communicate with the sensor-kit
- H & WB data
- Unified mgt of data

Chania Pilot VS2: v1– v3 Electronics

Version 1

Version 2

Version 3

Chania Pilot VS2: v.3 - Casing

VS1 - 2 Stakeholders (Annex E)

Stakeholder analysis			
Type of stakeholder	**Current status of engagement**	**Future engagement activities**	**Instruments/channels for dissemination and interaction**
Educational/ Social/ Cultural institutions, Sports organizations	Participation in 3 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: suggested locations, needs-uses, form	VS1 - Engagement Activities to train and familiarize the STKs with MULαR's innovative equipment (e.g. Hololens, Interactive projector, Robot kit, Standalone Virtual reality headset, smart screens etc.) and to specify the additional equipment needed to be incorporated in the MULαR (books, educational material, sports equipment etc.) - Engagement Activities for the design of the events/activities that will be carried out during the project.	Workshops, in-person meetings, contact personally or via associations (social media/email/phone)
	Participation in 2 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: cyclists' needs and preferences	VS2 - Engagement activities to raise STKs' awareness on unfavourable environmental conditions and their consequences. For instance, how citizens' decisions about the time and place of the outdoors activities can be affected (e.g. avoid school athletics sessions in poor air quality conditions)	
Users - Citizens / Individual participations / civil society (e.g. specific social groups: parents)	Not yet	VS1 -Engagement Activities to train and familiarize the users with MULαR's innovative equipment for the AR game (e.g. Hololens)	
		VS2 - Engagement Activities to train and familiarize the users with the sensor kit. The aim is to inform them about unfavourable environmental conditions and their consequences. For instance, how citizens' decision about the time and place of the outdoors activities can be affected (e.g. avoid school athletics sessions in poor air quality conditions)	
Environmental organizations (e.g. European Environment Agency, National Observatory of Athens)	Not yet	VS1/VS2 -Inform STKs about the open access data (even raw data), discuss about possible synergies with their activities - test and validate produced data - feed their applications with environmental data	

Specialised Bicycle Sports Associations	Not yet	VS2 - Engagement Activities for motivation of test-users (mounting the sensor-kit) during practice (checking their level of exposure to air quality and noise pollutants). -Before-and-after fact finding partners ("Environmental Scouts")	
Public bodies for Health / Doctors	Participation in 3 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: suggested locations, uses, form Participation in 2 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: cyclists' needs and preferences	VS1/ VS2 -Engagement Activities for contribution in raising awareness regarding environmental challenges (e.g. poor air quality effects) on human health and well-being and promote the use of the services, based on the VARCITIES collected data. - Possible synergies for the development of the H&WB questionnaires.	
Engineers and Architects	Participation in 3 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: suggested locations, uses, form Participation in 2 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: cyclists' needs and preferences	VS1/ VS2 -Engagement Activities for further contribution to the co-design process - Engagement Activities to evaluate the outcomes of VSs in the life and image of the city	
Chamber of Commerce and Industry (Local businesses)	Participation in 3 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: suggested locations, uses, form	VS1 - Engagement Activities to train and familiarize the STKs with MULαR's innovated equipment (e.g. Hololens, Interactive projector, Standalone Virtual reality headset, smart screens etc.) and to specify the additional equipment needed to be incorporated in the MULαR -Engagement activities for research and probe: new types of businesses based on the VSs, advertising opportunities.	

	Participation in 2 WSs, STKs contribution to the discussion by providing suggestions and comments for the configuration of the VS: cyclists' needs and preferences	VS2 -Showcase new types of bikes. -Engagement activities for research and probe: new types of businesses based on the VSs - promote Chania's (as a whole or certain areas) good air quality (e.g. hotels, real estate)	
Local/National Media	Not yet	VS1/VS2 - Engagement activities for the dissemination to improve awareness and outreach multipliers	

VS1 - 2 Strategic planning and assessment of the VS (Annex F)

Results of PESTLE analysis

The PESTLE analysis provides you with a structure that allows you to investigate the context in which your organization operates, it prompts you to ask yourself what the external factors of greatest impact on the organization are and to discuss their likely implications.

How you categorize each issue raised is not important when using the PESTLE technique because the purpose of this tool is simply to identify as many factors as possible.

For example, it is not important to classify an upcoming government regulation as a political or legal issue. The only thing that matters, in the end, is that it is identified as potentially having an impact on your organization.

Political factors affecting the planned Visionary Solutions

What are the key political factors?

*No outcomes from the co-creation workshops

* The following considerations were added by the Pilot leaders

VS1	VS2
	• *Chania's mobility strategy (shared bikes, active commuting)* • *Chania's SUMP (Sustainable Urban Mobility Plan)*

Economic factors affecting the planned Visionary Solutions

What are the most important economic factors?

*No outcomes of the co-creation workshops

* The following considerations were added by the Pilot leaders

VS1	VS2
	• *Expressed STKs' interest in private bicycles' sensor-kits and the data that will be being produced as possibly more relevant to the user in terms of location (wider geographical coverage and thus, richer data), resembling citizens' sciences examples. The cost of possible deployment on private bicycles increases the VS's budget, although only modestly.*

Social factors affecting the planned Visionary Solutions

What are the most important social and cultural aspects?

*Outcomes of the co-creation workshops

VS1	VS2
• MULR used not only in schools but e.g., can be placed closed to the hospital • MULR as a shell that hosts different activities (also promotional activities about local products) • Promotion of different educational activities for young and old ("intergenerationality") • Promotion of theatre performances and cultural events • Educational activities should be done also in distant areas and villages (from city centre)	• All people (not only cyclists) should have an overview of meteorological and air quality sensors insight on air quality and noise level data

* The following considerations were added by the Pilot leaders

VS1	VS2
	• *Inclusive (mothers with babies, disabled)*

Technological factors affecting the planned Visionary Solutions

What technological innovations could occur?

*Outcomes of the co-creation workshops

VS1	VS2
• Need for shading in school courtyards for external classrooms	• Analysis of the use of bicycles in Chania compared to other cities and how the data will be used • In existing places there should be a screen that encourages people to go out or not (according to air quality data), especially for people with health problems

* The following considerations were added by the Pilot leaders

VS1	VS2
	• *screens in public places (e.g. buses, squares etc) connected to the H&WB Platform showing live air quality and noise data* • *Modify public bicycles with baby seats, safely mounted, theft and vandalism-proof, for public use*

Legal factors affecting the planned Visionary Solutions

What current and upcoming legislation could affect the sector?

*Outcomes of the co-creation workshops

VS1	VS2
• There is a need to simplify requirements e.g. a school needs enthusiasm instead of extra space	No relevant factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2
	• Data privacy, esp. Health data (heart rate, pulse) produced by the smart-grip sensors

Environmental factors affecting the planned Visionary Solutions

What are the environmental considerations we should bear in mind?

*Outcomes of the co-creation workshops

VS1	VS2
No relevant factors identified	• Analysis of good days for cycling and "bad days for cycling" (according to PM10 and air quality)

Results of SWOT analysis

Strengths affecting the planned Visionary Solutions

Please describe the endogenous factors that can favour the pursuit of VS objectives.

*Outcomes of the co-creation workshops

VS1	VS2
• MULR as a shell that hosts different activities (also promotional activities about local products) • Promotion of different educational activities for young and old ("intergenerationality") • Promotion of theatre performances and cultural events • Educational activities should be done also in distant areas and villages (from city centre)	• Analysis of good days for cycling and "bad days for cycling" (according to PM10 and air quality)

* The following considerations were added by the Pilot leaders

VS1	VS2
	• *VS's direct implementation on a successful paradigm (Chania's bike sharing system) and its direct correlation to bicycles which have a good connotation in public opinion* • *No data availability, precious data of the VS* • *Increased public sensitivity on health and environmental matters*

Weaknesses factors affecting the planned Visionary Solutions

Please describe the endogenous factors that can hinder or delay the VS implementation process.

*Outcomes of the co-creation workshops

VS1	VS2
• Need for shading in school courtyards for external classrooms • There is a need to simplify requirements e.g. a school needs enthusiasm instead of extra space	No relevant factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2
	• *Lack of awareness of the health effects of hazardous air pollutants and noise levels* • *Possible vandalisms and thefts*

Opportunities affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect positively the VS implementation.

*Outcomes of the co-creation workshops

VS1	VS2
• MULR used not only in schools but e.g., can be placed closed to the hospital	• All people (not only cyclists) should have an overview of meteorological and air quality sensors • Analysis of the use of bicycles in Chania compared to other cities and how the data will be used • In existing places there should be a screen that encourages people to go out or not (according to air quality data), especially for people with health problems

* The following considerations were added by the Pilot leaders

VS1	VS2
	• *Chania's bike sharing system due expansion (it is likely to have tripled within the next 1,5 years) is giving ground to richer data, as the designed technology will be using richer infrastructure (more stations, 15 in total), travelling even further and covering wider town areas. This will enrich our data, both in volume and quality* • *Current absolute lack of air quality and noise data insight in Chania. Data becomes valuable*

Threats affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect negatively the VS implementation.

*No outcomes from the co-creation workshops

* The following considerations were added by the Pilot leaders

VS1	VS2
	• Vandalisms, theft

Risk and mitigation measures

Risk (description)	Probability (Unlikely – Likely – Very likely)	Impact (Low – Moderate – High)	Risk level (Low -Medium – High – Extreme)	Mitigation measures (description)
VS1 + VS2: Low involvement of special users' groups (e.g. elderly)	Likely	Moderate	Moderate	- Inform them through their organisations/social groups - Showcase MULaR with a special event - Ensure accessibility on and around MULaR
				VS2: - Inform them through

				their organisations/social groups - Showcase VS2 with special bikes (e.g. tricycles) - keep them in mind during the design (e.g. poor air quality alerts with SMS instead of using an app)
VS1: Low level of awareness about how to participate or use VS1 VS2: Low level of awareness about the effects of poor air quality and noise exposure	Likely	High	High	- Awareness campaigns - dedicated workshops - press releases - word of mouth dissemination
VS1: Thefts and vandalisms on MULaR	Likely	High: A couple of serious incidents, could lead the investment to a halt	High	- Awareness campaigns about the benefits on the public
VS2: Thefts and vandalisms of the bicycle sensor kits	Not very likely			
VS1: Operating and management costs of MULaR	Likely	High: the MULaR has to be booked for events for at least 6 months per year in order to be economically viable	Medium	the management can be done by a specialized company
VS2: Cost of sensor kits	Likely (although cost estimates are educated, field testing will be the crucial factor to see if components and their design is solid or not. If not, maybe more expensive components (e.g. casing) might be necessary	High: (it might lead to a very expensive product that cannot enter the market due to this characteristic)	Low : testing is thorough, development stages are well reviewed, experienced partner (CLP)	Proper testing before it hits the field. Good sourcing research so as to minimise cost production for larger quantities

VS1 - 2 Economic and Financial Analysis of the VS (Annex G)

Ownership of assets and management structure
VS1: MULaR will be managed by the Public Benefit Enterprise of Environment and Culture of the Municipality of Chania (KEPEDIH-CAM), which will use it for its actions and will make it available with or without fees to public and private entities and individuals who are interested in using it. VS2: KYDON S.A., the municipal company that is responsible for the Operation of the Municipal Car Parking Station will manage and operate the total fleet of public bicycles, either with or without sensors. Both KEPPEDIH-CAM and KYDON are public entities which operate within the framework of the Municipality of Chania. During the implementation of Chania Pilot, all decisions are made by the competent bodies of the Municipality of Chania. When VS1 and VS2 are completed, the appropriate actions will be taken to transfer them for use to the above-mentioned companies. However, representatives of both companies are already involved in the design process, and they offer their expertise in the field of knowledge.
Procurement structure
All actions will comply with the EU directives and the Greek Legislation System. Procurements will be performed mainly under the Law 4412/2016 on Public Procurement, which transposes the EU Directives no. 2014/24/EU and 2014/25/EU on public procurement of works, provisions and services in the Greek legal order (Official Government Gazette #147/8-8-2016) and Law 4782/2021 (Official Government Gazette #36/9-3-2016) which modifies Law no.4412/2016. Public procurement procedures are held by the Financial Committee of the Municipality of Chania (OE) and are subject to legality review by supervising entities. As for VS1 it is estimated that a couple of actions will be necessary (e.g. outsourcing of expertise services on how to properly describe and clarify the MULaR requirements, public procurement tender for attaining MULaR, etc). It is estimated that VS1 will cost [redacted]. According to the applicable legislation, the assignment of the projects with estimated value higher than [redacted] is mandatory to be implemented through the Digital National Public Procurement System (ESIDIS). VS2 budget [redacted] lies within the thresholds of Direct Assignment ([redacted] and will be assigned to the suitable entity after an invitation for Direct Assignment which will be made publicly known through the Central Electronic Public Procurement Registry (KIMDIS) platform.
Estimated costs and revenues

CAPEX (major expenditures foreseen over the long term for the implementation of the VS)	**VS1**	**VS2**
The estimated cost of planning processes	[redacted]	
The estimated cost of installation	[redacted]	
Estimated equipment cost	[redacted]	
Other(s) [other unexpected costs]	[redacted]	
Total investment cost	[redacted]	
OPEX (day-to-day expenses need to ensure the VS operation)		
Estimated maintenance cost (n° of years)	[redacted]	

Estimated staff cost (n° of years)	[redacted]
Estimated external sub-contracting (n° of years)	[redacted]
Other(s) [please specify]	[redacted]
Total operating cost *(n° of years)*	[redacted]

Financing approach and funding sources	
Please describe in detail the envisaged financing approach, including the different funding sources (e.g. own funds, grants from VARCITIES project, soft loans, (bank) loans, guarantees, external investments, etc.) and the stage of commitment (i.e. consulted, ongoing, negotiations, contracted). Please indicate the planned funding sources for the investment in the table below[47], including requested funding.	
Total investment cost	[redacted]
Own funding of the promoter / local cluster	[redacted]
VARCITIES project	[redacted]
Other sources [please specify]	[redacted]

47 All values incl. VAT, if not reclaimable.

VS1 Table B – Business Model Canvas

<table>
<tr>
<th>Key activities</th>
<th>Key resources</th>
<th>Value proposition</th>
<th>Key partners</th>
<th>Key beneficiaries</th>
</tr>
<tr>
<td>- Popup educational, cultural, social and athletic events
- Awareness campaigns
- Information kiosk
- Data collection and verification through sensors and surveys
- Promotional Activities
- Exploitation of project's results</td>
<td>- Converted minivan
- Technological equipment for educational, cultural, social, awareness and promotional events
- Additional equipment (books, educational material, sports equipment etc.) based on STKs needs
- Operational Costs</td>
<td>- Integrate green spaces into the everyday life of citizens
- Raise citizens and visitors' awareness on environmental and climate change issues
- Present technological innovations, nature-based solutions and healthy habits that can improve everyday life.
- Invite citizens to participate in public events and monitor their ideas and needs
- Establish a new approach in the way public spaces are used and designed.
- Increase the sense of respect for public spaces
- Promote health and well-being (increase citizens' interaction, develop a healthy green mindset through citizens awareness in environmental conditions data)</td>
<td>- Patrons (companies or associations who wish to "adopt" the solution and multiply its promotion)
- Media</td>
<td>- Local communities
- Students and teachers of all levels
- Citizens and visitors
- Private sector
- Marketers and advertisers
- Local authorities (Municipality, Clubs, Sports Associations, Tourism office, Chamber of Commerce and Industry)
- Hyper-local authorities (Environment Agencies, Government, Health Associations)
- Private institutions: Smart-City platform owners, insurance companies, real estate agencies, tourism sector</td>
</tr>
<tr>
<td colspan="3"></td>
<td colspan="2">Governance structure
- Municipality of CHANIA remains the owner of the data
- CLP remains the owner of the IP rights of the sensor kits' design
- Services developed upon the data delivered have to bear the consensus of both partners to hit the market
- Possible public-private-partnership</td>
</tr>
</table>

Cost structure	Channels	Capturing value
[redacted]		COST: - MULaR - maintenance - services development (feed platforms, mobile apps, customisations) - sales & distribution channels REVENUE: - h/w & s/w - related services
	Cost reduction	

VS2 Table B – Business model canvas

Key activities	Key resources	Value proposition	Key partners	Key beneficiaries
- Prototype development - Testing by a limited number of kits provided to individual test-users for their private bicycles - Data collection - Data verification - Refinements - Final prototype - Full deployment - Maintenance (battery swapping, ensure max availability) - Awareness campaign	- Public bicycles - Bicycle stations - Sensor kits - Communication and power modules - Access to existing air quality and noise data - Access to scientific knowledge about air quality - Awareness campaign - Legal advice on data ownership and access to personal data of the users - Commercialisation expertise	- Raise awareness on air quality and noise levels - Promote health and well-being - Help reduce "environmental inequality" - Help reduce air pollution and noise levels - Help reduce public and private health spending	- National Observatory of Athens - Suppliers of kits' components - Patrons (companies or associations who wish to "adopt" the solution and multiply its promotion) - Media	- Local communities - Infants and young children - Adults over 65, especially those with lung/ cardiovascular diseases - People who exercise outdoors - People who work outdoors especially those near busy roadways - People in poverty; people who lack access to health care - Local authorities (Municipality, Clubs, Sports Associations, Tourism office) - Hyper-local authorities (Environment Agencies, Government, Health Associations) - Private institutions: Smart-City platform owners, insurance companies, real estate agencies, tourism sector

<table>
<tr><td colspan="2"></td><td></td><td>Governance structure
- Municipality of Chania remains the owner of the data
- CLP remains the owner of the IP rights of the sensor kits' design
- Services developed upon the data delivered have to bear the consensus of both partners for exploitation
- Possible public-private-partnership</td></tr>
<tr><td colspan="2">Cost structure
[redacted]</td><td>Channels
- Existing subscribers' list of the Chania Municipality Bike Sharing System
- National Observatory of Athens (already expressed interest in the data to be produced)
- Sports Clubs
- Citizens' Associations, Civil Society
- Local media
- Specialised hyper-local media (environment, transport, health)

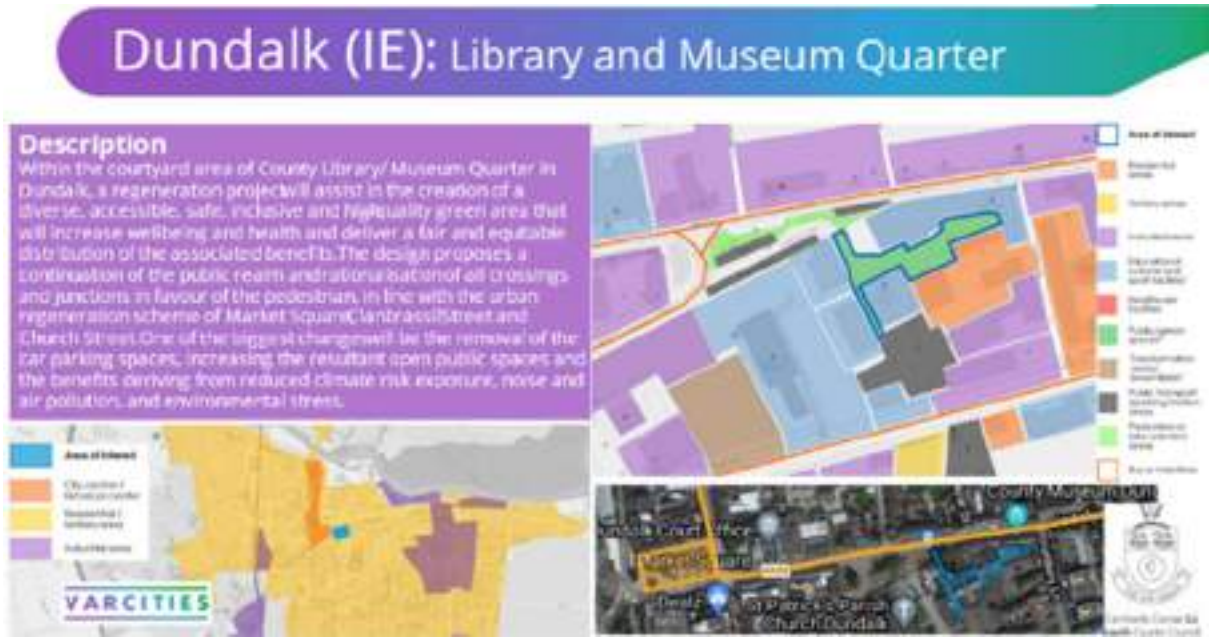
Cost reduction
– Possible patrons who could undertake costs (e.g., maintenance after the end of the project)
– Promotion patrons</td><td>Capturing value
COST:
- sensor kits
- maintenance
- services development (feed smart-city platforms, mobile apps, existing air quality apps, alerts, customisations)
- sensors' calibration
- sales & distribution channels

REVENUE:
- h/w & s/w
- related services</td></tr>
</table>

3 Dundalk (IE): Dundalk Library and Museum Quarter

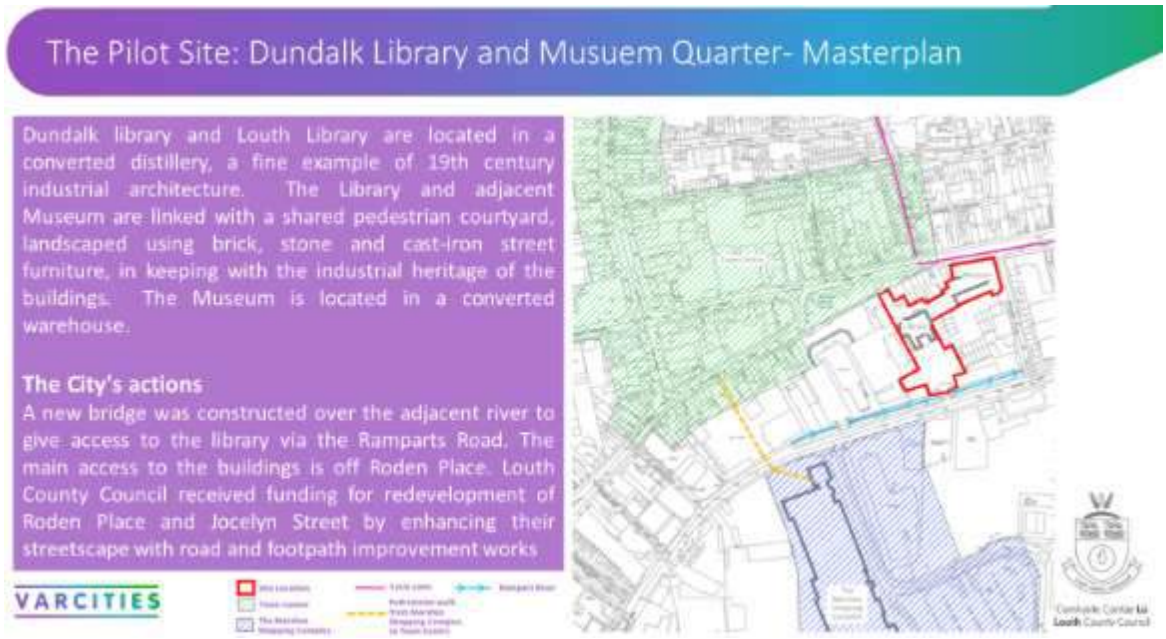
Overview of the pilot area and the VSs

Annex D: Dundalk- the Pilot area



Annex D: Dundalk- the existing situation

Annex D: Dundalk- the Masterplan



Annex D: Dundalk- Objectives/ H&WB link

Annex D: Dundalk- the Visionary Solutions on the Masterplan

Dundalk: Overview of the sketched solutions

VS1- Creation of Outdoor Learning Pod between Dundalk Library & Museum Quarter to showcase the newest technologies and host shared functions

VS1 Summary (Annex A)

<table>
<tr><td>Title</td><td>Outdoor Learning Pod</td></tr>
<tr><td>Motto</td><td>The Visionary Solution provides a sheltered outdoor learning space to host events for a wide range of visitors in order to engage and educate on improved biodiversity and NBS in urban areas and Health and Well Being.</td></tr>
<tr><td>Location of the planned investment</td><td>Dundalk: Library and Museum Quarter</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Louth County Council</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>x</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>x</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table>
For others, please specify
<table>
<tr><td>Citizen/Stakeholder engagement</td><td>x</td></tr>
<tr><td></td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>The Learning Pod provides a sheltered outdoor learning space that can be utilised for a large range of uses at the Library / Museum Quarter. It will address the following challenges:
Green space management
Air/ambient quality,
Urban regeneration, Social Justice & Social Cohesion,
Public H&WB,
Economic opportunities & green jobs
It will contain the following components:
Creation of a Virtual Learning Pod
The provision of new outdoor WIFI within the courtyard area
Installation of CCTV</td></tr>
</table>

	• 2 new security gates • Installation of Virtual Learning Pod Sensors to collate data on visitor numbers • Installation of new Software to record PV savings from existing PV roof panels on Museum roof • Questionnaire on Quality of Life to show how the visitors enjoyed their experience The sensors measure the number of visitors, monitoring improvements to the use of the space. The software for the existing solar panels will enable the energy generated to be seen by the visitors, encouraging the use of sustainable energy solutions in the area.		
Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [please specify]	None	
Estimated costs and revenues	*Total operating cost (year)*	EUR Estimated maintenance cost [redacted] /annum Estimated staff costs – [redacted] Estimated external sub-contracting – [redacted] Other(s) - maintenance of monitoring equipment and internet connectivity [redacted] Total – [redacted] annum	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected impact	Unit
	ID 1.5 Local energy production from renewable energy sources	Increased energy savings	kWh year-1
	ID 4.3 Increased recreational or cultural value of green spaces	Increased recreational or	No. of visitors / yr.

		cultural value of green spaces	
	ID 4.9 Effectiveness of seating locations	Increased use of green public space facilities	No. of people using seating locations/yr.
	ID 6.6 Use of reclaimed/recycled building materials	Increased reclamation of building materials	m3, tons, %
	ID 6.9 Access of residents to cultural facilities on foot	increased accessibility of cultural facilities	km / min
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	ID 7.12 No of initiatives proposed & implemented by the public in the project's framework	increased institutional capacity	Number of initiatives
	ID 7.13 No of new information channels generated between public institutions & citizenship	increased institutional capacity	Number of channels
	ID 7.16 No of persons involved (on average) in the project activities	Increased and improved participation	No of persons / year or age
	ID 8.8 Participation of individuals with functional disabilities	Greater inclusion of people with functional disabilities	No. of individuals / year
	ID 9.4 Noise reduction rates	Reduced noise level	dB
	ID 9.5 No of hours spent outdoors, time people spend in the facility	Increased outdoor presence	No of hours per week per capita / hours per capita

	ID 9.6 Perceived well-being before and after the visit of green space.	Increased health and well being	Yes/no regarding diseases, No of ER/ambulance visits.
	ID 9.8 Feeling of improving the quality of life (the Quality-of-Life questionnaire)	Improved quality of life	Scales' scores
	ID 10.1 No. of jobs created	increased job opportunities	No. of jobs created; Euros
	ID 10.3 Resource efficiency in the urban system	increased resource efficiency	CO2 tons / year per capita
	ID 10.4 Increased footfall and spend in the areas of interventions		n/a
	ID 10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	definition of parameters for (re)designing green public spaces based on the well-being of users	n/a
	ID 10.6 Replication of solutions		n/a
	ID 10.8 Saved healthcare spending	increased impact of the project	Euros per year / %
	ID 10.9 Public / Private Investments after 5 years	increased public private investments	Euro

VS1 Main Contacts (Annex B)

Lead Organization	
Organization name	Louth County Council
Contact person	[redacted]
Department	Sustainable Energy and Facilities Section - Public Realm Architect Office
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Consultant to be procured in accordance with Council's procurement procedures in the future and so at present TBC
Role	[redacted]
E-Mail	
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	tbd
E-Mail	

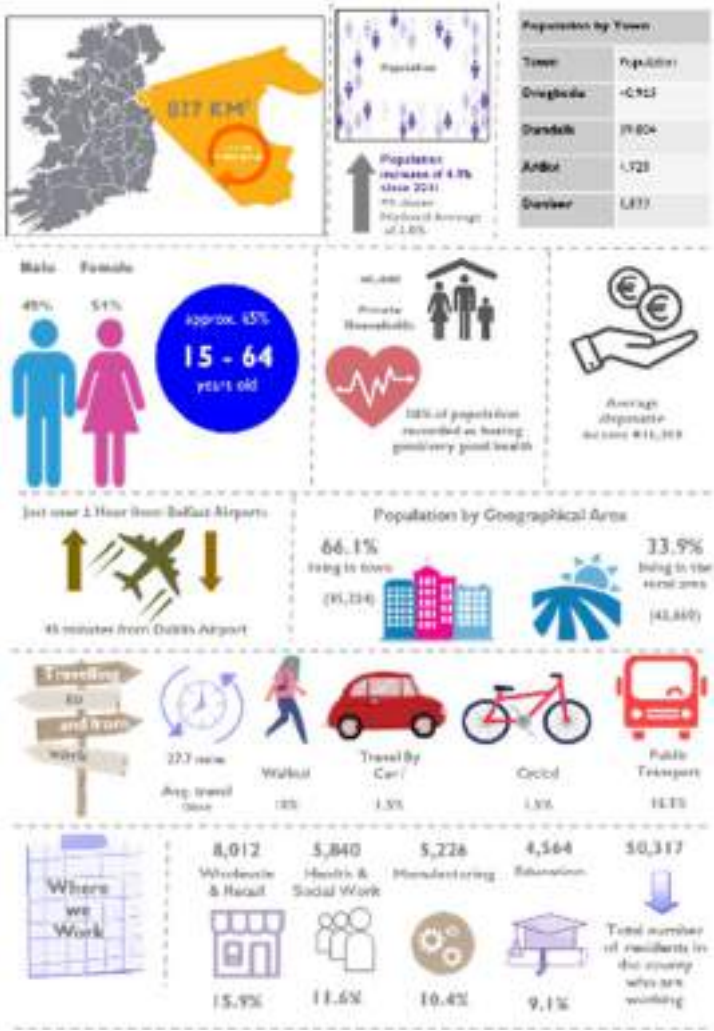
VS1 Description (Annex C)

Objectives of the Visionary Solution
"The Visionary Solution provides knowledge to learning audiences to promote the value of Nature for Health and Well Being."
Overview of Visionary Solution leader and partners
County Louth is strategically located approximately midway between the Capital cities of Dublin and Belfast. Its strategic location and state of the art infrastructural services and the existence of a primed, skilled and well-educated workforce has attracted many long-established multi-nationals to locate in the county. Louth County Council is the single Local Authority for County Louth and the Council are responsible for delivering key services such as housing provision and maintenance, social housing, affordable housing; Road design, construction, maintenance and improvements; Water services, including water supply, effluent and treatment in association with Irish Water; Planning services, Land use, forward planning, development management and planning enforcement; Environmental monitoring and enforcement; Support the objectives of the Memorandum of Understanding; and 3 sustainable energy to name but a few. Dundalk is the administrative capital of County Louth. It contains not only the offices of Louth County Council, but also the regional offices of the Sustainable Energy Authority of Ireland, the IDA and Enterprise Ireland. The town contains a highly regarded third level educational institution, namely Dundalk Institution of Technology (DkIT) and enjoys a great location, strategically located approximately midway between the two largest cities in the island of Ireland, Belfast and Dublin. The town is close to the border with Northern Ireland and equidistant from Dublin and Belfast. The Louth County Development Plan has set its strategic vision for the County as follows "*To Promote County Louth, in particularly the Regional Growth Centres of Drogheda and Dundalk, as uniquely attractive places in which to live, work, visit, and do business and where the quality of employment and educational opportunities, natural and built environment, cultural experiences and provision of inclusive communities are to the highest standards.* The land in which the development for the delivery of the VARCITIES project is within the ownership of Louth County Council, and The Chief Executive of Louth County Council along with the Elected Representatives of the Council are fully committed to the delivery of the objectives and the Visionary Solutions identified for the Library and Museum Quarter for Dundalk
General project background, context, and rationale
Project Ireland 2040 is the Governments long-term overarching strategy to make Ireland a better country for its entire people. It is predicated on the proper alignment of investment priorities and capital expenditure with a carefully considered and defined strategy. Alongside the development of physical infrastructure, Project Ireland 2040 supports business and communities across all of Ireland in realising their potential. The two documents constituting Project Ireland 2040 are The National Planning Framework (NPF) and National Development Plan (NDP), published by the Irish Government in 2018. The NDP sets out the investment priorities that will underpin the implementation of the NPF through a total investment of approximately €116 billion. Refining these two documents into more detailed plans is the responsibility of the three Regional Assemblies through the publication of the Regional Spatial and Economic Strategies for each Region. The Local Government Act 2014, in addition to inaugurating LECPs, streamlined local and regional authorities. At this regional level, the county is part of the Eastern and Midland Regional Assembly which consists of the former Dublin, Eastern and Midland Regions. The Planning and Development Act 2000 (as amended) requires that a Development Plan shall, so far as is practicable, be consistent with National and Regional Plans, Policies and Strategies relating to proper planning and sustainable development, have regard to Ministerial Guidelines (DHPLG). In accordance with the Planning and Development Act 2000 (as amended) LCC must prepare a new Development Plan every 6 years. At present a Draft County Development Plan has been prepared, with the adoption of the 2021-2027 Development Plan due before the end of 2021. The new County Development Plan 2021-2027 will out the Council's overall strategy for the proper planning and sustainable development of County Louth in accordance with the Planning and Development Act 2000 (as amended). It is a blueprint for development in County Louth and is the over-arching strategic framework for sustainable development in spatial, economic, social and environmental terms. It offers clear guidance on sustainable development policies and objectives, over a range of issues including, but not

limited to; settlement, sustainable communities, movement and transport, heritage and climate action.

Other Local Policy Plans are:

1. Louth Local Economic and Community Plan 2016-2022. The Vision of the Louth LECP 2016-2022 is that "***Louth will be a prosperous, proud, safe, and inclusive County where people want to live, work, visit and invest, and where there is equal opportunity for all***".
2. The Louth Corporate Plan 2019-2024. The Council's mission statement as outlined in the Louth County Council Corporate Development Plan 2019-2024 is to "***provide leadership and to deliver high-quality, citizen-focused, responsive and effective services"***. The Council stands for democracy, integrity, openness and accountability, and input from the people who live, work and do business in Louth is important to ensure the development of a shared vision for the County. The Plan highlights seven organisational strategic objectives, which guide and shape the direction of the functions of Louth County Council over the plans five-year period, as follows: · Housing; · Drogheda and Dundalk - Regional Growth Centres; · Climate Change; · Key Infrastructure Projects; · Economic Development and Job Creation; · Key Plans and Strategies; · Quality of Life
3. Louth Climate Adaptation Strategy. In response to the impact of climate change both now and into the future on County Louth and its citizens, Louth County Council developed a Climate Adaptation Strategy, which will allow the Council to plan for severe weather events (which are becoming more prevalent) and to make the organisation and its communities more sustainable and climate resilient. It forms part of the National Adaptation Framework (NAF), which was published in response to the provisions of the Climate Action and Low Carbon Development Act 2015. The role of the Louth Climate Adaptation Strategy at local level is to: · Ensure comprehension of risks and vulnerabilities of climate change; · Advance the implementation of climate resilient actions in a planned and proactive manner and · Ensure climate adaptation considerations are main-streamed into all plans and policies and into all operations and functions of the local authority



Dundalk Key Facts and Figures - Infographic Sept 21

In 2016 Co. Louth was the sixteenth largest county (measured by population) in Ireland at 128,884 (CSO Census of Population). This represents a 4.9% increase on the previous 2011 Census and notably higher than the national average growth rate of 3.8%. The county was the smallest of the 32 counties in area (827 sq. km). In 2016, the county had a population density of 156 persons per sq. km, compared to the state at 70 persons per sq. km. Dundalk is the administrative capital of County Louth and is the pilot town of VARCITIES. It has a population of 34,496, and growing. The town hosts a highly regarded third level educational institution, Dundalk Institution of Technology (DkIT)

Supporting actions required
The following have been carried out by LCC in relation to the Visionary Solutions: Topographical survey, ground penetrating radar survey, building use survey, service/ utility survey, existing lighting survey, existing drainage survey, existing parking survey, accessibility survey, proposed parking relocation assessment, existing lighting review, existing surface assessment, works phasing drawings, legal advice, fire tender access assessment, maintenance access assessment, Surveys to be completed in due course: DMURS review, National Road authority review, Universal Design review, signage decluttering survey, signage design proposal, procurement route assessment and preparation, order of magnitude costing, bill of quantities, road safety audit, cycle access assessment
Description of the Visionary Solution
The Learning Pod consists of a sheltered outdoor learning space that can be utilised for a large range of uses at the Library / Museum Quarter. Through installed sensors the number of visitors will be monitored. A software for the existing solar panels will enable the energy generated to be seen by the visitors, encouraging the use of sustainable energy solutions in the area. **Please see Table A below for a more description of size, materials, other new key requirements identified by the stakeholders during consultation for the learning pod such as new CCTV, WIFI to serve the courtyard are** In preparation for more detailed design plans, LCC have undertaken a number of surveys, these take the form of • Baseline Monitoring • Site surveying • Diagrammatic sketches • Concept design drawings • Photographic surveys • Land use surveys • Public stakeholder engagement meetings • Affected staff Briefings and updates • Questionnaires
Summary of VS components
The VS component(s) are summarised in Table A. Components of VS1 for LCC will include the following: • Creation of a Virtual Learning Pod • 2 new security gates / fencing around the Learning Pod • Installation of CCTV • Installation of outdoor WIFI to the courtyard area • Installation of Virtual Learning Pod Sensors to collate data on visitor numbers and duration of stay • Installation of new Software to record PV savings from existing PV roof panels on Museum roof • Questionnaire on Quality of Life to show how the visitors enjoyed their experience The sensors measure the number of visitors, which will allow the monitoring of how different events, uses and changes in the space affect visitor numbers. The software for the existing solar panels will enable the energy generated to be seen by the visitors, encouraging the use of sustainable energy solutions in the area. Visitors may be able to view the energy generated by solar panels via H&WB platform online which may be displayed in the pod.
Replication and/or up-scaling potential
Louth County Council are the single Local Authority for County Louth. The Council has large land banks within its ownership and has responsibility for public open green spaces. LCC's County Development Plan set policy for the County. The Council has a specific budget for the maintenance and improvement of these spaces, through Development Plan Levies, set out in the planning process. Successful results from the VARCITIES project, which will be demonstrated through the monitoring and verification process of the project could be replicated by LCC through the above mechanisms.

LCC actively engage and work in partnership with Local Tidy Town Groups and community groups spread throughout the County along with Sustainable Energy Communities both at the Local and Regional Level, who seek funding through the Sustainable Energy Authority for Ireland for projects. All learnings from this project can be communicated through this forum

VS1 Summary of Visionary Solution Components (Table A)[48]

VS1- Outdoor Learning Pod						
# [49]	Visionary Solution components[50]	Brief description of the component	Unit[51]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Creation of a Virtual Learning Pod	A new learning pod will be installed within the Dundalk Museum / Library quarter. Stakeholder pod requirements are as follows and shown on LCCs drawings: • Lockable • Covered • Suitably sized to accommodate 30 people which is the standard classroom size. • Movable chairs and table will be provided • A screen and a projector will be installed within the pod • Brightly lit by suitably proportionate window area with anti-glare glazing • Large / retractable doors which can be opened to enable up to half the pod to be opened to outside, • Constructed in a material that is readily available economical cost and durable material, provided in a suitable variety of colours, with anti-graffiti surface.	1	Green space management Air/ambient quality, Urban regeneration, Social Justice & Social Cohesion, Public H&WB, Economic opportunities & green jobs	*ID 4.3* *ID 6.6* *ID 6.9* *ID 7.12* *ID 7.13* *ID 7.16* *ID 8.8* *ID 8.11* *ID 9.6* *ID 9.8* *ID 10.1* *ID 10.4* *ID 10.5* *ID 10.6*	[redacted]

48 All values incl. VAT, if not reclaimable.
49 The number of rows can be adjusted as required.
50 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
51 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		• The external material of the pod may a fibre cement cladding and internally a plywood fix. Exact details to be finalised during tender process • Approx. 8.2m x 5.2m external size, 33.75m2, approx. internal area (7.5m x 4.5m) Shape and colour options to be considered in more detail to ensure it is suitable for all				
2.	New security gates / fencing	The Learning Pod will be positioned 0.5 to 1 metre from the adjacent high stone-built boundary walls, so as to limit the risk of damage from excessive rainwater run-off / weather-related damage to the Learning pod. As such 2 new gates or form of fencing is required to prevent the creation of a space where anti-social behaviour could develop. This enclosed space will also act as a secure, external storage area.			*ID 4.3* *ID 6.6* *ID 7.16* *ID 8.8* *ID 9.6* *ID 9.8* *ID 10.4*	[redacted]
3.	Installation of CCTV around the courtyard Area	This is required to address safety concerns, to prevent the learning pod from becoming an area for potential anti-social behaviour and to ensure the general safeguarding of the area			*ID 4.3* *ID 7.16* *ID 8.8* *ID 9.6* *ID 9.8* *ID 10.4*	[redacted]
4.	Outdoor Wi-Fi within the courtyard area	Outdoor Wi-Fi is required to operate the sensors and also to create a smart green space for users			*ID 4.3* *ID 9.6* *ID 9.8* *ID 10.4*	[redacted]

5.	Installation of Virtual Learning Pod Sensors to collate data on visitor numbers	Sensors installed will enable LCC and the VARCITIES project to determine how effective the measures and solutions have been in attracting new visitors to the courtyard area.		Green space management Public H&WB	*ID 4.3* *D 10.4*	[redacted]
6.	Installation of new Software to record PV savings from existing PV roof panels on Museum roof	New software will be installed to record PV savings from existing PV roof panels on Museum roof to enable better promotion of sustainable energy generation at the site and to promote green learning's at the site		Green space management Public H&WB	*ID 1.5*	[redacted]

7.	Questionnaire on Quality of Life to show how the visitors enjoyed their experience			Green space management Public H&WB	*ID 9.6* *ID 9.8*	[redacted]
8.	Associated construction costs	Preliminaries, Site Insurances, Contingencies, installation costs and general construction contract costs				[redacted]
TOTAL						[redacted]

VS1 Visualisation (Annex D)

VS2- Outdoor Urban Green Learning and Sensory Garden for H&WB

VS2 Summary (Annex A)

<table>
<tr><td>Title</td><td>Outdoor Urban Green Learning and Sensory Garden for H&WB</td></tr>
<tr><td>Motto</td><td>"The Visionary Solution provides enhanced biodiversity to the existing garden and improved ways for the public to appreciate, in order to ensure visitors, have all available means to experience the green spaces and feel the benefit of them."</td></tr>
<tr><td>Location of the planned investment</td><td>Dundalk: Library and Museum Quarter</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Louth County Council</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>x</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>x</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>x</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>x</td></tr>
<tr><td>Integrated infrastructure processes</td><td>x</td></tr>
</table>
For others, please specify
<table>
<tr><td>Citizen/Stakeholder engagement</td><td>x</td></tr>
<tr><td></td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>The Visionary Solution provides an Outdoor Urban Green Learning and Sensory Garden for Health and Wellbeing of citizens and visitors in order to improve the health and wellbeing of visitors by their visit and participation at the site.
It will address the following challenges:
Climate change mitigation & adaptation,
Green space management,
Air/ambient quality,
Urban regeneration, Social Justice & Social Cohesion,
Public H&WB,
Potential of economic opportunities and green jobs
The objective of the outdoor Urban Green Learning and Sensory Garden is the Enhancement of Health and Wellbeing. This will be achieved through increased sense of safety, recreation relaxation, reduction of stress for the visitors.</td></tr>
<tr><td>Total investment planned</td><td></td></tr>
</table>

	[redacted]		
	Requested funding (EU contribution)	[redacted]	
	Own funding	[redacted]	
	Other sources [please specify]	None	
Estimated costs and revenues	*Total operating cost (year)*	EUR Estimated maintenance cost [redacted] /annum Estimated staff costs - [redacted]num Estimated external sub-contracting – [redacted] annum Other(s) - maintenance of monitoring equipment and internet connectivity [redacted] annum Total - [redacted] annum	
	Total revenues (year)	LCC are a non-profit organisation	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected Impact	Unit
	ID 1.4 Energy savings from lighting upgrades and improvements	Energy savings from lighting upgrades and improvements	kWh year-1
	ID 1.5 Local energy production from renewable energy sources	Increased energy savings	KWh/yr.
	ID 2.4 Reduction in water routed to urban sewerage system	Reduction in water routed to drainage network	m3 year-1 / %
	ID 4.2 Accessibility of urban green	Increased accessibility of	km / min (by feet, by bus)

	spaces for population	urban green spaces	
	ID 4.3 Recreational or cultural value of green spaces	Increased recreational or cultural value of green spaces	No. of visitors / yr.
	ID 4.6 Proximity of green infrastructure to green travel routes	increased accessibility of urban green spaces	Km
	ID 4.9 Effectiveness of seating locations	Increased use of green public space facilities	No. of people year-1 / min per capita
	ID 4.11 Species richness and composition with respect to indigenous vegetation and local/national biodiversity targets	Increased urban biodiversity	
	ID 5.6 Chemical air quality indicators	Reduction of air pollution	µg of pollutant per m3
	ID 6.6 Use of reclaimed/recycled building materials	Increased reclamation of building materials	m3, tons, %
	ID 6.9 Access of residents to cultural facilities on foot	increased accessibility of cultural facilities	km / min
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	ID 8.8 Participation of individuals with functional disabilities	Greater inclusion of people with functional	No. of individuals / year

		disabilities	
	ID 9.4 Noise reduction rates	Reduced noise level	dB
	ID 9.5 No of hours spent outdoors, time people spend in the facility	Increased outdoor presence	No of hours per week per capita / hours per capita
	ID 9.6 Perceived well-being before and after the visit of green space.	Increased health and well being	Yes/no regarding diseases, No of ER/ambulance visits.
	ID 9.8 Feeling of improving the quality of life (the Quality-of-Life questionnaire)	Improved quality of life	Scales' scores
	ID 9.19 Increase in walking and cycling in and around areas of interventions	increased outdoor physical activity	No. of people / hours per week per capita
	ID 10.1 No. of jobs created; gross value added	increased job opportunities	No. of jobs created; Euros
	ID 10.3 Resource efficiency in the urban system	increased recourse efficiency	CO2 tons / year per capita
	ID 10.4 Increased footfall and spend in the areas of interventions		n/a
	ID 10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	*definition of parameters for (re)designing green public spaces based on the well-being of users*	
	ID 10.6 Replication of solutions		
	ID 10.8 Saved healthcare spending	increased impact of the project	Euros per yr
	ID 10.9 Public / Private Investments after 5 years	increased public private investments	Euro

VS2 Main contacts (Annex B)

Lead Organization	
Organization name	Louth County Council
Contact person	[redacted]
Department	Sustainable Energy and facilities Section Public Realm Architect
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Louth County Council In addition, Consultant to be procured in accordance with Council's procurement procedures in the future and so at present TBC
Role	[redacted]
Address	Millennium Centre, County Hall, Dundalk, Co. Louth, A91 KFW6
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador	
Organization name	tbd
Professional title	

VS2 Description (Annex C)

Objectives of the Visionary Solution
"The Visionary Solution provides an Outdoor Urban Green Learning and Sensory Garden for Health and Wellbeing of citizens and visitors in order to improve the health and wellbeing of visitors by their visit and participation at the site."
Overview of Visionary Solution leader and partners
County Louth is strategically located approximately mid-way between the Capital cities of Dublin and Belfast. Its strategic location and state of the art infrastructural services and the existence of a primed, skilled and well-educated workforce has attracted many long-established multi-nationals to locate in the county. Louth County Council is the single Local Authority for County Louth and the Council are responsible for delivering key services such as housing provision and maintenance, social housing, affordable housing; Road design, construction, maintenance and improvements; Water services, including water supply, effluent and treatment in association with Irish Water; Planning services, Land use, forward planning, development management and planning enforcement; Environmental monitoring and enforcement; Support the objectives of the Memorandum of Understanding; and 3 sustainable energy to name but a few. Dundalk is the administrative capital of County Louth. It contains not only the offices of Louth County Council, but also the regional offices of the Sustainable Energy Authority of Ireland, the IDA and Enterprise Ireland. The town contains a highly regarded third level educational institution, namely Dundalk Institution of Technology (DkIT) and enjoys a great location, strategically located approximately midway between the two largest cities in the island of Ireland, Belfast and Dublin. The town is close to the border with Northern Ireland and equidistant from Dublin and Belfast. The Louth County Development Plan has set its strategic vision for the County as follows " ***To Promote County Louth, in particular the Regional Growth Centres of Drogheda and Dundalk, as uniquely attractive places in which to live, work, visit, and do business and where the quality of employment and educational opportunities, natural and built environment, cultural experiences and provision of inclusive communities are to the highest standards.*** The land in which the development for the delivery of the VARCITIES project is within the ownership of Louth County Council, and The Chief Executive of Louth County Council along with the Elected Representatives of the Council are fully committed to the delivery of the objectives and the Visionary Solutions identified for the Library and Museum Quarter for Dundalk
General project background, context, and rationale
Project Ireland 2040 is the Governments long-term overarching strategy to make Ireland a better country for its entire people. It is predicated on the proper alignment of investment priorities and capital expenditure with a carefully considered and defined strategy. Alongside the development of physical infrastructure, Project Ireland 2040 supports business and communities across all of Ireland in realising their potential. The two documents constituting Project Ireland 2040 are The National Planning Framework (NPF) and National Development Plan (NDP), published by the Irish Government in 2018. The NDP sets out the investment priorities that will underpin the implementation of the NPF through a total investment of approximately €116 billion. Refining these two documents into more detailed plans is the responsibility of the three Regional Assemblies through the publication of the Regional Spatial and Economic Strategies for each Region. The Local Government Act 2014, in addition to inaugurating LECPs, streamlined local and regional authorities. At this regional level, the county is part of the Eastern and Midland Regional Assembly which consists of the former Dublin, Eastern and Midland Regions. The Planning and Development Act 2000 (as amended) requires that a Development Plan shall, so far as is practicable, be consistent with National and Regional Plans, Policies and Strategies relating to proper planning and sustainable development, have regard to Ministerial Guidelines (DHPLG). In accordance with the Planning and Development Act 2000 (as amended) LCC must prepare a new Development Plan every 6 years. At present a Draft County Development Plan has been prepared, with the adoption of the 2021-2027 Development Plan due before the end of 2021. The new County Development Plan 2021-2027 will out the Council's overall strategy for the proper planning and sustainable development of County Louth in accordance with the Planning and Development Act 2000 (as amended). It is a blueprint for development in County Louth and is the over-arching strategic framework for sustainable development in spatial, economic, social and environmental terms. It offers

clear guidance on sustainable development policies and objectives, over a range of issues including, but not limited to; settlement, sustainable communities, movement and transport, heritage and climate action.

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1. Louth Local Economic and Community Plan 2016-2022. The Vision of the Louth LECP 2016-2022 is that "***Louth will be a prosperous, proud, safe, and inclusive County where people want to live, work, visit and invest, and where there is equal opportunity for all***".
2. The Louth Corporate Plan 2019-2024. The Council's mission statement as outlined in the Louth County Council Corporate Development Plan 2019-2024 is to "***provide leadership and to deliver high-quality, citizen-focused, responsive and effective services.***" The Council stands for democracy, integrity, openness and accountability, and input from the people who live, work and do business in Louth is important to ensure the development of a shared vision for the County. The Plan highlights seven organisational strategic objectives, which guide and shape the direction of the functions of Louth County Council over the plans five-year period, as follows: · Housing; · Drogheda and Dundalk – Regional Growth Centres; · Climate Change; · Key Infrastructure Projects; · Economic Development and Job Creation; · Key Plans and Strategies; · Quality of Life
3. Louth Climate Adaptation Strategy. In response to the impact of climate change both now and into the future on County Louth and its citizens, Louth County Council developed a Climate Adaptation Strategy, which will allow the Council to plan for severe weather events (which are becoming more prevalent) and to make the organisation and its communities more sustainable and climate resilient. It forms part of the National Adaptation Framework (NAF), which was published in response to the provisions of the Climate Action and Low Carbon Development Act 2015. The role of the Louth Climate Adaptation Strategy at local level is to: · Ensure comprehension of risks and vulnerabilities of climate change; · Advance the implementation of climate resilient actions in a planned and proactive manner and · Ensure climate adaptation considerations are main-streamed into all plans and policies and into all operations and functions of the local authority

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Supporting actions required

The following have been carried out by LCC in relation to the Visionary Solutions: -
Topographical survey, ground penetrating radar survey, building use survey, service/ utility survey, existing lighting survey, existing drainage survey, existing parking survey, accessibility survey, proposed parking relocation assessment, existing lighting review, existing surface assessment, works phasing drawings, legal advice, fire tender access assessment, maintenance access assessment,

Surveys to be completed in due course:
DMURS review, National Road authority review, Universal Design review, signage decluttering survey, signage design proposal, procurement route assessment and preparation, order of magnitude costing, bill of quantities, road safety audit, cycle access assessment

Description of the Visionary Solution

In preparation for more detailed design plans, LCC have undertaken a number of surveys, these take the form of

- Baseline Monitoring
- Site surveying
- Diagrammatic sketches
- Concept design drawings
- Photographic surveys
- Land use surveys
- Public stakeholder engagement meetings
- Questionnaires
- Affected staff Briefings and updates

Summary of VS components
Components of VS2 for LCC will include the following: • Enhance the existing garden area and develop a new Sensory Garden (plants etc) • New moveable and non-movable planters • New seating area developed throughout the site • Set-up a Rainwater Harvesting System to collect water from the roofs of the Museum and Library • Rainwater harvesting data sensors collected and transmitted in a suitable format • Change of Public Lighting in the Outdoor space to low energy lighting; A projected up-lighting coloured LED system is being incorporated into the public lighting design scheme, to allow for different World Light Up Days and events to be marked and celebrated within the courtyard area; and the installation of ambient solar-powered lighting within the site . This Solar and ambient low-cost lighting should form part of the sensory garden – ambient lighting is low-level lighting for attractiveness at the site. This might be part of the sensory garden design • Installation of vertical metal fins in the courtyard area to act as a boundary between an emergency access route the garden area of the site. Vertical metal corten (weathering steel) • Questionnaires to report how the visitors enjoyed their experience • Sensors to collate data on visitor numbers and duration of stay • Sensors to collate data on Air Quality and noise • New Touchscreen Monitor to display green learnings
Replication and/or up-scaling potential
Louth County Council are the single Local Authority for County Louth. The Council has large land banks within its ownership and has responsibility for public open green spaces. LCC's County Development Plan set policy for the County. The Council has a specific budget for the maintenance and improvement of these spaces, through Development Plan Levies, set out in the planning process. Successful results from the VARCITIES project, which will be demonstrated through the monitoring and verification process of the project could be replicated by LCC through the above mechanisms. LCC actively engage and work in partnership with Local Tidy Town Groups and community groups spread throughout the County along with Sustainable Energy Communities both at the Local and Regional Level, who seek funding through the Sustainable Energy Authority for Ireland for projects. All learnings from this project can be communicated through this forum

VS2 Summary of Visionary Solution Components (Table A)[52]

VS2- Outdoor Urban Green Learning and Sensory Garden for H&WB						
#[53]	Visionary Solution components [54]	Brief description of the component	Unit[55]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Enhance the existing garden area and develop a new Sensory Garden (plants etc)	The purpose of the sensory garden is to create an outdoor space for well-being. The sensory garden will improve physical fitness, health, mood and cognition. Gardening and plant care help its users to develop gross and fine motor skills. Time outdoors, breathing fresh air, and being exposed to sunlight are extremely beneficial to the children's overall physical health. A sensory garden is all about stimulating and engaging the five basic senses of sight, smell, sound, touch and taste. This type of garden not only allows users to connect to nature, but encourages users to become more aware of their surroundings and their response to them, tapping into the principles of mindfulness. Overall, its aim is to improve citizen's health and well-being by the use of		Climate change mitigation & adaptation Green space management Air/ambient quality Urban regeneration, Social Justice & Social Cohesion Public H&WB	*ID 2.4* *ID 4.2* *ID 4.3* *ID 4.6* *ID 4.11* *ID 5.6* *ID 6.6* *ID 6.9* *ID 8.8* *ID 9.4* *ID 9.5* *ID 9.6* *ID 9.8* *ID 9.19* *ID 10.3* *ID 10.4* *ID 10.5* *ID 10.6* *ID 10.8* *ID 10.9*	[redacted]

52 All values incl. VAT, if not reclaimable.
53 The number of rows can be adjusted as required.
54 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
55 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		nature-based solutions		Potential of economic opportunities and green jobs		
2.	Moveable and Non-moveable planters	The planters will act as an addition to the Sensory Garden and can these be used to grow berries and herbs. The planters will also act as barriers between an identified emergency services access route to the rear of the County Museum and the sensory area of the site. The planters will aesthetically enhance the area as a NB solution.		Climate change mitigation & adaptation Green space management Air/ambient quality, Urban regeneration, Social Justice & Social Cohesion Public H&WB Potential of economic opportunities and green jobs		[redacted]
3.	New seating area developed throughout the site	The outside courtyard area is an underutilised tranquil space at present. It is envisaged that a well-planned outdoor seating area will provide a space for people to come and take time to sit,		Green space management	*ID 4.3* *ID 4.9* *ID 6.6*	[redacted]

		chat, read a book, use the sensory garden. Stakeholder engagement gave recommendations into what could be included within the seating plan. As such the new seating area will include: - • 5 bench seats and 4 seats with back and arm rests suitably located around the space. • The size will be 1.8 x 0.5 m typically • Anti-graffiti • Anti-fire Seats • Durable material required - most likely a mixture of aluminum with timber inserts • Suitable for use by all ages, especially older and younger people (i.e., a specified requirement that seats are mobility friendly – wheelchair bound people and older and younger able-bodied people etc),		Urban regeneration, Social Justice & Social Cohesion Public H&WB Potential of economic opportunities and green jobs	*ID 9.5* *ID 9.6* *ID 9.8* *ID 9.19*	
3	Set-up a Rainwater Harvesting System to collect water from the roofs of the Museum and Library			Climate change mitigation & adaptation, Green space management, Urban regeneration, Social Justice & Social Cohesion, Public H&WB, Potential of	*ID 2.4* *ID 6.6*	[redacted]

				economic opportunities and green jobs		
4	Rainwater harvesting data sensors collected and transmitted in a suitable format			Climate change mitigation & adaptation Public H&WB Potential of economic opportunities and green jobs	*ID 2.4*	[redacted]

5	Change of Public Lighting in the Outdoor space to low energy lighting and the installation of ambient solar-powered lighting within the site	A survey of existing public lighting serving the site has been undertaken, and the location for new LED lighting scheme to serve the site has been identified. A projected up-lighting coloured LED system is being incorporated into the public lighting design scheme, to allow for different World Light Up Days and events to be marked and celebrated within the courtyard area. Solar and ambient low-cost lighting should form part of the sensory garden – ambient lighting is low-level lighting for attractiveness at the site. This might be part of the sensory garden design.		Climate change mitigation & adaptation Green space management Air/ambient quality Urban regeneration, Social Justice & Social Cohesion Public H&WB Potential of economic opportunities and green jobs	*ID 1.4* *ID 1.5* *ID 4.2* *ID 4.3* *ID 4.9* *ID 6.6* *ID 9.5* *ID 9.6* *ID 9.8* *ID 9.19* *ID 10.3* *ID 10.4*	[redacted]
6.	Installation of vertical metal fins in the courtyard area	Purpose is to act as a boundary between an emergency access route the garden area of the site. Vertical metal corten (weathering steel)		Green space management Urban regeneration, Social Justice &		[redacted]

				Social Cohesion		
7.	Questionnaires to report how the visitors enjoyed their experience			Green space management Public H&WB	*ID 9.6* *ID 9.8*	[redacted]
7	Sensors to collate data on visitor numbers	Sensors installed will enable LCC and the VARCITIES project to determine how effective the measures and solutions have been in attracting new visitors to the courtyard area.		Green space management Public H&WB	*ID 4.3*	[redacted]

8	Sensors to collate data on Air Quality and noise	Sensors will allow VARCITIES to measure the reduction in CO2 emissions		Green space management Public H&WB	*ID 5.6* *ID 9.4*	[redacted]
9	New Touchscreen Monitor to display green learnings	A new digital touchscreen will be placed in a space front of the library. Placing it in front of the library is the most visible place in which to locate this piece of equipment thereby ensuring maximum usage of the touchscreen Given Ireland's damp climate, the touchscreen may be placed in a covered area, it may be possible to incorporate this into the design of the covered sheltered bicycle stations which also will be located in front of the library. Locating the touchscreen at this location will also provide for passive surveillancee of the touchscreen		Green space management Air/ambient quality Urban regeneration, Social Justice & Social Cohesion Public H&WB	*ID 4.3* *ID 9.5* *ID 9.6* *ID 9.8* *ID 9.19* *ID 10.4* *ID 10.5* *ID 10.6*	[redacted]

				Economic opportunities & green jobs		
10.	Associated Construction costs	Preliminaries, Site Insurances, Contingencies, installation costs and general construction contract costs				[redacted]
TOTAL						[redacted] **Comprising of** [redacted]

VS3- Sensors on Bike Stations

VS3 Summary (Annex A)

<table>
<tr><td>Title</td><td>Bike Stations and Sensors on Bike Stations</td></tr>
<tr><td>Motto</td><td>"The Visionary Solution provides a new car free area for pedestrians and cyclists with improved cycling infrastructure for visitors, in order to encourage active travel, reduce air pollution and encourage urban regeneration."</td></tr>
<tr><td>Location of the planned investment</td><td>Dundalk: Library and Museum Quarter</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Louth County Council</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>x</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>x</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>x</td></tr>
<tr><td>Sustainable district and built environment</td><td>x</td></tr>
<tr><td>Integrated infrastructure processes</td><td>x</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>The Sensors on Bike Stations will address the following challenges:
Climate change mitigation & adaptation
(Pollution reduction / reduced reliance on cars in cities),
Green space management Air/ambient quality,
Urban regeneration,
Social Justice & Social Cohesion,
Public H&WB
It will contain the following components:
Removal and Relocation of the car park area
Enhancement of this surface area for pedestrian and cycle use - e.g., deep cleaning of the existing paving through power washing, new stencil art, and works to include the removable of the bollards and chains to the front of library
Creation of a new covered Bike Station
Within the designated cycle space cabling for EV charging points for electric bikes and scooters will be provided. If sufficient funding exists plug in points will be provided - you pay for charging at the charging pedestal type arrangement</td></tr>
</table>

	• A bike maintenance area will be developed for cyclists with a designated area for cyclists to undertake bike repairs, an air pumps, a fresh water drinking. No washing of bikes permitted on site • Sensors to collate data on Air Quality and noise • Sensors to collate data on cyclist numbers and duration of stay The sensors measure the number of visitors, monitoring improvements to the use of the space		
Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	Total LCC EUR [redacted] Comprising of [redacted]	
	Other sources [please specify]	None	
Estimated costs and revenues	*Total operating cost (year)*	EUR Estimated maintenance cost - [redacted] /annum Estimated staff costs - [redacted] /annum Estimated external sub-contracting – [redacted] annum Other(s) - maintenance of monitoring equipment and internet connectivity [redacted] annum Total - [redacted] annum	
	Total revenues (year)	*LCC are a non-profit organisation*	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected impact	Unit
	ID 4.2 Accessibility of urban green spaces for population	Increased accessibility of urban green spaces	km / min (by feet, by bus)

	ID 4.3 Recreational or cultural value of green spaces	Increased recreational or cultural value of green spaces	No. Of visitors per year
	ID 4.6 Proximity of green infrastructure to green travel routes	increased accessibility of urban green spaces	km
	ID 5.6 Chemical air quality indicators	Reduction of air pollution	µg of pollutant per m3
	ID 6.6 Use of reclaimed/recycled building materials	Increased reclamation of building materials	m3, tons, %
	ID 6.7 Road surface dedicated to pedestrians	Increased share of pedestrian areas	%
	ID 6.9 Access of residents to cultural facilities on foot	increased accessibility of cultural facilities	km / min
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	ID 9.4 Noise reduction rates	Reduced noise level	dB
	ID 9.5 No of hours spent outdoors, time people spend in the facility	Increased outdoor presence	No of hours per week per capita / hours per capita
	ID 9.6 Perceived well-being before and after the visit of green space.	Increased health and well being	scores
	ID 9.8 Feeling of improving the quality of life (the Quality-of-Life questionnaire)	Improved quality of life	Scales' scores
	ID 9.19 Increase in walking and cycling	increased outdoor	No. of people /

	in and around areas of interventions	physical activity	hours per week per capita
	ID 10.1 No. of jobs created; gross value added	increased job opportunities	No. of jobs created; Euros
	ID 10.3 Resource efficiency in the urban system	increased resource efficiency	CO2 emissions (tons) per capita
	ID 10.4 Increased footfall and spend in the areas of interventions		
	ID 10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	definition of parameters for (re)designing green public spaces based on the well-being of users	
	ID 10.6 Replication of solution		
	ID 10.8 Saved healthcare spending	Savings in healthcare spending	Euros per yr
	ID 10.9 Public / Private Investments after 5 years	increased public private investments	Euro

VS3 Main Contacts (Annex B)

Lead Organization	
Organization name	Louth County Council
Contact person	[redacted]
Department	Sustainable Energy and facilities Section Public Realm Architect
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Consultant to be procured in accordance with Council's procurement procedures in the future and so at present TBC
Role	
E-Mail	
Local ambassador	
Organization name	Tbd
E-Mail	

VS3 Description (Annex C)

Objectives of the Visionary Solution
"The Visionary Solution provides new bike facilities to cyclists over a rolling one-year period in order to support health and well-being of cyclists."
Overview of Visionary Solution leader and partners
County Louth is strategically located approximately mid-way between the Capital cities of Dublin and Belfast. Its strategic location and state of the art infrastructural services and the existence of a primed, skilled and well-educated workforce has attracted many long-established multi-nationals to locate in the county. Louth County Council is the single Local Authority for County Louth and the Council are responsible for delivering key services such as housing provision and maintenance, social housing, affordable housing; Road design, construction, maintenance and improvements; Water services, including water supply, effluent and treatment in association with Irish Water; Planning services, Land use, forward planning, development management and planning enforcement; Environmental monitoring and enforcement; Support the objectives of the Memorandum of Understanding; and 3 sustainable energy to name but a few. Dundalk is the administrative capital of County Louth. It contains not only the offices of Louth County Council, but also the regional offices of the Sustainable Energy Authority of Ireland, the IDA and Enterprise Ireland. The town contains a highly regarded third level educational institution, namely Dundalk Institution of Technology (DkIT) and enjoys a great location, strategically located approximately midway between the two largest cities in the island of Ireland, Belfast and Dublin. The town is close to the border with Northern Ireland and equidistant from Dublin and Belfast. The Louth County Development Plan has set its strategic vision for the County as follows " ***To Promote County Louth, in particular the Regional Growth Centres of Drogheda and Dundalk, as uniquely attractive places in which to live, work, visit, and do business and where the quality of employment and educational opportunities, natural and built environment, cultural experiences and provision of inclusive communities are to the highest standards"***. The land in which the development for the delivery of the VARCITIES project is within the ownership of Louth County Council, and The Chief Executive of Louth County Council along with the Elected Representatives of the Council are fully committed to the delivery of the objectives and the Visionary Solutions identified for the Library and Museum Quarter for Dundalk
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DMURS review, National Road authority review, Universal Design review, signage decluttering survey, signage design proposal, procurement route assessment and preparation, order of magnitude costing, bill of quantities, road safety audit, cycle access assessment

Description of the Visionary Solution

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- Site surveying
- Diagrammatic sketches
- Concept design drawings
- Photographic surveys-
- Land use surveys
- Public stakeholder engagement meetings
- Questionnaires
- Affected staff Briefings and updates

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VS3 Summary of Visionary Solution Components (Table A)[56]

VS3- Sensors on Bike Stations						
# [57]	Visionary Solution component[58]	Brief description of the component	Unit[59]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Removal and relocation of the car park area and the enhancement of this surface area for pedestrian and cycle use	Removal involves the physical process of banning car parking from the existing staff car park – this involves decision by Council senior management and liaison with Council staff and a small number of adjacent properties owners who are using the Council car park. No physical changes to the surface layers are envisaged. Enhancement surface works will to the area for pedestrian and cycle use e.g., deep cleaning of the existing paving through power washing, new stencil art, and works to include the removable of the bollards and chains to the front of library along with costs		Climate change mitigation & adaptation (Pollution reduction / reduced reliance on cars in cities) Green space management Air/ambient quality,	*ID 4.2* *ID 4.3* *ID 5.6* *ID 6.6* *ID 6.7* *ID 6.9* *ID 9.5* *ID 9.6* *ID 9.8* *ID 9.19* *ID 10.4*	[redacted]

56 All values incl. VAT, if not reclaimable.
57 The number of rows can be adjusted as required.
58 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
59 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

				Urban regeneration Social Justice & Social Cohesion Public H&WB		
2	Creation of a new Bike Station	A new covered bicycle station will be placed in front of the library area Within the designated cycle space cabling for EV charging points for electric bikes and scooters will be provided. If sufficient funding exists plug in points will be provided - you pay for charging at the charging pedestal type arrangement A bike maintenance area will be developed for cyclists with a designated area for cyclists to undertake bike repairs, an air pumps, a fresh water drinking. No washing of bikes permitted on site		Climate change mitigation & adaptation (Pollution reduction / reduced reliance on cars in cities) Green space management Air/ambient quality, Urban regeneration Social Justice & Social Cohesion	*ID 4.2* *ID 4.3* *ID 4.6* *ID 6.6* *ID 8.11* *ID 9.5* *ID 9.6* *ID 9.8* *ID 9.19*	[redacted]

				Public H&WB		
3	Sensors to collate data on Air Quality and noise	Sensors will allow VARCITIES to measure the reduction in CO2 emissions		Green space management Public H&WB	*ID 5.6* *ID 9.4*	[redacted]
4	Sensors to collate data on cyclist numbers and duration of stay	Sensors installed will enable LCC and the VARCITIES project to determine how effective the measures and solutions have been in attracting new visitors to the courtyard area.		Green space management Public H&WB	*ID 4.3* *ID 4.6* *ID 9.5* *ID 9.6* *ID 9.8*	[redacted]

					ID 9.19	[redacted]
5.	Associated Construction costs	Preliminaries, Site Insurances, Contingencies, installation costs and general construction contract costs				[redacted]
TOTAL						Total Costs for VS3: [redacted] **Comprising of** [redacted] from GA [redacted] from LCC Breakdown of sensor costs are located in Dundalk file: 'ReportDigitalSolution_DundalkV2.doc' [redacted]

VS1 - 2 - 3 Stakeholders (Annex E)

Stakeholder analysis			
Type of stakeholder	**Current status of engagement**	**Future engagement activities**	**Instruments/channels for dissemination and interaction**
		e.g upcoming workshops, social/ cultural events, etc	
LCC Staff	Positive level of staff engagement – room for improvement	Better and more consistent roll out of the Staff Energy Newsletter	Online energy newsletter issued to staff and on display in various Council buildings on staff notice boards
Local Representatives	Positive level of engagement – room for improvement	News on a page issued to Councillors. VARCITIES could use this platform the future to update Local Representatives	This is emailed to all LCC Local Representatives
LCC Website	Fair to good level of engagement – room for improvement	This should be updated more regularly and linked with VARCITIES website better	Online website
All members of the Public	Part 8 Planning Drawings Excellent	Over 12-week period drawings will be on public display in the main Council buildings, this will be advertised in the local papers and all interested parties are invited to submit their comments and feedback.	Drawings on public display, online and advertisement of same in local newspapers. Due for public display in approx. March 2021
Health, Economic, Retail and Commercial, Community, Educational, Cultural sectors	Fair to good level of engagement with these sectors– room for improvement	Monthly input into Public Participation Network Magazine, which is issued to over 600 people / organisations in the Health, Economic, Retail and Commercial, Community, Educational, Cultural sectors. This is presently not being done but work is in progress to advance with this.	Online newsletter issued monthly.
The creation of a VARCITIES Steering Group Committee with representatives from the Health, Economic, Retail and Commercial, Community, Educational, Cultural sectors	Fair to good level of engagement with these sectors– room for improvement	This is presently not being done but work is in progress	Regular meetings with this group to update them of VARCITIES project progress and to listen and get their continued views and ideas for the project
Ongoing Dissemination events organised by VARCITIES			

VS1 - 2 - 3 Strategic Planning and Assessment of the VS (Annex F)

Results of PESTLE analysis

Political factors affecting the planned Visionary Solutions

What are the key political factors?

VS1	VS2	VS3
No relevant factors identified	No relevant factors identified	No relevant factors identified

Economic factors affecting the planned Visionary Solutions

What are the most important economic factors?

VS1	VS2	VS3
No relevant factors identified	• Potential of economic opportunities and creation of jobs	No relevant factors identified

Social factors affecting the planned Visionary Solutions

What are the most important social and cultural aspects?

VS1	VS2	VS3
• Considering also pods for older people to meet and chat	• Urban regeneration • Social Justice & Social Cohesion • Public Health & Well being	• Urban regeneration • Public Health & Well being • Cycle route map of the area/town would be useful

Technological factors affecting the planned Visionary Solutions

What technological innovations could occur?

VS1	VS2	VS3
• Careful consideration of bikes access and movement throughout the pilot site area • Learning pod should not be isolated but rather integrated with surrounding buildings • How can people access it (booking system) • Weatherproofing of the pod	No relevant factors identified	• Understand what is appropriate and what's not regarding bike stations/racks • Cycling access to the bike sheds, correct design of racks for cyclists • How to maintain a certain distance between walkers & cyclists

Legal factors affecting the planned Visionary Solutions

What current and upcoming legislation could affect the sector?

VS1	VS2	VS3
• Safety issue (emergency services perspective)	No relevant factors identified	No relevant factors identified

Environmental factors affecting the planned Visionary Solutions

What are the environmental considerations we should bear in mind?

VS1	VS2	VS3
• Rainwater harvesting • Weather considerations during the design of the Pod • Seats placed under a tree were where leaves will fall in autumn may not being used as people won't sit on it	• Climate change mitigation & adaptation • Green space management • Air quality	• Climate change mitigation & adaptation • Green space management

Results of SWOT analysis

Strengths affecting the planned Visionary Solutions

Please describe the endogenous factors that can favour the pursuit of VS objectives.

VS1	VS2	VS3
• Careful consideration of bikes access and movement throughout the pilot site area • Weatherproofing of the pod	• Urban regeneration • Social Justice & Social Cohesion • Public Health & Well being	• Public Health & Well being

Weaknesses factors affecting the planned Visionary Solutions

Please describe the endogenous factors that can hinder or delay the VS implementation process.

VS1	VS2	VS3
• Loss / relocation of the car-parking area in the courtyard • Seats placed under a tree were where leaves will fall in autumn may not being used as people won't sit on it	• Green space management • Air quality	• Urban regeneration • Understand what is appropriate and what's not regarding bike stations/racks • How to maintain a certain distance between walkers & cyclists

Opportunities affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect positively the VS implementation.

VS1	VS2	VS3
• Considering also pods for older people to meet and chat • Learning pod should not be isolated but rather integrated with surrounding buildings • How can people access it (booking system)	• Potential of economic opportunities and creation of jobs • Climate change mitigation & adaptation	• Cycle route map of the area/town would be useful • Cycling access to the bike sheds, correct design of racks for cyclists

Threats affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect negatively the VS implementation.

VS1	VS2	VS3
No relevant factors identified	No relevant factors identified	No relevant factors identified

Risk and mitigation measures				
Risk (description)	**Probability (Unlikely – Likely – Very likely)**	**Impact (Low – Moderate – High)**	**Risk level (Low -Medium – High – Extreme)**	**Mitigation measures (description)**
Lack of support from elected officials for the installation	Unlikely	High	Medium	Continue internal engagement to ensure ongoing support
Equipment, installation and labour costs are too high	Likely	Moderate	Medium	Conduct effective sourcing and monitor any potential cost increase on materials
Don't have the right people to do the installations	Unlikely	Moderate	Low	Once requirements are clear, engagement with the right people to do the work should begin as soon as possible
Not enough time to implement the installations	Unlikely	Moderate	Low	Plan to be created as soon as possible for installation timeline
Stakeholders and citizens don't use the space as intended after installation	Unlikely	High	Medium	Continue engagement with stakeholders to ensure buy in
Not enough time to go through the necessary procurement and planning processes	Unlikely	Moderate	Low	Begin procurement and planning process as soon as possible once equipment/contractor requirements are clear
Unable to source the right equipment	Unlikely	Moderate	Low	Begin sourcing equipment as soon as possible once it is specified
Sensors and ICT data exchange does not work correctly	Likely	Low	Medium	Work closely with WP5 and IESRD. Early engagement with IT people in LCC
Return of Covid restrictions	Likely	Moderate	High	Follow public health advice

VS1 - 2 - 3 Economic and Financial Analysis of the VS (Annex G)

Ownership of assets and management structure			
Project leader = Louth County Council. The project leader is the sole owner of assets for the project. Stakeholders for the project have various interests including voluntary maintenance of components of the project, payment towards project maintenance by sponsorships, commercial benefit from commercial trading nearby and benefiting from increased visitors so increased business opportunities. There is no legal relationship between the project leader and the stakeholders. However, there may be opportunities for service level agreements for maintenance and so on...The Project leader is the Local Authority for many statutory functions such as the Roads, Planning, Environmental monitoring and so on. Louth County Council, as the Local Authority is responsible for decision making for the project conception, design and construction. The implementation of the Visionary Solutions will be subject to public consultation by the Local Authority and approved by the elected members.			
Procurement structure			
The Visionary Solution implementation follows a public investment scheme / public procurement and related legislation. It also involves engagement with local stakeholders and public consultation by the Local Authority.			
Estimated costs and revenues			
CAPEX (major expenditures foreseen over the long term for the implementation of the VS)	**VS1**	**VS2**	**VS3**
The estimated cost of planning processes	[redacted]		
The estimated cost of installation	[redacted]		
Estimated equipment cost	[redacted]		
Other(s) - Cost of monitoring and verification	[redacted]		
Total investment cost (€603,823)	[redacted]		
OPEX (day-to-day expenses need to ensure the VS operation)	**VS1**	**VS2**	**VS3**
Estimated maintenance cost (n° of years)	[redacted]		
Estimated staff cost (n° of years)	[redacted]		
Estimated external sub-contracting (n° of years)	[redacted]		

Other(s) - maintenance of monitoring equipment and internet connectivity [please specify]	[redacted]		
Total operating cost *(5 years)*	[redacted]		
Financing approach and funding sources			
Total investment cost	[redacted]		
Own funding of the promoter / local cluster	[redacted]		
VARCITIES project	[redacted]		
Other sources [please specify]	[redacted]		

VS1 - 2 - 3 Table B – Business Model Canvas

<table>
<tr>
<td>Key activities

VS1: Creation of Outdoor Learning Pod
VS2: Outdoor urban Learning & Sensory Garden
VS3: New bike stations with sensors
Associated planning and procurement requirements</td>
<td>Key resources

LCC employees (all VSs)
LCC resources (all VSs)
Materials/Equipment for VS1 Learning Pod, VS2 Sensory Garden, VS3 Bike Station
Sensors (all VSs)
ICT databases
H&WB platform (all VSs)
Outdoor wifi (VS1)</td>
<td rowspan="2">Value proposition

New green areas (VS2)
New recreational opportunities for citizens (VS2, 3)
Dedicated areas to pedestrians and cyclists (VS2, 3)
Areas where citizens (especially elderly, disabled) can take time to experience nature and improve their health and well-being. (all VSs)</td>
<td>Key partners

LCC (all VSs , IESRD (research and support for all software related items)</td>
<td>Key beneficiaries

Local stakeholders and citizens</td>
</tr>
<tr>
<td colspan="2"></td>
<td colspan="2">Governance structure

All spaces and facilities governed by LCC</td>
</tr>
<tr>
<td colspan="2">Cost structure

LCC own funding
Contribution from EC H2020 VARCITIES funding</td>
<td>Channels
(Applies to all VSs)
Social/cultural/educational events
H&WB platform
Publications/newsletters/leaflets
Public website of Dundalk/LCC
Social media posts</td>
<td colspan="2" rowspan="2">Capturing value
(Applies to all VSs)
Increased H&WB of Dundalk citizens and surrounding areas
Increased use of public spaces
Increased incentive to visit Dundalk, its businesses and amenities
Cleaner air
Reduced noise pollution
Additional potential value from third party VAS, e,g. data, monitoring applications etc?</td>
</tr>
<tr>
<td colspan="2"></td>
<td>Cost reduction

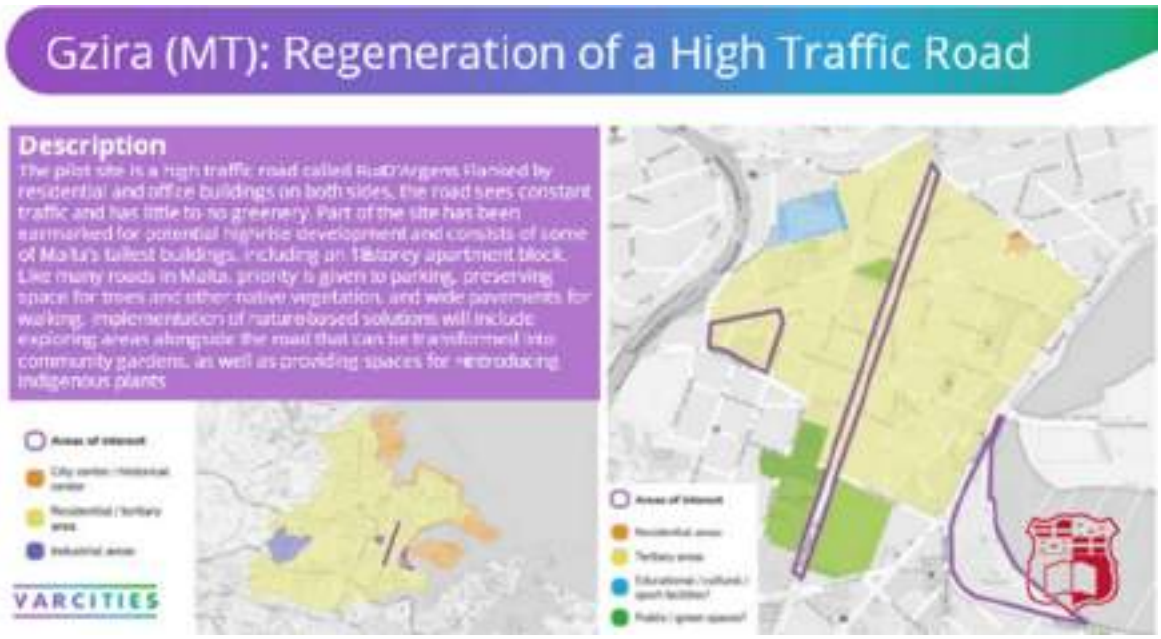
Reduced costs for public healthcare for both physical and mental aspects (applies to all VSs)

Reduced costs for potable treated water for plants via harvested rainwater (VS2)</td>
</tr>
</table>

4 Gzira (MT): Regeneration of a high traffic road in the Gzira locality in Malta

Overview of the pilot area and the VSs

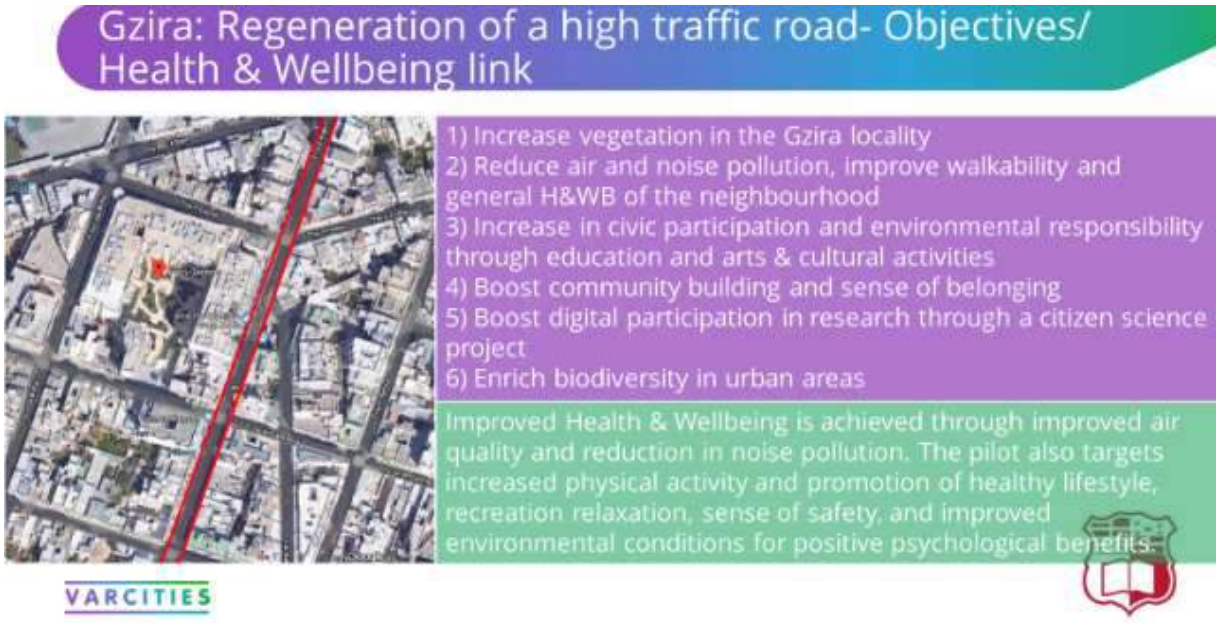
Annex D: Gzira- the Pilot area



Annex D: Gzira- the existing situation

Annex D: Gzira- the City's Actions

Annex D: Gzira- Objectives/ H&WB link



Annex D: Gzira- the Visionary Solutions on the masterplan

Gzira: Overview of the sketched solutions

VS1- Rue D' Argens: Micro-greening Interventions through a Participatory Design Process

VS1 Summary (Annex A)

<table>
<tr><td>Title</td><td>Micro-greening in Rue D'Argens</td></tr>
<tr><td>Motto</td><td>"VS1 provides a greener urban environment by supporting and involving residents and local businesses in the process of greening their properties and embellishing the street of Rue D'Argens in order to revitalise the area through a participatory process where residents are active agents in the decision-making process of the preferred micro-greening interventions. "</td></tr>
<tr><td>Location of the planned investment</td><td>Rue D'Argens (Gzira)</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Gzira Local Council and UM</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>X</td></tr>
<tr><td>Public Spaces Interventions</td><td>X</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>X</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table>
For others, please specify
<table>
<tr><td>Digital tools for citizen engagement</td><td>X</td></tr>
<tr><td></td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>Following a series of field observations to evaluate the current urban conditions of Rue D'Argens, property-owners and businesses on this street will be invited to contribute to the VARCITIES project through micro-greening NBS interventions. Such interventions include the supply of plant seeds to promote greening of balconies, facades and interiors of households to raise awareness about the benefits of green solutions to our H&WB. Another intervention in the same street is the greening of a bus stop area to increase vegetation, improve the visual aesthetics of the streetscape and attract biodiversity into our urban settings. The latter could also be done through the greening of a bus stop roof located in Rue D' Argens. Furthermore, users of the space and local community members will be</td></tr>
</table>

	consulted through a pop-up engagement activity (one in number) to collect first-hand information about the needs of the locality and inform them of possible NBS to implement greening into and outside their properties. The data will be evaluated and discussed with the local municipality to explore ways in which they can be improved		
Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [please specify]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected impact	Unit
	ID4.1 Surface of public green space per capita	*Increased recreational or cultural value of green spaces*	*m2 per capita*
	ID7.16 No of persons involved (on average) in the project activities	*Increased and improved participation*	*No of persons / year or age*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	ID8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*No. of people per category*
	ID8.9 Participation of immigrants	*Greater inclusion of immigrants*	*%*
	ID9.13 Residential attachment and satisfaction	*increased residential attachment and*	*Scales' scores*

[60] All values incl. VAT, if not reclaimable.

		satisfaction	
	ID10.2 New businesses attracted and additional business rates. Increase in start-up funding attracted by businesses in the area	*increased business opportunities*	*No of new businesses; SME funding; Euros / year*
	ID10.6 Replication of solutions		
	ID10.8 Saved healthcare spending	*Savings in healthcare spending*	*Euros per year / %*
	ID10.9 Public Private Investments after 5 years	*increased public private investments*	*Euros*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	Goal 3. Good Health and Wellbeing	Microscale (demo neighbourhood)	
	Goal 8. Decent Work and Economic Growth	Microscale (demo neighbourhood)	
	Goal 9. Industry, Innovation and Infrastructure	Microscale (demo neighbourhood)	
	Goal 13. Take urgent action to combat climate change and its impacts	Microscale (demo neighbourhood)	
	Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation	Microscale (demo neighbourhood)	

VS1 Main Contacts (Annex B)

Lead Organization	
Organization name	University of Malta
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Gzira Local Council
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	University of Malta
Professional title	[redacted]
Telephone	
E-Mail	[redacted]

VS1 Description (Annex C)

Objectives of the Visionary Solution
VS1 provides a greener urban environment by supporting and involving residents and local businesses in the process of greening their properties and embellishing the street of Rue D'Argens in order to revitalise the area through a participatory process where residents are active agents in the decision-making process of the preferred micro-greening interventions.
Overview of Visionary Solution leader and partners
The visionary solution leader is UM which is responsible for managing the available funding to implement the relevant interventions. The Gzira Local council are directly associated with the visionary solution and will provide the UM with the relevant permits to carry out the pop-up engagement activity. In addition, they will support in our permit application process to implement the greening interventions. Another supporting measure is to aid in the effort to communicate with citizens and to distribute them with seeds.
General project background, context, and rationale
The pilot site is a high traffic road called Rue D'Argens with high levels of air pollution. Flanked by residential and office buildings on both sides, the road sees constant traffic and has little to no greenery. Part of the site has been earmarked for potential high-rise development and consists of some of Malta's tallest buildings, including an 18-storey apartment block. Like in many roads in Malta, priority is given to parking, limiting available space for trees and other native vegetation, and narrow pavements for walking. Implementation of nature-based solutions will include exploring areas alongside the road that can be transformed into green spaces by utilising all the necessary resources and available spaces, as well as providing spaces for re-introducing indigenous plants. Relevant conceptual policy interventions include; Sustainable Development Vision 2050, National Strategy for the Environment 2050. Demography is composed of a mixture of nationalities, mostly transients, migrants, native residents who are now becoming an ageing population - Field Observations - Content analysis of existing data - Procurement - Ethical Clearance - Land Survey - Permits - Tender - Citizen Engagement Pop-up Workshops - Stakeholder Workshops - Landscape Design - Construction Works
Supporting actions required
N/A
Description of the Visionary Solution
VS1 is directly concerned with the targeted road of Rue D'Argens in Gzira. The road is located in a highly urbanised zone with high traffic volumes leading to high pollution levels especially during rush hours. This road has been ear marked as the major source of interventions in this pilot. Another challenge with the site is the very minimal availability of land area to implement greening solutions. As a result, this VS focuses on micro-greening interventions and social engagement activities. The other VSs support these implementations by providing greening in other nearby zones. A site survey was carried out in order to be able to design a single greening intervention in a part of the road. A

preliminary proposal was put forward to the local council in order to investigate the feasibility of the intervention. Once the sketching of the solution is available, the necessary permit will have to be applied for to ensure there is a definite direction on whether this project may proceed given that the interventions need to take place on public land.
Summary of VS components
Please briefly summarise the VS component(s) in Table A.
Summary of expected impacts and benefits (based on those identified in the monitoring framework)
Please fill the table below with the results expected from the implementation of the Visionary Solution. Please refer to the Monitoring and Evaluation Framework for details of the calculation, including relevant assumptions, baselines, conversion factors, etc.
Replication and/or up-scaling potential
The replication potential considers three important levels: (1) On a local level, the Gzira Local Council, which is strongly affiliated with the VARCITIES can replicate the initiatives on a wider scale in the locality. The pop-up engagement that is envisaged will provide an excellent test case on how successful these initiatives are and the lessons learnt can be used for improved success in the future. The seed distribution amongst citizens will also show whether or not it has been effective and an assessment can be made on how to extend this initiative to reach the wider public in the locality. The local council can provide incentives for procurement of seeds and encourage citizens to take advantage of these initiatives. Finally, the local council may identify other areas in Gzira where micro greening interventions on for example bus stop areas can be implemented. (2) Also, on a local level but this time country wide, the initiatives taken in VS1 may be of particular interest to government and the relevant ministries. There are various areas in Malta which are highly densely populated and therefore the challenges found in the locality can be similar to those found in other localities. Micro-greening interventions in this pilot might therefore be used as a foundation for country wide future initiatives. Meeting with the relevant ministers is planned for the upcoming future once this VS is implemented. (3) VS1 has replication potential also internationally where similar challenges are arising in overpopulated cities across Europe. The evaluation of the interventions will be critical in this regard to assess the potential benefits in more detail.

VS1 Summary of Visionary Solution Components (Table A)[61]

VS1- Micro-greening in Rue D'Argens						
# [62]	Visionary Solution components[63]	Brief description of the component	Unit[64]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Provision of seeds and distribution to residents through a baseline data collection survey	Seeds will be provided to interested citizens to increase appreciation of greening solutions. People having balconies will be encouraged to locate their vegetation in outdoor location to act as a micro-intervention.	1	Lack of greening space	7.16 8.5 8.9 9.13 10.2 10.6 10.8	[redacted]
2	Greening of a small area in Rue D'Argens and pop-up greening spatial interventions	A bus stop area has been identified in Rue D'Argens which could serve as an opportunity for micro-greening interventions in front of Savoy Gardens. Balcony greening could accompany the intervention depending on the participation of residents and other areas in the street will be selected as green pockets for temporary greening (some of these may become permanent following	1	Lack of greening space	9.13 10.2 10.6 10.8 10.9	[redacted]

61 All values incl. VAT, if not reclaimable.
62 The number of rows can be adjusted as required.
63 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
64 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		consultation with municipality and residents)				
3	Pop-up engagement event	A location has been selected to create a pop-up where citizens are made more aware of the implementation of NBS in the locality	1	Citizens' awareness	4.3 7.16 8.5 8.9 9.13 10.2 10.6 10.8	[redacted]
TOTAL			3			

VS1 Visualisation (Annex D)

Description of the Visionary Solutions

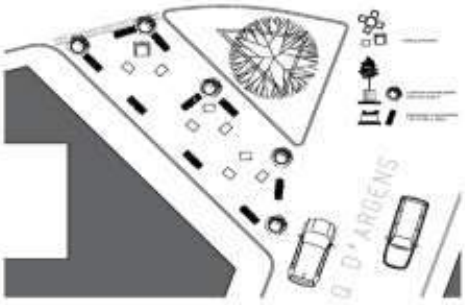
VS1: Rue D'Argens: Micro-greening Interventions through a Participatory Design Process

- Micro-greening of an area in Rue D'Argens to improve visual aesthetics of streetscape.
- Property-owners and businesses will be invited to contribute to the Varcities project through greeninger: *balconies, facades other exteriors*
- Pop-up greening setups to create temporary community spaces

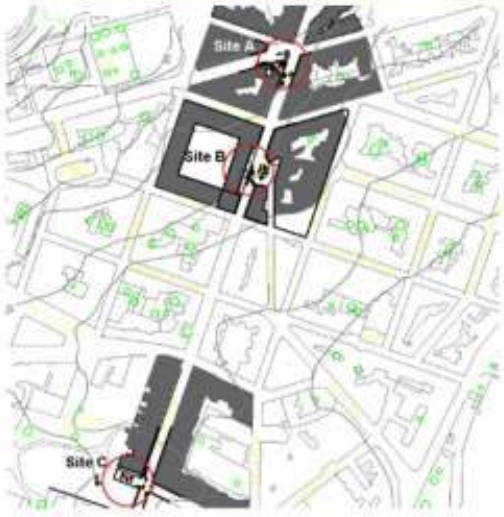
VARCITIES

The latest version of the sketches-visualisations.

VS1/VS3: Pop-up Greening and Citizen Engagement Workshops in Gzira



VARCITIES



Pop-up Description and Case Study

- A modular and mobile green setup engaging citizens and local businesses
- Pop-up parks are created by taking over car designated zones for use by pedestrians.
- Apart from offering seating and possibly bike parking and other amenities, such spaces usually incorporate vegetation so as to encourage human-nature interaction.

A Pop-up in Arlington, Virginia US.https://geographical.co.uk/places/cities/item/3323-pop-up-park

VARCITIES

The latest version of the sketches-visualisations.

VS1: Rue D'Argens: Micro-greening Interventions through a Participatory Design Process

VARCITIES

VS2- Citizen Science on Air/Noise quality to increase H&WB awareness

VS2 Summary (Annex A)

<table>
<tr><td>Title</td><td>Citizen Science to increase air/sound quality awareness</td></tr>
<tr><td>Motto</td><td>"VS2 provides environmental awareness and democratization of knowledge to citizens in order to improve their health and wellbeing through awareness of the air quality of their locality."</td></tr>
<tr><td>Location of the planned investment</td><td>Gzira - fixed sensors will be placed at various points in the locality and citizens will be provided with handheld / portable sensors to be located in their homes.</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Local Council and UM</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>X</td></tr>
<tr><td>Public Spaces Interventions</td><td>X</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>X</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table>
For others, please specify
<table>
<tr><td></td><td>☐</td></tr>
<tr><td></td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>Sensors are to be installed at various locations, mostly within Gzira, to collect and compare data at different geographical points to identify the various pollutants and the amount of noise and air pollution there is in the area. The locations of the installed sensors are the Gzira Gardens, Rue D'Argens and at the University of Malta as a reference point. Handheld sensors (indicated as light blue on the map) will be provided to citizens who will be interested in participating in the data collection of pollutant measurements. The latter introduces an element of civic action, that gives citizens scientific means of engaging. We will also be considering other means of engaging users of the space through barcode scanning, which can be carried out using mobile device applications to provide them information related to pollution, NBS interventions and their H&WB benefits or even to give them access to the H&WB platform.</td></tr>
<tr><td>Total investment planned</td><td>[redacted]</td></tr>
<tr><td>Funding sources</td><td>Requested funding (EU contribution)</td><td>[redacted]</td></tr>
</table>

	Own funding	[redacted]	
	Other sources [please specify]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	ID5.6 Chemical air quality indicators	*Reduction of air pollution*	*µg of pollutant m-3, others (for each species)*
	ID7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	ID8.1 The availability and distribution of parks (different types) or ecosystem services with respect to specific individual or household socioeconomic profiles landscape design	*Fair availability of green spaces and ecosystem services*	*distance, no. of households in various categories*
	ID8.9 Participation of immigrants	*Greater inclusion of immigrants*	*%*
	ID9.4 Noise reduction rates	*Reduced noise level*	*dB(A) m-2 vegetation unit*
	ID9.5 No of hours spent outdoors; time people spend in the facility	*Increased outdoor presence*	*No of hours per week per capita / hours per capita*
	ID9.8 Feeling of improving the quality of life (the Quality-of-Life questionnaire)	*Improved quality of life*	*Scales' scores*
	ID10.6 Replication of solutions		
Contribution to SDGs	*SDG n° and name*	Expected impact	
	Goal 4. Quality Education	*Microscale (demo neighbourhood)*	
	Goal 7. Affordable and Clean Energy	*Microscale (demo neighbourhood)*	
	Goal 11. Sustainable Cities and Communities	*Mesoscale (City/Locality)*	

	Goal 12. Responsible Consumption and Production	*Microscale (demo neighbourhood)*
	Goal 13. Climate Action	*Microscale (demo neighbourhood)*

VS2 Main contacts (Annex B)

Lead Organization	
Organization name	**University of Malta**
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Gzira Local Council
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	University of Malta
Professional title	[redacted]
Telephone	
E-Mail	[redacted]

VS2 Description (Annex C)

Objectives of the Visionary Solution
"VS2 provides environmental awareness and democratization of knowledge to citizens over the project's duration in order to improve their health and wellbeing through awareness of the air quality of their locality."
Overview of Visionary Solution leader and partners
The visionary solution leader is UM which is responsible for managing the available funding to implement the relevant interventions. The Gzira Local council are directly associated with with the visionary solution and will provide the UM with IT infrastructure to log the data being generated from the citizen science campaign. The local council will also support in the gathering of measurements to be carried out by UM.
General project background, context, and rationale
The basin type terrain and densely built urban zone with high-rise buildings deflect wind flows and traps air pollution at surface level within the street canyons. The ambient air quality legislation, which includes the assessment, monitoring, reporting on air quality and air pollution impacts, together with the reporting of the emissions inventory and projections is found in Malta's National Air Pollution Control Program-2019. With high levels of air pollution and a few green open spaces, introducing more greenery into the context pilot site will contribute towards more awareness about the benefits of green spaces. VARCITIES will provide this basis on which NBS can be implemented in the local context. - Field Observations - Content analysis of existing data - Ethical Clearance - Procurement - Recruitment of Citizens - Citizen EScience Sensor Workshops - Stakeholder Workshops - A database to store collected data
Supporting actions required
- Technical expertise on remote connectivity needed - Procurement tender for portable sensors to be used in citizen science campaign - Sensor installation support for the fixed sensor campaign (before and after) - Specialised information activity for citizens to explain how to use the portable sensors in the citizen science campaign
Description of the Visionary Solution
With this visionary solution, the aim is to generate an air quality and noise data set that can be used to raise awareness about the issue of air quality in Rue D'Argens and surroundings. There are two faces in this campaign. The need to carry out scientific measurements using fixed sensors. The purpose of this is mainly to create preliminary information for citizens and stakeholders on the current situation in Gzira. The second aspect of this VS is the citizen science campaign where citizens are provided with portable, simple to use sensors to be installed outdoors in balconies, rooftops etc. Data would then be transmitted locally and also used as part of other tasks in the project such as the online platform.
Summary of VS components
VS components summarised in Table A.

Replication and/or up-scaling potential
This VS has replication potential on a country wide level but requires a concerted effort from government. The major benefit is that air quality challenges in urban environments can be assessed in more detail by the citizens themselves. While in Malta, the Environmental and Resources Authority (ERA) which an important stakeholder, has various air quality stations at key locations around Malta, a more wholistic measurement campaign would be interesting to have albeit using sensors that are more designed to have a first-hand assessment. The potential of this VS2 can also extend internationally despite the fact that the concept is not entirely new.

VS2 Summary of Visionary Solution Components (Table A)[65]

VS2- Citizen Science to increase air/sound quality awareness						
# [66]	Visionary Solution components[67]	Brief description of the component	Unit[68]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Fixed sensors	The fixed sensors campaign will include air quality measurements, wind measurement, noise and traffic flow measurements	14	Air quality problem awareness	5.6 5.7 7.11 9.4	[redacted]
2	Citizen science campaign	A number of portable air quality sensors will be provided to citizens.	10	Air quality problem awareness	5.6 5.7 7.8 7.11 8.9 9.8 10.6	[redacted]
TOTAL						[redacted]

65 All values incl. VAT, if not reclaimable.
66 The number of rows can be adjusted as required.
67 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
68 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

VS2 Visualisation (Annex D)

Description of the Visionary Solutions

VS2: Measurements of Air quality and noise pollution with citizen science to increase H&WB awareness

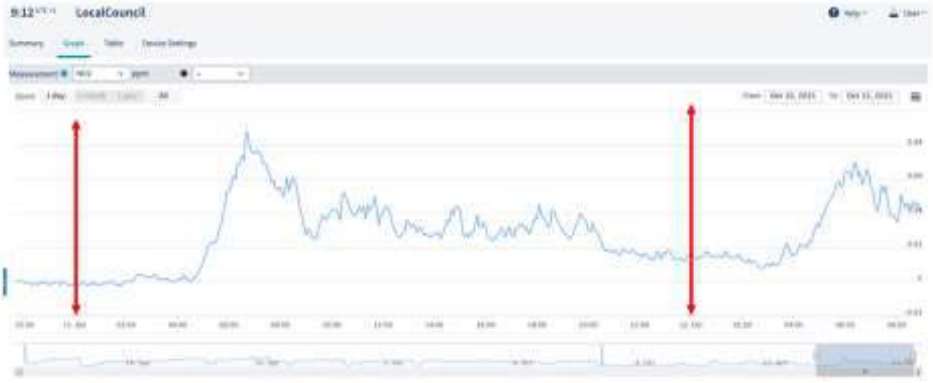
- Sensors are to be installed at various locations, mostly within Gzira, to collect and compare data at different geographical points to identify the various pollutants
- Handheld sensors (indicated as light blue on the map) will be provided to citizens who will be interested in participating in the data collection of pollutant measurements

VARCITIES

The latest version of the sketches-visualisations.

VS2: Measurements of air quality and noise and citizen science

Example NO2 measurements already carried out on site



VARCITIES

VS3- Urban Biodiversity Education and Engagement through a Co-Created Community Garden Project

VS3 Summary (Annex A)

Title	An Educational Community Garden project
Motto	"The Visionary Solution provides a green public space in Gzira, increased in biodiversity and environmental education to school children and the local community to improve health and well-being of both children and adults through the development of an ecological playscape and community garden. In addition, social engagement will be carried out in a newly developed garden area in Gzira along with pop-up engagement events"
Location of the planned investment	St. Clare Gzira Primary School, Council of Europe Gardens
Municipality/local authority/main partners	Gzira Local Council, ACT – Malta (NGO), UM
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions X Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity X Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☐ For others, please specify A gamified experience using digital tools X
Overview and objectives of the planned Visionary Solution	NBS interventions and citizen engagement activities will be implemented at the St. Clare Primary School and Gzira Gardens with the intention of embedding a greener perspective into our educational institutions and cultural context. Greenery will be installed at the school with particular plants being selected to attract birdlife, bringing nature closer to our urban environments and instil ecological awareness into our younger generations. A Community Garden will be constructed at the school, which will eventually become accessible to the public; contributing to their mental, physical and social wellbeing through greening interventions and integrating the concept of urban gamification of a playscape. During the redevelopment of the Gzira Gardens, an outdoor workshop will be used to explore, with citizens, possibilities of NBS that will be considered together with the Gzira municipality and developers to promote a co-creative attitude towards local planning and development. This will be supplemented by other pop-up engagement events (2 in number).

Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [please specify]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected impact	Unit
	ID4.1 Surface of public green space per capita	*Increased public green space surface per capita*	*m2 per capita*
	ID4.2 Accessibility of urban green spaces for population	*Increased accessibility of urban green spaces*	*km/min*
	ID4.3 Recreational (number of visitors, number of recreational activities) or cultural (number of cultural events, people involved, children in educational activities) value of green spaces	*Increased recreational or cultural value of green spaces*	*No. of visitors year-1 / No. of recreational activities year-1*
	ID6.1 Urban green: Index of biodiversity, provision and demand of ecosystem services	*Increased urban biodiversity / ecosystem services*	*Time and spatial distance*
	ID7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No of people per year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	ID8.1 The availability and distribution of parks (different types) or ecosystem	*Fair availability of*	*No of persons*

[69] All values incl. VAT, if not reclaimable.

	services with respect to specific individual or household socioeconomic profiles landscape design	*green spaces and ecosystem services*	*/year or age*
	ID8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*Distance, no. Of households in various categories*
	ID9.5 No of hours spent outdoors; time people spend in the facility	*Increased outdoor presence*	*No of hours per week per capita / hours per capita*
	ID9.16 Number / share of people being physically active (min. 30 min 3 times per week)	*Increased outdoor physical activity*	*No of people / %*
	ID10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	*Definition of parameters for (re)designing green public spaces based on the wellbeing of users*	
	ID10.6 Replication of Solutions		
	ID10.8 Saved healthcare spending	*Savings in healthcare spending*	*Euros per year / %*
	ID10.9 Public Private Investments after 5 years	*Increased public and private investments*	*euros*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	Goal 4. Quality Education	*Microscale (demo neighbourhood)*	
	Goal 11. Sustainable Cities and Communities	*Microscale (demo neighbourhood)*	
	Goal 15. Life on Land	*Microscale (demo neighbourhood)*	
	Goal 16. Peace, Justice and Strong Communities	*Microscale (demo neighbourhood)*	

VS3 Main Contacts (Annex B)

Lead Organization	
Organization name	**University of Malta**
Contact person	[redacted]
Department	Department of Environmental Design and Centre of Entrepreneurship and Business Incubation
Address	[redacted]
Telephone	[redacted]
E-Mail	
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	St Clare's College Gzira Primary School
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert	
Organization name	[redacted]
Role	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	University of Malta
Professional title	[redacted]
E-Mail	[redacted]

VS3 Description (Annex C)

Objectives of the Visionary Solution
"The Visionary Solution provides a social engagement activity in a green public space in Gzira which has been earmarked for renovation. In addition, it targets increased biodiversity and environmental education to school children and the local community as well as improve the health and well-being of both children and adults through the development of an ecological playscape and community garden. Pop-up engagements will be used around Gzira"
Overview of Visionary Solution leader and partners
The visionary solution leader is UM which is responsible for managing the available funding to implement the relevant interventions. The Gzira Local council and the Gzira Primary School are directly associated with the school intervention within this visionary solution. The Gzira Local Council will also support in the social engagement activities including pop-ups in the redevelopment of the Council of Europe Gardens.
General project background, context, and rationale
The Gzira Primary School has one of the few open public spaces in the locality which is only accessible to school children and parents. Focusing on a public institution rather than a private space proved to be more achievable in the course of the VARCITIES Project. Attempts have been made to owners of private open land however complications were arising. By implementing NBS in this pilot site we will not only be providing citizens of the area with a greener space but also educating school children on their benefits. The garden implemented at the school will be open to the public after school hours to provide citizens with a recreational space, which is lacking in the central areas of the locality. The Council of Europe Garden is a recreational park of approximately 20 ha which is a substantial size for such open spaces in the urban area. It provides recreational value for the wider region. It provides for informal play and structured play. A substantial area of the garden is dedicated to soil coverage however the vegetation provision is quite moderate. According to the Environment and Resources Authority (ERA, 2019) the amount of green urban areas available in Malta is 181.1 Ha (ERA, 2019). This was determined using the Corine Land Cover (CLC) description as visualized in the figure. However, for this analysis, the smallest surface mapped when considering green infrastructure is 25 hectares. In fact, "any land cover that is less than 25 ha is not plotted....A case in point is the class on green urban areas. Many of the gardens and areas identified...are too small to be recorded for the purpose of CORINE. For this reason, CORINE land cover is strictly for indicative purposes and not for direct interpretation." (ERA, 2019, p.50) Taking the Council of Europe Garden in Gzira, for example, which acts as a major green space for the wider urban region, this is of just about 20 ha, and such spaces are few a far between in this urban conurbation. This calculation therefore does not take into account the finer grain GI elements which may be found within the urban conurbation. For VARCITIES we plan on organising activities centred around the concept of the project to add cultural and educational value to the place. - Field Observations - Content analysis of existing data - Procurement - Land Survey - Construction Permits - Event Permits - Ethical Clearance - Tender - Citizen Engagement Pop-up Workshops - School Children Workshops - Stakeholder Workshops - Landscape Design - Construction Works

Supporting actions required
An architect is required to file the planning application with the local Planning Authority. Additional support is needed in the compilation of the procurement tender for the implementation of the school garden. The tender will be issued by the University of Malta following the issue of the implementation permit. The permitting procedure might take up to 6 months or more.
Description of the Visionary Solution
NBS interventions and citizen engagement activities will be implemented at the St. Clare Primary School, and cultural events at the Council of Europe Gardens with the intention of embedding a greener perspective into our educational institutions and cultural context. Green walling systems will be installed at the school with particular plants being selected to attract birdlife, bringing nature closer to our urban environments and instil ecological awareness into our younger generations. A Community Garden will be constructed at the school, which will eventually become accessible to the public, contributing to their mental, physical and social wellbeing through greening interventions and integrating the concept of urban gamification of a playscape. During the redevelopment of the Gzira Gardens, a form of citizen engagement approach and possibilities of NBS will be considered together with the Gzira municipality and developers to promote a co-creative attitude towards local planning and development.
Summary of VS components
VS components summarised in Table A.
Replication and/or up-scaling potential
The replication potential of VS3 is for the most part linked to the envisaged playscape solution at the Gzira Primary school. The co-creation process with children is a rather novel approach and the educational multipliers are envisaged to be many. On a national level, such initiatives may instigate a drive towards the creation of NBS solutions in schools with the possibility to integrate the concept of a school with a public space outside of school hours. This is particularly useful in zones that are restricted in space. Such replication potential could also be interesting on an international level where playscapes can be used as a tool for learning and as a means to health and wellbeing of children from a very young age.

VS3 Summary of Visionary Solution Components (Table A)[70]

VS3- An Educational Community Garden project						
# [71]	Visionary Solution components[72]	Brief description of the component	Unit[73]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	School community garden and green playscape following co-design workshops with school children	The development of a school community garden and green playscape aimed at providing school children with improved health and wellbeing as well as educating students in the upkeep and maintenance of the playscape.	1	Improved health and well-being for children and improved biodiversity	4.1 4.2 4.3 6.1 7.8 7.16 8.1 8.5 9.5 10.5 10.6 10.8 10.9	[redacted]

70 All values incl. VAT, if not reclaimable.
71 The number of rows can be adjusted as required.
72 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
73 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

2	Council of Europe Gardens cultural event	An outdoor event will be organised to entice citizens to co-create the garden area and organisation of an educational event to increase awareness on the benefits NBS	1	Co-creation	4.1 4.2 4.3 6.1 7.8 7.16 8.1 8.5 9.5 10.5 10.6 10.8 10.9	[redacted]
3	Pop-up engagement in surrounding locations	Pop-up engagement events will be organised in locations surrounding the interventions	2	Co-creation	4.3 7.8 7.16 8.5 9.5 9.19 10.6	[redacted]
TOTAL						

VS3 Visualisations (Annex D)

Description of the Visionary Solutions

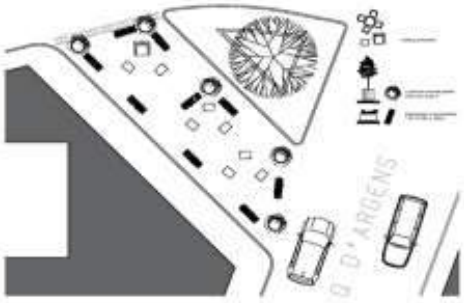
VS3: Urban Biodiversity, Education and Engagement through a CoCreated Community Garden Project

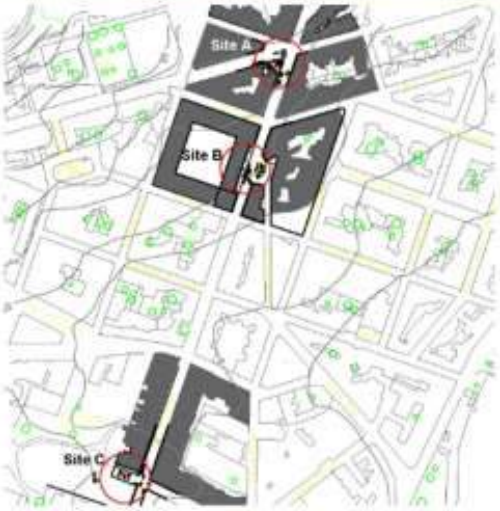
- A community garden with eo design educational workshops involving school children to improve the urban ecosystem, educate children and and improve wellbeing
- Cultural and Popup Event at Gżira Gardens to raise awareness on benefits of NBS
- Creating a green public space in a densely built urban environment

VARCITIES

The latest version of the sketches-visualisations.

VS1/VS3: Pop-up Greening and Citizen Engagement Workshops in Gzira





VARCITIES

Pop-up Description and Case Study

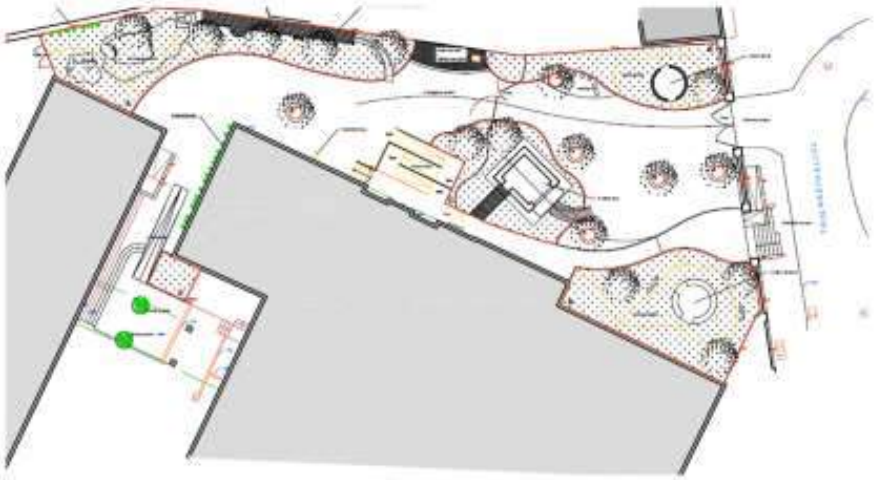
- A modular and mobile green setup engaging citizens and local businesses
- Pop-up parks are created by taking over car designated zones for use by pedestrians.
- Apart from offering seating and possibly bike parking and other amenities, such spaces usually incorporate vegetation so as to encourage human-nature interaction.

A Pop-up in Arlington, Virginia US https://geographical.co.uk/places/cities/item/3323-pop-up-park

VARCITIES

The latest version of the sketches-visualisations.

VS3: Urban Biodiversity, Education and Engagement through a Co-Created Community Garden Project



VARCITIES

Pop-up Description and Case Study

- A modular and mobile green setup engaging citizens and local businesses
- Pop-up parks are created by taking over car designated zones for use by pedestrians.
- Apart from offering seating and possibly bike parking and other amenities, such spaces usually incorporate vegetation so as to encourage human-nature interaction.

VARCITIES

School Garden Ideas and Case Studies

VARCITIES

VS1 - 2 - 3 Stakeholders (Annex E)

Stakeholder analysis			
Type of stakeholder	Current status of engagement	Future engagement activities	Instruments/channels for dissemination and interaction
[redacted]	Collaborators: VS3	School Garden Playscape Project	Telephone, email, in-person meeting, workshops
	Partially funding VS3	School Garden Playscape Project	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop and co-design workshop	VS2 - Sharing of air quality data	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop and co-design workshop	Sharing past experience and expertise on NBS	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop and co-design workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop and co-design workshop, and Gzira resident input	Keeping regular contact to organise events in our intervention sites	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop and co-design workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop and co-design workshop.	Offering Monitoring Support for the School Garden Playscape Project (VS3)	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop and co-design workshop, and collaborator in VS3	Artistic Direction of the playscape for the School Garden Playscape Project (VS3)	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop, and willing to participate in project events	Will be engaged in future VARCITIES Workshops for consultancy And active participation	Telephone, email, in-person meeting, workshops
	Involved in co-implementation workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops

[redacted]	Involved in co-implementation workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-implementation workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-design workshop and willing to collaborate in VS1 and VS3	Will be engaged in future VARCITIES Workshops for consultancy and collaboration in activities	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-design workshop and willing to collaborate in VS1, VS2 and/or VS3	Will be engaged in future VARCITIES Workshops for consultancy and collaboration in activities	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-design workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-design workshop and will collaborate in VS1 or VS3	Will be engaged in future VARCITIES Workshops for consultancy and collaboration in activities	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-design workshop	Will be engaged in future VARCITIES Workshops for consultancy And possibly a collaboration in activities	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-design workshop	Will be engaged in future VARCITIES Workshops for consultancy	Telephone, email, in-person meeting, workshops
[redacted]	Involved in co-design workshop	Will be engaged in future VARCITIES Workshops for consultancy And possibly a collaboration in activities	Telephone, email, in-person meeting, workshops

VS1 - 2 - 3 Strategic Planning and Assessment of the VS (Annex F)

Results of PESTLE analysis

Political factors affecting the planned Visionary Solution

What are the key political factors?

Please describe the (local, national, and potentially international/EU) key political elements.

*Outputs of the co-creation workshops

VS1	VS2	VS3
• Collaborate with private entities	No relevant factors identified	No relevant factors identified

* The following considerations were added by the Pilot leaders

- Compliance with regulations and EU commitments
- Local Council and Central Government interaction
- Sensitive timing to access local funding sources – opening of new structural funding programmes can open new opportunities
- Public spaces should remain public not be glorified restaurants
- Traffic Management in the area
- Political will, empowering the municipality to make it's own decision with budget access
- Investment in Gzira should be possible through EU funding
- Quality of life in the centre of Government's political agenda

Economic factors affecting the planned Visionary Solution

What are the most important economic factors?

*Outputs of the co-creation workshops

VS1	VS2	VS3
No relevant factors identified	No relevant factors identified	No relevant factors identified

* The following considerations were added by the Pilot leaders

- Need input from companies, CSR needs to be implemented in the immediate community
- Cars and restaurants are prioritised over residents
- Possible (financial) contribution to public space by economic operators as well as boat owners / marina management
- Direct access for municipalities to the RRF
- Overly privatised area
- Supporting of local business in the area
- Supporting innovation in the field
- Creating green jobs-skills – such as green space maintenance, installation, et cetera
- Improve financial and other grants for sustainable choices
- Stakeholder mapping and make sure that everyone is involved

Social factors affecting the planned Visionary Solution

What are the most important social and cultural aspects?

*Outputs of the co-creation workshops

VS1	VS2	VS3
• Encourage meeting and social integration creating welcoming spaces • Assess the impact of the intervention on the wellbeing of	• Ask for citizens' opinion on how sustainable modes of transport can be implemented in the area • Establish exciting platforms to	• Ensuring that the public is involved and aware of this opportunity to turn the space into a spot for cultural events, workshops, and leisure activities

those who live/work there • More involvement of "art" or a community board for what events are on nearby	engage citizens and for continuity after the project	• Participatory approaches and high level of community engagement are crucial • Co-design with the children: workshops where they will experience feelings, land compass where they can express themselves and learn how they can grow their own plants • Make a map about kids and youth organisations in the locality (beyond schools) so they can be approached for input and feedback, also as possible future users • How to create ownership of spaces that require citizen participation

* The following considerations were added by the Pilot leaders

- Awareness of recent demographic changes and trends can help develop appropriate solutions (e.g. elderly and issues of access; kids and public play areas)
- Not much focus on the resident's wellbeing both short and long term
- Exercise and sports are important
- Supporting a different lifestyle Complex area that needs stakeholder mapping
- Urban farms even on publicly accessible roofs
- Incomers to the area (expats & foreign workers, locals moving in) to be involved, as there may be a social / linguistic barrier in communication
- How to create ownership?
- The need to improve lifestyle and wellbeing of residents
- Involvement of locality-based NGOs
- Have events linked to a community garden to give it life!
- Consider accessibility for different abilities
- Reuse existing spaces
- Reimagine existing spaces: old houses, rundown places into social activity spa
- Orpheum Theatre
- Possibly identify area which can be pedestrianized, even if on a time based / for a limited no of days per week
- Cycle lanes and parking for bicycles

Technological factors affecting the planned Visionary Solution

What technological innovations could occur?

*Outputs of the co-creation workshops

VS1	VS2	VS3
• Lot of traffic and small pedestrian space so hard to implement greenery • Diminish car parking spaces, create events to close the streets • Consider e-bike and e-scooters parking solutions • Consider the soundscape (installation of bird feeders, fountains, wooden buffers), involving people to find out more about what sounds they would like	• Citizens want to have access to the data collected by sensors about noise, air pollution and wind flow • Possibly engage Local Council / NGOs, so people who cannot provide online / app-based feedback can still contribute and be engaged • In some cities people use a telegram or messenger bot to get updates about air quality	• Concerns about the accessibility and visibility of the space to the public, i.e. it could be perceived as a space which falls part of school property • Who will be ensuring the gardens are maintained? Can the general public be involved in maintaining it? • Consider children with disabilities in terms of "play structures" • Look into how same play areas

to mitigate or eliminate • About air quality and pollution levels, make point not to relocate the traffic pollution to other streets (possible pollution shifting) • Take into account a study on slow streets done by the Local council; in general, pay attention not to create a good situation here and ruin it somewhere else • Document the intervention in an audio-visual way since it will likely inspire others • At a research level, include biodiversity indicators to monitor project performance • Integrate waste collection facilities • Propose road infrastructure measures that can lead to the use of sustainable modes of transport • Passage-ways, seating, pavements, etc. (which may be necessary) are all take up space, and could minimise the actual greening effect • Address the minor feeder roads in the main junctions, and possibly remove the feeder function of these roads (e.g. keeping access to residents only)	in their neighbourhood (to raise awareness)	can be used by kids and adults (i.e. elderly) for fitness, exercises, playful therapy • Integrate shading facilities (possibly removable in winter) to extend possible use of the space

* The following considerations were added by the Pilot leaders

- Open data portals
- Green roofs to cool buildings and improve air quality
- Modern technologies to improve research and development
- Crowd Sourcing of data – including Social Media Analysis
- Alternative traffic routes can be promoted using real-life traffic / mobility data
- Use tools for citizen science to report biodiversity, environmental issues, etc interactively
- Develop shading devices that can also serve as greening facilities
- Data sharing which is important for evidence base

Legal factors affecting the planned Visionary Solution

What current and upcoming legislation could affect the sector?

*Outputs of the co-creation workshops

VS1	VS2	VS3
No relevant factors identified	No relevant factors identified	No relevant factors identified

* The following considerations were added by the Pilot leaders

- School restrictions means that a playscape garden would be difficult to access for citizens – to have discussions with school administration however we do not have much control over the situation
- Health and Safety law – We will seek consultation from technical experts with a health and safety warrant
- Implementation of EU environmental laws – will take into consideration in our intervention designs
- Lack of enforcement for infringements of building developers/air quality (apart from LESA) - by raising consciousness about the problem we attempt to highlight the urgency of the situation so action is taking by the state
- Compliance with EU standards (air quality and noise thresholds) - by raising awareness we would like to make people aware of their daily consumption of fossil fuels

Environmental factors affecting the planned Visionary Solution

What are the environmental considerations we should bear in mind?

*Outputs of the co-creation workshops

VS1	VS2	VS3
• More shade is required, especially for the sustainability of the micro climates to be created • Improving the ecosystem, link the biodiversity impact to greater awareness of biodiversity already (still) present in the area • The plants that we will be using, working together with the biology department on what species • Study how planting could work effectively for reduction of noise pollution • Supplement this intervention with greening interventions on façades	No relevant factors identified	No relevant factors identified

The need of an Environmental Impact Assessment (EIA)[74] is to be determined at application stage of VS3 (the school garden project)

* The following considerations were added by the Pilot leaders

- Pavements are difficult for pedestrians to use
- Research on sustainable materials
- Support local species
- Build natural corridors between gardens and nature spots in the vicinity
- Shade is important to enjoy outdoor areas
- Large built areas in Malta reduce air exchange and have heat and pollution pockets
- Air quality targets
- Cool and green city actions implemented
- Find ways how the sea can be valorised for residents
- Aesthetic assessment of the urban space, with recommendations for improvement
- Creating shade with trees to encourage social interaction in the streets
- Greenery to improve air currents, air exchange, etc...
- Involve NGOs to contribute and make use of environmental resources developed by the project
- Integration of the relevant policy areas (especially environment, spatial planning & transport)
- Increase all greening to avoid flooding
- Breathable pavements and roads
- Assess possibility of installing shading material (similar to street installed in Spain
- Improve the ambient air in Gzira by improving air currents
- Rue D'Argens is a heat trap, It would be great to look at it holistically to reduce fuel traffic and increase greenery. Plants and trees also absorb noise and vibrations

Results of SWOT analysis

Strengths affecting the planned Visionary Solution

Please describe the endogenous factors that can favour the pursuit of VS objectives.

74 The EIA Directive (85/337/EEC) applies to a wide range of public and private projects in Europe, which are defined in Annexes I and II of the document.

*Outputs of the co-creation workshops

VS1	VS2	VS3
• Collaborate with private entities • Encourage meeting and social integration creating welcoming spaces • Assess the impact of the intervention on the wellbeing of those who live/work there • More involvement of "art" or a community board for what events are on nearby • Consider e-bike and e-scooters parking solutions • Supplement this intervention with greening interventions on facades • Integrate waste collection facilities • Propose road infrastructure measures that can lead to the use of sustainable modes of transport	• Establish exciting platforms to engage citizens and for continuity after the project • Possibly engage Local Council / NGOs, so people who cannot provide online / app-based feedback can still contribute and be engaged	• Participatory approaches and high level of community engagement are crucial • Co-design with the children: workshops where they will experience feelings, land compass where they can express themselves and learn how they can grow their own plants • Integrate shading facilities (possibly removable in winter) to extend possible use of the space • Consider children with disabilities in terms of the "play structures"

* The following considerations were added by the Pilot leaders

- A multi-disciplinary team who can assess, analyse and develop strategies from different perspectives which are adequate for the implementation of the VSs
- Lack of urban greening has been a strong political debate and had media presence over the years, therefore collaborations are easier as such topics attract interest of various stakeholders with a common objective
- Support from other departments within the University of Malta

Weaknesses factors affecting the planned Visionary Solution

Please describe the endogenous factors that can hinder or delay the VS implementation process.

*Outputs of the co-creation workshops

VS1	VS2	VS3
• Lot of traffic and small pedestrian space so hard to implement greenery • Diminish car parking spaces, create events to close the streets • Passage-ways, seating, pavements, etc. (which may be necessary) are all take up space, and could minimise the actual greening effect	No relevant factors identified	• Concerns about the accessibility and visibility of the space to the public, i.e. it could be perceived as a space which falls part of school property • Who will be ensuring the gardens are maintained? Can the general public be involved in maintaining it? • How to create ownership of spaces that require citizen participation

* The following considerations were added by the Pilot leaders

- Lengthy bureaucratic process for procurement, tendering and ethical compliance
- Lack of public financial resources/investment for greening infrastructure implementation and maintenance
- COVID-19 restrictions may weaken project participation
- Most of the residents are transients which may affect long-term commitment to the project engagement activities

Opportunities affecting the planned Visionary Solution

Please describe the exogenous factors that can affect positively the VS implementation.

*Outputs of the co-creation workshops

VS1	VS2	VS3
• Study how planting could work effectively for reduction of noise pollution • Consider the soundscape (installation of bird feeders, fountains, wooden buffers), involving people to find out more about what sounds they would like to mitigate or eliminate • Document the intervention in an audio-visual way since it will likely inspire others • At a research level, include biodiversity indicators to monitor project performance • Address the minor feeder roads in the main junctions, and possibly remove the feeder function of these roads (e.g. keeping access to residents only)	• Citizens want to have access to the data collected by sensors about noise, air pollution and wind flow • Ask for citizens' opinion on how sustainable modes of transport can be implemented in the area • In some cities people use a telegram or messenger bot to get updates about air quality in their neighbourhood (to raise awareness)	• Ensuring that the public is involved and aware of this opportunity to turn the space into a spot for cultural events, workshops, and leisure activities • Look into how same play areas can be used by kids and adults (i.e. elderly) for fitness, exercises, playful therapy • Make a map about kids and youth organisations in the locality (beyond schools) so they can be approached for input and feedback, also as possible future users

* The following considerations were added by the Pilot leaders

- Project support from employees within the University of Malta who are responsible for transport, personal data protection, communications team , IT services and interns
- Local events and communication channels are efficient avenues to be exploited for the facilitation of interaction and collaboration
- This project will provide a model for replication which may present employment opportunities, experience in management and investment in NBS
- Accessibility to academic resources and literature

Threats affecting the planned Visionary Solution

Please describe the exogenous factors that can affect negatively the VS implementation.

*Outputs of the co-creation workshops

VS1	VS2	VS3
• About air quality and pollution levels, make point not to relocate the traffic pollution to other streets (possible pollution shifting) • Take into account a study on slow streets done by the Local council in general, pay attention not to create a good situation here and ruin it somewhere else	No relevant factors identified	No relevant factors identified

* The following considerations were added by the Pilot leaders

- Due to the lengthy bureaucratic processes mentioned above, target dates are at risk of not being met
- Political polarisation may decrease participation from citizens and local businesses
- COVID-19 restrictions may delay timelines

Risk and mitigation measures				
Risk (description)	**Probability (Unlikely – Likely – Very likely)**	**Impact (Low – Moderate – High)**	**Risk level (Low – Medium – High – Extreme)**	**Mitigation measures (description)**
Permit application for interventions turned down by local Planning Authority	Unlikely	High	Low	The only intervention requiring permits is the school playscape under VS3. An alternative design strategy would be to only include micro interventions within the school area.
Pop-up engagement activities not frequented	Likely	Moderate	Moderate	Other engagement activities are being organised including the workshop with residents in the Council of Europe Gardens area under VS3. This would help to increase the possibility of engaging and co-creating.
Resident/Shop owner objections to interventions	Unlikely	High	Low	Whilst every effort will be done to inform citizens and shop owners of the efforts that are being done close to them, it might be that people might, for some reason, object. The Varctiles team along with the Local council will try to explain better the overall benefits of interventions.
Budget restriction	Likely	Moderate	Moderate	The interventions will be optimised within the current budget limitations of each Visionary Solution.
Inability to adhere to deadlines due to lengthy bureaucratic process	Likely	High	High	Reduction of time duration from citizen engagement activities
COVID-19 restriction may delay timelines	Very Likely	Moderate	Moderate	We will need to adapt to the situation.

VS1 - 2 - 3 Economic and Financial Analysis of the VS (Annex G)

Ownership of assets and management structure			
Procurement structure			
Estimated costs and revenues			
CAPEX (major expenditures foreseen over the long term for the implementation of the VS)	**VS1**	**VS2**	**VS3**
The estimated cost of planning processes	[redacted]		
The estimated cost of installation	[redacted]		
Estimated equipment cost	[redacted]		
Other(s) [please specify]	[redacted]		
Total investment cost	[redacted]		
OPEX (day-to-day expenses need to ensure the VS operation)			
Estimated maintenance cost (n° of years)	[redacted]		
Estimated staff cost (n° of years)	[redacted]		
Estimated external sub-contracting (n° of years)	[redacted]		
Other(s) [please specify]	[redacted]		
Total operating cost *(n° of years)*	[redacted]		
Financing approach and funding sources			
Total investment cost	[redacted]		
Own funding of the promoter / local cluster	[redacted]		
VARCITIES project	[redacted]		
Other sources [please specify]	[redacted]		

VS1 - 2 - 3 Table B – Business Model Canvas

<table>
<tr>
<td colspan="2">Key activities

- Educational/Co-Design/Science Workshops with School Children
- Pop-up Citizen Engagement Workshops in Pilot Site
- Pop-up green interventions in Rue D'Argens
- Community Garden with a Playscape at the Primary School
- Citizen Science Air Quality Sensors Workshops
- Urban micro-greening of an area of Rue D'Argens
- Survey with Residents</td>
<td>Key resources

- Community Engagement Expertise
- Citizen Science Expertise
- Air Quality/Flow Expertise
- Academic Support from other departments at University of Malta; Biology, Statistics, Urban and Environmental Design
- University Procurement, Technical and Communications support</td>
<td>Value proposition

- Creating and outdoor learning environment for children
- Creating a public space for citizens
- Increasing awareness of air and noise pollution
- Greening and Cultural Placemaking activities with citizens and local businesses in intervention areas
- Increase biodiversity
- Regeneration of Rue D'Argens Street by making the area more attractive and creating opportunities</td>
<td>Key partners
-
- Local Government
- Biology department
- Statistics department
- Urban and Environmental Design departments
- Local businesses
- Citizens
- Public institutions</td>
<td>Key beneficiaries

- Users of the spaces; residents, school children, parents, passers-by, tourists
- Cultural NGOs
- Environmental NGOs
- Local Government
- Local Businesses</td>
</tr>
<tr>
<td colspan="3"></td>
<td colspan="2">Governance structure

- Bottom-up Community Engagement Model:
- Stage 1: Identification of Pilot Site
- Stage 2: Field Observations
- Stage 3: Stakeholder Co-identification and Co-Design Workshops
- Stage 4: Liaison with Local and Central Government
- Stage 5: Data Collection from Citizen Engagement
- Stage 6: Implementation
- Stage 7: Add Cultural and Environmental Value through Educational Activities and Events</td>
</tr>
<tr>
<td colspan="2">Cost structure

- Green Infrastructure Services and Installation Budget
- Citizen Engagement Workshops Budget
- Stakeholder Workshops Budget</td>
<td>Channels

- Social Media: Facebook, Instagram, Twitter
- Digital WSs
- Pop-up WSs in pilot site
- Press Releases
- Project Opening Events, an Art Exhibition and a Cultural Event involving Ministers
- News Articles
- Academic Publications</td>
<td colspan="2">Capturing value

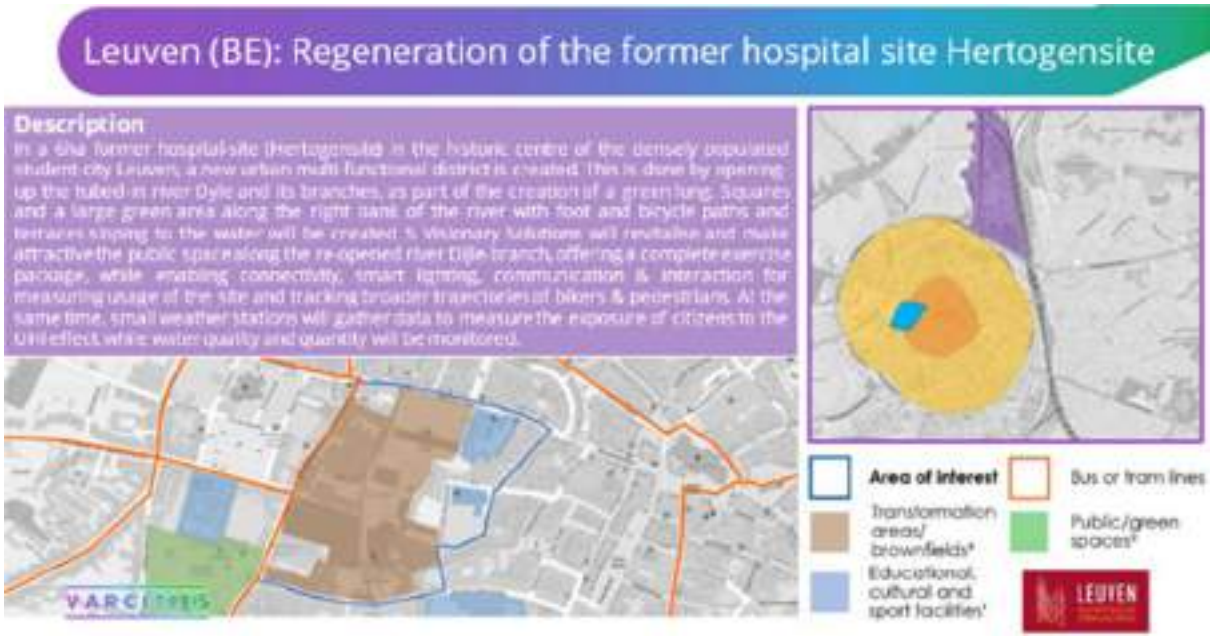
- Increase in the value of surrounding properties
- Creation of Jobs
- Revenue for local businesses
- Enhance visual aesthetics of the area
- Provide opportunities for cultural and environmental events
- Educate citizens on the benefits of NBS
- Increase biodiversity in the area and improve the</td>
</tr>
</table>

	Cost reduction - Choice of Plants and trees - Placemaking – by investing in the skills of citizens and local businesses for the provision of goods and services (voluntarily) - New technology and approaches - to reduce maintenance costs	ecosystem of the micro-climate

5 Leuven (BE): Hertogensite- Regeneration of the former hospital site

Overview of the pilot area and the VS

Annex D: Leuven- the Pilot area



Annex D: Leuven- the existing situation

Annex D: Leuven- site/ cultural heritage

Annex D: Leuven- the masterplan

Annex D: Leuven- the masterplan

Annex D: Leuven- Objectives/ H&WB link

Annex D: Leuven- the Visionary Solutions on the masterplan

Overview of the sketched solutions

VS1- Riverside urban living room linked to culture and heritage

VS1 Summary (Annex A)

<table>
<tr><td>Title</td><td>Riverside Urban Living Room linked to culture and heritage</td></tr>
<tr><td>Motto</td><td>"VS1 provides a meeting place to inhabitants of Leuven in order to allow for low threshold social contact."</td></tr>
<tr><td>Location of the planned investment</td><td>Hertogensite park along the Dyle River</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Leuven/Resiterra</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>x</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>At Hertogensite, the tubed-in Dyle River will be opened up and the medieval city wall along it will be restored. Next to that a new park will be created. What is now a fully built area, will be transformed into a green district, where riverbanks will be re-opened and the connection between the city centre and the river landscape will be re-established.

An urban living room will be created along the opened up river, directly connected with the history of the site, as part of the restored fortification wall. The urban living room will be visualised with contemporary elements, combining accessible resting and exercise areas, while also being able to host various activities. The overall objective of the intervention is to revitalise and make attractive the public space along the re-opened river Dijle-branch.

This solution aims to stimulate social contact. Being a place linked to nature and the cultural heritage it will have a natural attraction for people, offering a welcoming sheltered seating area along the river and the designed paths of the park.

The challenges addressed by this solution are linked to Green Space Management, Social justice and Social Cohesion, Public Health & Well-being, Urban regeneration, Participatory planning and Governance.

The objectives of the urban living room have been: 1) To implement NbS</td></tr>
</table>

	integrated with Social and Cultural innovation, 2) To co-create the solution with the public and the local authority, 3) To increase Health and Well-being through sense of safety, recreation, relaxation, social interaction and increased physical activity.		
Total investment planned	The total investment in de natural based solution being the opening up of the river and the creation of the park and the restauration and visualisation project of the medieval city wall adds up to over 5.500.000 euro.		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources (Resiterra nv)	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected Impact	Unit
	I.D 4.3 Recreational (number of visitors, number of recreational activities) or cultural (people involved, children in educational activities) value of green spaces	Increased recreational or cultural value of green spaces	*No. of visitors year-1, No. of recreational activities year-1*
	I.D 6.9 Increased accessibility of cultural facilities	*Increased accessibility of cultural facilities*	*km / min*
	I.D 7.1 Openness of participatory processes	*Increased and improved participation*	*No. of people / year*
	I.D 7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	*Increased and improved participation in the development and delivery of interventions*	*No. of people / year*
	I.D 7.16 No of persons involved (on average) in the project activities	*Increased and improved participation in the project activities*	*No of persons / year or age*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved	no./% of individuals/participants

		participation	
	I.D 7.17 Increased and improved participation in activities involving children	*Increased and improved participation in activities involving children*	*No of activities involving children*
	I.D 8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	I.D 8.10 Accessibility of open public spaces and buildings for families with baby carriages and individuals with restricted mobility	*Greater inclusion of families with babies and individuals with restricted mobility*	*No. of to people with physical limitations*
	I.D 9.5 No of hours spent outdoors, time people spend in the facility	*Increased outdoor presence*	*No of hours per week per capita / hours per capita*
	I.D 9.8 Feeling of improving the quality of life (the Quality of Life questionnaire)	*Improved quality of life*	*Scales' scores*
	I.D 9.13 Residential attachment and satisfaction	*Increased residential attachment and satisfaction*	*Scales' scores*
	I.D 10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	*Definition of parameters for (re)designing green public spaces based on the well-being of users*	
	I.D 10.6 Replication of solutions	*Replication of VARCITIES NbS outside pilot cases*	
	I.D. 10.9 Public Private Investments after 5 years	*Increased public private investments*	*Euros*
Contribution to SDGs	*SDG n° and name*	Expected impact	

	Goal 11: Sustainable Cities and Communities	Microscale (demo/ neighbourhood)
	Goal 3: Ensure healthy lives and promote well-being for all at all ages	Microscale (demo/ neighbourhood)

VS1 Main Contacts (Annex B)

Lead Organization	
Organization name	City of Leuven
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution	
Organization name	[redacted]
Role	Design
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. The "face" of the project in front of the public.	
Organization name	City of Leuven
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS1 Description (Annex C)

Objectives of the Visionary Solution	
"The Visionary Solution provides a meeting place to inhabitants of Leuven over the year in order to lower the threshold for social contact."	
Overview of Visionary Solution leader and partners	
partners	**Role**
City of Leuven (Leader)	Will be responsible to pay for the building of the solution and guide the design
Resiterra (partner)	Private developer responsible for the realisation of the park as a whole
360 architects (partner)	Designer of the park and the urban living room
Contractor (partner)	Still to be appointed, responsible for building the urban living room

General project background, context, and rationale

- Leuven is the capital of Vlaams-Brabant, one of Belgium's ten provinces. It is situated 25km east of Brussels and covers an area of 5663 ha. It has a moderate maritime climate, with generally mild wet winters and relatively cool, damp summers. The annual rainfall amounts to about 750 mm and falls evenly throughout the year.
- The population of Leuven in 2018 was 101.213, showing a strong growth in recent years with everything indicating that the trend will persist. With international migration playing an important role in this growth, the city is increasingly diverse (over 170 nationalities). On the other hand, the University plays an important role, with many young people in their 20s living in Leuven.
- The economy in Leuven is good, with annual growth of more than 3%. Unemployment in 2018 was 7%. Leuven is a real SME city with a lot of micro-enterprises. Number of starters is high but growth remains difficult. Leuven is a shopping city with a very concentrated core shopping area attracting people from surrounding municipalities.
- Leuven has itself set a target to be climate neutral by 2050. CO2 emissions show a slight reduction in the last years, but still can gain a lot in the field of renewable energy
- Withing Leuven, several important blue-green infrastructures connect large green areas together, bringing nature into the city. The demo site is in the valley of the river Dijle, so giving space to water again is an important goal.
- Air quality in Leuven is good in general, although there are some points requiring attention (ring road and roads leading to centre)
- Concerning health, Leuven has a two-speed population: The high educated people have a good subjective and objective health condition. But there is a growing group that has difficulties to pay their medical expenses, a group that doesn't participate with health programmes such as cancer screening or has unhealthy lifestyle habits (mostly immigrants). Child poverty is in general increasing. Universal primordialism is therefore important for Leuven: we have to offer projects and campaigns for the global population in combination with specific efforts to reach certain vulnerable groups.
- The pilot area for the VARCITIES project is a former hospital site in the medieval centre of the city. This fully built area will be transformed into a green district, where riverbanks will be re-opened and the connection between the city centre and the river landscape will be re-established.

  The area will become a multifunctional neighbourhood with different housing typologies, economical functions like hotels, shops, restaurants and cafés and co-working spaces. Cultural attractions like the new performing arts hall for the city and a museum site on the history and future of health care will be the heart of this area.

- Relevant municipal infrastructure projects by the project promoter(s) that would be running in parallel to the Visionary Solution: JUSTNature H2020 project, Leuven Rainwater Strategy 2019, Leuven drought strategy 2020, "Leuven mobility plan" 2016, "Kom op voor je wijk" ("Stand up for your neighbourhood"): Citizen engagement program, "Leuven 2025-2035-2050" roadmap for a climate-neutral city

Supporting actions required

- The concept design has to be elaborated to a final and detailed design.
- A building permit is required.
- A procurement for building the solution has to be organised
- The building of the solution

Description of the Visionary Solution

Initially as part of VS1, a riverside mobile urban living room for cultural activities was foreseen on the Hertogensite site with the objective of revitalising and making attractive the public space along the re-opened river Dijle-branch.

During a revision plan for the pilots following the kick off of VARCITIES project, it was decided not to have a mobile element, but rather a fixed structure that would function as an urban living room, in the same context and with the same objectives, towards addressing challenges related to green space management, social justice and social cohesion, Public H&WB, Urban Regeneration, Participatory Planning and Governance.

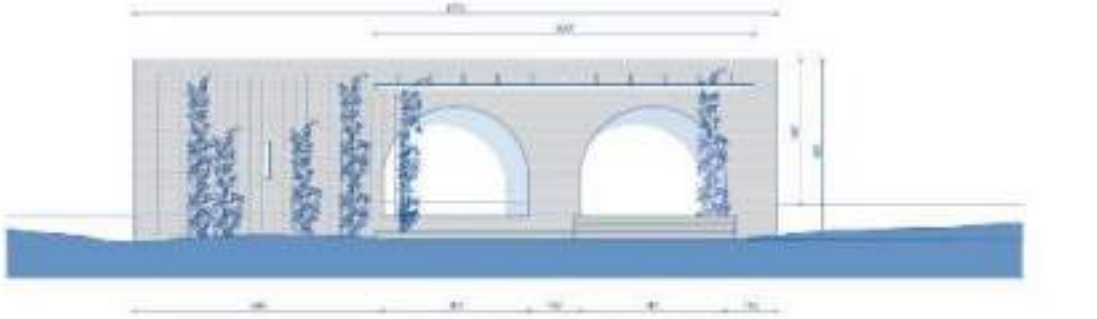
As an outcome of the cocreation process it was decided that the medieval city wall is a very important element in the identity of the park and should therefore be integrated in the overall design. It felt therefore natural to link the realisation of the urban living room to the visualisation of the disappeared parts of the city's fortification, creating a balanced architectural quality in the park and offering a link to the cultural heritage of the site.

Merging VS1 and VS3: As an outcome of the co-creation process it was also decided that the moving bench of VS3, instead of being a stand-alone element in the park, it should be integrated in the "reconstructed" part of the fortification wall around which the urban living room will be created.

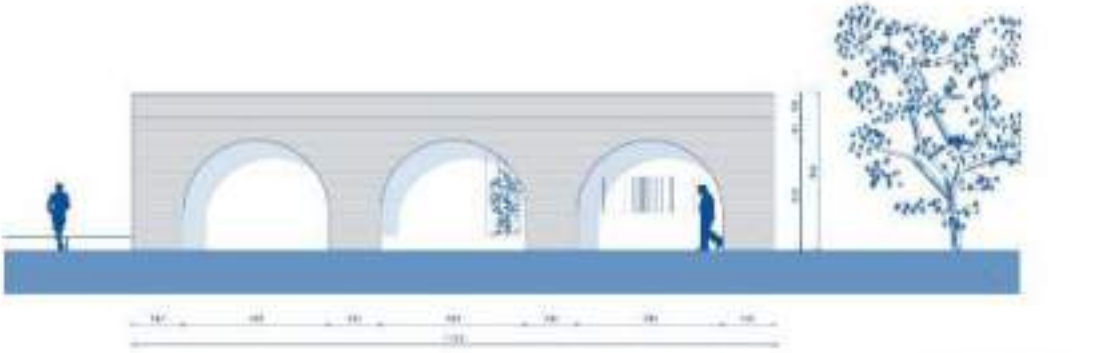
Therefore, the result of the co-creation process has been the partial merging of VS1 and VS3 and the creation of a 'moving wall', which offers a sheltered place to sit, meet, move, inform, educate. The uses and functions of VS1 and VS3 are integrated in a contemporary visualisation of the medieval city wall which becomes a place linked to nature and the cultural heritage, with a natural attraction for people, offering a welcoming sheltered seating area along the river and the designed paths of the park.

The VARCITIES solutions VS1 and VS3 fit very well in the idea of re-vitalising the track of the city-wall while at the same time valorising the cultural heritage of the site. Besides, as part of the general masterplan, 2 old fortification towers along this track will also be restored.

The urban living room of VS1 is therefore established along a new (partly covered) structure with arches in stamped concrete and steel canopy, able to host the following activities: sports – playing – games - exercise – meeting – resting – enjoying culture and nature – education…The structure will be covered with climbing plants and fruit trees, similar to what the city wall used to look like in the past. It will be a combination of an active exercise/sports space with info-panel along the health trail (VS3) at the garden side with a rest point/meeting place (riverside urban living room) at the riverside (VS1)



Zicht vanaf de Dijle



Zicht vanaf het Park

Summary of VS components
VS component(s) summarised in Table A.
Replication and/or up-scaling potential
Because of the very specific context of the urban living room, integrated into the visualisation of the medieval city wall, it will not be reproduced in other locations. But the concept of an urban living room integrated in parks and public spaces, if shown that it works well here, can be reproduced elsewhere.

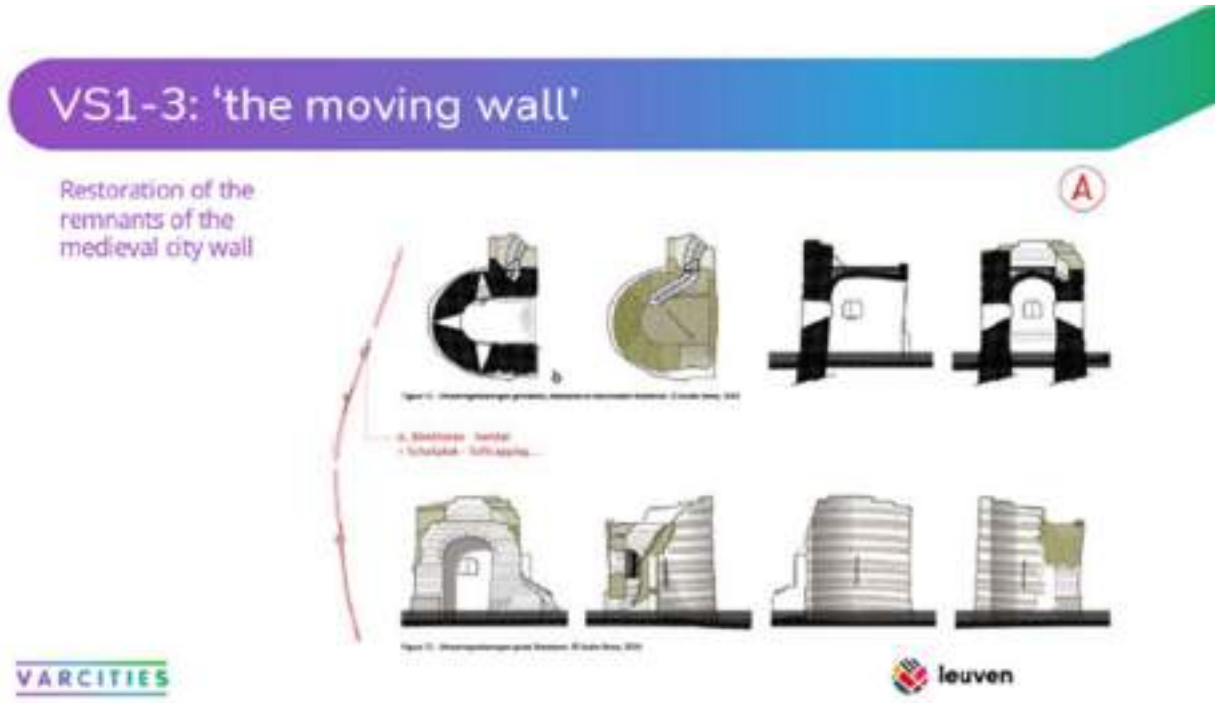
VS1 Summary of Visionary Solution's Components (Table A)[75]

VS1- Urban living room						
# [76]	Visionary Solution components[77]	Brief description of the component	Unit[78]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Micro-pillars	Elements to create stability for the wall	1	Increased Health and Wellbeing Implementation of Solutions integrated with Digital, Social and Cultural innovation	I.D 4.3 I.D 6.9 I.D 7.1 I.D 7.8 I.D 7.16 I.D 7.17 I.D 8.5 I.D 8.10 I.D 9.5 I.D 9.8 I.D 9.13 I.D 10.5 I.D 10.6 I.D. 10.9	[redacted]
2	foundation	Elements to create stability for the wall	36,17 m³			[redacted]
3	Stamped concrete wall	Main structure of the wall	90,1 m³			[redacted]
4	Steel canopy	Creating a covered area for meeting	17,85m²			[redacted]
5	Sitting area under canopy	Room for meeting	16,54m²			[redacted]

75 All values incl. VAT, if not reclaimable.
76 The number of rows can be adjusted as required.
77 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
78 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

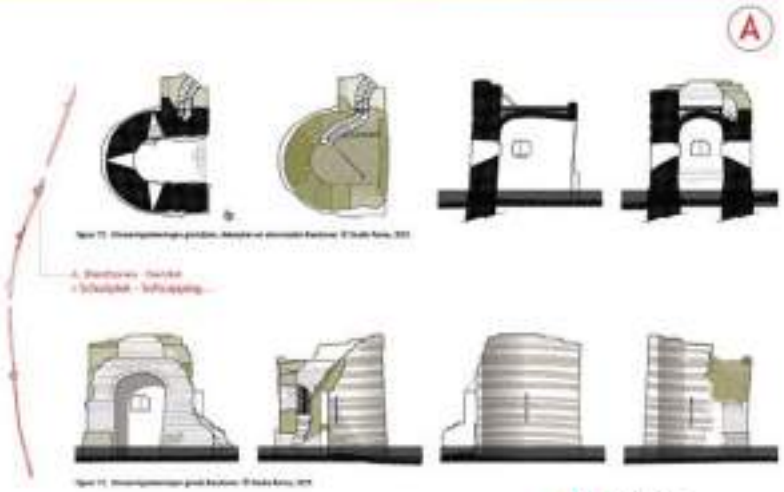
TOTAL		[redacted]

VS1 - 3 Visualisation (Annex D)



VS1-3: 'the moving wall'

Restoration of the remnants of the medieval city wall

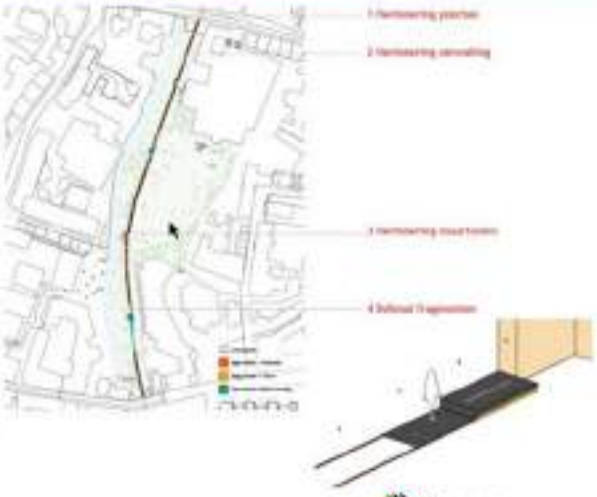


VARCITIES

leuven

VS1-3: 'the moving wall'

The visualization concept for the disappeared elements of medieval city wall

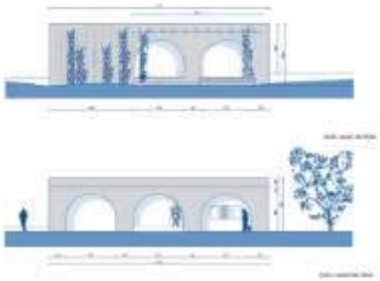


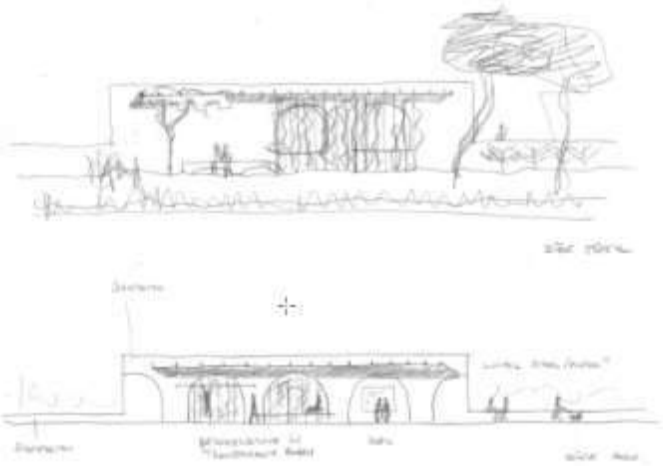
VARCITIES

leuven

VS1-3: 'the moving wall'

Adding a canopy and seating area as a sheltered meeting space near the Dyle in a green setting

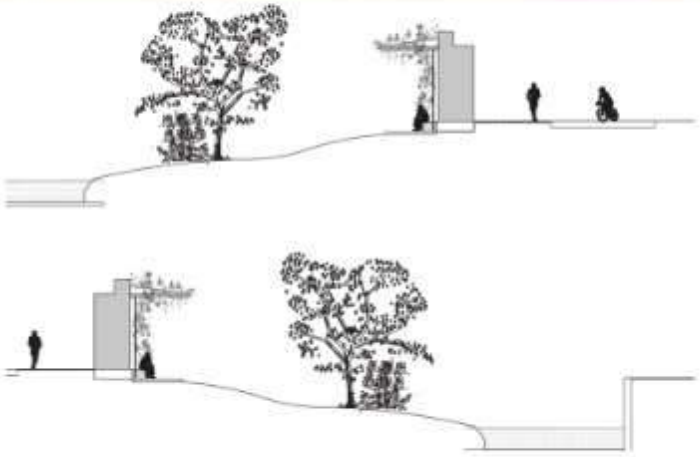




VARCITIES leuven

VS1-3: 'the moving wall'

Adding a canopy and seating area as a sheltered meeting space near the Dyle in a green setting



VARCITIES leuven

VS2- Sensors for health and water measurements

VS2 Summary (Annex A)

<table>
<tr><td>Title</td><td>Sensors for Health and Water measurements</td></tr>
<tr><td>Motto</td><td>"The Visionary Solution provides data/knowledge to the city over the year in order to know the impacts of opening up the water and greening the area on the liveability of the area."</td></tr>
<tr><td>Location of the planned investment</td><td>Hertogensite, sensors in the park and in the river</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>City of Leuven/VMM</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>X</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>X</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>Hertogensite at the moment is a completely hardened surface. The revitalisation project creates lots of green spaces and reopens the tubed in Dyle River. As a city we want to know what the impact will be on the living quality of this area by measuring the quality of the water and the climate. This way we can know and show the expected positive impact of the project.

By installing sensors and through the measurement of surrounding factors, like temperature, wind and air humidity, the comfort conditions in the area will be monitored. Small weather stations and sensors will gather data to measure the exposure of citizens to the UHI effect. Water quality of the opened-up river branch will also be monitored.

Hosted around the urban living room and the installed weather stations, educational activities can be set up to introduce to citizens weather and city-climate related topics

The challenges addressed through this Visionary Solution are related to Water management, Public H&WB, Climate mitigation & adaptation, Green Space Management</td></tr>
</table>

Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources (please specify)	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impacts	Unit
	I.D 1.2 Decrease in mean or peak daytime local temperatures	*Reduced urban temperature*	*°C*
	I.D 1.3 Measures of human comfort	*Reduced urban temperature/ Improved human comfort*	*various*
	I.D 2.3 Improved surface water quality Water quality indicators (physical)	*Improved surface water quality*	*turbidity (NTU), field temperature (°C)*
	I.D 5.5 Physical air quality indicators: temperature, humidity, etc.	*Improvement of local climatic conditions*	*°C, %*
	I.D 5.6 Chemical air quality indicators	*Reduction of air pollution*	*µg of pollutant m-3, others (for each species)*
	I.D 7.1 Openness of participatory processes	*Increased and improved participation (co-creation process)*	*No. of people / year*
	I.D 7.16 No of persons involved (on average) in the project activities	*Increased and improved participation in the project activities*	*No of persons / year or age*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year

[79] All values incl. VAT, if not reclaimable.

	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	I.D 7.17 No of activities involving children	*Increased and improved participation (activities involving children)*	*No of activities involving children*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	Goal 3. Ensure healthy lives and promote well-being for all at all ages	Micro scale (demo / neighbourhood)	

VS2 Main contacts (Annex B)

Lead Organization	
Organization name	City of Leuven
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	VMM
Role	Providing the water sensors
Address	/
Telephone	[redacted]
E-Mail	[redacted]
Organization name	City of Leuven
Role	Coordinating climate actions
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS2 Description (Annex C)

Objectives of the Visionary Solution	
"The Visionary Solution provides data/knowledge to the city in order to know the impacts of opening up the water and greening the area on the liveability of the area."	
Overview of Visionary Solution leader and partners	
partners	**role**
City of Leuven (Leader)	Responsible for the solution
VMM (partner)	Responsible for river management, will provide a water sensor
KU Leuven (partner)	Onboarding of weather station data into Leuven Cool open data platform
General project background, context, and rationale	
- Since several years, a quadruple helix project is operational in which the university KU Leuven collaborates with the city of Leuven, non-profit organisation Leuven 2030, the Royal Meteorological Institute, and citizens of Leuven to investigate the city climate. Within this project, the effect of green areas on climate-related parameters such as temperature in the public and private domain are mapped and studied. For this, a network of more than hundred low-cost weather stations are spread in the Leuven' area. Also, at Hertogensite a weather station will be placed to capture these climate-related data of the new green site in the city centre which will add valuable data within this project. - Hertogensite at the moment is completely hardened surface. The revitalisation project creates lots of green spaces and reopens the tubed in Dyle River. As a city we want to know what the impact will be on the living quality of this area by measuring the quality of the water. - Other relevant municipal infrastructure projects by the project promoter(s) running in parallel to the Visionary Solution: JUSTNature H2020 project, Leuven Rainwater Strategy 2019, Leuven drought strategy 2020, "Leuven mobility plan" 2016, "Kom op voor je wijk" ("Stand up for your neighbourhood"): Citizen engagement program, "Leuven 2025-2035-2050" roadmap for a climate-neutral city	
Supporting actions required	
- The contract with VMM (Flemish Environmental Agency) has to be signed up for the water sensors - The contract with KUL has to be signed up for the climate station	
Description of the Visionary Solution	
As a city we want to know what the impact will be on the living quality of this area monitoring several health aspects. On one hand we will measure the quality of the water of the newly opened tube of the Dijle. The VMM public company is responsible for the management of the river and will foresee the installation of the water quality sensor and will provide the water quality data that can be visualized in the VARCITIES health and well-being platform. Another option considered is that of monitoring the surface water quality through water samples. Also, several parameters reflecting climate-related conditions of the environment, such as temperature, air humidity, radiation..) are monitored using one weather station that will be placed on the site, as presented on the images below. Data will first be sent to a central gateway that is located nearby the Hertogensite, and then sent to the Leuven Cool open data platform. These data can also be visualised in the Health & Well-Being data platform of VARCITIES.	

We expect to see a positive impact of the nature-based solutions on both water and environmental climate-related parameters at the site, compared to other areas in the city.,

Hosted around the urban living room and the installed weather stations, educational activities can be set up to introduce to citizens weather and city-climate related topics.

Summary of VS components

The VS components are summarised in Table A.

Replication and/or up-scaling potential

The weather stations already are introduced in different locations within the city, so already part of a network.

The water measurements are handled by the river manager (VMM) who has the required expertise to do this also in other locations.

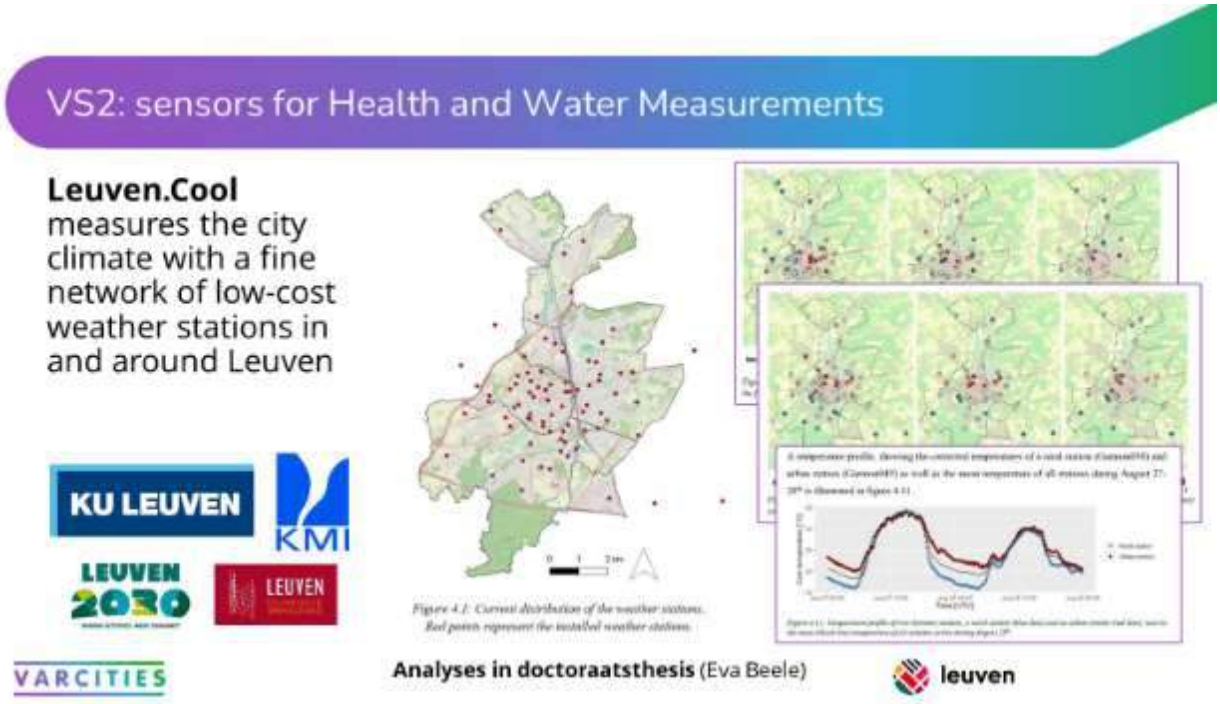
VS2 Summary of Visionary Solution's Components (Table A)[80]

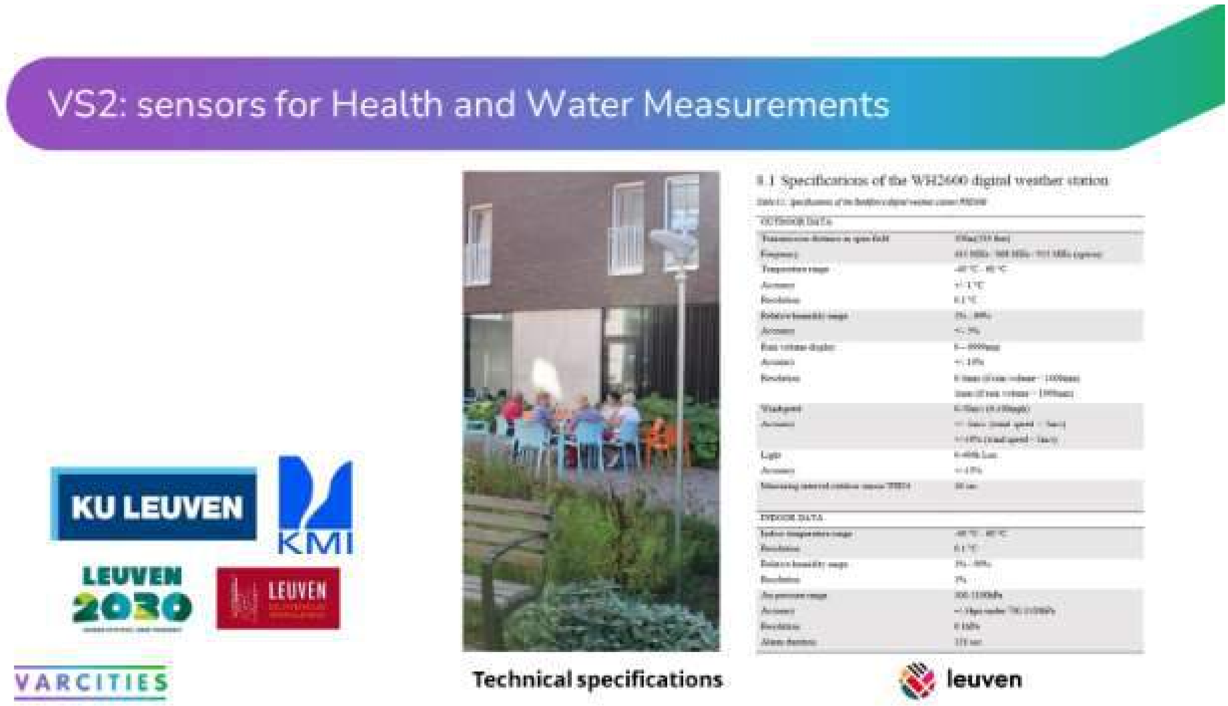
VS2 – Health and water measurements						
# [81]	Visionary Solution components[82]	Brief description of the component	Unit [83]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Monitoring local climate conditions	A weather station will be placed at the park to measure environmental parameters such as temperature, humidity, air pressure…	1	The city suffers from heath island effect, causing every year a lot of deaths. The weather station will measure if the opening up of the river and greening of the area will have a positive impact on local climate conditions: Through this we will gain Knowledge/data about the impact of opening up of the river and greening of the area	*I.D 1.2* *I.D 1.3* I.D 5.5 I.D 5.6 I.D 7.1 I.D 7.16 I.D 7.17	[redacted]
2	Monitoring local climate conditions	Installation weather station, connectivity, API and maintenance related costs,	1			[redacted]
3	Water quality	VMM will install a multi-parameter probe in the water to continuously measure water quality parameters dissolved oxygen, pH,		Water quality is important for biodiversity in the water. By opening up the river it is expected that by adding oxygen and light to the water,	*I.D 2.3*	[redacted]

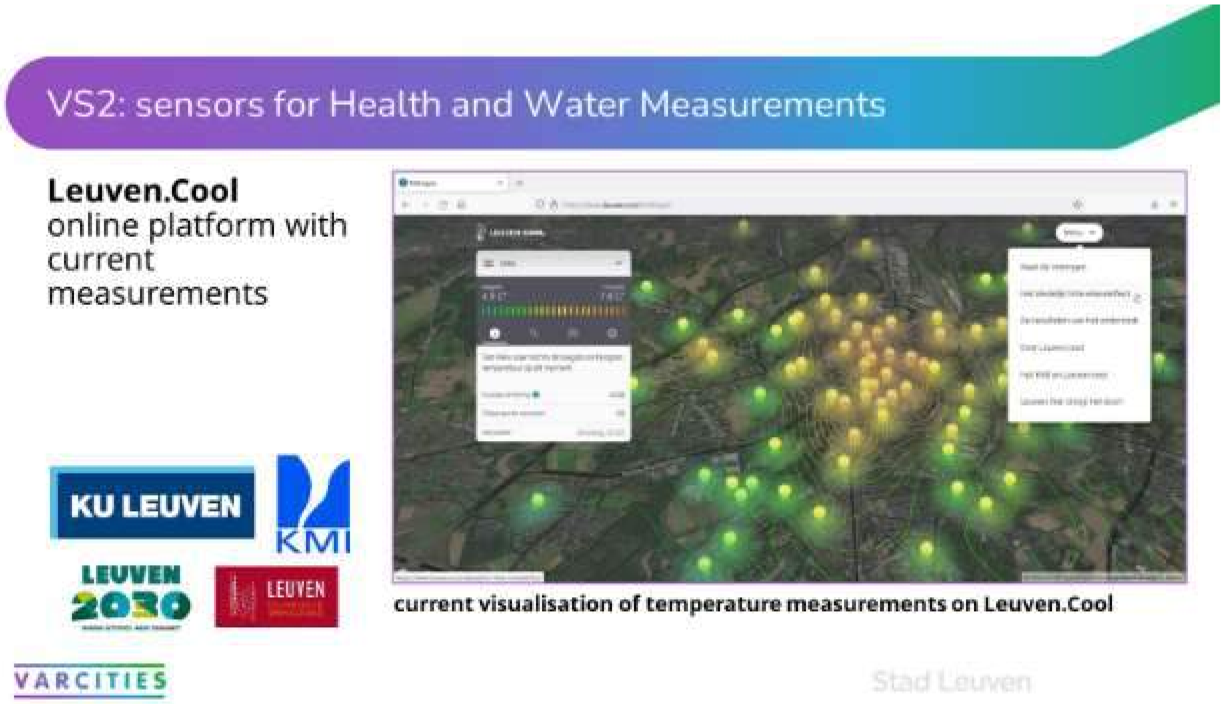
80 All values incl. VAT, if not reclaimable.
81 The number of rows can be adjusted as required.
82 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
83 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		temperature and conductivity * The alternative of monitoring the surface water quality through regular analysis of water samples instead of the multi-parameter probe, is being considered in collaboration with VMM		quality will improve. The sensors will measure if there will be an expected positive impact.		
TOTAL						[redacted]

VS2 Visualisation (Annex D)




VS2: sensors for Health and Water Measurements
Specifications of the WH2600 digital weather station
OUTDOOR DATA
INDOOR DATA
Technical specifications
leuven
KU LEUVEN
KMI
LEUVEN 2030
LEUVEN
VARCITIES


VS2: sensors for Health and Water Measurements
Leuven.Cool
online platform with current measurements
current visualisation of temperature measurements on Leuven.Cool
KU LEUVEN
KMI
LEUVEN 2030
LEUVEN
VARCITIES
Stad Leuven

VS2: sensors for Health and Water Measurements

Leuven.Cool tries to engage citizens un the motto: 'what can you do?'

Encouraging residents to take action themselves

Stad Leuven

VS2: sensors for Health and Water Measurements

As their is a difference in the 'air temperature' and the thermal comfort, it is also relevant to measure the temperature of surfaces apart from the wheater station:

- I-buttons and tracker: they measure the temperature tra

- Heath camera's

street park square

VS3- Health trail

VS3 Summary (Annex A)

<table>
<tr><td>Title</td><td>Health trail</td></tr>
<tr><td>Motto</td><td>"This Visionary Solution provides stimuli to the inhabitants of Leuven to move and exercise (over the years) in improving their health and well-being."</td></tr>
<tr><td>Location of the planned investment</td><td>Hertogensite park</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Leuven / Resiterra</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>x</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>At Hertogensite a new park will be realised in the city connected to other parks. A lot of paths for slow traffic will be added to the city network. Therefore, it will already stimulate walking and cycling through the city.

Specifically with this solution a trail through the park will be formed with different elements incorporated that will stimulate movement for different ages, helping people work on their physical condition. This particular health trail will form a "loop", like a closed circuit, connecting different points of attraction on the Hertogensite park (nature, education, playing, sports, moving, enjoying, meeting…)
The health trail will be a low-threshold loop, linked to a wider network of paths and parks , while being linked to a city network of moving benches.
On the other hand, open air fitness equipment will be carefully integrated in the reconstructed city's fortification wall, forming part of the urban living room (Visionary Solution 1)
The challenges linked to this solution are green space management, social justice and social cohesion, Public H&WB
The objective has been to co-create the solution with the public, the local authorities and industry, in order to increase Health & Well-being of citizens through increased sense of safety, recreation relaxation, social interaction and physical activity.</td></tr>
</table>

Total investment planned	The total investment in the park in paths, benches and a play yard for children adds up [redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [the paths, benches, play garden]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	General maintenance of public spaces by the city	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	I.D 4.2 Accessibility of urban green spaces for population	Increased accessibility of urban green spaces	*km / min (by feet, by bus)*
	I.D 4.3 Recreational (number of visitors or recreational activities) or cultural (people involved, children in educational activities) value of green spaces	Increased recreational or cultural value of green spaces	*No. of visitors year-1*
	I.D 4.14 Increased connectivity to existing Green Infrastructure	Increased connectivity to existing Green infrastructure	*ha*
	I.D 6.8 Access of residents/employees by foot to open space: sports centre, recreation area, or green space	Increased accessibility of sport and recreation facilities	*km / min*
	I.D 7.1 Openness of participatory processes	Increased and improved participation (openness of participatory processes)	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	*no. /% of individuals/participants*
	I.D 7.8 Citizen participation in and co-creation of the design, implementation and	Increased and	*No of people/year (participating to*

	evaluation of project interventions	improved participation (co-creation process)	*development and delivery of interventions)*
	I.D 7.16 No of persons involved (on average) in the project activities	Increased and improved participation (involvement in project activities)	*No of persons / year or age*
	I.D 7.17 No of activities involving children	Increased and improved participation of children	*No of activities involving children*
	I.D 8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*No of people per category (age, education level, profession...)*
	I.D 8.10 Accessibility of open public spaces and buildings for families with baby carriages and individuals with restricted mobility	Greater inclusion of families with babies and individuals with restricted mobility	*No. of to people with physical limitations*
	I.D 9.5 No of hours spent outdoors, time people spend in the facility	Increased outdoor presence	*No of hours per week per capita / hours per capita*
	I.D 9.6 Perceived well-being before and after the visit of green space. Can also measure metrics from health centres and hospitals to determine level of health conditions and support needed	Increased health and Well being	*Yes/no regarding diseases, No of ER/ambulance visits.*
	I.D 9.8 Feeling of improving the quality of life (the Quality-of-Life questionnaire)	Feeling of improving the quality of life (the Quality of Life questionnaire)	*Scales' scores*
	I.D 9.13 Residential attachment and satisfaction	Increased residential attachment and satisfaction	*Scales' scores*
	I.D 9.16 Number / share of people being physically active (min. 30 min 3 times per week)	Increased outdoor physical activity (physically active people)	*No of people / %*

	I.D 9.19 Increase in walking and cycling in and around areas of interventions	Increased outdoor physical activity (increase in walking/cycling in and around site)	*No. of people / hours per week per capita*
	I.D 10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	Definition of parameters for (re)designing green public spaces based on the well-being of users	
	I.D 10.6 Replication of solutions	Replication of VARCITIES outside pilot cases	
	I.D 10.8 Saved healthcare spending	Savings in healthcare spending	*Euros per year / %*
	I.D 10.9 Public Private Investments after 5 years	Public Private investment (after 5 years)	Euros
Contribution to SDGs	*SDG n° and name*	Expected impact	
	Goal 3: Ensure healthy lives and promote well-being for all at all ages	Meso scale (urban / regional)	

VS3 Main Contacts (Annex B)

Lead Organization	
Organization name	City of Leuven
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert The external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Organization name	[redacted]
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	City of Leuven
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS3 Description (Annex C)

Objectives of the Visionary Solution	
"The Visionary Solution provides stimuli to move to inhabitants of Leuven over the year in order to benefit the health of the inhabitants of Leuven."	
Overview of Visionary Solution leader and partners	
partners	**Role**
City of Leuven (Leader)	Responsible for the solution
Resiterra (partner)	Private developer responsible for the realisation of the park as a whole
360 architects (partner)	Designer of the park and integration of the health trail elements
Ip-it-up (partner)	Company of the moving bench that will enter expertise in the design process of the moving wall

General project background, context, and rationale

- Concerning health, Leuven has a two-speed population: The high educated people have a good subjective and objective health condition. But there is a growing group that has difficulties to pay their medical expenses, a group that doesn't participate with health programmes such as cancer screening or has unhealthy lifestyle habits (mostly immigrants). Child poverty is in general increasing. Universal primordialism is therefore important for Leuven: we have to offer projects and campaigns for the global population in combination with specific efforts to reach certain vulnerable groups.
- The pilot area for the VARCITIES project is a former hospital site in the medieval centre of the city. This fully built area will be transformed into a green district, where riverbanks will be re-opened and the connection between the city centre and the river landscape will be re-established.
- The area will become a multifunctional neighbourhood with different housing typologies, economical functions like hotels, shops, restaurants and cafés and co-working spaces. Cultural attractions like the new performing arts hall for the city and a museum site on the history and future of health care will be the heart of this area.
- Relevant municipal infrastructure projects by the project promoter(s) running in parallel to the Visionary Solution: JUSTNature H2020 project, Leuven Rainwater Strategy 2019, Leuven drought strategy 2020 "Leuven mobility plan" 2016, "Kom op voor je wijk" ("Stand up for your neighbourhood"): Citizen engagement program, "Leuven 2025-2035-2050" roadmap for a climate-neutral city

Supporting actions required

- The concept design has to be elaborated to a final and detailed design.
- A building permit is required.
- A procurement for building the solution has to be organised
- The execution of the solution

Description of the Visionary Solution

A health trail with exercise facilities will be realised in the new park of the Hertogensite. This health trail will be connected to other paths for slow traffic within the city network. By adding elements that simulate movement for different ages (VS3), it helps people to work on their physical condition.

Within the park the trail connects different elements for an interesting tour within the park. Making a small tour along accessible pathways is the lowest threshold moving possibility both for elderly people as for young

children. To make the tour attractive it connects different points in the park:

1) The moving wall (urban living room (VS1) + health trail (VS3))
2) The accessible embankment of the river
3) The restored remnant of the medieval city wall
4) a play garden for children, with special attention for children with disabilities
5) a planned artwork (still to be confirmed)
6) all surrounding a grass field that can stimulate different activities (frisbee, soccer, yoga,…)

Merging VS1 and VS3: As an outcome of the co-creation process it was also decided that the moving bench of VS3, instead of being a stand-alone element in the park, should be integrated in the urban living room (VS1) along the track of the fortification wall. Several variations of the already existing ready-made "moving bench" (used in different places in the city), will be chosen in combination with VS1, which will be an innovative and inspiring solution.

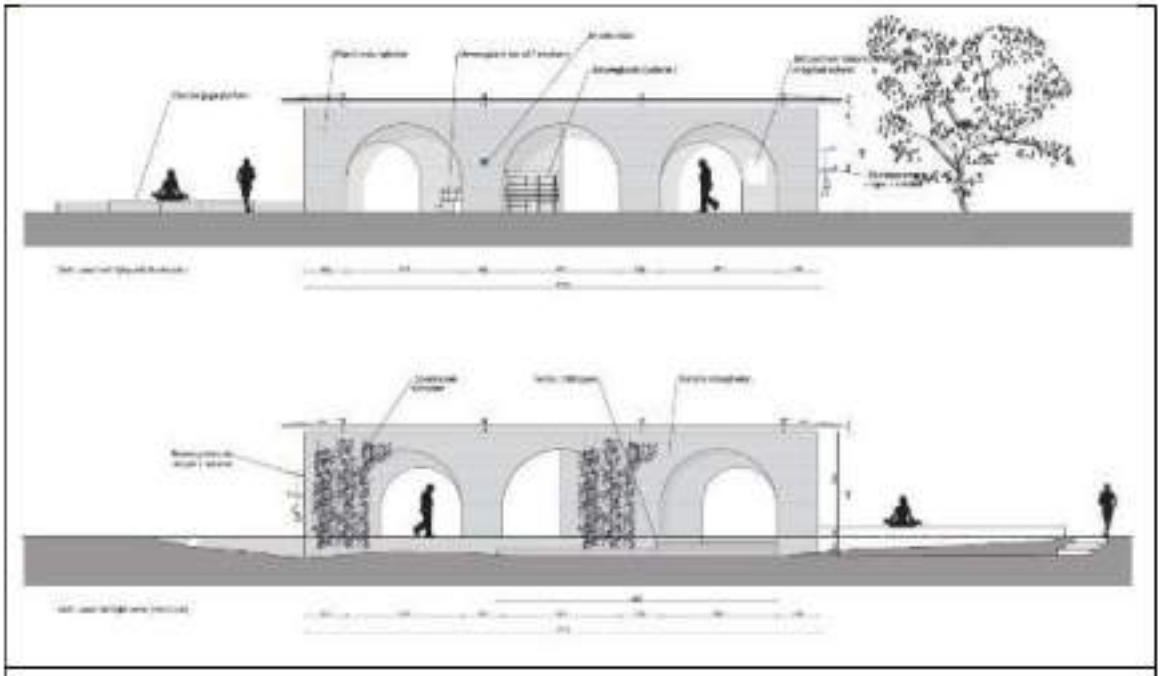
Thus, the result of the co-creation process has been the merging of VS1 and VS3 and the creation of a 'moving wall', which offers a sheltered place to sit, meet, inform, educate (VS1) but also to move and exercise (VS3). The uses and functions of VS1 and VS3 are integrated in a contemporary visualisation of the medieval city wall which becomes a place linked to nature and the cultural heritage, with a natural attraction for people, offering a welcoming sheltered seating area along the river and the designed paths of the park.

The urban living room of VS1 will be combined with an active exercise/sports space with info-panel along the health trail (VS3) at the garden side with a rest point/meeting place (riverside urban living room) at the riverside (VS1).







Summary of VS components

VS components summarised in Table A.

Replication and/or up-scaling potential

It is very likely that the elements that we will introduce in the park will also be relevant to integrate in other parks and public spaces, i.e., the ip-it-up bench integrated in an architectural element can be an inspiration for other public spaces. At the moment in different public space design the designers don't like the generic bench in the design as it is not perceived as spatially or architectural attractive. Therefor for sports managers it is sometimes a struggle to have the bench located in public spaces, however the more it is reproduced and works as a network in the city, the better it works to stimulate movement and exercising. In that sense the solution is seen as a very interesting innovation by sport managers.

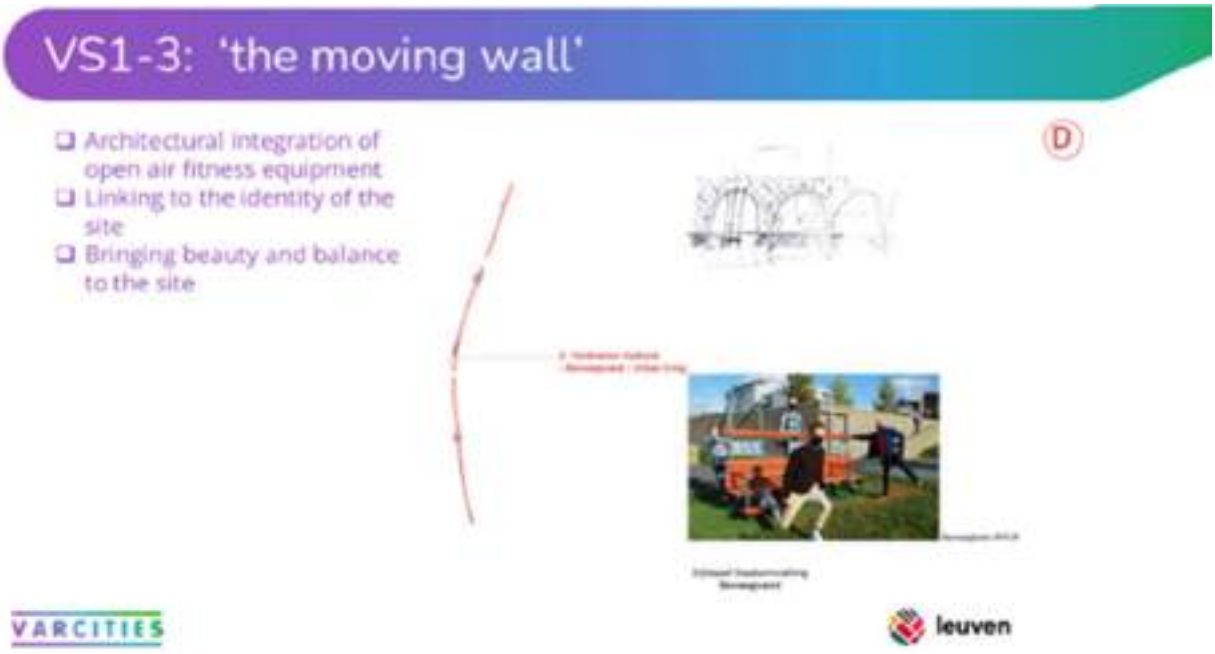
VS3 Summary of Visionary Solution's Components (Table A)[84]

VS3- Health Trail						
# [85]	Visionary Solution components[86]	Brief description of the component	Unit[87]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Steel structure	Structure to hang moving elements and plants	1	• Green space management, • Social justice and social cohesion, • Public H&WB	I.D 4.2 I.D 4.3 I.D 4.14 I.D 6.8 I.D 7.1 I.D 7.8 I.D 7.16 I.D 7.17 I.D 8.5 I.D 8.10 I.D 9.5 I.D 9.6 I.D 9.8 I.D 9.13	[redacted]
2	Moving elements: bar, bench, loops	The actual elements attached to the wall to stimulate movement	1			[redacted]
3	Education/ information panel	Integrated panel to explain/educate about VARCITIES project	1			[redacted]
4	Plants and lei fruit	Integrated planting adding scents and colours to the solution	1			[redacted]

84 All values incl. VAT, if not reclaimable.
85 The number of rows can be adjusted as required.
86 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
87 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

					I.D 9.16 I.D 9.19 I.D 10.5 I.D 10.6 I.D 10.8 I.D 10.9	
TOTAL						[redacted]

VS1 - 3 Visualisation (Annex D)



VS4- IoT infrastructure for smart lighting and noise measurements

VS4 Summary (Annex A)

Title	Smart lighting and noise measurements
Motto	"This Visionary Solution provides smart infrastructure to the city over the upcoming years to monitor the environmental noise climate and to nudge in case of night noise by changing the light intensity of the smart lighting poles."
Location of the planned investment	Leuven, Hertogensite park
Municipality/local authority/main partners	Leuven / Resiterra / Fluvius
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☐ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes X
Overview and objectives of the planned Visionary Solution	In the new park, smart lighting poles will be installed next to the main walk trail. In those poles noise sensors are integrated as a noise sensor ring. These sensors can measure the overall environmental noise during day and night. Also, they can be used as a nudging tool to regulate the lighting intensity of the light poles, in case night noise occurs. The objectives of this Visionary Solution are linked to the need for increased Health and Wellbeing of park users and nearby residents.
Total investment planned	[redacted]
Funding sources	*Requested funding (EU contribution)* [redacted]
	Own funding [redacted]

[88] All values incl. VAT, if not reclaimable.

	Other sources [Resiterra]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	General maintenance and energy costs of public lighting in the city	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Value	Unit
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	I.D 9.4 Noise reduction rates	*Reduced noise level*	dB(A)
	I.D 9.8 Feeling of improving the quality of life (the Quality-of-Life questionnaire)	*Improved quality of life*	*Scale's scores*
	I.D 9.13 Residential attachment and satisfaction	*Increased residential attachment and satisfaction*	*Scale's scores*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	Goal 3. Ensure healthy lives and promote well-being for all at all ages	Micro scale (demo / neighbourhood)	

VS4 Main Contacts (Annex B)

Lead Organization	
Organization name	City of Leuven
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	City of Leuven
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS4 Description (Annex C)

Objectives of the Visionary Solution	
"The Visionary Solution provides smart infrastructure to the city over the years in order to integrate sensors in lighting poles for noise management."	
Overview of Visionary Solution leader and partners	
partners	**role**
City of Leuven (Leader)	Responsible for the solution
Resiterra (partner)	Private developer responsible for the realisation of the park as a whole
360 architects (partner)	Designer of the park and integration of the lighting elements in the park
Fluvius (partner) Urban Sense (partner)	Manager of public lighting infrastructure Technical partner managing the Smart City Data Platform of Leuven
General project background, context, and rationale	
- The pilot area for the VARCITIES project is a former hospital site in the medieval centre of the city. This fully built area will be transformed into a green district, where riverbanks will be re-opened and the connection between the city centre and the river landscape will be re-established. The area will become a multifunctional neighbourhood with different housing typologies, economical functions like hotels, shops, restaurants and cafés and co-working spaces. Cultural attractions like the new performing arts hall for the city and a museum site on the history and future of health care will be the heart of this area. - In the broader environment of this new site, only limited number of green spaces are available to the public. Therefore, this green area that will be created at the Hertogensite will attract visitors and residents to come and have a relaxing time spent there. - Smart-lighting application has emerged in the past decade, predominantly focusing on energy saving. However, smart lighting can be seen in a broader perspective as part of a smart environmental concept where the main goal is to provide comfort, security and as such contribute to the well-being of the users of the public environment. - It is known that environmental noise may have a negative effect on physical and mental health by increasing the stress level. In case night noise occurs, this may cause a disrupted sleeping pattern which on its turn has a negative impact on health and well-being of the residents living nearby. - The city of Leuven has its own business unit working on Smart City project implementation. Currently, an experimental project in a specific street in the city is in progress, where a problem of night noise occurs with negative effects on the residents' sleeping quality. In this project, the effect of changing light intensity on the occurrence of night noise is studied. Data from noise sensors located in the street are used to trigger the public lights. The lessons learnt from this project will be very useful in the implementation of the smart lighting poles with embedded noise sensors at Hertogensite. - In preparation of this VS, a light study of the company Fluvius, as manager of the public lighting infrastructure has already been executed. As a result, four smart lighting poles are planned to be installed next to the main walking trail. Two of them will be equipped with an integrated noise sensor.	
Supporting actions required	
- The order of the smart lighting poles is foreseen to be included in the overall infrastructural plan of the whole site. - Procurement preparation for the noise sensors	

Description of the Visionary Solution

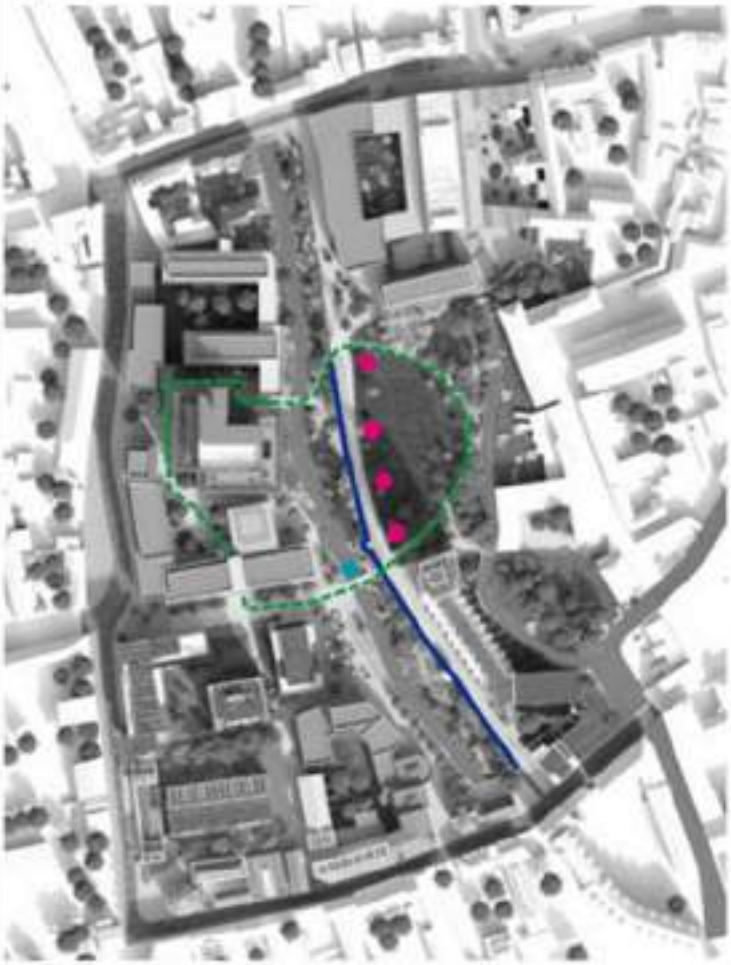
In this context, please provide details of the underlying technical or social analysis (e.g. results from audits conducted for the project, assessment of suitable technology options, questionnaires and surveys distributed before the intervention, etc.), and refer to the targeted areas including details for instance, to:

- For public/private buildings: number and type of buildings, surface areas managed, current energy consumption, technology options proposed, etc.
- For public/private areas: surface areas managed, land use, etc.
- For infrastructure: foreseen energy efficiency improvement, ownership of installations, etc.
- For NBS description of species, functionalities,
- For services: number of users, etc.

Please also describe the approach for aggregation/bundling of various Visionary Solutions, if relevant.

The description should be consistent with the visualization

Four smart lighting poles will be installed aside the main north-south path crossing the park (cfr. pink dots on the plan included below).



Two of these poles include an integrated noise sensor, as shown in the image below (prototype). These sensors capture several dB-related parameters to monitor the overall environmental noise during day and night. Also, they will be used as a nudging tool to regulate the lighting intensity, in case night noise occurs.

- Data captured by the noise sensors will be sent via the platform of the sensor provider to the Smart City Data Platform (SCDP) of Leuven, managed by our technical partner Urban Sense. Based on predefined criteria (for example night noise exceeding 80dB for more than two seconds), a trigger is sent from this SCDP to the platform of the light infrastructure provider to change the light intensity of the lighting poles.

-The SCDP contains a context broker from which data can be made available for onboarding on the Health & Well-being platform.

Summary of VS components

VS component(s) summarised in Table A.

Replication and/or up-scaling potential

- A comparable set-up of smart lighting poles with integrated sensors can useful to implement in other public spaces.
- The Smart lighting pole that is proposed in the VS has the potential to mount other valuable technical devices in the future such as a speaker, a 4G/5G antenna...

VS4 Summary of Visionary Solution's Components (Table A)89

VS4- Smart Lighting and noise measurement						
# 90	Visionary Solution components[91]	Brief description of the component	Unit 92	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Smart lighting poles with integrated noise measurement module	Four smart lighting poles will be installed next to the main walk path, of which two will contain an integrated noise sensor. Within the scope of this grant, only these **two integrated light poles** are proposed as investment cost. The other two, without sensor, will be included in the general infrastructural financial plan of the site.	2	Sensors are often vulnerable and have to have access to electricity and network. By integrating them in public lighting poles this can be tackled.	I.D 9.4 I.D 9.8 I.D 9.13	[redacted]
2	Use and management of the sensors	Full operation of the noise sensors requires installation, calibration and management, telecom- and platform costs, and project management by the technical partner specialized in noise sensor devices and data	1	Proper operation and monitoring of the sensors are crucial to succeed in this VS Knowledge about noise conditions in the area		[redacted]
3	Influencing light intensity	Based on the noise data captured by the sensors, a trigger can be sent from the Smart City Data Platform of Leuven to the light poles to change the light intensity in case night noise occurs. This step is an integrated part of the VS	1	Via changing the light intensity, night noise may be reduced, with on its turn a positive effect on health and well-being Reduction of night noise with positive effect on health issues		[redacted]
TOTAL						[redacted]

89 All values incl. VAT, if not reclaimable.
90 The number of rows can be adjusted as required.
91 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
92 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

VS4 Visualisations (Annex D)

VS5- Mobility sensors

VS5 Summary (Annex A)

Title	Measuring sustainable mobility
Motto	"This Visionary Solution provides data to the city on the flows of pedestrians and bikers visiting the park over a year in order to know the impact of the project on sustainable mobility."
Location of the planned investment	Leuven/Hertogensite
Municipality/local authority/main partners	Leuven
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☐ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility x Sustainable district and built environment ☐ Integrated infrastructure processes ☐
Overview and objectives of the planned Visionary Solution	In the Hertogensite project a lot of new paths are added to the slow traffic network of the city. To properly assess the impact of the network improvements, we need to monitor the general use of the park, the shift in cyclists and pedestrians' pathing and the air quality. This will allow us to better understand the impact of small-scale interventions on traffic trajectories and exposure to air pollutants and it will also enable us to illustrate the effectiveness to the general project. To realize this, we will install one air quality measurement station with several sensors to monitor the relevant pollutants, and about eight traffic sensors capable of capturing trajectories to monitor the most relevant routes and areas of the park. The exact number of sensors depends on the supplier and the specific technology that they use, that will be selected via public procurement.

Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [please specify]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	I.D 4.2 Accessibility of urban green spaces for population	Increased accessibility of urban green spaces	*km / min (by feet, by bus)*
	I.D 4.3 Recreational (number of visitors, activities) or cultural (people involved, children in educational activities) value of green spaces	Increased recreational or cultural value of green spaces	*No. of visitors year-1 / No. of recreational activities year-1*
	I.D 4.14 Increased connectivity to existing Green Infrastructure	14 Increased connectivity to existing Green Infrastructure	ha
	I.D 5.6 Chemical air quality indicators	Reduction of air pollution	*µg of pollutant m-3, others (for each species)*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category

[93] All values incl. VAT, if not reclaimable.

	I.D 8.10 Accessibility of open public spaces and buildings for families with baby carriages and individuals with restricted mobility	Greater inclusion of families with babies and individual with restricted mobility	*No of accesses/year*
	I.D 9.16 Number / share of people being physically active (min. 30 min 3 times per week)	Increased outdoor physical activity	*No of people / %*
	I.D 9.19 Increase in walking and cycling in and around areas of interventions	Increased outdoor physical activity	*No. of people / hours per week per capita*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	Goal 3. Ensure healthy lives and promote well-being for all at all ages	Micro scale (demo / neighbourhood)	

VS5 Main Contacts (Annex B)

Lead Organization	
Organization name	City of Leuven
Contact person	[redacted]
Department	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
Address	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	City of Leuven
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS5 Description (Annex C)

Objectives of the Visionary Solution	
In the Hertogensite project a lot of new paths are added to the slow traffic network of the city. To properly assess the impact of the network improvements, we need to monitor the general use of the park, the shift in cyclists and pedestrians' pathing and the air quality. This will allow us to better understand the impact of small-scale interventions on traffic trajectories and on exposure to air pollutants. Additionally, it will enable us to illustrate the effectiveness of the network improvements to the general public. To realize this, we will install two air quality measurement stations with several sensors to monitor the relevant pollutants, and about eight traffic sensors capable of capturing trajectories to monitor the most relevant routes and areas of the park. The exact number of sensors depends on the supplier and the specific technology that they use, which will be selected via public procurement.	
Overview of Visionary Solution leader and partners	
The Visionary Solution will be carried out by the City of Leuven and two suppliers, to be selected by public procurement.	
partners	**role**
City of Leuven (Leader)	Responsible for the solution
General project background, context, and rationale	
In the last two decades, Leuven has been one of the fastest growing cities in Belgium with regards to inhabitants (+ 16%) and jobs (+25%), resulting in a substantial increase in transport demand, and in turn, in a negative impact on congestion, parking pressure, traffic accidents and so on. To make the city more liveable, Leuven aims for a significant modal shift in the coming years, as is determined in its Policy Plan, Climate Action Plan and Mobility Plan. To realize this, the city has focussed on the "push side" with circulation measures in the city centre, lower speed limits, reducing parking spaces and increasing prices. However, on the "pull side", the city wants to develop its "slow traffic network" by increasing the connectivity, level of comfort and safety of walking and cycling paths. On the other hand, the City of Leuven is also committed to evidence based or data-driven policymaking. By professionalizing data collection, structurally assessing impact of policy decisions and learning from the resulting analyses, we can greatly improve our policy making . Proper data collection on pedestrians and cyclists, park use and air quality impact are areas in which the city has not made much progress as of yet, and where there is still a lot of room for improvement.	
Supporting actions required	
Technical preparation of power source connections (lighting grid – power grid – solar panels) Procurement preparation for the air quality measurement station. Procurement preparation for the traffic sensors.	
Description of the Visionary Solution	

The additions to the bike and pedestrian pathways in the city centre by the Hertogensite project form an excellent opportunity to assess the impact of these changes on trajectories (which routes do people actually take) and on exposure to air pollutants on these routes. Measuring these impacts properly will not only give the city insight in the actual impact of this particular project, but it will also gain us much experience in a data driven approach that can be transferred to other projects and interventions.

To properly measure traffic trajectories and park use, we need capable but cost-efficient sensors that can monitor a sufficient area and distinguish between different modes, speeds and directions. Ideally, they can map full trajectories throughout the park. Market research has been carried out to gather information on the possible technical solutions currently on the market and to estimate the necessary budget. The available technologies are either based on electromagnetic pulses or on camera sensors. Figure 1 shows an illustration of a possible sensor. All available sensors can be mounted on lighting poles or on other existing objects. The number of sensors needed to gather enough data to give a complete enough picture of the park and its main trajectories, differ depending on the technology and the specific supplier. Figure 2 gives an indication of the most likely scenario: six sensor locations, with double sensors on the two main nodes resulting in an estimated eight sensors.

Figure 1: illustrations of possible traffic sensor

Figure 2: possible locations for traffic sensors

To properly measure air quality impact, we propose to place two air quality measurement stations (i.e. a combinations of sensors capable of detecting at least levels of CO2, NOx, PM10, PM2.5 and certain context variables). One within the park and one the enclosing streets as a reference point. While these sensors too will have to be ordered through public procurement, given the estimated cost, based on market research, a less

formal and time-consuming procedure could be followed. Given that these sensors are readily available, measuring could start relatively quickly, so we can monitor air quality as the site is being developed. Figure 3 shows some examples of available sensors on the market. Important requirements are easy redeployment of the sensors and minimal calibration needed.

Figure 3: illustrations of possible air quality sensor

Apart from the sensor capabilities itself, installation, maintenance and connectivity costs need to be taken into account. Since the city has little or no logistics capacity, this all needs to be part of the procurement procedure. Further points of attention are privacy (preference for privacy friendly technology, i.e. avoiding using cameras) and easy redeployment of the sensors. In preparing the tender, the possibilities for the potential power source for these sensors needs to be further investigated, so the technical requirements for the sensor are completely clear. Generally, these kinds of sensors can be power grid, lighting grid or solar panel driven. Each option comes with certain technical and esthetical implications.

Summary of VS components

VS components summarised in Table A.

Replication and/or up-scaling potential

The knowledge and experience gained by the city administration regarding trajectory and air quality data collection can be used in other projects and contexts. Insights resulting from the analyses of the data with regards to impact of certain infrastructure and measures can be very valuable for future policy questions. The knowledge and experience can be shared with other interested parties through the VARCITIES project or through other network organizations.

VS5 Summary of Visionary Solution's Components (Table A)[94]

VS5- Sustainable mobility measurements						
# [95]	Visionary Solution components[96]	Brief description of the component	Unit[97]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Traffic sensors - capex	Traffic sensors capable of capturing trajectories	8	Monitoring use of the park and "slow network connections" to gain insight in the amount of people using the space, the type of their activity ad their trajectories	I.D 4.2 I.D 4.3 I.D 4.14 I.D 5.6	[redacted]
2	Traffic sensors – opex	Installation, connectivity, API and maintenance related costs	1		I.D 8.10 I.D 9.16	[redacted]
3	Air quality sensors – capex	Air quality sensors capable of capturing CO2, PM10, PM2.5, NOx, temperature, humidity and airpressure.	2	How does the new development affect exposure to pollutants: Insight in CO2, fine dust, NOx levels	I.D 9.19	[redacted]
4	Air quality sensors – opex	Installation, connectivity, API and maintenance related costs	1			[redacted]
TOTAL						[redacted]

94 All values incl. VAT, if not reclaimable.
95 The number of rows can be adjusted as required.
96 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
97 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

VS5 Visualisations (Annex D)

VS5: Measuring sustainable mobility

In the Hertogenslte project a lot of new paths are added to the slow traffic network of the city. To properly assess the impact of the network improvements, we need to monitor the general use of the park, the shift in cyclists and pedestrians' pathing and the air quality. This will allow us to better understand the impact of small scale interventions on traffic trajectories and exposure to air pollutants and it will also enable us to illustrate the effectiveness to the general project. To realize this, we will install one air quality measurement station with several sensors to monitor the relevant pollutants, and about eight traffic sensors capable of capturing trajectories to monitor the most relevant routes and areas of the park. The exact number of sensors depends on the supplier and the specific technology that they use, that will be selected via public procurement.





VARCITIES

leuven

VS1 - 2 - 3 – 4 - 5 Stakeholders (Annex E)

Stakeholder analysis			
Type of stakeholder	**Current status of engagement**	**Future engagement activities**	**Instruments/channels for dissemination and interaction**
Cultural actors linked to the site	WS1, WS2	Organising cultural activities linked to the urban living room	consultation
Health actors that communicate about history and future of health linked to the site	WS1, WS2	Organising educational events, content linked to the solutions	consultation
Nature and sustainability organisations	WS1, WS2	Sharing measurements and results of the NBS	Communication/information
Local businesses	WS1, WS2	Organising events near the urban living room	consultation
Sport organisations	WS1, WS2	Organising moving events linked to the health trail	consultation
Neighbourhood residents	WS1, WS2	Organise and participate in events linked to the solutions	Consultation and communication
Health care organisations linked to the site	WS1, WS2	Organising educational and prevention activities linked to the solutions	consultation
Schools linked to the site	WS1, WS2	Organising educational activities linked to the solutions	Consultation and communication

VS1 - 2 - 3 – 4 - 5 Strategic Planning and Assessment of the VS (Annex F)

Results of PESTLE analysis

Political factors affecting the planned Visionary Solutions

What are the key political factors?

* No outputs from the co-creation workshops

Economic factors affecting the planned Visionary Solutions

What are the most important economic factors?

* No outputs from the co-creation workshops

Social factors affecting the planned Visionary Solutions

What are the most important social and cultural aspects?

VS1	VS2	VS3	VS4	VS5
• Play a pioneering role to actively stimulate inclusiveness of children towards the environment and vice versa	• Big potential for interpreting the relationship between parameters (humidity and temperature of air) and health care, and also how to interpret this historically	• Night-time noise • Do something that is seen positive from all perspectives • Being attractive for all ages	• Addressing night-time noise	• Measuring flows interesting also to see if this part of the city actually becomes a part of the city or still remains an island

Technological factors affecting the planned Visionary Solutions

What technological innovations could occur?

VS1	VS2	VS3	VS4	VS5

• Provide a kind of open cinema • Create a pad of plants between the water and the path or an inclined bank so that a child can get out if necessary (ref. to the safety of children) • Create a place where information about health and sustainability can come together and work on this by showing content in an accessible way • The reception areas of Vesalius Museum, Health House and Performing Arts Site can each be a safe and guarded place for screen/digital solutions	• Focus mainly on heat, water quality will also be considered further • Air quality measurements should be seen in a broader context (a sensor alone says little on a local level), should be linked with other projects in town • Measure the fauna and flora present along the Dijle	• Finding a good balance between the different functions on the site	• Not to limit the placement to the park, there is also noise pollution in Brusselsestraat and Minderbroedersstraat; it will be the place where people "hang out" the most on the site (need for more space)	• Dijlepad will be an important cycle route, it would be interesting to measure its use and see if cyclists take this route and thus spare the entrance to the Vesalius Museum • Pay attention to pedestrians and adapt the use of this site for cyclists, possibly provide separate circuits or examine whether the site should be accessible for all types of cyclists

Legal factors affecting the planned Visionary Solutions

What current and upcoming legislation could affect the sector?

* No outputs from the co-creation workshops

Environmental factors affecting the planned Visionary Solutions

What are the environmental considerations we should bear in mind?

* No outputs from the co-creation workshops

Results of SWOT analysis

Strengths affecting the planned Visionary Solutions

Please describe the endogenous factors that can favour the pursuit of VS objectives.

VS1	VS2	VS3	VS4	VS5
• Provide a kind of open cinema • Create a pad of plants between the water and the path or an inclined bank so that a child can get out if necessary (ref. to the safety of children) • Create a place where information about health and sustainability can come together and work on this by showing content in an accessible way	• Focus mainly on heat, water quality will also be considered further • Measure the fauna and flora present along the Dijle	• Being attractive for all ages • Finding a good balance between the different functions on the site	No factors identified	No factors identified

Weaknesses factors affecting the planned Visionary Solutions

Please describe the endogenous factors that can hinder or delay the VS implementation process.

VS1	VS2	VS3	VS4	VS5
No factors identified	• Air quality measurements should be seen in a broader context (a sensor alone says little on a local level), should be linked with other projects in town	No factors identified	• Not to limit the placement to the park, there is also noise pollution in Brusselsestraat and Minderbroedersstraat; it will be the place where people "hang out" the most on the site (need for more space)	• Pay attention to pedestrians and adapt the use of this site for cyclists, possibly provide separate circuits or examine whether the site should be accessible for all types of cyclists

Opportunities affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect positively the VS implementation.

VS1	VS2	VS3	VS4	VS5
• Play a pioneering role to actively stimulate inclusiveness of children towards the environment and vice versa • The reception areas of Vesalius Museum, Health House and Performing Arts Site can each be a safe and guarded place for screen/digital solutions	• Big potential for interpreting the relationship between parameters (humidity and temperature of air) and health care, and also how to interpret this historically	• Do something that is seen positive from all perspectives	• Measuring flows interesting also to see if this part of the city actually becomes a part of the city or still remains an island	• Dijlepad will be an important cycle route, it would be interesting to measure its use and see if cyclists take this route and thus spare the entrance to the Vesalius Museum

Threats affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect negatively the VS implementation.

VS1	VS2	VS3	VS4	VS5
No factors identified	No factors identified	• Night-time noise • Traffic noise	No factors identified	No factors identified

Risk and mitigation measures

Risk (description)	Probability (Unlikely – Likely – Very likely)	Impact (Low – Moderate – High)	Risk level (Low -Medium – High – Extreme)	Mitigation measures (description)
Building permit not received for the moving wall	likely	high	medium	People that have to decide on this/ or might be against it involving in the detailed design stage before handing in the building application
Higher cost of the solutions than estimated	likely	high	high	Adapt the design when necessary, shorten time of measurements

VS1 - 2 - 3 – 4 - 5 Economic and Financial Analysis of the VS (Annex G)

Ownership of assets and management structure
VS1: The urban living room will be owned and managed by the City of Leuven. VS2: The sensors for water quality will be leased by VMM (the Flemish Environmental Agency) who will be responsible for the management and the collection of the data from the sensors. The weather station will be owned and managed by the city VS3: The infrastructure related to the health trail and the moving wall exercise elements will be owned and managed by the City of Leuven. VS4: The lighting poles with the integrated noise rings will be managed by Fluvius (Flemish intermunicipal utility company managing city lights) VS5: The mobility sensors will be leased. They will be managed by the contractor (to be identified through procurement process) During the implementation of Leuven Pilot, all decisions are made by the competent bodies of the City of Leuven.
Procurement structure
VS 1-3 will be designed by 360 architects working for Resiterra. The design will be handed over to the city after the building permit is received, to procure a contractor to build it. After that it will be part of the public domain and maintained by the city. VS 2 has two parts, the weather station and the water quality probe. The public water management company will be appointed by the city to install the water quality probe. The weather station network in the city is managed by the KU Leuven, who will be appointed to install another weather station on this site. VS4 the public company responsible for public lighting will be appointed to install the solution for the city. VS5 will be publicly procured so private companies can hand in their proposals.
Estimated costs and revenues

CAPEX (major expenditures foreseen over the long term for the implementation of the VS)	**VS1**	**VS2**	**VS3**	**VS4**	**VS5**
The estimated cost of planning processes	[redacted]				
The estimated cost of installation	[redacted]				
Estimated equipment cost	[redacted]				
Other(s) [please specify]	[redacted]				
Total investment cost	[redacted]				
OPEX (day-to-day expenses need to ensure the VS operation)	**VS1**	**VS2**	**VS3**	**VS4**	**VS5**
Estimated maintenance cost (n° of years)	[redacted]				
Estimated staff cost (n° of years)	[redacted]				

	[redacted]				
Estimated external sub-contracting (n° of years)	[redacted]				
Other(s) [please specify]	[redacted]				
Total operating cost *(n° of years)*	[redacted]				
Financing approach and funding sources					
Total investment cost	[redacted]				
Own funding of the promoter / local cluster	[redacted]				
VARCITIES project	[redacted]				
Other sources [please specify]	[redacted]				

VS1 Table B – Business Model Canvas

<table>
<tr><td>Key activities</td><td>Key resources</td><td rowspan="2"><u>Value proposition</u>

We provide an infrastructure where people can meet/ educate/ enjoy culture and nature
and therefore, feel better, connected to their history and culture and other people, be more happy, better mental well-being
this in the end has lots of benefits for our society where loneliness’ and mental health problems create indirect costs</td><td><u>Key partners</u></td><td><u>Key beneficiaries</u>
City and neighbourhood residents</td></tr>
<tr><td colspan="2"></td><td colspan="2"><u>Governance structure</u>
City administration has to manage the activities organised/maintain the infrastructure</td></tr>
<tr><td colspan="2" rowspan="2">Cost structure</td><td><u>Channels</u>
Organise activities at the site</td><td colspan="2" rowspan="2">Capturing value</td></tr>
<tr><td>Cost reduction</td></tr>
</table>

VS2 Table B – Business Model Canvas

<table>
<tr>
<td>Key activities

Monitoring of environmental climate-related conditions

Monitoring water quality</td>
<td>Key resources</td>
<td rowspan="2"><u>Value proposition</u>

We measure the effects on climate conditions of the opening up of the river and the creation of the park to see whether we can have a positive impact on the local conditions where heath, water quality, can have a negative impact on biodiversity and residents' health. By doing these measurements we provide knowledge on the impact and prove of the usefulness of the NBS</td>
<td><u>Key partners</u>
Conrad (weather station)
VMM (Vlaamse Milieu Maatschappij) (water sensor)</td>
<td><u>Key beneficiaries</u>
City and neighbourhood residents, nature</td>
</tr>
<tr>
<td colspan="3"><u>Governance structure</u>
The platform and data flow has to be managed</td>
</tr>
<tr>
<td colspan="2">Cost structure
- Weather station & technical aspects: [redacted]
- Water quality sensor: [redacted]</td>
<td><u>Channels</u>
Through the Health and Well-Being platform of VARCITIES
Leuven cool website (weather station)

Cost reduction</td>
<td colspan="2" rowspan="2">Capturing value</td>
</tr>
</table>

VS3 Table B – Business Model Canvas

<table>
<tr><td>Key activities</td><td>Key resources</td><td rowspan="2"><u>Value proposition</u>

We provide infrastructure that allows and stimulates people to move and exercise in a low-cost way and therefore accessible to everyone in an enjoyable environment close to nature. It is known that sport and movement is essential for physical and mental health, definitely in a green environment.</td><td><u>Key partners</u>
Ip-it-up
Sports department</td><td><u>Key beneficiaries</u>
City and neighbourhood residents</td></tr>
<tr><td colspan="2"></td><td colspan="2"><u>Governance structure</u>
Partners should keep organising activities and stimulate the use of the infrastructure and maintain it in good condition</td></tr>
<tr><td colspan="2" rowspan="2">Cost structure</td><td><u>Channels</u>
Through providing information, activities, apps people should be led to the park and health trail to get the place to exercise known and stimulate people to keep using it</td><td colspan="2" rowspan="2">Capturing value</td></tr>
<tr><td>Cost reduction</td></tr>
</table>

VS4 Table B – Business Model Canvas

<table>
<tr>
<td>Key activities

Smart lighting poles with integrated sensor module</td>
<td>Key resources

- VARCITIES grant for two poles with integrated sensor module, all technical aspects related to noise sensors (sensors, telecom, platform, project management costs,..) and use of the Smart City Data Platform
- Other resources for two smart lighting poles without sensor module</td>
<td colspan="2"><u>Value proposition</u>

We provide smart lighting poles where sensors can be integrated. Therefore, they are easy to integrate in the public space in a safe way. The sensors measure noise in the surroundings. Noise nuisance causes lots of well-being issues with city residents. By changing the light intensity in case night noise occurs, we will be able influence this noise nuisance</td>
<td><u>Key partners</u>
Fluvius
Urban Sense (Smart City Data Platform of Leuven)</td>
<td><u>Key beneficiaries</u>
neighbourhood residents</td>
</tr>
<tr>
<td colspan="4"></td>
<td colspan="2"><u>Governance structure</u>
The data from the noise sensors will be sent via the platform of the sensor supplier to the Smart City Data Platform. Via this platform, a trigger can be sent to the lights to change the lights' intensity. The City of Leuven is able to overview all these steps and to act in case problems occur</td>
</tr>
<tr>
<td colspan="2">Cost structure
- Two smart lighting poles with integrated noise sensor: [redacted]
- Technical aspects sensors (installation, platform costs…): [redacted]
- Integration of sensor data to trigger lighting poles via Smart City Data Platform: [redacted]

Not in scope of grant: Two smart lighting poles without sensor module: [redacted]</td>
<td colspan="2"><u>Channels</u>
Provide the data through the smart city data platform of the city
And linked with the health and well-being platform of VARCITIES

Cost reduction
Integrated infrastructure including sensors is safer and more cost-efficient (energy & implementation) than separate devices</td>
<td colspan="2">Capturing value</td>
</tr>
</table>

VS5 Table B – Business Model Canvas

<table>
<tr>
<td>Key activities

Crowd counting and monitoring trajectories through the site</td>
<td>Key resources</td>
<td colspan="2"><u>Value proposition</u>

The additions to the bike and pedestrian pathways in the city centre by the Hertogensite project form an excellent opportunity to assess the impact of these changes on trajectories and on exposure to air pollutants on these routes.</td>
<td><u>Key partners</u>
City of Leuven
Procurement is needed for the technical partners</td>
<td><u>Key beneficiaries</u>
City and neighbourhood residents</td>
</tr>
<tr>
<td colspan="4" rowspan="2"></td>
<td colspan="2"><u>Governance structure</u>
The data and the platform should be managed</td>
</tr>
<tr>
<td colspan="2">Cost structure
• Traffic sensors & technical aspects: [redacted]
• Air quality sensor & technical aspects: [redacted]</td>
<td colspan="2"><u>Channels</u>
Provide the data through the smart city data platform of the city
And linked with the health and well-being platform of VARCITIES

Cost reduction</td>
<td colspan="2">Capturing value
Measuring these impacts properly will not only give the city insight in the actual impact of this particular project, but it will also gain us much experience in a data driven approach that can be transferred to other projects and interventions.</td>
</tr>
</table>

6 Novo mesto (SI): Sports and recreational park Češča vas

Overview of the pilot and the VSs

Annex D: Novo mesto- the Pilot area

Annex D: Novo mesto- the existing situation

Annex D: Novo mesto- the masterplan

The pilot site: sports and recreational park Češča vas - masterplan

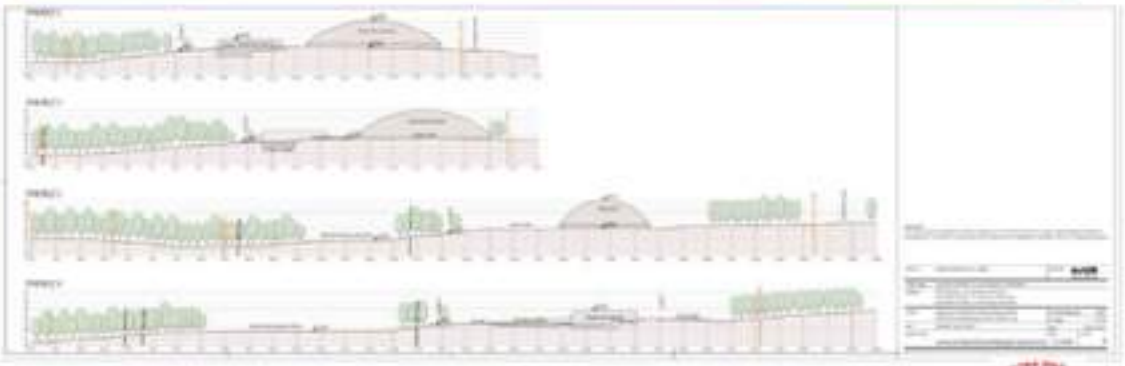
The City's actions

The military brownfield site will be regenerated. Emphasis will be given on the health of citizens, elderly, youth and impaired people. The area will include:
1) A motoric-experience park.
2) Recreational facilities and playgrounds (i.e. running track, nature-based fitness facilities etc.).
3) Therapy centre with horses
4) Multifunctional hall (velodrome & athletic track, multipurpose area for training and events).
5) Future pool & camp site.

Synergies with other programmes are envisioned in the area for revitalization. SRC Češča vas will provide citizens and special groups health- and recreation-based interconnected services and activities.

VARCITIES

The pilot site: sports and recreational park Češča vas - masterplan

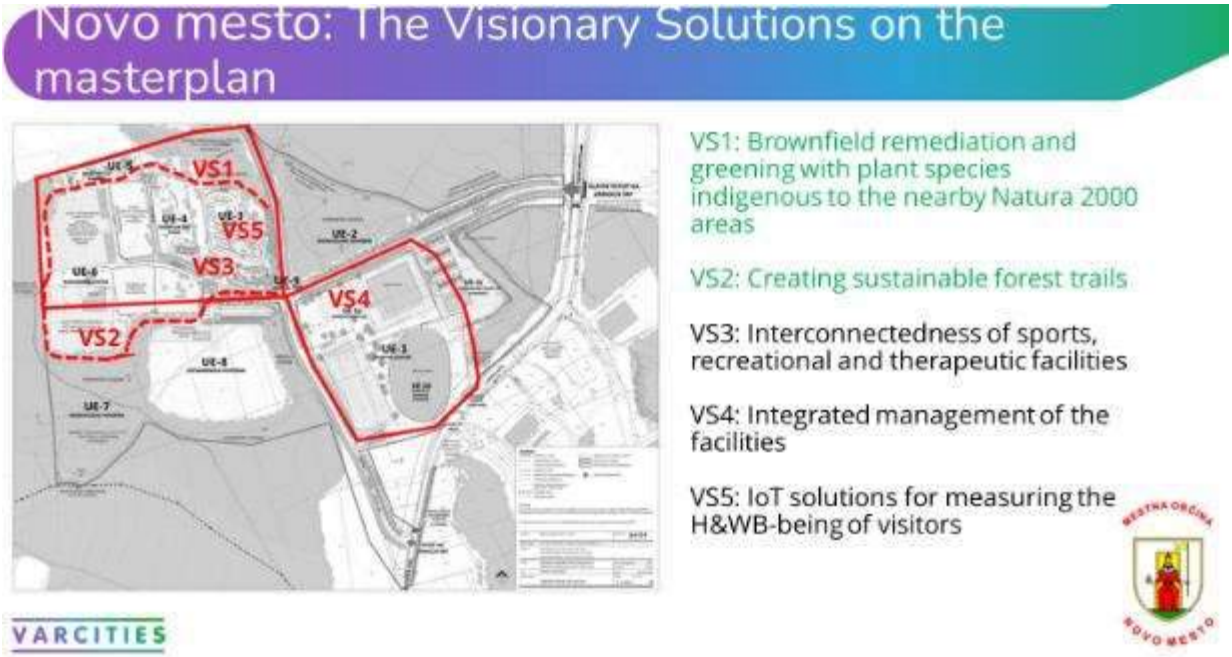


MONM: are there any other representations of the planned City actions? Renderings? Photos?

VARCITIES

Annex D: Novo mesto- Objectives/ H&WB link

Annex D: Novo mesto- the Visionary Solutions on the masterplan



Novo mesto: Overview of the sketched solutions

VS1- Brownfield remediation and greening

VS1 Summary (Annex A)

Title	Brownfield remediation and greening
Motto	The Visionary Solution provides landscaping and monitoring activities to the degraded area to facilitate regeneration of the area that will enable other activities of the stakeholders to commence in the park and has also an educational purpose, as it will inform visitors about plant and animal species located in the surrounding area.
Location of the planned investment	Recreational centre Češča vas, Municipality of Novo mesto
Municipality/local authority/main partners	Municipality of Novo mesto
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☐ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☒ Interventions in Ecological and Habitat Biodiversity ☒ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☐ For others, please specify IoT sensors for AQI monitoring ☒ ☐
Overview and objectives of the planned Visionary Solution	The military brownfield at the pilot site will be regenerated with plant species indigenous to the nearby Natura 2000 areas. This part of the landscaping also has an educational purpose, as it will inform visitors about plant and animal species located in the surrounding area. From the landscaped part of the recreational park, the visitor can take a walk along well-kept forest paths through the natural environment of the river Temenica. As part of this measure, sensors to monitor air quality and meteorological data will be installed - in part to measure the difference in climate and AQI parameters of this area in comparison to urban

	centre of the city.		
Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	100 %	
	Own funding	0 %	
	Other sources [please specify]	0 %	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	N/A	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected Impact	Unit
	1.1 C removed/stored by vegetation	Increased C sequestration in urban vegetation	C tons km^{-2} $year^{-1}$
	5.5 Physical air quality indicators: temperature, humidity, etc.	improvement of local climatic conditions	°C, %
	5.6 Chemical air quality indicators	Reduction of air pollution	pollutant µg m^{-3}, others (for each species)
	6.2 Accessibility: distribution, configuration & green space diversity & land use changes	increased accessibility of green spaces	/
	6.4 Reclamation of contaminated land	increased reclamation of contaminated land	km^2 / %
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	10.1 No. of jobs created; gross value	Increased job opportunities	No. of jobs created; euro

[98] All values incl. VAT, if not reclaimable.

	added		
	10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	definition of parameters for (re)designing green public spaces based on the well-being of users	/
	10.6 Replication of solutions		/
	10.9 Public Private investments after 5 years	increased public private investments	Euro
Contribution to SDGs	*SDG n° and name*		Expected Impact
	4.5 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		2
	4.7 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		4
	11.4 Make cities and human settlements inclusive, safe, resilient and sustainable		2
	11.6 Make cities and human settlements inclusive, safe, resilient and sustainable		1
	12.7 Ensure sustainable consumption and production patterns		2
	13.1 Take urgent action to combat climate change and its impacts		1
	13.3 Take urgent action to combat climate change and its impacts		4
	15.5 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation		1
	15.8 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation		1
	17.16 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development		4
	17.17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development		2
	4.5 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		2

VS1 Main Contacts (Annex B)

Lead Organization	
Organization name	Municipality of Novo mesto
Contact person	[redacted]
Department	Department for spatial planning and development
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert	
Organization name	Institute of the Republic of Slovenia for Nature Conservation, unit Novo mesto
Role	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador	
Organization name	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS1 Description (ANNEX C)

Objectives of the Visionary Solution

The Visionary Solution provides landscaping and monitoring activities to the degraded area to facilitate regeneration of the area that will enable other activities of the stakeholders to commence in the park and has also has an educational purpose, as it will inform visitors about plant and animal species located in the surrounding area.

Overview of Visionary Solution leader and partners

Visionary Solution 1 is led by MONM, which is leading the investment project. With expertise on selection of the plants and micro-location of solutions Institute of the Republic of Slovenia for Nature Conservation is assisting to the actions. Technology partners of VARCITIES (Korona & Sensedge) are assisting in analysing the needs and technology regarding sensory equipment envisioned in solutions.

General project background, context, and rationale

The military brownfield at the pilot site will be regenerated with plant species indigenous to the nearby Natura 2000 areas. This part of the landscaping also has an educational purpose, as it will inform visitors about plant and animal species located in the surrounding area. From the landscaped part of the recreational park, visitors can take a walk along well-kept forest paths through the natural environment of the river Temenica.

As part of this measure, sensors will also be installed to monitor air quality and meteorological data. These measurements will also allow to track the difference in climate and AQI parameters of this area in comparison to urban centre of the city.

Supporting actions required

The Institute of the Republic of Slovenia for Nature Conservation (IRSNC) will help determine the plant species for greening of brownfield. Other supporting actions include landscaping and planting of indigenous species.

Description of the Visionary Solution

The military brownfield at the pilot site (0.5 ha) will be regenerated with plant species indigenous to the nearby Natura 2000 areas. This part of the landscaping also has an educational purpose, as it will inform visitors about plant and animal species located in the surrounding area. From the landscaped part of the recreational park, visitors can take a walk along well-kept forest paths through the natural environment of the river Temenica. As part of this measure, sensors will also be installed to monitor air quality and meteorological data. These measurements will also allow to track the difference in climate and AQI parameters of this area in comparison to urban centre of the city.

Summary of VS components

VS components consists from operational steps in fulfilling the solutions – planning, basic general landscaping, planting of native tree species and installing of AQ and climate IoT sensors. (Table A for VS1)

Replication and/or up-scaling potential

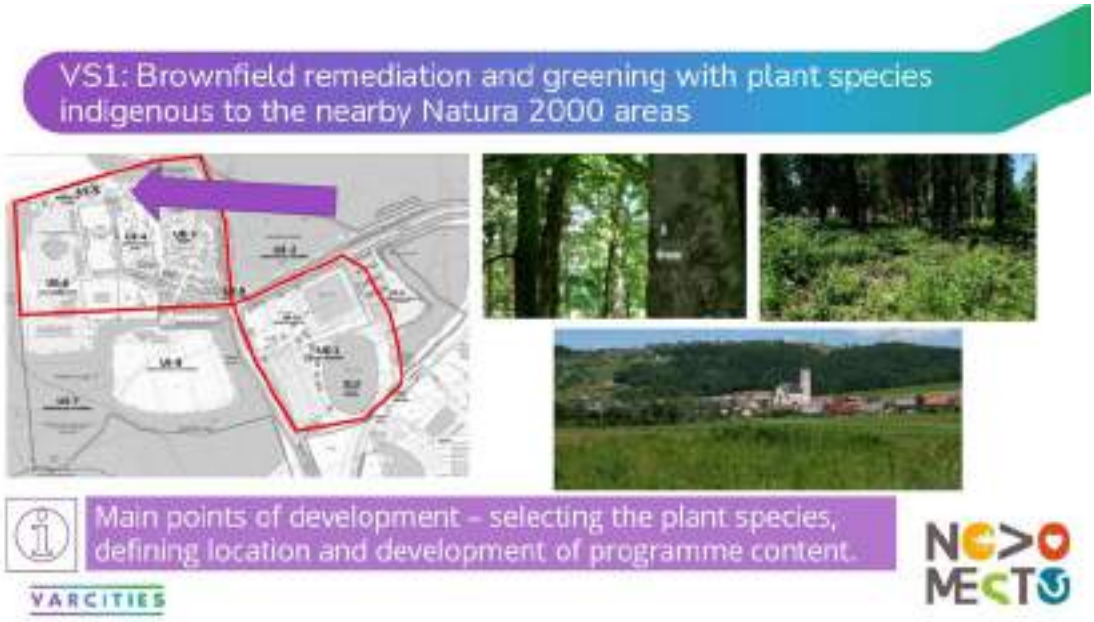
In 2020, there were 1132 degraded areas with a total area of 3695 ha (37 ha former military sites) recorded in Slovenia. Additionally, Slovenia has 355 Natura 2000 sites, which represent 37% of the total area. Moreover, 204 out of 212 municipalities in Slovenia have Natura 2000 sites. The envisioned visionary solution has the potential to become a reference case for successful brownfield remediation in the country and, thus, has a high replicability potential.

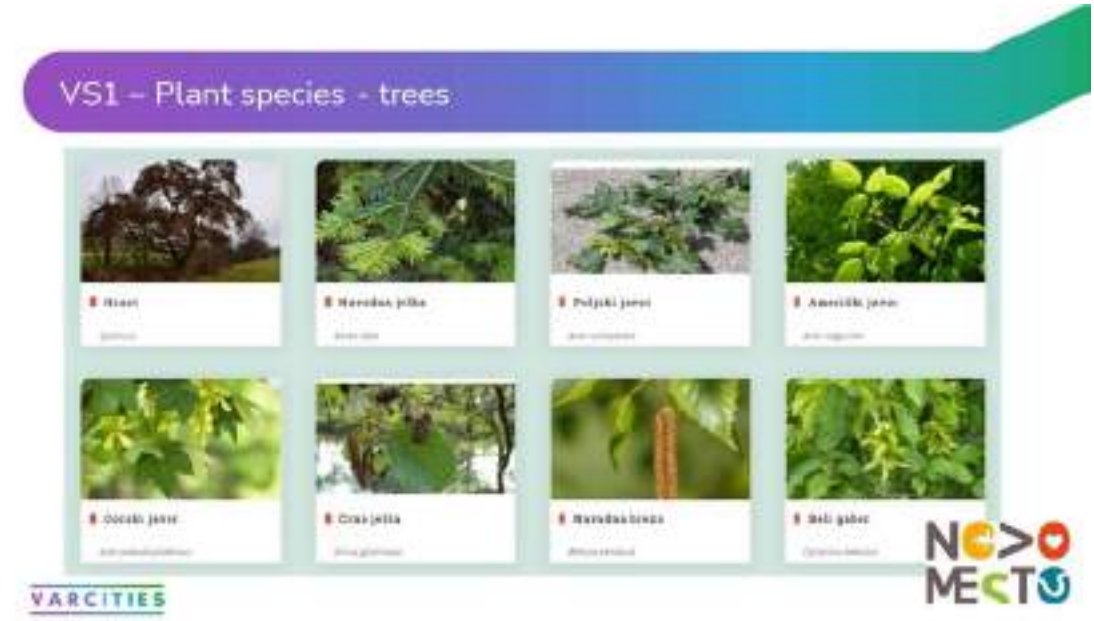
VS1 Summary of Visionary Solution components (Table A)[99]

# [100]	Visionary Solution components[101]	Brief description of the component	Unit [102]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Preparatory documentation	Preparation of technical documentation and Visualisations for obtaining required permits and expert opinions	1	Obtaining required permits and expert opinions	1.1 5.5 5.6 6.2	[redacted]
2	Basic landscaping of the degraded area	Removal of scrubs and levelling of the degraded area	0.5 ha	Necessary physical preparation of the degraded area	6.4 10.1 10.5	[redacted]
3	Planting of trees and bushes native to the Nature 2000 area	Purchase & planting of trees and bushes	20	Expanding existing greenery with species native to the Nature 2000 area, serving as educational tool and driver to visitors to the area	10.6 10.9	[redacted]
4	Measurements of Air/ambient quality and environmental parameters	Selection, purchase & installation of air quality and microclimate sensors	2+10	Establishing reference points of air quality and ambient quality of the area. Measurements will allow to track the difference in climate and AQI parameters of this area in comparison to urban centre of the city.		[redacted]
TOTAL						[redacted]

99 All values incl. VAT, if not reclaimable.
100 The number of rows can be adjusted as required.
101 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
102 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

VS1 Visualisations (Annex D)





VS2- Creating sustainable forest trails

VS2 Summary (Annex A)

Title	Creating sustainable forest trails
Motto	Creating sustainable trails in the surrounding mixed forest in order to connect the facilities of the sports and recreational park ŠRC Češča vas.
Location of the planned investment	Recreational centre Češča vas, Municipality of Novo mesto
Municipality/local authority/main partners	Municipality of Novo mesto
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☒ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☒ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☐ For others, please specify IoT sensors for visitor monitoring ☒
Overview and objectives of the planned Visionary Solution	Sustainable trails in the surrounding mixed forest will be created in order to connect the facilities. Public awareness, educational events and information campaigns will be initiated to promote and facilitate the creation of sustainable forest trails. The sustainable forest path will be carried out in the length of 1 km. The trim track will be equipped with information stations providing visitors with information on healthy lifestyle. The route will also be equipped with sensors for tracking and detecting the movement of visitors for counting and analysis.
Total investment planned	[redacted]

[103] All values incl. VAT, if not reclaimable.

Funding sources	*Requested funding (EU contribution)*	100 %	
	Own funding	0 %	
	Other sources [please specify]	0 %	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected Impact	Unit
	1.3 Measures of human comfort	Reduced urban temperature / Improved human comfort	Various
	4.2 Accessibility of urban green spaces for population	Increased accessibility of urban green spaces	km / min (by feet, by bus)
	4.3 Recreational (number of visitors, number of recreational activities) or cultural (number of cultural events, people involved, children in educational activities) value of green spaces	Increased recreational or cultural value of green spaces	No. of visitors year^{-1} / No. of recreational activities year^{-1}
	4.4 Weighted recreation opportunities provided by Urban Green Infrastructure	increased weighted recreation opportunities provided by Urban Green Infrastructure	%
	4.5 Nature based recreation opportunities	increased Nature Based recreation opportunities	No. of NB recreation opportunities
	4.13 Sustainability of green areas	Big savings in operational cost	euro
	4.14 Increased connectivity to existing Green Infrastructure	Increased connectivity to existing Green Infrastructure	ha
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/ participants
	8.5 Personal and social background of	Fair	no. of

	people who participated in the project's activities	participation to project activities	people per category
	10.1 No. of jobs created; gross value added	increased job opportunities	No. of jobs created; euro
	10.5 Definition of parameters for (re)designing of green public spaces based on the well-being of users	definition of parameters for (re)designing green public spaces based on the well-being of users	/
	10.6 Replication of solutions		/
	10.9 Public Private Investments after 5 years	increased public private investments	Euro
Contribution to SDGs	*SDG n° and name*	Expected Impact	
	4.7 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	**4**	
	12.2 Ensure sustainable consumption and production patterns	**2**	
	12.7 Ensure sustainable consumption and production patterns	**2**	
	15.2 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation	**4**	
	15.a + 15.b Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation	**2**	
	17.16 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	**4**	
	17.17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	**2**	

VS2 Main contacts (Annex B)

Lead Organization	
Organization name	Municipality of Novo mesto
Contact person	[redacted]
Department	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert	
Organization name	Est=Etika, Society for the Promotion of Ethics in Space
Role	Expert for spatial planning and innovative architectural solutions
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	-
E-Mail	[redacted]
Local ambassador	
Organization name	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS2 Description (Annex C)

Objectives of the Visionary Solution
Creating sustainable trails in the surrounding mixed forest in order to connect the facilities of the sports and recreational park ŠRC Češča vas.
Overview of Visionary Solution leader and partners
Visionary Solution 2 is led by MONM, which is leading the investment project. Est=Etika will assist with matters related to spatial planning and architecture. Technology partners of VARCITIES (Korona & Sensedge) are assisting in analysing the needs and technology regarding sensory equipment envisioned in solutions.
General project background, context, and rationale
The military brownfield site in Češča vas is an area with signs of urban degradation. It is nearby a Natura 2000 site, and therefore of nature conservation interest. The military brownfield site will be regenerated. Emphasis will be given on the health of citizens, elderly, youth and impaired people. The area will include: a motoric-experience park, Recreational facilities and playgrounds, Therapy centre with horses, Multifunctional Hall, Future pool & camp site. Sports and recreational park (SRC) Češča vas will provide citizens and special groups health- and recreation-based interconnected services and activities. Synergies with other programmes are envisioned in the area for revitalization. Particularly, VS 2 will physically connect the facilities of the SRC.
Supporting actions required
Est=Etika will assist with matters related to spatial planning and architecture.
Description of the Visionary Solution
Creating sustainable trails in the surrounding mixed forest in order to connect the facilities of the sports and recreational park ŠRC Češča vas. Public awareness and educational events as well as information campaigns will be initiated to promote and facilitate the creation of sustainable forest trails, which provide reduced disturbances to fauna as well as damage to soils and vegetation, in the region (more than 58% of total area in Slovenia covered by forests). Planning and construction of a sustainable forest path will be carried out in the length of 1 km. The trim track will be equipped with information stations that will provide visitors information about the factors of a healthy lifestyle. The route will also be equipped with sensors for tracking and detecting the movement of visitors for counting and analysis of the visitor use. It is envisaged that the trim track will "embrace" the area of the recreation park, but it is possible that in dialogue with stakeholders' other possible routes will be identified as well as the additional possible use of such paths. Trails will also have to act as part of the pedestrian connection between different parts of the recreation area.
Summary of VS components
VS components consists from operational steps in fulfilling the solutions: preparatory documentation, promotional material, construction of sustainable forest trails, IoT sensors for monitoring visitors, public awareness and educational events, surveys & questionnaires, information campaigns. (Table A for VS2)
Replication and/or up-scaling potential
Forests cover more than 60% of land area in Slovenia. Around 5% of this area is dedicated predominantly for recreation and tourism. The within VARCITIES created forest trail (VS 2) will represent a showcase example of sustainable forestry that can be replicated in urban forests across the country.

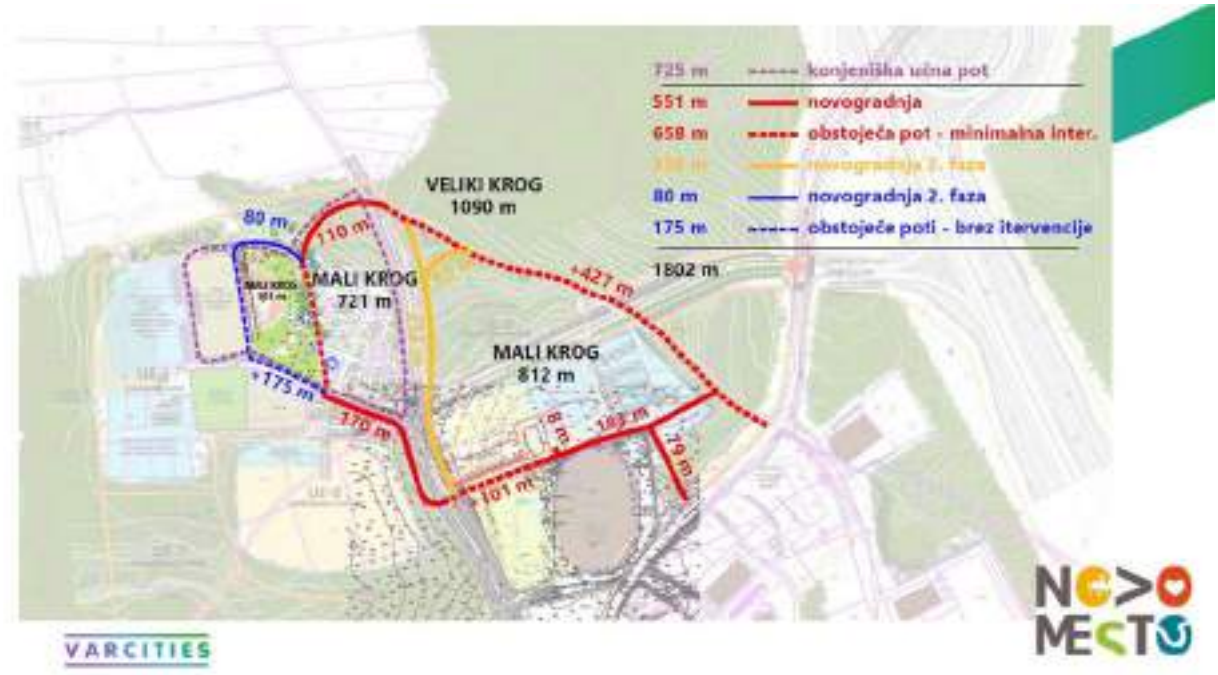
VS2 Summary of Visionary Solution Components (Table A)[104]

# [105]	Visionary Solution components[106]	Brief description of the component	Unit[107]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Preparatory documentation	Preparation of technical documentation and Visualisations for obtaining required permits and expert opinions	1	Obtaining required permits and expert opinions	1.3 4.2 4.3 4.4 4.5 4.13 4.14 10.1 10.5 10.6 10.9	[redacted]
2	Programmatic setup (H&WB content)	Design & content of informative spots of the sustainable trail	1 plan; 6 spots	Planning the content for support of the track and its functions, giving it educational purpose		[redacted]
3	Construction of sustainable forest trails	Construction work for execution of the trail	1 km	Trail will serve as classic trim track and educational pathway for learning about healthy lifestyle		[redacted]
4	Monitoring of visitor data	4 Infrared (IR) people counters with LoRaWAN connectivity	4	Route will also be equipped with Sensors for tracking and detecting the movement of visitors for counting and analysis.		[redacted]

104 All values incl. VAT, if not reclaimable.
105 The number of rows can be adjusted as required.
106 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
107 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

5	Public awareness and educational events	Promotional events design & activities	2	For communication and public awareness purposes two promotional events will be held		[redacted]
6	Surveys & questionnaires	Supporting actions for execution of survey and questionnaires	2	Two sets of surveys will measure affection and understanding of the solutions encompassed by the track		[redacted]
7	Information campaigns	Social media & mass media information	1	Expand understanding of the park's vision and its nature-based solutions		[redacted]
TOTAL						[redacted]

VS2 VISUALISATION (Annex D)



VS3- Interconnectedness of facilities

VS3 Summary (Annex A)

Title	Interconnectedness of facilities
Motto	The interconnection of objects and contents primarily focuses on their programmatic, communication and technical connection.
Location of the planned investment	Recreational centre Češča vas, Municipality of Novo mesto
Municipality/local authority/main partners	Municipality of Novo mesto
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☒ Public Spaces Interventions ☒ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☒
Overview and objectives of the planned Visionary Solution	The interconnection of objects and contents primarily focuses on their programmatic, communication and technical connection. The planned resources and tools are: development of integrated business and environmental programs, information equipment for connecting facilities, enabling the access for disabled people in and around facilities, social and educational events, strategic placement of Wi-Fi points, etc. As part of this measure, a comprehensive self-sustaining program offer of the park will be created, offering healthy leisure time for all generations. In cooperation with stakeholders for special target groups (children – motor development, elderly – health strengthening) special part of the programme will be created. At the same time routing tables will be set up for shaping the users' paths in the physical space. The facilities will be marketed and managed as one entity through development of integrated business and environment programs. Synergies between the offered activities and therapeutic services will be identified with the aim to enhance the experience and H&WB of visitors. Common resources and facilities (e.g. restrooms, wardrobes, rest areas, Wi-Fi hotspot) will be designed and strategically placed to encourage spontaneous encounters and interactions between the various user groups (elderly, youth, motorically impaired), as well as to facilitate serendipitous interactions among the different service providers. The multifunctional hall and the other facilities and parts of the park will work as a seamless entity overcoming the division between sport, recreation and wellbeing. Regular social and educational events as well as meetings with STKs will be organised to facilitate knowledge and experience exchange between the facilities.

	Inter-departmental collaboration and Institutional learning will be assessed through surveys & questionnaires.		
Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	100 %	
	Own funding	0 %	
	Other sources (please specify)	0 %	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	NA EUR	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected impact	Unit
	4.7 Green-related social service provided to population	increased Green-related social service provided to population	/
	4.14 Increased connectivity to existing Green Infrastructure	Increased connectivity to existing Green Infrastructure	ha
	7.4 Perceptions of citizens on urban nature	increased awareness of urban ecosystems	Number of visitors
	7.5 Social values for urban ecosystems and biodiversity	increased awareness of urban ecosystems	Number of visitors
	7.6 Inter-departmental collaboration leading to NBS designs for multi-functionality	increased governance coordination for NBS	No. paper / year
	7.7 Improved coordination of NBS strategies within and across levels of governance	increased governance coordination for NBS	/
	7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.9 Institutional learning concerning acquisition of knowledge and understanding	increased institutional capacity	/
	7.13 No of new information channels generated between public institutions &	increased institutional	No. of new information

[108] All values incl. VAT, if not reclaimable.

	citizenship	capacity	channels
	7.14 No civil society entities that have participated in the execution of the project in relation to the total of entities with presence in the neighbourhood	Increased and improved participation	%
	8.5 Fair participation to project activities	no. of people per category	8.5 Personal and social background of people who participated in the project's activities
	8.7 Participation of entities representing groups of persons with functional disabilities	Greater inclusion of people with functional disabilities	%
	8.8 Participation of individuals with functional disabilities	Greater inclusion of people with functional disabilities	No. of individuals / year
	8.10 Accessibility of open public spaces and buildings for families with baby carriages and individuals with restricted mobility	Greater inclusion of families with babies and individuals with restricted mobility	No. of accesses / year
	9.8 Feeling of improving the quality of life (the Quality of Life questionnaire)	Improved quality of life	Scales' scores
	9.22 Improved motor skills among the youth	Improved motor skills among the youth	/
	10.1 No. of jobs created; gross value added	increased job opportunities	No. of jobs created; euro
	10.9 Public Private Investments after 5 years	increased public private investments	Euro
Contribution to SDGs	*SDG n° and name*	Expected Impact	
	4.a.1 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	**4**	
	8.5 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	**1**	
	10.2 Reduce inequality within and among countries	**1**	
	11.7 Make cities and human settlements	**4**	

	inclusive, safe, resilient and sustainable	
	12. 7 Ensure sustainable consumption and production patterns	2
	17.16 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	4
	17.17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	2

VS3 Main Contacts (Annex B)

Lead Organization	
Organization name	Municipality of Novo mesto
Contact person	[redacted]
Department	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS3 Description (Annex C)

Objectives of the Visionary Solution
The interconnection of objects and contents primarily focuses on their programmatic, communication and technical connection.
Overview of Visionary Solution leader and partners
Visionary Solution 3 is led by MONM, which is leading the investment project. DCNM will support the development of integrated business and environment programmes Technology partners of VARCITIES (Korona & Sensedge) are assisting in analysing the needs and technology regarding sensory equipment envisioned in solutions.
General project background, context, and rationale
The military brownfield site in Češča vas is an area with signs of urban degradation. It is nearby a Natura 2000 site, and therefore of nature conservation interest. The military brownfield site will be regenerated. Emphasis will be given on the health of citizens, elderly, youth and impaired people. The area will include: a motoric-experience park, Recreational facilities and playgrounds, Therapy centre with horses, Multifunctional Hall, Future pool & camp site. Sports and recreational park (SRC) Češča vas will provide citizens and special groups health- and recreation-based interconnected services and activities. Synergies with other programmes are envisioned in the area for revitalization. Particularly, VS 3 will be implemented to interconnect the facilities of SRC Češča in terms of programmes, services, and communication with the aim to facilitate knowledge and experience exchange between the service providers, and enhance the experience and H&WB of visitors.
Supporting actions required
The supporting actions include technical expertise and construction of disabled friendly access.
Description of the Visionary Solution
The interconnection of objects and contents primarily focuses on their programmatic, communication and technical connection. The planned resources and tools are: development of integrated business and environmental programs, information equipment for connecting facilities, enabling the access for disabled people in and around facilities, social and educational events, strategic placement of WiFi points, etc. As part of this measure, a comprehensive self-sustaining program offer of the park will be created, offering healthy leisure time for all generations. In cooperation with stakeholders for special target groups (children – motor development, elderly – health strengthening) special part of the programme will be created. At the same time routing tables will be set up for shaping the users' paths in the physical space. The facilities will be marketed and managed as one entity through development of integrated business and environment programs. Synergies between the offered activities and therapeutic services will be identified with the aim to enhance the experience and H&WB of visitors. Common resources and facilities (e.g. restrooms, wardrobes, rest areas, WiFi hotspot) will be designed and strategically placed to encourage spontaneous encounters and interactions between the various user groups (elderly, youth, motorically impaired), as well as to facilitate serendipitous interactions among the different service providers. The multifunctional hall and the other facilities and parts of the park will work as a seamless entity overcoming the division between sport, recreation and wellbeing. Regular social and educational events as well as meetings with STKs will be organised to facilitate knowledge and experience exchange between the facilities. Inter-departmental collaboration and Institutional learning will be assessed through surveys & questionnaires.
Summary of VS components
VS components consists from operational steps in fulfilling the solutions: Development of integrated business and environment programmes, Serendipitous design of common resources and facilities, Disabled friendly access in and around facilities, Social and educational events, Strategic placement of WiFi hotspots, Surveys & questionnaires, Meetings with STKs. (Table A for VS3)

Replication and/or up-scaling potential
The measures and actions deployed in VS3 to achieve interconnectedness of sports, recreational and therapeutic facilities, can be replicated as well across the various departments of the municipality as other municipality operated entities to facilitate inter-departmental collaboration and institutional learning.

VS3 Summary of Visionary Solution Components (Table A) [109]

# [110]	Visionary Solution components[111]	Brief description of the component	Unit[112]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Development of integrated business and environment programmes	Consumables for implementing the developed integrated business and environment programmes	5	We want to create a special part of the programs together with stakeholders for special target groups - children (motor development) and the elderly (strengthening health).	ID 4.7 ID 4.14 ID 7.4 ID 7.5 ID 7.6 ID 7.7 ID 7.8 ID 7.9 ID 7.13 ID 7.14 ID 8.7 ID 8.8 ID 8.10 ID 9.8 ID 9.22	[redacted]
2	Serendipitous design of common resources and facilities	Common resources and facilities (rest areas) will be designed and strategically placed to encourage spontaneous encounters and interactions between the various user groups	5	Common markings and directional and information boards, wifi spots, interaction spots on the touching points of the facilities.		[redacted]
3	Disabled friendly access in and around facilities	Analysis and mitigating measures of disabled friendly access in the park	1	Disabled friendly access		[redacted]
4	Social and educational events	Performing events that will market and show	2	We want general public to perceive integrative nature of		[redacted]

109 All values incl. VAT, if not reclaimable.
110 The number of rows can be adjusted as required.
111 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
112 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		facilities in the interconnectedness		the park that offers a healthy leisure time to all generations.	ID 10.1 ID 10.9	
5	LoRaWAN Gateways	LoRaWAN Gateways	3	Enabling network for IoT sensors		[redacted]
6	Strategic placement of WiFi hotspots	Enabling connectivity for all users	2	Wifi spots for the nature-based part of the park		[redacted]
7	Surveys & questionnaires	Supporting actions for execution of survey and questionnaires	2	Correcting measures and analysis of the impact of the programmes and their design		[redacted]
8	Meetings with STKs	Sustainable follow-up of the programmes – analysis and setup of further development of the special and general groups programmes for healthy living	1	Sustainable development of the programmes		[redacted]
TOTAL						[redacted]

VS3 Visualisations (Annex D)

VS4- Integrated management of SRC facilities

VS4 Summary (Annex A)

<table>
<tr><td>Title</td><td>Integrated management of SRC facilities</td></tr>
<tr><td>Motto</td><td>Sports and recreational facilities at ŠRC Češča vas will be managed through a common ICT platform.</td></tr>
<tr><td>Location of the planned investment</td><td>Recreational centre Češča vas, Municipality of Novo mesto</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Municipality of Novo mesto</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☒</td></tr>
<tr><td>Public Spaces Interventions</td><td>☒</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table>
For others, please specify
<table>
<tr><td>ICT platform for integrated management of facilities</td><td>☒</td></tr>
<tr><td>IoT sensors for visitor monitoring</td><td>☒</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>Sports and recreational facilities at ŠRC Češča vas will be managed through a common ICT platform, which will include a CRM system to collect and manage data from IoT sensors deployed at the park. Sensors for visitors' movement tracking and detection (people counter) will be installed for visitors flow overview and management. Additionally, public screens will be placed in the check-in area of the park where the visitors flow data will be displayed as well as statistics from the aggregated data collected from other IoT sensors deployed at the park.</td></tr>
</table>

Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	100 %	
	Own funding	0 %	
	Other sources [please specify]	0 %	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	NA EUR	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected impact	Unit
	7.3 Social learning concerning urban ecosystems and their functions/services	increased awareness of urban ecosystems	/
	7.4 Perceptions of citizens on urban nature	increased awareness of urban ecosystems	Number of visitors
	7.5 Social values for urban ecosystems and biodiversity	increased awareness of urban ecosystems	Number of visitors
	7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	10.9 Public Private Investments after 5 years	increased public private investments	Euro
Contribution to SDGs	*SDG n° and name*	Expected Impact	
	12.b Ensure sustainable consumption and production patterns	4	
	12.7 Ensure sustainable consumption and production patterns	2	
	17.16 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	4	
	17.17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	2	

[113] All values incl. VAT, if not reclaimable.

VS4 Main Contacts (Annex B)

Lead Organization	
Organization name	Municipality of Novo mesto
Contact person	[redacted]
Department	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS4 Description (Annex C)

Objectives of the Visionary Solution
Sports and recreational facilities at ŠRC Češča vas will be managed through a common ICT platform, which will include a Customer Relationship Manager (CRM) system to collect and manage data from IoT sensors deployed at the park.
Overview of Visionary Solution leader and partners
Visionary Solution 4 is led by MONM, which is leading the investment project. Technology partners of VARCITIES (Korona & Sensedge) are assisting in analysing the needs and technology regarding sensory equipment envisioned in solutions. Zavod Novo mesto will be involved in the implementation process of VS4 as the main end-user of the ICT platform.
General project background, context, and rationale
The military brownfield site in Češča vas is an area with signs of urban degradation. It is nearby a Natura 2000 site, and therefore of nature conservation interest. The military brownfield site will be regenerated. Emphasis will be given on the health of citizens, elderly, youth and impaired people. The area will include: a motoric-experience park, Recreational facilities and playgrounds, Therapy centre with horses, Multifunctional Hall, Future pool & camp site. Sports and recreational park (SRC) Češča vas will provide citizens and special groups health- and recreation-based interconnected services and activities. Synergies with other programmes are envisioned in the area for revitalization. Particularly, VS 4 aims to implement a common ICT platform for booking and IoT sensor data for integrated management of the SRC facilities.
Supporting actions required
Zavod Novo mesto, as the entity responsible management of the sport & recreational facilities in Novo mesto, will assist with the implementation and validation of VS4.
Description of the Visionary Solution
Sports and recreational facilities at ŠRC Češča vas will be managed through a common ICT platform, which will include a CRM system to collect and manage data from IoT sensors deployed at the park. Sensors for visitors' movement tracking and detection (people counter) will be installed for visitors flow overview and management. Additionally, public screens will be placed in the check-in area of the park where the visitors flow data will be displayed as well as statistics from the aggregated data collected from other IoT sensors deployed at the park. The measure envisages the design and installation of information technologies that will support the overall operation of the park and will connect: the Velodrome and the multipurpose hall, the swimming pool complex, the motor park, the camp, the event space and the activities of the equestrian centre. The implementation of a central website with an overview of the offer, occupancy and events, a booking system for all facilities and events, a platform for data management and visitors is planned.
Summary of VS components
VS components consists from operational steps in fulfilling the solutions: ICT platform, IoT Sensors, Public Screens.
Replication and/or up-scaling potential
The ICT platform deployed in VS4 for integrated management of the sports, recreational and therapeutic facilities, can be potentially integrated with other IT systems across the various departments of the municipality and/or other municipality operated entities.

VS4 Summary of Visionary Solution components (Table A) [114]

# [115]	Visionary Solution component[116]	Brief description of the component	Unit[117]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Preparatory documentation	Preparation of mock-ups and other visualizations required for the implementation of ICT platform	1	Design phase, requirements analysis and specifications	ID 7.3 ID 7.4 ID 7.5 ID 7.8 ID 10.9	[redacted]
2	ICT platform	Main ICT platform for managing facilities, bookings, programmes and CRM	1	Integration of the facilities through a common ICT platform, which will include a CRM system as well as collect and manage data collected from IoT sensors deployed at the park		[redacted]
3	IoT Sensors	Sensors for tracking and detecting the movement of visitors will give an overview and manage the people flow	5	Management and analysis of people flow in the park for development of new programmes and facilities.		[redacted]
4	Public Screens	Public touchscreens as information points of the centre, functional part of the VSS	2	Information and engagement of the visitors – serving as main info points of the park as the whole and supporting VSS activities as the frontend.		[redacted]
TOTAL						[redacted]

114 All values incl. VAT, if not reclaimable.
115 The number of rows can be adjusted as required.
116 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
117 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

S4 Visualisations (Annex D)

VS5- IoT solutions for H&WB monitoring

VS5 Summary (Annex A)

Title	IoT solutions for H&WB monitoring
Motto	Wearables will be acquired to actively track the activities and directly monitor the H&WB of visitors
Location of the planned investment	Recreational centre Češča vas, Municipality of Novo mesto
Municipality/local authority/main partners	Municipality of Novo mesto
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions ☒ Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☐ For others, please specify IoT wearables for H&WB monitoring ☒ ☐
Overview and objectives of the planned Visionary Solution	Wearables will be acquired to actively track the activities and directly monitor the H&WB of visitors. Additionally, visitor tracking sensors will be placed at the pilot site to more accurately track the movement of visitors.
Total investment	[redacted]

[118] All values incl. VAT, if not reclaimable.

planned			
Funding sources	*Requested funding (EU contribution)*	100 %	
	Own funding	0 %	
	Other sources [please specify]	0 %	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	NA EUR	
Expected impacts (based on those identified in the monitoring framework)	*Indicator*	Expected Impact	Unit
	1.3 Measures of human comfort	Reduced urban temperature / Improved human comfort	Various
	5.5 Physical air quality indicators: temperature, humidity, etc.	improvement of local climatic conditions	°C, %
	5.6 Chemical air quality indicators	Reduction of air pollution	pollutant µg m^{-3}, others (for each species)
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	9.8 Feeling of improving the quality of life (the Quality of Life questionnaire)	Improved quality of life	Scales' scores
	9.16 Number / share of people being physically active (min. 30 min 3 times per week)	Increased outdoor physical activity	No. of people / %
	9.19 Increase in walking and cycling in and around areas of interventions	increased outdoor physical activity	No. of people / hours per week per capita
Contribution to SDGs	*SDG n° and name*	Expected Impact	
	9.c Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	**4**	
	12.7 Ensure sustainable consumption and production patterns	**2**	
	17.16 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	**4**	

	17.17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	**2**

VS5 Main Contacts (Annex B)

Lead Organization	
Organization name	Municipality of Novo mesto
Contact person	[redacted]
Department	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
Address (Street, No. Postal Code, City Country)	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	[redacted]
Telephone	[redacted]
E-Mail	[redacted]

VS5 Description (Annex C)

Objectives of the Visionary Solution
Wearables will be acquired to actively track the activities and directly monitor the H&WB of visitors
Overview of Visionary Solution leader and partners
Visionary Solution 5 is led by MONM, which is leading the investment project. Technology partners of VARCITIES (Korona & Sensedge) are assisting in analysing the needs and technology regarding sensory equipment envisioned in solutions.
General project background, context, and rationale
The military brownfield site in Češča vas is an area with signs of urban degradation. It is nearby a Natura 2000 site, and therefore of nature conservation interest. The military brownfield site will be regenerated. Emphasis will be given on the health of citizens, elderly, youth and impaired people. The area will include: a motoric-experience park, Recreational facilities and playgrounds, Therapy centre with horses, Multifunctional Hall, Future pool & camp site. Sports and recreational park (SRC) Češča vas will provide citizens and special groups health- and recreation-based interconnected services and activities. Synergies with other programmes are envisioned in the area for revitalization. Particularly, within VS5 IoT sensors will be deployed with the aim to directly monitor the H&WB of the park's visitors.
Supporting actions required
/
Description of the Visionary Solution
Wearables will be acquired to actively track the activities and directly monitor the H&WB of visitors. Additionally, visitor tracking sensors will be placed at the pilot site to more accurately track the movement of visitors.
Summary of VS components
VS components consists from operational steps in fulfilling the solutions: IoT Sensors, Wearables, App/web page (Table A for VS5)
Replication and/or up-scaling potential
According to the National Programme of Sport 2014-2023 Slovenia aims to ensure 0,35 m² of indoor and 3,2 m² of outdoor sport area per capita. To the best of our knowledge, there are currently no solutions deployed to directly monitor the H&WB of visitors in public recreational areas in Slovenia. Consequently, VS5 has a high up-scaling potential.

VS5 Summary of Visionary Solution components (Table A) [119]

# [120]	Visionary Solution components[121]	Brief description of the component	Unit[122]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Wearables	Wearables will be acquired to actively track the activities and directly monitor the H&WB of visitors	20	Purchase and setup of wearables that will be used for various movement enhancing activities (trail, running, motoric skills…)	ID 1.3 ID 5.5 ID 5.6 ID 9.8	[redacted]
2	Tablet computer	Tablet computer s with WiFi and BLE connectivity which will serve as a network getaway for wearables	2	Purchase and setup and installation of tablets for wearables registration	ID 9.16 ID 9.19	[redacted]
TOTAL						[redacted]

119 All values incl. VAT, if not reclaimable.
120 The number of rows can be adjusted as required.
121 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
122 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

VS5 VISUALISATION (Annex D)

VS5: IoT solutions for measuring the H&WB -being of visitors

Challenges addressed related to	VS components	Budget	Timeline for implementation
• Social Justice & Social Cohesion, • Public H&WB	1. IoT sensors, 2. Wearables and apps	€20,000	May 22- Jun 22

Wearables will be acquired to actively track the activities and directly monitor the H&WB of visitors. Additionally, visitor tracking sensors will be placed at the pilot site to more accurately track the movement of visitors. Furthermore, a dedicated web page/application will be deployed, where visitors will have an overview over their H&WB data collected through wearables.

VS1 - 2 - 3 – 4 - 5 Stakeholders (Annex E)

Stakeholder analysis			
Type of stakeholder	**Current status of engagement**	**Future engagement activities**	**Instruments/channels for dissemination and interaction**
primary school	involved in codesign of VS3	co-implementation/evaluation of VS3	telephone, email, in-person meeting, workshops
secondary school	involved in codesign of VS3	co-implementation/evaluation of VS3	telephone, email, in-person meeting, workshops
kindergarten	involved in codesign of VS3	co-implementation/evaluation of VS3	telephone, email, in-person meeting, workshops
sports clubs	involved in codesign of VS3	co-implementation/evaluation of VS3	telephone, email, in-person meeting, workshops
NGOs for special needs programmes	involved in codesign of VS3	co-implementation/evaluation of VS3	telephone, email, in-person meeting, workshops
NGOs for elderly	involved in codesign of VS3	co-implementation/evaluation of VS3	telephone, email, in-person meeting, workshops
public bodies for health	involved in codesign of VS3	co-implementation/evaluation of VS3	telephone, email, in-person meeting, workshops
independent experts for forestry (institute)	involved in codesign of VS1, VS2	Co-evaluation of VS3	telephone, email, in-person meeting, workshops
operator of SRC facilities	involved in codesign of VS1-5	co-implementation/ evaluation of VS1-5	telephone, email, in-person meeting, workshops
service providers of SRC facilities (e.g. horse therapy)	involved in codesign of VS3, VS4	co-implementation/ of VS3, co- evaluation of VS4	telephone, email, in-person meeting, workshops
experts from sports, recreational activities	involved in codesign of VS3, VS5	co-implementation/ of VS3, co- evaluation of VS5	telephone, email, in-person meeting, workshops

VS1 - 2 - 3 – 4 - 5 STRATEGIC PLANNING AND ASSESSMENT OF THE VS (ANNEX F)

Results of PESTLE analysis

The PESTLE analysis provides you with a structure that allows you to investigate the context in which your organization operates, it prompts you to ask yourself what the external factors of greatest impact on the organization are and to discuss their likely implications.

How you categorize each issue raised is not important when using the PESTLE technique because the purpose of this tool is simply to identify as many factors as possible.

For example, it is not important to classify an upcoming government regulation as a political or legal issue. The only thing that matters, in the end, is that it is identified as potentially having an impact on your organization.

Political factors affecting the planned Visionary Solutions

What are the key political factors?

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• Integration with programmes/ projects already in place • Forest Service of the Republic of Slovenia is ready to cooperate	No factors identified	• Integration with the existing therapeutic equestrian centre with educational trail and a sensory park (specially adapted for blind and partially sighted people) • The two projects should also be connected with the neighbouring municipality	No factors identified	No factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
	• Support from Municipality of Novo mesto council and city administration • Support from Association for conservation of nature • Support from expert organizations, Forest Service of the Republic of Slovenia is ready to cooperate		• Integration with broader digitalization processes of Municipality • Support from professional associations from the field of digitalization (OASC, CEMR…)	• Support from Ministry of education and sport, Support from ministry of health • Compliance and questions regarding GDPR legislation

Economic factors affecting the planned Visionary Solutions

What are the most important economic factors?

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• New jobs will need to be created	No factors identified	No factors identified	No factors identified	No factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
• Enable nature based educational programmes on Natura 2000 area	Facilities from VS2 – nature path – should support business opportunities	Programmes devised from activities of VS3 should enable business opportunities of clubs, associations…	Systems should support programmes and business opportunities of clubs, associations from sport and health; possibility of other companies that could use this for their business ideas	Systems should support programmes and business opportunities of clubs, associations from sport and health, new programmes are possible through use of wearebles, possibility of other companies that could use this for their business ideas

Social factors affecting the planned Visionary Solutions

What are the most important social and cultural aspects?

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• Development of forest pedagogy (environmental education) for children and adults • Explore how visitors affect the forest • What would happen if the number of visitors of existing equestrian centre increased significantly	• The construction of new infrastructures often forgets the elements adapted to people in wheelchairs	• The sensory park and the educational trail are also used by the locals and the tourists	• Key target audience should be children and recreational athletes	No factors identified

What are the most important social and cultural aspects?

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
• Development of forest pedagogy (environmental education) for children and adults; • Awareness raising on natural heritage • Explore how visitors affect the forest; • Raising awarenes on air quality and importance for healthy living	• The construction of new infrastructures should employ the elements adapted to people in wheelchairs • Fostering social functions of green infrastrucure - socializing of citizens through sport • intergenerational functions of trail and other facilities (socializing of elderly and children on common facilities)	• The sensory park and the educational trail are also used by the locals and the tourists • Integration with the existing therapeutic equestrian centre with educational trail and a sensory park (specially adapted for blind and partially sighted people);	• Key target audience should be children and recreational athletes • Optimization of usage of sport and recreational facilities (access to larger target groups through optimized utilization) • Technology solutions enable us to adapt to special needs of target groups	• Fostering healthy living through usage and feedback of technological solutions (IoT, wearables), using novelty factor

Technological factors affecting the planned Visionary Solutions

What technological innovations could occur?

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• Forest trails are difficult to maintain • Counting the number of visitors with the help of sensors	• Create a running trail so that people in wheelchairs can use it (surface material, etc.) • Problems were identified especially about access and visitors' flow • Connect the running trail with other cross-country running areas in the city	• Access to people with disabilities in and around the facilities, social and educational events	• Transport connections (that should be expanded) • Information technology should support the entire operation of the park • Sensors to track and detect the movement of visitors for the management of people flow	No factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
• Forest trails are difficult to maintain; we	• Create a running trail so that people in	• Access to people with disabilities in and around the	• Transport connections (that should be	• Wearables system will be provided for prototype

• expect that new maintaining processes will be defined • Counting the number of visitors with the help of sensors and new analysis of visitors' flow, activities could be developed	wheelchairs can use it (testing of new usage of surface material, etc.); • Problems were identified especially about access and visitors' flow; • Connect the running trail with other cross-country running areas in the city. • Design of the trail foresees future development of trail connections	facilities, social and educational events • Innovative use of existing facilities could come forward through new innovative programmes • Facilities could prove as a testing ground for new technologies	expanded); • Information technology should support the entire operation of the park; • Sensors to track and detect the movement of visitors for the management of people flow. • Integration of different IT systems on common platform, gaining competencies on data exchange and standardization	testing for further health related projects, • Aggregate data on usage and physical activities will be available for further research and analysis

Legal factors affecting the planned Visionary Solutions

What current and upcoming legislation could affect the sector?

* No factors identified from the co-creation workshops

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
Nature 2000 Nature conservation legislation	Natura 2000, Construction Law, land ownership	Legislation on public access for impaired users	GDPR	GDPR

Environmental factors affecting the planned Visionary Solutions

What are the environmental considerations we should bear in mind?

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• Preservation of the vegetation that is already present in this area	No factors identified	No factors identified	No factors identified	No factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
Preservation of the Natua 2000 vegetation that is already present in this area Maintaining green nature of the area (maintaining forest)	Trail should foster sustainable mobility movement Maintaining green nature of the area Maintaining forest functions	Maintaining green nature of the area and integration of the facilities,	Efficiency of resources, fostering sustainable mobility	Fostering sustainable mobility through promotion of walking and other types of physical activites Fostering sharing of devices – sharing

				economy principles

Results of SWOT analysis

Strengths affecting the planned Visionary Solutions

Please describe the endogenous factors that can favour the pursuit of VS objectives.

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• Forest Service of the Republic of Slovenia is ready to cooperate • Preservation of the vegetation that is already present in this area	• Create a running trail so that people in wheelchairs can use it (surface material, etc.)	• Integration with the existing therapeutic equestrian centre with educational trail and a sensory park (specially adapted for blind and partially sighted people)	No factors identified	No factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
• Forest Service of the Republic of Slovenia and association for nature conservation is supporting the project; • Green area already present in this area	• Trail is interesting new content for existing visitors of the area • Trail will have multi-faceted usage and will target several subgroups • Trail will also serve as communication path	• Already communicated interest form clubs and sports, health associations • Through the Varcities actions programmes will be developed that will serve as sustainable factor	• Possibility and intention to integrate existing City card system Sitium with ICT platform of the park	• Younger target groups have high interest for usage of wearable devices (novelty factor)

Weaknesses factors affecting the planned Visionary Solutions

Please describe the endogenous factors that can hinder or delay the VS implementation process.

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• Forest trails are difficult to maintain	• The construction of new infrastructures often forgets the elements adapted to people in wheelchairs	• The two projects should also be connected with the neighbouring municipality	No factors identified	No factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
	• Forest trails are difficult to maintain • Placement in space could prove difficult due to area needed	The two projects should also be connected with the neighbouring municipality		Number of wearables is somewhat limited

Opportunities affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect positively the VS implementation.

* Outcomes of the co-creation workshops

VS1	VS2	VS3	VS4	VS5
• Integration with programmes/ projects already in place • New jobs will need to be created • Development of forest pedagogy (environmental education) for children and adults • Explore how visitors affect the forest • Counting the number of visitors with the help of sensors	• Connect the running trail with other cross-country running areas in the city	• The sensory park and the educational trail are also used by the locals and the tourists • Access to people with disabilities in and around the facilities, social and educational events	• Key target audience should be children and recreational athletes • Transport connections (that should be expanded) • Information technology should support the entire operation of the park • Sensors to track and detect the movement of visitors for the management of people flow	No factors identified

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
	• New usage patterns through trail connecting facilities of the park • Explore how visitors affect the forest; • Counting the number of visitors with the help of sensors		• Expanding sustainable mobility support through IT support (integration with car sharing, city card, public mass transport)	• Possibility of developing new programmes through data analysis and wearables platform available

Threats affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect negatively the VS implementation.

VS1	VS2	VS3	VS4	VS5
• What would happen if the number of visitors of existing equestrian centre increased significantly	• Problems were identified especially about access and visitors' flow	No factors identified	No factors identified	No factors identified

* Outcomes of the co-creation workshops

* The following considerations were added by the Pilot leaders

VS1	VS2	VS3	VS4	VS5
Number of visitors of existing facilities could increase significantly	Managing coexistence between groups of people (cyclist, young, older, pedestrians)	Clubs and associations associated with integrated programmes could have problems fulfilling their objectives (threats related to funds available and workforce)	Integration and maintaining of sub-systems could prove complex	Maintaining of the wearable's platform could prove complex

Risk and mitigation measures

Risk (description)	Probability (Unlikely – Likely – Very likely)	Impact (Low – Moderate – High)	Risk level (Low -Medium – High – Extreme)	Mitigation measures (description)
Changing level of support from local government	Unlikely	Moderate	Low	Continuation of communication of the projects' goals with local government bodies
Municipality of Novo mesto will not perform all planned facilities in the area	Unlikely	Moderate	Low	Integration of the project in the plans of the Municipality and communication with administration on importance of the fullfilment of the project as a whole
Risks of inadequate financing of the project due to rising prices of construction services etc.	Likely	High	Medium	Provision of the additional financial resources from the Municipality, negotiation with the contractors,

				optimization of the plans
Performance of stakeholders for implementing the programmes not at the intended level	Likely	Moderate	Medium	Continuous engagement with the stakeholders on employment and planning of the health and sport related programmes, periodic supervision of the goals
Local population will oppose to the activities in the park due to larger flow of visitors to the park	Likely	Low	Low	Continuous communication with the local community on the importance of the project VARCITIES
Due to the Covid pandemic it will not be possible to fulfil all the programmatic events in the park	Likely	High	High	Adjustment of the project timeline to the perceived pandemic events
Rising prices of the energy could lead to periodic closing of the facilities that have high energy consumption	Unlikely	Moderate	Medium	Adjustment of the project activities to parts of the year that are energy efficient

VS1 - 2 - 3 – 4 - 5 ECONOMIC AND FINANCIAL ANALYSIS OF THE VS (ANNEX G)

Ownership of assets and management structure					
Please describe briefly: MONM is owner of the assets to be developed within VARCITIES as well as the whole SRC Česča vas, where the VS will be implemented. Facilities of SRC are governed by Zavod Novo mesto, i.e. office of MONM for promoting of active and healthy lifestyle and creating conditions for activities in the fields of sport, tourism, culture and youth					
Procurement structure					
Public procurement according to national legislation.					
Estimated costs and revenues					
CAPEX (major expenditures foreseen over the long term for the implementation of the VS)	**VS1**	**VS2**	**VS3**	**VS4**	**VS5**
The estimated cost of planning processes	[redacted]				
The estimated cost of installation	[redacted]				
Estimated equipment cost	[redacted]				
Other(s) [programmes, events, Surveys & questionnaires, Information campaigns]	[redacted]				
Total investment cost	[redacted]				
OPEX (day-to-day expenses need to ensure the VS operation)	**VS1**	**VS2**	**VS3**	**VS4**	**VS5**
Estimated maintenance cost (n° of years)	[redacted]				
Estimated staff cost (n° of years)	-	-	-	-	-
Estimated external sub-contracting (n° of years)	-	-	-	-	-
Other(s) [please specify]	-	-	-	-	-
Total operating cost *(n° of years)*	[redacted]				
Financing approach and funding sources					
Total investment cost	[redacted]				
Own funding of the promoter / local cluster	[redacted]				
VARCITIES project	[redacted]				
Other sources [please specify]	[redacted]				

VS1 - 2 - 3 – 4 - 5 TABLE B – BUSINESS MODEL CANVAS

<table>
<tr>
<td colspan="2">Key activities
VS1- Brownfield remediation and greening,
VS2- Creating sustainable forest trails,
VS3-Interconnectedness of facilities,
VS4- Integrated management of SRC facilities,
VS5- IoT solutions for H&WB monitoring</td>
<td>Key resources
Natura 2000 fauna
Sustainable forest trail
IoT Sensors
ICT platform
Wearables
Common resources and facilities of SRC Češča vas</td>
<td rowspan="2">Value proposition
New green areas
New recreational opportunities for citizens
Programmes for encouraging sport and recreational activities of for children, elderly, disabled
Interconnectedness of ŠRC Češča vas facilities</td>
<td>Key partners
MONM, DCNM, KORONA, SENSEDGE</td>
<td>Key beneficiaries
Visitors and service providers of SRC Češča vas (sport clubs, NGOs etc)</td>
</tr>
<tr>
<td colspan="3"></td>
<td colspan="2">Governance structure
Facilities of SRC governed by Zavod Novo mesto, i.e. office of MONM for promoting of active and healthy lifestyle and creating conditions for activities in the fields of sport, tourism, culture and youth</td>
</tr>
<tr>
<td colspan="2" rowspan="2">Cost structure
EU contribution
MONM own funds</td>
<td colspan="2">Channels
Social and cultural events
Educational events
Publications
Public website of SRC
Social media posts</td>
<td rowspan="2">Capturing value
Increased H&WB of Novo mesto citizens and surrounding municipalities</td>
</tr>
<tr>
<td colspan="2">Cost reduction
Lower costs for sports and recreational activities for Public Schools
Lower expenditure for public health (covered by state, employers, citizens)</td>
</tr>
</table>

7 Skelleftea (SE): Transforming old landfill area into a residential and educational area using green/blue solutions

Overview of the pilot area and the VSs

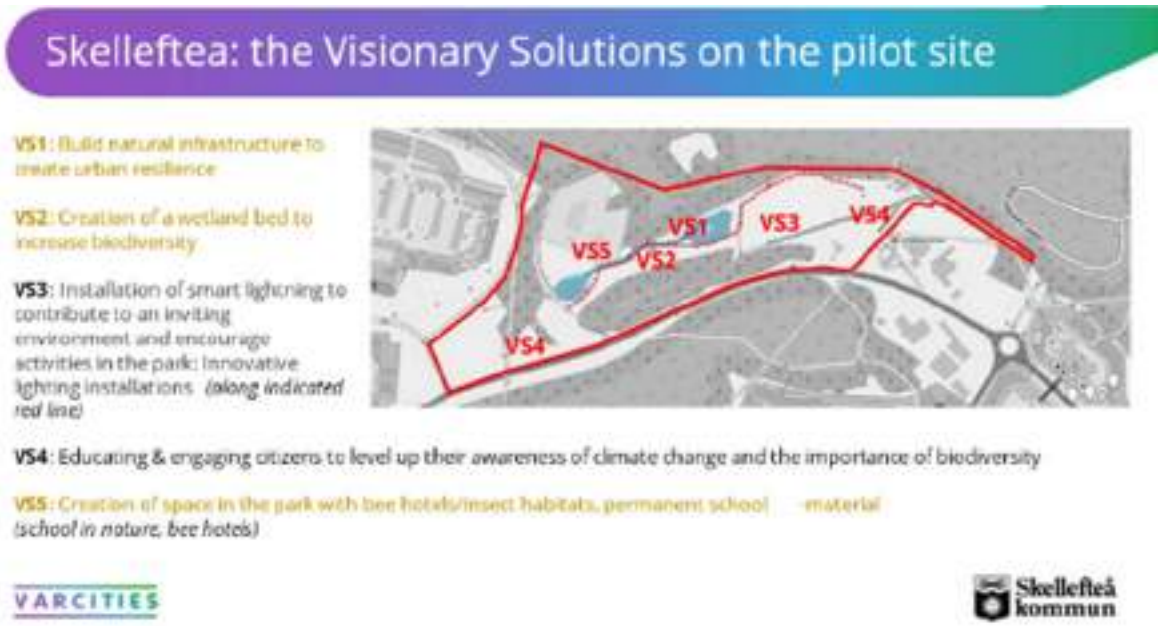
Annex D: Skelleftea – the Pilot area

Annex D: Skelleftea – the existing situation

Annex D: Skelleftea- the masterplan

Annex D 1: Skelleftea – Objectives/ H&WB link

Annex D 2: Skelleftea- the Visionary Solutions on the masterplan



Skelleftea: Overview of the sketched solutions

VS1 – Build natural infrastructure to create urban resilience

VS1 Summary (Annex A)

Title	Improvement of ditches and ponds - build natural infrastructure to create urban resilience
Motto	"The Visionary Solution provides improvements of the water ways in the park, making it more attractive to visitors and nearby residents in order to encourage people to spend time in the park."
Location of the planned investment	Skellefteå, Klockardalsparken
Municipality/local authority/main partners	Skellefteå kommun.
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions X Interventions in Water Bodies and Drainage Systems X Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity X Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☐
Overview and objectives of the planned Visionary Solution	The improvement of ditches and ponds includes: • digging out sediments, • cutting down vegetation in water channel that connects the two ponds • Cutting down vegetation in the ditch upstream the two ponds • Restore the ditch by covering the rubber lining with stone material. • Adjust the dimension of the hatch for the outflow from the second pond (materials used are concrete and granite. • Measure water flow by placing measure devices at pt. 1-4, appendix • Measure water quality by placing measuring devices at pt. 5-8, as well as including results from existing pt. 5-10, appendix 1. to inform visitors about the performance of the solution. This will give benefits for visitors in the park (better accessibility, improved look and feel – a more attractive area) as well as residents in nearby areas (reduce flooding of

	properties)		
Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [Boverket]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	ID 2.2 Water retention capacity by vegetation and soil	*Increased water retention capacity by vegetation and soil*	*m3 km-2 s-1 or litres km-2 s-1*
	ID 2.6 Water quality indicators (chemical, biological)	*Improved surface water quality*	*microgram/l*
	ID 2.7 Economic benefit of reduced stormwater to be treated in public sewerage system	*Reduction in water routed to drainage network / Reduced costs for sewerage treatment*	*Euros year-1*
	ID 4.3 recreational or cultural value of green spaces	*Increased recreational or cultural value of green spaces*	*No. of visitors / No. of recreational activities held per unit time*
	ID 4.13 Sustainability of green areas	*Big savings in operational cost*	*Euros*
	ID 6.4 Reclamation of contaminated land	*increased reclamation of contaminated land*	*surface / percentage of contaminated area reclaimed*
	ID 10.6 replication of solutions	*replication of VARCITIES NBS*	

[123] All values incl. VAT, if not reclaimable.

		outside pilot cases	
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	ID 10.8 Saved healthcare spending	*Savings in healthcare spending*	*Euros per year / %*
	ID 10.9 Public Private Investments after 5 years	*increased public private investments*	*Euros*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	15 Life on land	promote sustainable use of terrestrial ecosystems, halt biodiversity loss	
	11 Sustainable cities and communities	inclusive, safe, resilient and sustainable cities	

VS1 Main Contacts (Annex B)

Lead Organization	
Organization name	**Skellefteå kommun**
Contact person	[redacted]
Department	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert External consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
E-Mail	[redacted]
Local ambassador A person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	[redacted]
E-Mail	[redacted]

VS1 Description (Annex C)

Objectives of the Visionary Solution
"The Visionary Solution provides improvements of the waterways in the park, making it more attractive to visitors and nearby residents, encouraging people to spend more time in the park. Visible water also will improve biodiversity and has an educational effect on the public."
Overview of Visionary Solution leader and partners
Leader; Stina, Skellefteå kommun Partner; WSP, organization to interpret the measuring results (subcontracted) Parter; Park (will maintain the area) Partner; Sjungande dalens kolonilottsförening This is an important pilot for a solution that could be replicated in other areas of Skellefteå, to handle rainwater in a sustainable way. The solution will be an important demonstrator, and when proven to be effective, will enable commitment from higher management levels towards future replication.
General project background, context, and rationale
Skellefteå is a municipality with many industries, and although the surface area is large, a substantial part of the land is used for different industrial purposes which leads to a loss of habitats. The city is becoming denser, with less green spaces – so it needs to be compensated in other areas. Central wetlands and a different view of wetlands where it is already accepted as a resource is one way to counterbalance these trends. They can also serve as recreational areas, improving their value.
Supporting actions required
• Complete design and draft construction documents • Create a health and safety plan. • Additional procurement might be necessary for the construction work • Purchasing and placing orders for materials. (Delivery times vary but approximately 3 months). • When building or making changes in water flows in Sweden you often are required to secure a permit for "notification of water activities" ("Anmälan om vattenverksamhet"). This action will include producing a planning application. The process to get an approved planning application can take 3 months. • Produce a maintenance plan. • Programming (getting the results on the right platform/ getting their data into the dashboard and possibly other apps/data containers).
Description of the Visionary Solution
Adjustment of water ways, water outlet from one of the dams. Ground works in the waterways, to make sure water is directed in the correct way and aesthetic pleasing. Area 10 000 m², municipal land, public area Functionality, handling of rain water The improvement of ditches and ponds includes: • digging out sediments, • cutting down vegetation in water channel that connects the two ponds • cutting down vegetation in the ditch upstream the two ponds

- restore the ditch by covering the rubber lining with stone material.
- adjust the dimension of the hatch for the outflow from the second pond (materials used are concrete and granite.
- measure water flow by placing measuring devices at pt. 1-4 , appendix
- measure water quality by placing measuring devices at pt. 5-8, as well as including results from existing pt. 9-10,. to inform visitors about the performance of the solution.

This will give benefits for visitors in the park (better accessibility, improved look and feel – a more attractive area) as well as residents in nearby areas (reduce flooding of properties)

Summary of VS components

VS component(s) summarised in Table A.

Replication and/or up-scaling potential

The solutions can be replicated in other areas in Skellefteå to handle rainwater, as well as in other cities, regions and countries.

VS1 Summary of Visionary Solution Components (Table A)[124]

VS1- Build natural infrastructure to create urban resilience						
# [125]	Visionary Solution component[126]	Brief description of the component	Unit[127]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Ditches and ponds	Improve waterflow	m3/h	Visual appearance of the park, accessibility, flooding	ID 2.2	
	Ditches and ponds	Working hours, 2 people (48 h)	h		ID 2.7 ID 4.3	[redacted]
	Ditches and ponds	(Material) Water pump (superpump, rental?)			ID 6.4	
	Ditches and ponds	Material costs casting (adjustment of outflow in lower pond)			ID 10.5 ID 10.6 ID 10.8	[redacted]
	Ditches and ponds	Excavator, 8 h	h		ID 10.9	[redacted]
	Ditches and ponds	Loader, 8 h	h			[redacted]
2	Measurement of water quality and flow	Measure of water quality in relation to chemicals contained in it. This will be contracted out to specialist who will take samples every 2 months	PH, cond, TOC	Visitors sometimes doubt the water quality, measurements make it	ID 2.6	[redacted]

124 All values incl. VAT, if not reclaimable.
125 The number of rows can be adjusted as required.
126 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
127 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		and give results.		possible to give correct information (for example, is the water safe for a dog to drink)		
	Measurement of water quality	Flow measurement (rental costs for 6 months + installation). This will be contracted out to specialist.	5 st			[redacted]
3		Using nature instead of building new pond	SEK	Reduced operating costs	ID 4.13	
TOTAL						[redacted]

VS1 Visualisation (Annex D)

VS1 Build natural infrastructure to create urban resilience:

Description:
- The function of the pilot's blue infrastructure will be created/ improved.
- An overview of the whole water system (water coming down the mountain to the pilot area) has been made and actions to improve the system upstream have been discussed.
- The action for the ditches and ponds includes eliminating obstacles, digging out sediments, cutting down vegetation in water channel that connects the two ponds, and more.

Stakeholders feedback
- Interested in knowing what is measured in the water flow, especially from the old dump
- Is the water safe for the dog to drink it?
- We want to see pH and precipitation
- Toxins and pollutants in the area?
- Making more water ways accessible, that today are hidden underground pipes?

VARCITIES

Skellefteå kommun

Updated proposal for VS1 following STKs initial feedback

Feedback	Design response
What is measured?	Water quality in creek, diches and ponds + in ditch within allotment.
Safe for animals to drink?	Information in the park and the digital twin.
Making water ways more accessible	Ongoing work in other project. In the work with the "*Fördjupad översiktsplan för Skellefteådalen 3.0*" is looking at suggesting a continuing corridor of meadows and water ways from Klockardalsparken to Nordanå/Älven.

VARCITIES

Skellefteå kommun


VS1 : Build natural infrastructure to create urban resilience: Updated proposal and next steps
Mätpunkter vatten
Points of discussion:
- Measuring the right things?
- Measuring on relevant places?
VARCITIES
Skellefteå kommun

VS2 – Creation of a wetland bed to increase biodiversity

VS2 Summary (Annex A)

<table>
<tr><td>Title</td><td>Creation of a wetland bed to increase biodiversity - Planting of indigenous species</td></tr>
<tr><td>Motto</td><td>"The Visionary Solution provides a wetland bed to visitors in the park and nearby stakeholders in order to improve biodiversity."</td></tr>
<tr><td>Location of the planned investment</td><td>Skellefteå, Klockardalsparken</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Skellefteå kommun
The nature conservation association (Naturskyddsföreningen)
Allotment organisation (Sjungande dalens kolonilottsförening)</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>☐</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>X</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>X</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table>
For others, please specify
<table>
<tr><td></td><td>☐</td></tr>
<tr><td></td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>An inventory of species will be conducted within the pilot area (including invasive species that should be eliminated). Existing flora will be complemented by planting.
The greater biodiversity will make the park more attractive and the area more functional for the allotments, since pollination will increase.</td></tr>
<tr><td>Total investment planned</td><td>[redacted]</td></tr>
</table>

[128] All values incl. VAT, if not reclaimable.

Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [please specify]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	ID 2.2 Water retention capacity by vegetation and soil	*Increased water retention capacity by vegetation and soil*	*m3 km-2 s-1 or litres km-2 s-1*
	ID 2.7 Economic benefit of reduced stormwater to be treated in public sewerage system	*Reduction in water routed to drainage network / Reduced costs for sewerage treatment*	*Euros year-1*
	ID4.3 Recreational (number of visitors, activities) or cultural (people involved, children in educational activities) value of green spaces	*Increased recreational or cultural value of green space*	*No. of visitors / No. of recreational activities*
	ID 4.11 Species richness and composition with respect to indigenous vegetation and local/national biodiversity targets	*Increased urban biodiversity*	*km2 and population size of each species / no. of (new) species*
	4.12 Total area of designated sites of local biodiversity importance within the city (habitat/species management areas)	*Increased urban biodiversity*	*km2*
	ID 4.13 Sustainability of green areas	*Big savings in operational cost*	*Euros*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	Increased and improved participation	No. of people / year
	7.11 Number of individuals that is aware of the project's objectives, content and processes	Increased and improved participation	no./% of individuals/participants
	8.5 Personal and social background of people who participated in the project's activities	Fair participation to project activities	no. of people per category
	ID 10.6 replication of solutions	*replication of VARCITIES NBS outside pilot cases*	
	ID 10.8 Saved healthcare spending	*Savings in healthcare spending*	*Euros per year / %*
	ID 10.9 Public Private Investments after 5 years	*increased public private investments*	*Euros*
Contribution to SDGs	*SDG n° and name*	Expected impact	

	15 Life on land	*promote sustainable use of terrestrial ecosystems, halt biodiversity loss*
	13 Climate change	Improve the ability to retain water

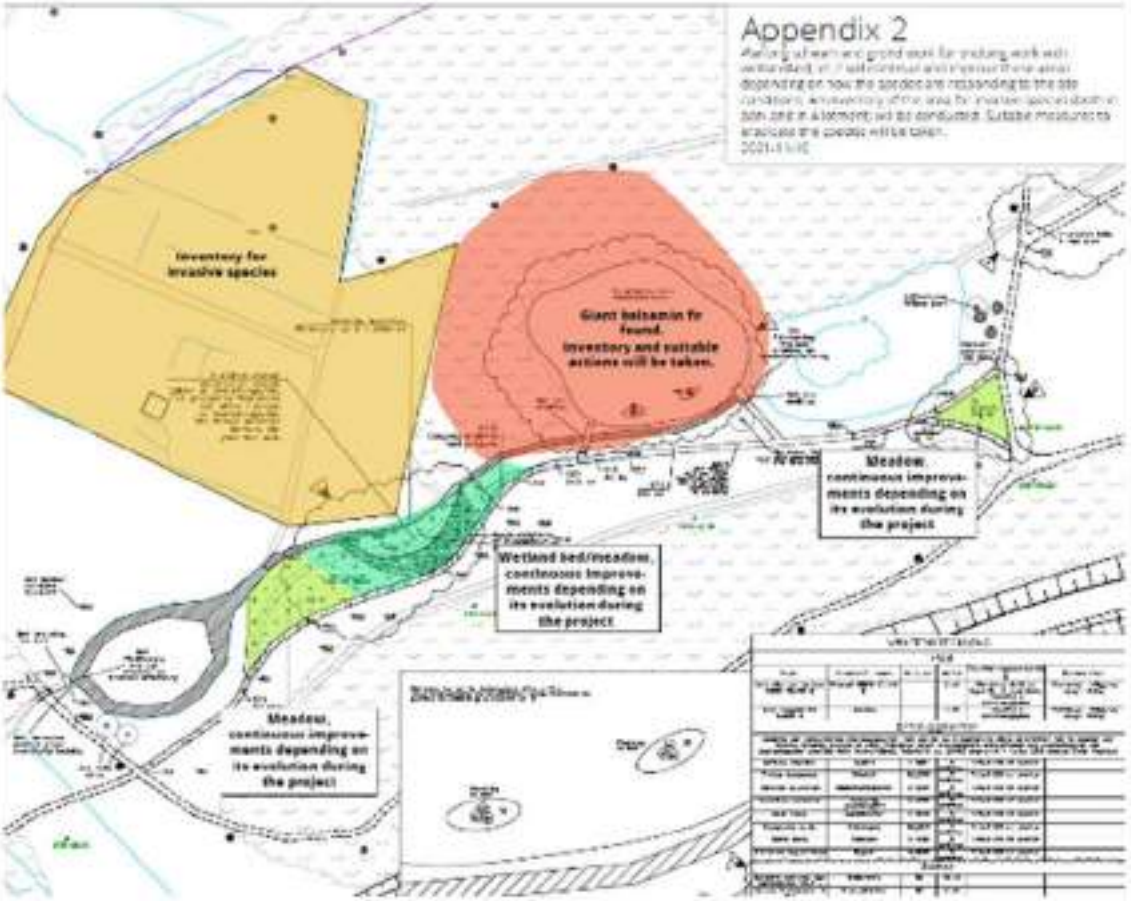
VS2 Main contacts (Annex B)

Lead Organization	
Organization name	**Skellefteå kommun**
Contact person	[redacted]
Department	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Skellefteå kommun
Role	[redacted]
E-Mail	[redacted]
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	
E-Mail	[redacted]

VS2 Description (Annex C)

Objectives of the Visionary Solution
The Visionary Solution provides a wetland bed to visitors in the park and nearby stakeholders in order to improve biodiversity.
Overview of Visionary Solution leader and partners
Leader – Elsa Karlberg, Gata och park Partner; Fredrik Winnerfall, Park och natur, Pia Fagerström, Naturskyddsföreningen (Nature conservation association), Gunilla Andersson, Sjungande Dalens kolonilottsförening. Municipal environmental office (regulatory responsibilities), Johanna Engström, Municipal biologist Securing letters of Support from Naturskyddsföreningen and Sjungande Dalens kolonilottsförening could be possible. 'Park och natur' is responsible for the maintenance of the park area.
General project background, context, and rationale
Similar to VS1; Skellefteå is a municipality with many industries, and although the surface area is large, a substantial part of the land is used for different industrial purposes which leads to a loss of habitats. The city is densifying, with less green spaces – higher biological and recreational values are needed in the green spaces that are kept. By implementing meadows, in this case a wetland bed, the habitat loss for local species can be halted. A higher biodiversity on site also increases the recreational value for users. The VS also enables the municipality to try different green area management for a sustainable and rational management of biodiverse areas in the future.
Supporting actions required
• Complete design and draft construction documents. • Repeated inventory of species during project. Support from Naturskyddsföreningen, Sjungande dalens kolonilottsförening (handling of organic waste from the area) with green area management. In case the project discovers the presence of any invasive species, necessary actions will be taken for that specific species. • If needed – complementary actions for the wetland meadow will be taken. This can include purchasing and placing orders for new plant materials and specific management actions during the project. (Delivery times for plant materials vary and will also be restricted to the local growing periods.) • Produce a maintenance plan.
Description of the Visionary Solution
Municipal land, public space, recreational area. The lower areas of the park will be converted from traditional lawn areas to diverse meadows. In a total area of 1600 + 300 square meters species will be planted or sown, selected with their preference to wet and moist conditions in mind. Invasive species (*Lupinus polyphyllus* and *Impatiens glandulifera*) will be located and eradicated with a suitable method according to the respective species. The number of species on site are expected to be more than doubled and with the right management the number of species can continue to stay high. An emphasis on design will ensure an inviting recreational area. The project aims to complement and improve the already existing meadow and wetland bed as well as to ensure that invasive species (have been observed close by) do not take over the habitat from the local species. A path will be constructed to make the wetland bed more accessible for visitors.

Municipal land, public space, recreational area.



Species for increased biodiversity are as follows:

Suggested species wetland bed:

Achillea ptarmica
Angelica sylvestris
Antennaria dioica
Aquilegia vulgaris
Caltha paulustris
Campanula rotundifolia
Cardamine partensis
Eupatorium cannabinum
Filipendula ulmaria
Geum rivale
Hypericum maculatum
Linaria vulgaris
Knautia arvensis
Leucanthemum vulgare
Lysimachia vulgaris
Lythrum salicaria
Pilosella aurantiaca
Prunella vulgaris
Pulsatilla vulgaris

Ranunculus acris
Silene dioica

Suggested species gradient area between wet and dry:

Achillea millefolium
Achillea ptarmica
Cantaurea jacea
Centaurea sacabiosa
Hieracium umbellatum
Knautia arvensis
Leucanthemum vulgare
Lotus corniculatus
Malva moschata
Plantago lanceolata
Rumex acetosa
Scabiosa columbaria
Festuca ovina
Festuca partensis
Festuca rubra
Poa partensis

Herbaceous annuals for flower splendor:

Agrostemma githago
Anthemis arvensis
Centaurea cyanus

Silene flos-cuculi *Succisa partensis* *Trifolium repens* *Trollius europaeus* *Valeriana officinalis* *Verbascum nigrum* *Alopecurus partensis* *Briza media* *Cyosurus cristatus* ***Deschampsia cespitosa*** *Festuca partensis* *Festuca rubra* *Molinia caerulea*	*Glebionis segetum* *Papaver dubium* *Papaver rhoeas*
Summary of VS components	
VS component(s) summarised in Table A.	
Replication and/or up-scaling potential	
The solutions can be replicated in other areas in Skellefteå to increase biodiversity, as well as in other cities, regions and countries.	

VS2 Summary of Visionary Solution Components (Table A)[129]

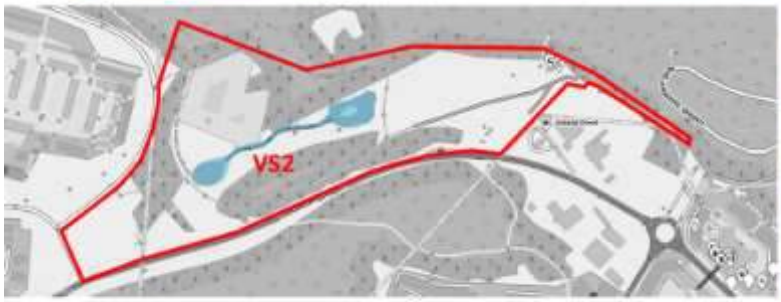
VS2- Creation of a wetland bed to increase biodiversity - Planting of indigenous species						
# [130]	Visionary Solution component[131]	Brief description of the component	Unit[132]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Creation of a wetland bed	Part of the park will be redesigned to work as a wetland bed		Lack of biodiversity, reduction of operating costs	ID 2.2 ID 2.7	
		Working hours (två veckor/2 people)			ID 4.3	[redacted]
		Loader or excavator (2)	weeks		ID 4.11 4.12	[redacted]
	Path to wetland bed (accessibility)	(Material) for accessibility to the meadows 300 m2 Stone flour, 5 mm Base course gravel, 0-30, 15 mm Reinforcement layer, 0-80, 20 mm	m2		ID 4.13 ID 10.5	[redacted]
		Bark 30 (ink markduk)	m2		ID 10.6 ID 10.8	[redacted]
		Establishment (8)	h		ID 10.9	[redacted]
2	Inventory of species	An inventory of species will be conducted within the pilot area (including invasive species that		Lack of biodiversity, Invasive species can be managed and eradicated		

129 All values incl. VAT, if not reclaimable.
130 The number of rows can be adjusted as required.
131 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
132 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		should be eliminated).		from site		
3	Inventory of species	(Work hours) Inventory by ecologist/biologist	h			[redacted]
4	Inventory species	(Working hours) removing invasive species 140 h	h			[redacted]
5	Inventory species	Shipping to landfill (Degermyran) [redacted]				[redacted]
6	Inventory of species	Landfill fee (Degermyran)				[redacted]
TOTAL						[redacted]

VS2 Visualisation (Annex D)

VS2 Creation of a wetland bed to increase biodiversity: **We asked**



Description:
The main objective of VS2 is to enhance biodiversity by making the habitats suitable. An inventory of species will be conducted within the pilot area, by persons with knowledge of species. Existing flora will be complemented by planting.

Era kommentarer från förra workshopen:
- Invasive giant balsam fir. - connection allotment?
- Make an inventory of the colony area for invasive species – Allotment area positive
- Make sure there is money for management in the long run.
- Would like to know how we plan to connect different places in the city, the park with other green spaces in the city. Green corridors for insects, for example - for breeding?

VARCITIES

Skellefteå kommun

Updated proposal VS 2 following STKs initial feedback

Feedback	Design response
Invasive species- giant balsam fir	Inventory and suitable actions will be conducted during 2022. Follow up also planned during the project.
Inventory of colony/allotment area.	Inventory of the allotment will be conducted during 2022. Results will be shared with the allotment and dialog with the allotment on suitable actions will be held if invasive species are found.
Money for management in the long run	The design is taking the management cost in account.
Would like to know how we plan to connect different places in the city, the park with other green spaces in the city. Green corridors for insects, for example - for breeding?	Ongoing work in other project in the work with the "*Fördjupad översiktsplan för Skellefteådalen 3.0*".

VARCITIES

Skellefteå kommun

VS3 – Installation of smart lighting to contribute to an inviting environment and encourage activities in the park: Innovative lighting solutions

VS3 Summary (Annex A)

<table>
<tr><td>Title</td><td colspan="2">Installation of smart lighting to contribute to an inviting environment and encourage activities in the park</td></tr>
<tr><td>Motto</td><td colspan="2">"The Visionary Solution provides smart lighting to visitors in the park in order to provide an inviting environment and encourage activities in the park"</td></tr>
<tr><td>Location of the planned investment</td><td colspan="2">Skellefteå kommun, Klockardalsparken</td></tr>
<tr><td>Municipality/local authority/main partners</td><td colspan="2">Skellefteå kommun</td></tr>
<tr><td>Targeted area(s)</td><td colspan="2">Nature Based Solutions
<table><tr><td>Buildings Scale Interventions</td><td>☐</td></tr><tr><td>Public Spaces Interventions</td><td>X</td></tr><tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr><tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr><tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr><tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr></table>Smart city / digital solutions
<table><tr><td>Sustainable urban mobility</td><td>☐</td></tr><tr><td>Sustainable district and built environment</td><td>X</td></tr><tr><td>Integrated infrastructure processes</td><td>☐</td></tr></table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td colspan="2">Smart and interactive lighting will make more areas of the park inviting and encourage activities, also during the darker time of year. This will benefit visitors to the park, school children and people sporting in the neighbourhood.</td></tr>
<tr><td>Total investment planned</td><td colspan="2">[redacted]</td></tr>
<tr><td>Funding sources</td><td>Requested funding (EU contribution)</td><td>[redacted]</td></tr>
<tr><td></td><td>Own funding</td><td>[redacted]</td></tr>
<tr><td></td><td>Other sources [please specify]</td><td>[redacted]</td></tr>
</table>

[133] All values incl. VAT, if not reclaimable.

Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	EUR	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	ID 4.3 Recreational (number of visitors, number of recreational activities) or cultural (number of cultural events, people involved, children in educational activities) value of green spaces	*Increased recreational or cultural value of green spaces*	*No. of visitors/activities year-1*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	ID 9.19 Increase in walking and cycling in and around areas of interventions	*increased outdoor physical activity*	*No. of people / hours per week per capita*
	ID 9.27 Anxiety levels	*Reduction in anxiety levels*	*Scales' scores*
	ID 9. 28 Affective status	Increased psychological well-being and/or quality of life: improved positive emotions; reduced negative emotions	*Scales' scores*

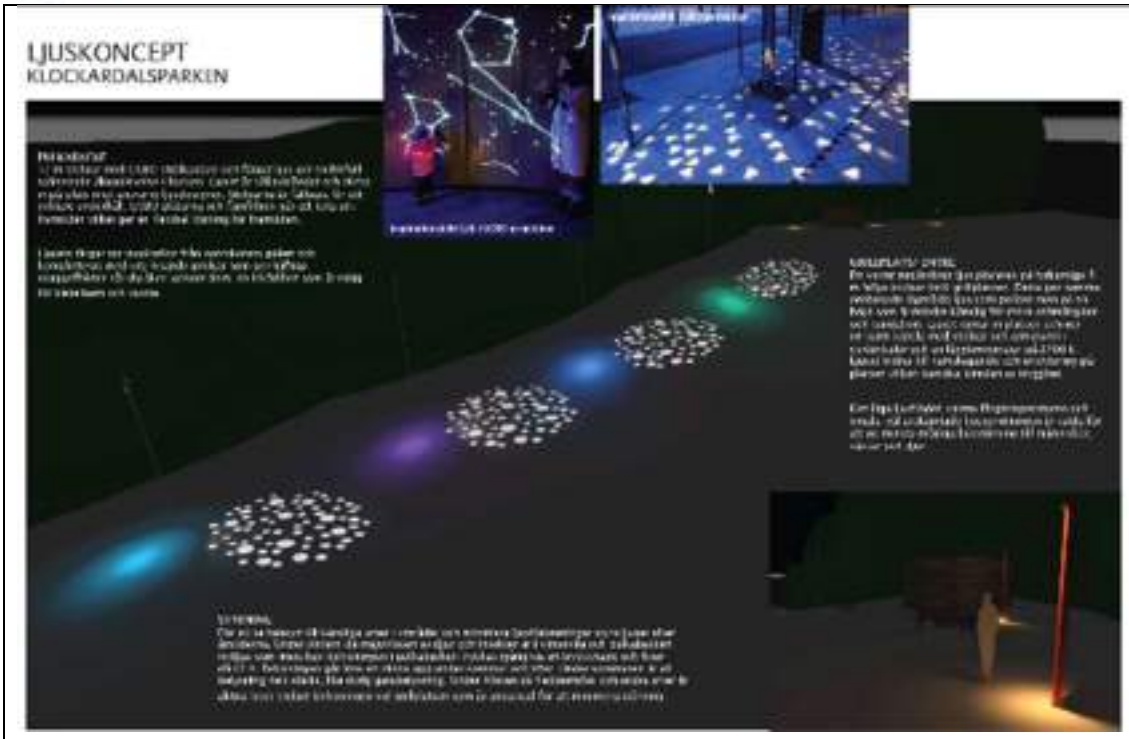
Contribution to SDGs	*SDG n° and name*	Expected impact
	3 Good health and wellbeing	healthy lives and promote well-being for all ages

VS3 Main Contacts (Annex B)

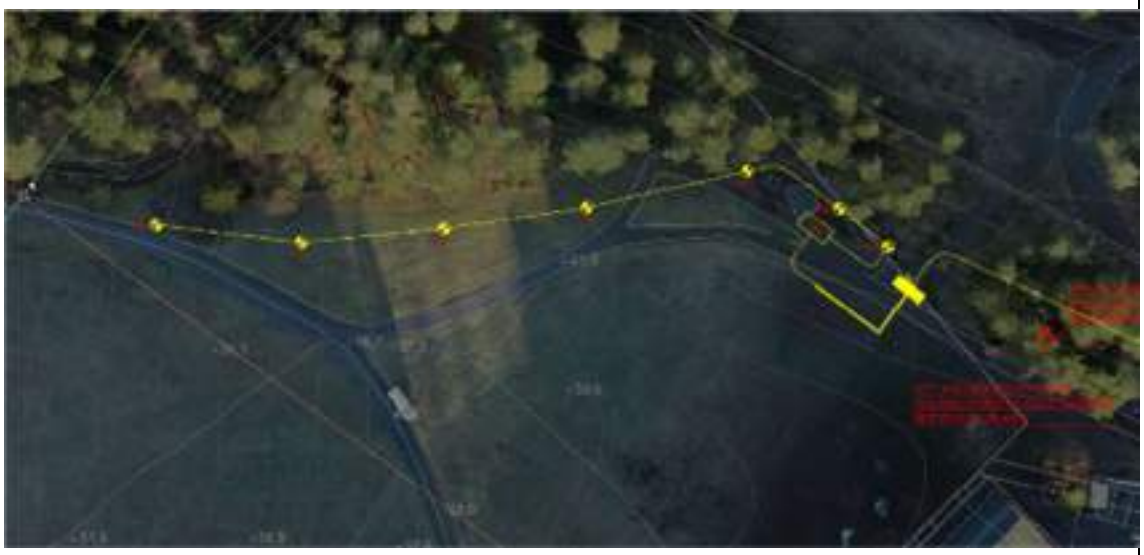
Lead Organization	
Organization name	**Skellefteå kommun**
Contact person	[redacted]
Department	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	TBD
Role	Lighting expert
E-Mail	
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	LTU
Professional title	[redacted]
E-Mail	[redacted]

VS3 Description (Annex C)

Objectives of the Visionary Solution
The Visionary Solution provides smart lighting to visitors in the park in order to provide an inviting environment and encourage activities in the park
Overview of Visionary Solution leader and partners
Leader: Stefanos Neopoulus project engineer / Anders Saadio, Lighting manager Samhällsbyggnad Partner: Christer Åhlund, Leif Häggmark, Luleå University of Technology Partner: Skellefteå CIO/Michael Carlberg Lax The leaders are committed to the task as it is part of their normal operations but the project setting gives it a new dimension with possibilities to further develop the use of technology. Luleå University of technology is involved in the other smart lighting projects in the city. The CIO for Skellefteå has a main responsibility for the IT architecture including the IoT structure of the city.
General project background, context, and rationale
As Skellefteå is far north, the winter months (from late October through March) have many hours of darkness restricting outdoor activities. Smart lighting to promote activity in the park (especially during dark winters) while reducing light pollution, is one way to give people possibilities to still be active outdoors. Giving visitors access to sensors and the lightning itself to improve interactivity and to increase engagement is an interesting option to explore. There is a smart lighting project on Campus Skellefteå that can be seen as a "sister project" – the focus for that installation is different, with more focus on safety and security.
Supporting actions required
• Complete design and draft construction documents. • Create a health and safety plan. • Additional procurement might be necessary for the construction / installation work of lights and sensors. • Purchasing and placing orders for materials. (Delivery times vary but approximately 3 months). • Programming of the sensors. • Produce a maintenance plan – for the sensors. Agreement with external resource, the local electricity company (Skellefteå Kraft).
Description of the Visionary Solution
Smart and interactive lighting will make more areas of the park inviting and encourage activities, also during the darker time of year. This will benefit visitors to the park, school children and people sporting in the neighbourhood by contributing to placemaking as well as increase the security of security to the visitors. The lighting can be interactive and respond to different activities in the area, possibly also be controlled by the visitors (on/off, intensity, colour etc). A lighting scheme will be produced that corresponds to the needs of species in the local area. During the period when most insects and mammals are active the light will be turned off. This is also the season where it is most light during nighttime in the area. During autumn the light will have a warmer colour (less disturbing to fauna) and the whiter and coloured light will be present during winter months. The autumn and winter lights will also be regulated during the day (some will be shut down during a certain hour in nighttime) to not disturb / cause light pollution to the surrounding homes.



The image above shows the lighting scheme/concept for the park, produced by a lighting designer contracted in the project. On top of the hill the lighting is warm and intimate and correlates with the fire spot on the site. Downhill the lighting is inspired by the Aurora Borealis, combined with more playful shapes. The image below shows the plan for placement of lighting poles. Only the slope used for winter activities will be complemented with new lighting. The other part of the project area is already partially lit and will be left as is.



The sensors to be applied in the park are planned as following:
- Measuring activities in bee-hives.
- Measure availability at the parking-lot.
- Measure if fire wood is available at the grilling area.
- Measuring number of visitors in the park
- Measure local temperature.
- Measure local wind speed.

- Measure local temperature
- Measure local air humidity.

- Measure local snow depth. The sensors have technical demands that require the project to install a separate cable cabinet to control the sensors. The area is owned by the Municipality, and is a public space, a recreational area. Approximately 10-15 light poles, area 7000m2
Summary of VS components
VS component(s) summarised in Table A.
Replication and/or up-scaling potential
The solutions can be replicated in other areas in Skellefteå to increase activity, sense of safety and security etc, as well as in other cities, regions and countries.

VS3 Summary of Visionary Solution Components (Table A)[134]

VS3- Installation of smart lighting to contribute to an inviting environment and encourage activities in the park						
# [135]	Visionary Solution components[136]	Brief description of the component	Unit[137]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Installation of smart light poles	Light poles with different sensors and communication abilities	10-15	Darkness during part of the year limit activities in the park and reduces feel of safety and security	ID 4.3 ID 9.15 ID 9.27 ID 9.28 ID 9.19	[redacted]
	Installation of smart light poles	(Work hours) Consultant cost. Light designer and planner	h			[redacted]
		(Material) lighting materials (with shipping)				[redacted]
		(Work hours) installation + adjust/configue lighting (48 h)	h			[redacted]
		Establishment				[redacted]

134 All values incl. VAT, if not reclaimable.
135 The number of rows can be adjusted as required.
136 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
137 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		Excavator (16 h)	h			[redacted]
		Crane (8 h)	h			[redacted]
		(Material) Cable				[redacted]
		(Work hours) Cable laying (8 h)				[redacted]
		(Material) Cable cabinet				
2	Interactive solutions for the lighting	Making the light poles interact with visitors in different ways for example to provide different lighting for different activities, possibly also lighting that reacts to activity		Feeling of safety and security, promotion of activities in the park		
		(Work hours) Consultant cost	h			[redacted]
		(Material) Sensors (with shipping)				[redacted]
		(Work hours) Installation (8 h)	h			[redacted]
TOTAL		Costs are adjusted, [redacted]				[redacted]

VS3 Visualisations (Annex D)

VS3 : Installation of smart lighting to contribute to an inviting environment and encourage activities in the park: Innovative lighting installations:

Description:
The main objective is to light up the park with lighting designed to make people feel safe but not to disturb insects and other animals. The light poles will have smart technology, for example to collect data of presence in the park.

Era kommentarer från förra workshopen:
•Lighting that disturbs pollinating insects. Make sure it does not undermine the biodiversity objective
•Great benefit if there is lighting at the barbecue area and the road down, for school and preschool
•Lighting or more functions? For example, microphone/speakers for interaction with the light poles?
•Information about certain environments/areas in the park is good to communicate with visitors. the light poles can possibly be used for that.

Updated proposal VS3 following STKs initial feedback

Feedback	Design response
Make sure new lighting does not undermine the biodiversity objective	Looking at options, there are light with frequencies that does not disturbe animals but looks as "usual" for humans. Priority in design
Great benefit if there is lighting at the barbecue area and the road down, for school and preschool	Priority
Lighting or more functions? For example, microphone/speakers for interaction with the light poles?	Suggestions of sensors will be persented in the next slide.
Use light poles for information and spreading knowlege	Looking at options, the once we have found so far are a bit too expensive.

VS4 – Educating and engaging citizens to level-up their awareness of climate change and the importance of biodiversity

VS4 Summary (Annex A)

<table>
<tr><td>Title</td><td>Educating and engaging citizens</td></tr>
<tr><td>Motto</td><td>"To provide information, educational material and interactive solutions to educate and engage citizens in order to understand and interact with the solutions in the park."</td></tr>
<tr><td>Location of the planned investment</td><td>Skellefteå, Klockardalsparken</td></tr>
<tr><td>Municipality/local authority/main partners</td><td>Skellefteå kommun
The nature conservation association (Naturskyddsföreningen)</td></tr>
<tr><td>Targeted area(s)</td><td>Nature Based Solutions
<table>
<tr><td>Buildings Scale Interventions</td><td>☐</td></tr>
<tr><td>Public Spaces Interventions</td><td>X</td></tr>
<tr><td>Interventions in Water Bodies and Drainage Systems</td><td>☐</td></tr>
<tr><td>Interventions in Transport Linear Infrastructures</td><td>☐</td></tr>
<tr><td>Interventions in Natural Areas and Management of Rural Land</td><td>☐</td></tr>
<tr><td>Interventions in Ecological and Habitat Biodiversity</td><td>☐</td></tr>
</table>
Smart city / digital solutions
<table>
<tr><td>Sustainable urban mobility</td><td>☐</td></tr>
<tr><td>Sustainable district and built environment</td><td>☐</td></tr>
<tr><td>Integrated infrastructure processes</td><td>☐</td></tr>
</table></td></tr>
<tr><td>Overview and objectives of the planned Visionary Solution</td><td>Knowledge is used as a bridge to contribution. An information campaign will be addressed to the nearby residents, the pre-schools, schools and the city residents to give them knowledge about the pilot goals, and to give them a tool to get up-dates about the proceedings. Information signs will be put up in the park to help engage and educate visitors about the NBS.
The digital twin is the same as the H&WB-platform and will contain all the data for the up-dates and proceedings.
The users can also use the H&WB-platform to download and create own maps of the pilot with their own data, for examples species that they have found.</td></tr>
</table>

Total investment planned	[redacted]		
Funding sources	*Requested funding (EU contribution)*	[redacted]	
	Own funding	[redacted]	
	Other sources [please specify]	[redacted]	
Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected Impact	Unit
	ID 7.3 Social learning concerning urban ecosystems and their functions/services	*increased awareness of urban ecosystems*	*No. of learning supporting units*
	ID 7.4 Perceptions of citizens on urban nature	*increased awareness of urban ecosystems*	*number of visitors*
	ID 7.5 Social values for urban ecosystems and biodiversity	*increased awareness of urban ecosystems*	*number of visitors*
	ID 7.8 Citizen participation in and co-creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
	ID 4.3 Recreational (number of visitors, number of recreational activities) or cultural (number of cultural events, people involved, children in educational activities) value of green spaces	*Increased recreational or cultural value of green spaces*	*No. of visitors-activities year-1*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	4 Quality education	Adding practical parts into educational programmes can have positive effects for learning, especially when the normal classroom is complemented by other environments. It is often easier this way for children to concentrate and take in the lecture, also for persons with different learning abilities. Green environments moreover improve study	

[138] All values incl. VAT, if not reclaimable.

		results and can reduce stress.
	13 Climate action	Increase awareness of climate change and actions
	11 Sustainable cities and communities	Citizens can get closer to nature (something that not all people have the privilege to in their upbringing), improve their knowledge about the connection between human and nature, along with an increased awareness of our responsibility to take care of our environment. The digital twin is a new, interactive approach, that can help build a community and a relation to the physical location. The possibility to organise events can also build communities, interaction and a sense of ownership.

VS4 Main Contacts (Annex B)

Lead Organization	
Organization name	**Skellefteå kommun**
Contact person	[redacted]
Department	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	Skellefteå kommun
Role	[redacted]
E-Mail	
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	
E-Mail	[redacted]

VS4 Description (Annex C)

Objectives of the Visionary Solution
"To provide information, educational material and interactive solutions to educate and engage citizens in order to understand and interact with the solutions in the park."
Overview of Visionary Solution leader and partners
Leader: Berith Juvonen, Skellefteå kommun Partner: Karin Lindfors, Communication office, Skellefteå kommun Partner: Johannes Lindberg, Kultur och Fritidskontoret, Skellefteå, Anna Granlund, park och natur (barnrättsgruppen) The leader is central in the VARCITIES project and as a representative for the land and development section of the municipality the VS is line with the overarching work being done in the area.
General project background, context, and rationale
The overarching idea is to inform and educate citizens about climate change, natural cycles (in particular the water cycle), and biodiversity by using the park as a living example. The purpose is to gain an increased understanding about the design of the solutions but also how the society can adapt for a sustainable city. This can have a positive effect on mental health for citizens when concrete examples of solutions are shown, along with the fact that being in the green areas (something the information encourages) also increase well-being of the visitors. As a Child-Friendly-City, according the Rights of the Child convention, the possibility for children to get information about the interventions as well as being able to engage with them is important.
Supporting actions required
• We will need to reconcile with ongoing separate work through the municipality's sign program. • Produce a communications plan – both for signs and also other communications. (With help from internal communicators). • Additional procurement could be necessary for the construction work • Purchase and place orders for materials (delivery times vary but approximately 3 months) • Produce a maintenance plan.
Description of the Visionary Solution
An information campaign will be addressed to the nearby residents, the pre-schools, schools and the city residents to give them knowledge about the pilot goals, and to give them a tool to get up-dates about the proceedings. Information signs in the park will help engage and educate visitors about the NBS. The digital twin is the same as the H&WB-platform and will contain all the data for the up-dates and proceedings. The users can also use the H&WB-platform to download and create own maps of the pilot with their own data, for examples species that they have found. Targeted number of users/recipients; • Number of pre-school and school children that are active in the area and take part of the information and educational material in the pilot area by having at least one lecture in the park during their school time. Measure: 100% of schoolchildren in the Norrhammarskolan (public school).

- Number of residents that are active in the area using the digital twin. Measure: 10% of the residents (4000) within the area around the pilot area as defined in the application.

Summary of VS components

VS component(s) are summarised in Table A.

Replication and/or up-scaling potential

This information campaign can be used in other areas in the municipality where new solutions are used in planning. Informing the public and the nearby residents can reduce the complaints and give the people more knowledge of the challenges in planning and building cities, giving them a sense of belonging.

VS4 Summary of Visionary Solution Components (Table A)[139]

VS4- Educating and engaging citizens						
# [140]	Visionary Solution component[141]	Brief description of the component	Unit[141]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Information materials	Information material such as signs will be provided in the park	10-20	Understanding of the solutions in the park	ID 7.3 ID 7.4 ID 7.5 ID 7.8 ID 4.3	
		(Material) Signs 20-25 (both towards public and children)	st			[redacted]
		(Material) Base for signs 40 Some signs have 2, some have 1.	st			[redacted]
		(Work hours) Assembly (3 dagars jobb, 2 personer)				[redacted]
		Excavator (1 dag)				[redacted]
		(Consultant cost) designer, produce layout of the sign				[redacted]
2	Information campaigns	Campaigns will complement the static material to raise more interest	3-4	Understanding of the solutions in the park		
3	Educational material	Material that is specifically designed for educational use will be produced	10-20	Understanding of the solutions in the park		

139 All values incl. VAT, if not reclaimable.
140 The number of rows can be adjusted as required.
141 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
142 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

				Climate change awareness		
		Material				[redacted]
		(Consultant cost) designer/ "Exploratorier" - partner				[redacted]
4	Digital twin	The digital twin/dashboard that is being developed in WP5 will be linked to the site and promoted on site	5-10	Understanding of the solutions in the park Climate change awareness Interactivity and feeling of ownership		
TOTAL						[redacted]

VS4 Educating and engaging citizens in the area to level up their awareness of climate change and the importance of biodiversity

Beskrivning:
The main objective is to install information signs in the area in order to enlighten and engage citizens in thinking about climate change and the importance of biodiversity.

Era kommentarer från förra workshopen:
•How to deal with mosquitoes and gnats (that breed in flooded areas)? –> the idea is not so much to have stagnant water but more water in motion."
• Interesting for all people to be able to visit the park and read on signs about plants etc. People in general are curious but don't know where to find the information

VARCITIES

Skellefteå kommun

Updated proposal VS4 following STKs initial feedback

Feedback	Design response
Interesting for all people to be able to visit the park and read on signs about plants etc. People in general are curious but don't know where to find the information	The projet will place out informationsigns about species, natural systems, climate change etc. Sign will have informations directed both towards childen and adults.

Information and signs

How to build your own insect hotel

Our suggestions:

- The water cycle – effects from climate change
- Pollinators, why are they omportant.
- Species of local flora in the park
- Species of local insects in the park
- Invasive species
- Information about the recreational area "Vitbergets friluftsområde"
- The colour of the water, why is it brown and why does it have a film on it in certain areas (iron in the soil, naturally occuring and bacteria on the water).
- Information about the out-door classrooms (how to use them).
- Information about smart lighting (how to utalise it).

Points of discussion:

What do you think?

What information are we missing?

What languages? Swedish enough?

Acessability Signlanguage?

VS5 – Creation of a space in the park with bee hotels/insect habitats, permanent school material (school in nature, bee hotels)

VS5 Summary (Annex A)

Title	Open air classrooms
Motto	"The Visionary Solution provides open air classrooms to young students in order to receive education in natural settings."
Location of the planned investment	Skellefteå kommun, Klockardalsparken
Municipality/local authority/main partners	Skellefteå kommun Local schools
Targeted area(s)	Nature Based Solutions Buildings Scale Interventions ☐ Public Spaces Interventions X Interventions in Water Bodies and Drainage Systems ☐ Interventions in Transport Linear Infrastructures ☐ Interventions in Natural Areas and Management of Rural Land ☐ Interventions in Ecological and Habitat Biodiversity ☐ Smart city / digital solutions Sustainable urban mobility ☐ Sustainable district and built environment ☐ Integrated infrastructure processes ☐
Overview and objectives of the planned Visionary Solution	Open air classrooms will be designed and built. This includes creation of space in the park with bee hotels/insect habitats and permanent school-material. Development of educational materials as well as bee hotels/ insect habitats: signs on different species, building material for hotels/habitats
Total investment planned	[redacted]
Funding sources	*Requested funding (EU contribution)* [redacted] *Own funding* [redacted] *Other sources [please specify]* [redacted]

[143] All values incl. VAT, if not reclaimable.

Estimated costs and revenues	*Total operating cost (year)*	[redacted]	
	Total revenues (year)	[redacted]	
Expected impacts (based on those identified in the monitoring framework)	*Impact name*	Expected impact	Unit
	ID4.15 Pollinator species increase	*increased urban biodiversity / increased pollinator species*	*number of spieces, number of bee hotels*
	ID 7.3 Social learning concerning urban ecosystems and their functions/services	*increased awareness of urban ecosystems*	*No. of learning supporting units*
	ID 7.5 Social values for urban ecosystems and biodiversity	*increased awareness of urban ecosystems*	*number of visitors*
	7.8 Citizen participation in and co creation of the design, implementation and evaluation of project interventions	*Increased and improved participation*	*No. of people / year*
	7.11 Number of individuals that is aware of the project's objectives, content and processes	*Increased and improved participation*	*no./% of individuals/participants*
	8.5 Personal and social background of people who participated in the project's activities	*Fair participation to project activities*	*no. of people per category*
Contribution to SDGs	*SDG n° and name*	Expected impact	
	4 Quality education	Adding practical parts into educational programmes can have positive effects for learning, especially when the normal classroom is complemented by other environments. It is often easier this way for children to concentrate and take in the lecture, also for persons with different learning abilities. Green environments moreover improve study results and can reduce stress.	
	11Sustainable cities and communities	Citizens can get closer to nature	

		(something that not all people have the privilege to in their upbringing), improve their knowledge about the connection between human and nature, along with an increased awareness of our responsibility to take care of our environment.
	14 Life on land	Increased biodiversity through enhancement of pollinators, using bee hotels (that create a living space for them)

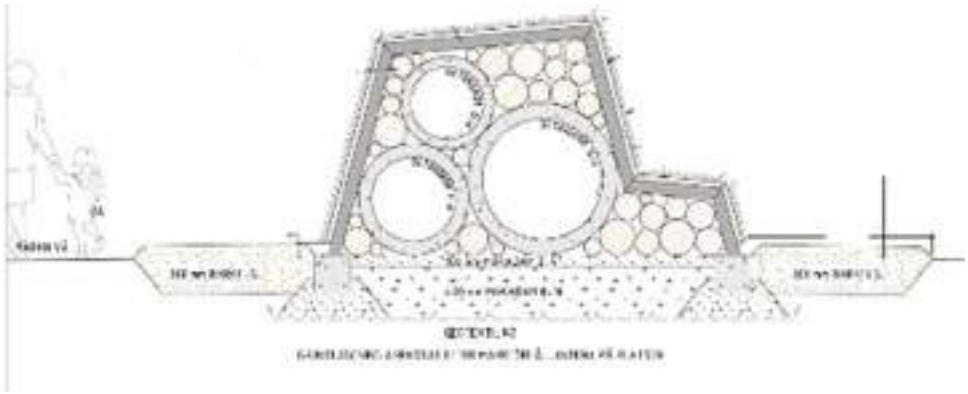
VS5 Main Contacts (Annex B)

Lead Organization	
Organization name	**Skellefteå kommun**
Contact person	[redacted]
Department	[redacted]
Telephone	[redacted]
E-Mail	[redacted]
Consultancy Support / Local expert If applicable, please list the external consultant or local experts that support the development of the Visionary Solution and include the contact details.	
Organization name	[redacted]
Role	[redacted]
E-Mail	[redacted]
Local ambassador The ambassadors should be a person on the front line who shares the aims and objectives of the VS to embed an H&WB culture in the local community. He is the "face" of the project in front of the public.	
Organization name	[redacted]
Professional title	[redacted]
E-Mail	[redacted]

VS5 Description (Annex C)

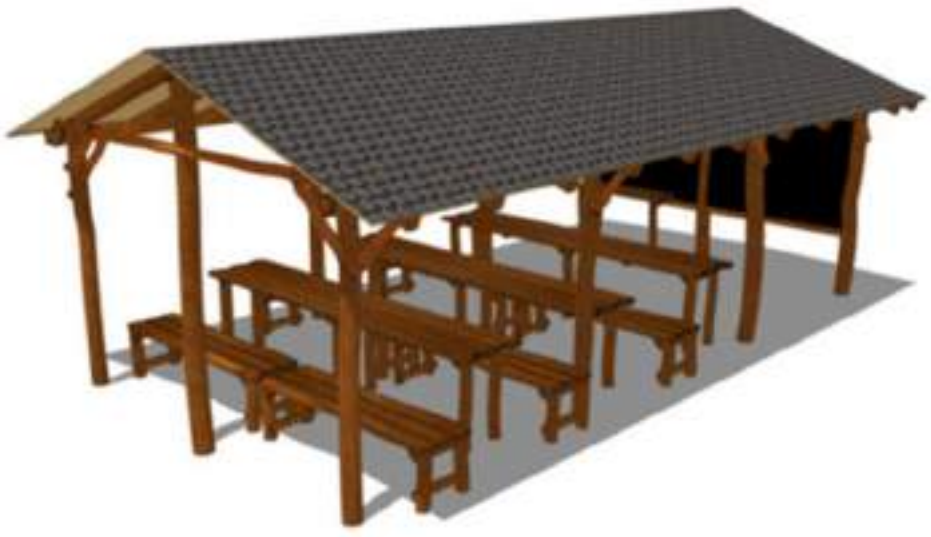
Objectives of the Visionary Solution
"The Visionary Solution creates a creative space in the park with bee hotels/insect habitats and permanent school-material."
Overview of Visionary Solution leader and partners
Leader: Berith Juvonen Partner: Anneli Marklund, Teacher Norrhammarskolan (public school), Park, Naturskyddsföreningen (Nature conservation association), Sjungande Dalens kolonilottsförening (allotment organisation) Municipal environmental office (regulatory responsibilities), Municipal biologist Letter of Support from Naturskyddsföreningen and Sjungande Dalens kolonilottsförening could be possible.
General project background, context, and rationale
The solution aims to give children in the area tools to get educated about nature, ecology and climate change. By building a classroom in the nature (placing benches and tables under a simple roof) the pre-school and school children, can more easily have outdoor lessons. The surrounding nature is on its own an inspiring environment for learning, but the solution aims to complement that with school material that can be stored in the area. The solution will also contain material for building bee hotels and other insect habitats. The allotment organisation intention is to have a space for the children to grow flowers or vegetables.
Supporting actions required
• Complete design and make construction documents. • Possibly conduct further investigations (eg solid sample/test pit to endure bearing capacity. The roof must withstand heavy snow loads.) • Make a work environment plan. • Additional procurement could be necessary for the construction work • Purchase and place orders for materials (delivery times vary but approximately 3 months). • The roof for the outdoor classroom requires a building permit. • Produce planning application. The process to get an approved planning application can take approximately 3 months from application. • Produce a maintenance plan.
Description of the Visionary Solution
In the first workshop the solution was greatly appreciated and several ideas where noted, for example the cultivation plot for children at the allotment area. The representative for the school described the frequency of their visits in the area and welcomed any contribution to make the area more useful. The solution can benefit from the VS 3, getting more lighting in the park area. That is particularly the case from the month October to March. The solution is also connected to VS4, the informational and educational campaign.

In the context of VS5, open air classrooms will be designed and built. This includes creation of space in the park with bee hotels/insect habitats and permanent school-material. Development of educational materials as well as bee hotels/ insect habitats: signs on different species, building material for hotels/habitats



Above is an image of the up-scaled insect hotel that will be placed in the area between the ponds. It is created as a seating but also as a pedagogical object to showcase and inspire to learn about insects and their living conditions. It will be placed in an area with smaller educational elements (financed outside this project) as well as infomation signs corralating to the object aswell as the surrounding nature types.

Above is a reference image for the up-scaled inset hotel together with an information sign.



The image above shows a visualisation of the bigger weather protected out door classroom. It is locaded on top of the

hill with an acessible connection form the visitors parking lot. It will also be able to be used for families visiting and going downhill slaying in the wintertime.
Summary of VS components
VS component(s) of VSS are summarised in Table A.
Replication and/or up-scaling potential
Within the municipality it can be replicated nearby other school areas and possibly included in the early stages of city planning (and the concept can be used by other cities/municipalities as well). The nature conservation organisation can use experiences from the pilot in other learning projects with children and youths.

VS5 Summary of Visionary Solutions' Components (Table A)[144]

VS5- Open air classrooms						
# [145]	Visionary Solution components[146]	Brief description of the component	Unit [147]	Issue tackled	Expected result (KPI)	Total investment costs (EUR)
1	Shelter for open air classroom, 1,	Protective structure/ shelter,	1	Open air classroom needs/ weather shelter	ID 7.3 ID 7.5 ID4.15	
		(Material + assembly) Roof, benches and tables				[redacted]
		Planning permit for rood				[redacted]
		Establishment (2 weeks)				[redacted]
		(Material) Casting / Anchorage				[redacted]
		(Work hours) Assembly (2 weeks)				[redacted]
		Consultant cost (Architect/stuctural engineer)				[redacted]
		Loader				[redacted]
		(Groundwork + material for acessability) Stone gravel				[redacted]

144 All values incl. VAT, if not reclaimable.
145 The number of rows can be adjusted as required.
146 Specify the investment component, e.g. investment in renewable energy production, apps, sensors, NBS, mobility solutions etc. Use a separate row in the table for each investment component.
147 Specify the number of investments and an appropriate unit, e.g. x number of buildings, trees, square meters, lamp posts, sensors, etc.

		Stödmur (material 1,5 m high + assembly)				[redacted]
		Loader				[redacted]
		Work hours				[redacted]
3	Bee hotels/insect habitats	Bee hotels/insect habitats will be made for educational use, and there may be materials for the pupils to build more of them		Improved quality of education, increase pollination and biodiversity		
		Consultant costs (Landscape architect)				[redacted]
		(Material)				[redacted]
		(Work hours) Assembly				[redacted]
		Material (base/foundation)				[redacted]
TOTAL		Costs are adjusted, [redacted]				[redacted]

VS5 Visualisations (Annex D)

VS5 Creation of space in the park with bee hotels/insect habitats, permanent school-material

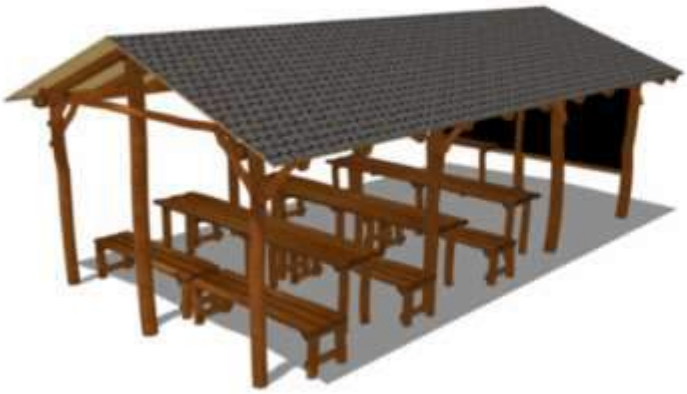
Beskrivning: The main objective is to give opportunities to be creative. In this VS we deliver the hardware for this, (meaning tables, roof, and chairs for the open-air classroom, the material for bee-hotels and so on).

- **"Maybe supply materials for birdhouses too"**
- **"What we need for an outdoor classroom is benches, tables, shelters, access to materials (we use NTA boxes that the Exploratorium has). Barbecue rings/fire pits is also a plus (so we can cook simple lunch). An exercise track or similar is also good."**
- **"At Vitberget there is a "schoolroom" with animals made of wood etc. – we can get inspiration from that."**
- **Including older citizens, so that community between younger and older people is created?"**
- **"We should think about accessibility**, but we need to work mo… physical accessibility"
- **input from LTU (forestry section) can be provided"**

Updated proposal VS5 following STKs initial feedback

Feedback	Design response
Maybe supply materials for birdhouses too	Will be looked in to in the design
Outdoor classroom is benches, tables, shelters, access to materials (we use NTA boxes that the Exploratorium has). We often go to the ponds looking for bugs etc. Barbecue rings/fire pits is also a plus (so we can cook simple lunch). An exercise track or similar is also good	Will be looked in to in the designs. At the moment we have suggestions for all the stated equipment except for an exercise track.
Have you thought about including older citizens, so that community between younger and older people is created?	Dialoge with allotment about possibility of expanding and including a "childrens garden". Also the information/knowledge signs on site directed both towards children and adults.
Accessibility, but we need to work more on this, not just physical accessibility	Looking at some signs with Braille.
Input from the university LTU (forestry section) can be provided.	We will be happy to use their knowlege in the work with information signs and management of the local forest.

Summer classroom pt 2



Educational area under a roof
Placed close to the forest. Other design possible.

Informations signs for the children. Placed close to and in the classrooms.

During the project materials for insects hotels can be available on site.

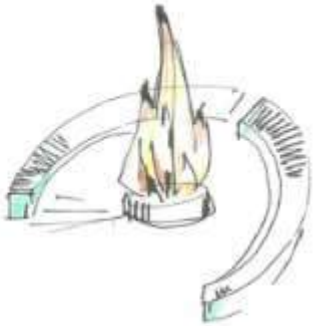
Points of discussion

How to manage the acessability to buildingmaterials for insect hotels?
- Certain intervals? - theme weeks with schools?
- Always available?

Summer classroom pt 1

Large scale insectt hotel and bat hotel, for children to investigate (able to crawl in to).

Real scale insects hotels – educating about what they should look like, aswell as providing information about how they are made.



New meeting place, well designed fire spot

Winter classroom

Simple classroom with logs, stubs or rustic benches

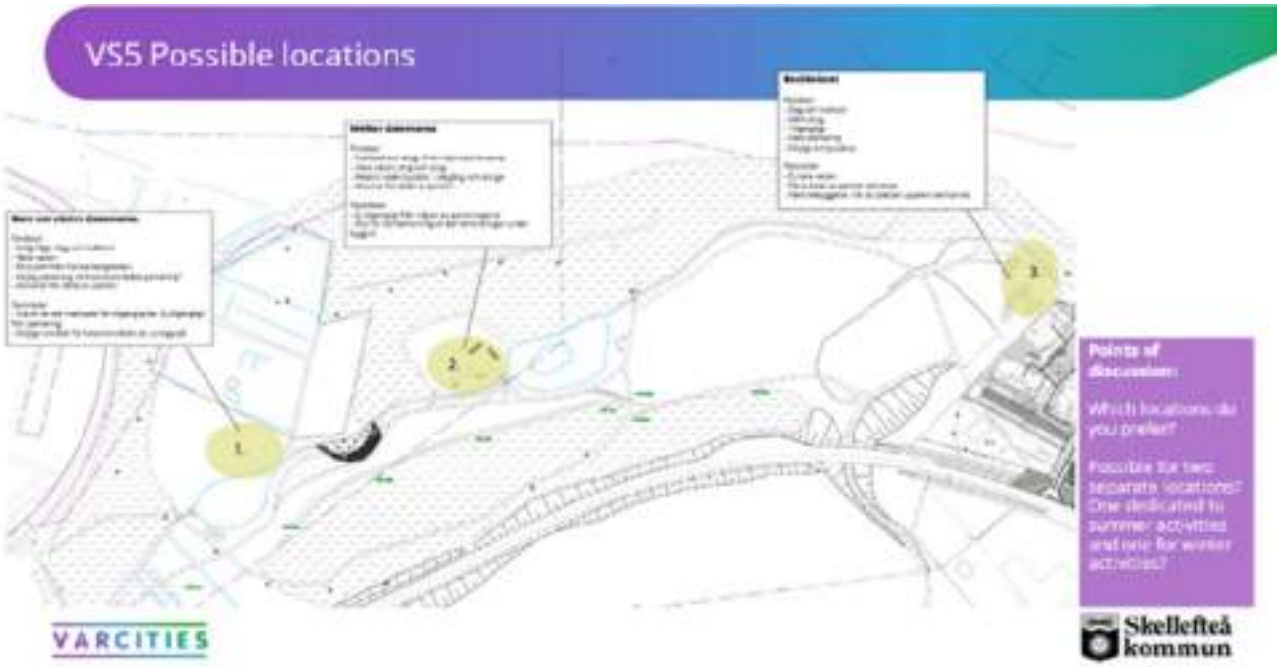
Relevant lighting, to create functioning and attractive place

Points of discussion

What do you think?

Under which season is a roof over the classroom most important?

Any alternative designs/additions you would like to see?



Other equipment

New accessible benches, low maintenance materials. Large garbage disposal bins. Color to match the bridges on site.

Points of discussion

Any input or suggestions?

VS1 - 2 - 3 – 4 - 5 Stakeholders (Annex E)

Stakeholder analysis

The public schools and preschools, particularly in the nearby area, are very important players since one of the solutions is an outdoor classroom. They must be given a chance to fit their co-creation inputs into their own schedule. If the VARCITIES project members can come to them instead of the opposite, and if their inputs can be gathered from small groups or representatives, the project can have greater success in engaging them.
The schools and preschools already use the area, but they have indicated that the project may be of great help for them in the future.

The nature conservation association wants to play a significant part in the project. They want to help us fill the information with substance, and they want to have future events of informative character in the area.
They need to be involved and they want the association to be highlighted. They already have a big number of members.

Sustainable Skellefteå and Exploratoriet can contribute with knowledge and tools, Exploratoriet have toolboxes that the schools can borrow. Sustainable Skellefteå and Exploratoriet needs to know what the project needs from them and, in co-operation with the schools, design the toolboxes or tools.

The allotment wants to have a part in learning schoolchildren about plants and insects important for pollination. They need help in picking a suitable spot and organizing, together with the schools, how the children can visit, discover and work in the allotment.

The department of recreation and sports will be participation in the design of the upper part of the park (the grilling area). They need meetings with the project members to decide about design of the area.

The BRF Klockaren consists of inhabitants in the area. They can have a say about the final design and contribute and maybe, organise events in the area. They moreover need information about what's happening, and perhaps information in a format that they can share in their own channels.

The above is complemented by the work conducted in VARCITIES WP4:

- describe further stakeholders (civil society, economic stakeholders, etc.) and their possible role for the success of the investment project;
- highlight their needs and expectations from the proposed investment project;
- indicate their current level of support; and
- describe the future envisaged engagement strategy, using the following table.

Type of stakeholder	Current status of engagement	Future engagement activities	Instruments/channels for dissemination and interaction
Public schools Norrhammar, Lejonström,	*No engagement yet*	*Participation in the co-implementation/ co-evaluation process*	Meetings with project members
Preschool Klockaren	*No engagement yet*	*Participation in the co-implementation/ co-evaluation process*	Meetings with project members
The nature conservation association	Participitation in co-creation workshop nr 1	*Participation in the co-implementation/ co-evaluation process* Organisation of events.	Maybe they can be part of a working group together with project members
Sustainable Skellefteå	No engagement yet	Organisation of events.	Meetings with project members

Exploratoriet	Participitation in co-creation workshop nr 2	Organisation of events.	Meetings with project members
Allottment	Participitation in co-creation workshop nr 1 and 2	*Participation in the co-implementation/ co-evaluation process* Organisation of events.	Maybe they can be part of a working group together with project members
Department of recreation and sports	Participitation in co-creation workshop nr 2	*Participation in the co-implementation/ co-evaluation process*	Meetings with project members
BRF Klockaren	Participitation in co-creation workshop nr 2	Organisation of events.	Information by email to representatives

VS1 - 2 - 3 – 4 - 5 Strategic Planning and Assessment of the VS (Annex F)

Results of PESTLE analysis

The PESTLE analysis provides you with a structure that allows you to investigate the context in which your organization operates, it prompts you to ask yourself what the external factors of greatest impact on the organization are and to discuss their likely implications.

How you categorize each issue raised is not important when using the PESTLE technique because the purpose of this tool is simply to identify as many factors as possible.

For example, it is not important to classify an upcoming government regulation as a political or legal issue. The only thing that matters, in the end, is that it is identified as potentially having an impact on your organization.

Political factors affecting the planned Visionary Solutions

What are the key political factors?

*No outputs from the workshops

Economic factors affecting the planned Visionary Solutions

What are the most important economic factors?

VS1	VS2	VS3	VS4	VS5
No factors identified	• Management in the long run	No factors identified	No factors identified	No factors identified

Social factors affecting the planned Visionary Solutions

What are the most important social and cultural aspects?

VS1	VS2	VS3	VS4	VS5
No factors identified	No factors identified	• Great benefit if there is lighting for school and preschool	• It's great to cater for schools and kindergartens, but it is also interesting for all people	• Learning outdoors is important for today's children who spend a lot of time behind a computer / Outdoors is the best classroom • Inclusion of older citizens, so that community between younger and older people is created

Technological factors affecting the planned Visionary Solutions

What technological innovations could occur?

VS1	VS2	VS3	VS4	VS5
• Luleå University of Technology is interested in cooperating about sensors and sensor networks • Make accessible more water ways that today are hidden in under-ground pipes	• How to make the park more accessible and connected with other green spaces in the city	• There will be just lighting or more functions (like microphones/speakers for interaction and information about different environments/areas) • Lights with different light temperature, depending on the presence of a person (when no person is close by, it is more red - good for insects - and then gets brighter when a person passes)	No factors identified	• What we need for outdoor classrooms is benches, tables, shelters, access to materials (plus barbecue rings/fire pits, exercise track) • Accessibility (not just physical)

Legal factors affecting the planned Visionary Solutions

What current and upcoming legislation could affect the sector?

*No outputs from the workshops

Environmental factors affecting the planned Visionary Solutions

What are the environmental considerations we should bear in mind?

VS1	VS2	VS3	VS4	VS5
• Water can contain toxins (from the old dump) / water quality (pH, conductivity, etc.) • How toxins and pollutants affect the soil, for example in case of flooding • Measurements performed continuously or sporadically	• Check for unwanted species, like invasive species / make an inventory of species of the colony area	• There is some lighting that disturbs pollinating insects, make sure it does not undermine the biodiversity	• Water quantity decrease during dry and hot summers, how to deal with mosquitoes and gnats • It is better not to have stagnant water but water in motion	• Luleå University of Technology (forestry department) and the Swedish Forest Agency will provide inputs on forest environment/forest edge

Results of SWOT analysis

Strengths affecting the planned Visionary Solutions

Please describe the endogenous factors that can favour the pursuit of VS objectives.

VS1	VS2	VS3	VS4	VS5
• Measurements performed continuously or sporadically	No factors identified	• Lights with different light temperature, depending on the presence of a person (when no person is close by, it is more red - good for insects - and then gets brighter when a person passes)	No factors identified	No factors identified

Weaknesses factors affecting the planned Visionary Solutions

Please describe the endogenous factors that can hinder or delay the VS implementation process.

VS1	VS2	VS3	VS4	VS5
• Make accessible more water ways that today are hidden in under-ground pipes	• Management in the long run	• There is some lighting that disturbs pollinating insects, make sure it does not undermine the biodiversity	• It is better not to have stagnant water but water in motion	• Accessibility (not just physical)

Opportunities affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect positively the VS implementation.

VS1	VS2	VS3	VS4	VS5
• Luleå University of Technology is interested in cooperating about sensors and sensor networks	• How to make the park more accessible and connected with other green spaces in the city	• Great benefit if there is lighting for school and preschool • There will be just lighting or more functions (like microphones/speakers for interaction and information about different environments/areas)?	• It's great to cater for schools and kindergartens, but it is also interesting for all people	• Learning outdoors is important for today's children who spend a lot of time behind a computer / Outdoors is the best classroom • Inclusion of older citizens, so that community between younger and older people is created • What we need for outdoor classrooms is benches, tables, shelters, access to materials (plus barbecue rings/fire pits, exercise track) • Luleå University of Technology (forestry department) and the Swedish Forest Agency will provide inputs on forest environment/ forest edge

Threats affecting the planned Visionary Solutions

Please describe the exogenous factors that can affect negatively the VS implementation.

VS1	VS2	VS3	VS4	VS5
• Water can contain toxics (from the old dump) / water quality (pH, conductivity, etc.) • How toxins and pollutants affect the soil, for example in case of flooding	• Check for unwanted species, like invasive species / make an inventory of species of the colony area	No factors identified	• Water quantity decrease during dry and hot summers, how to deal with mosquitoes and gnats	No factors identified

Risk and mitigation measures				
Risk (description)	**Probability (Unlikely – Likely – Very likely)**	**Impact (Low – Moderate – High)**	**Risk level (Low -Medium – High – Extreme)**	**Mitigation measures (description)**
Local climate and weather conditions. (to wet on site during summer months makes in impossible to build). Not possible for construction work during winter.	Likely	Moderate	Medium. Heath and safely risks as well as material risks when constructing during bad weather conditions.	If we have some flexibility during the construction phase, some building elements can be postponed to next years building season if the upcoming one is to difficult.
No building permit for roof to the outdoor classroom.	Unlikely	High	Low	Thorough work with the documents for the building permit.
No permit for "water activeties"	Unlikely	High	Low	Good dialogue with the authorities.
The sensor data about visitors in the park might raise issues with privacy (GDPR).	Unlikely	Moderate	low	Taking necessary steps to ensure that any personal data is protected.
Lack of support from elected officials for the installation	Unlikely	High	Low	Continue internal engagement to ensure ongoing support
Equipment, installation and labour costs are too high	Likely	Moderate	Medium	Conduct effective sourcing and monitor any potential cost increase on materials
Don't have the right people to do the installations	unlikely	Moderate	Low	Once requirements are clear, engagement with the right people to do the work should begin as soon as possible
Not enough time to implement the installations	unlikely	Moderate	Low	Plan to be created as soon as possible for installation timeline
Unable to source the right equipment	Unlikely	Moderate	Low	Sensors sourcing to be contracted out
Sensors and ICT data exchange does not work correctly	Likely	Low	Medium	Work closely with WP5 and IESRD. Early engagement with IT people in Skelleftea
Return of Covid restrictions	Likely	Moderate	High	Follow public health advice

VS1 - 2 - 3 – 4 - 5 Economic and Financial Analysis of the VS (Annex G)

Ownership of assets and management structure
• The municipality owns the project at large; the Exploratorium may own toolboxes for outdoor classrooms, Beehives will be owned by private individuals • Agreements may be signed with e.g. allotment holders, Exploratoriet and the Nature Conservation Society. • The project team will make proposals and the respective heads of the Parks and Leisure and Lighting departments will need to approve designs and solutions. The Communications Unit needs to approve information signs and campaigns. • The ownership structure of the project leader and partners over the assets concerned; • The (legal) relations between the leading and associated organizations regarding the whole Visionary Solution; • The organizational structure and decision-making processes for the implementation of the Visionary Solution, explaining how decisions are made and who makes them.
Procurement structure
The project follows the Swedish legislation of public procurement "Lag (2016:1145) om offentlig upphandling": Lag (2016:1145) om offentlig upphandling Svensk författningssamling 2016:2016:1145 t.o.m. SFS 2021:1110 - Riksdagen
Estimated costs and revenues

CAPEX (major expenditures foreseen over the long term for the implementation of the VS)	**VS1**	**VS2**	**VS3**	**VS4**	**VS5**
The estimated cost of planning processes	[redacted]				
The estimated cost of installation	[redacted]				
Estimated equipment cost	[redacted]				
Other(s) [please specify]	[redacted]				
Total investment cost	[redacted]				
OPEX (day-to-day expenses need to ensure the VS operation)					
Estimated maintenance cost (n° of years)	[redacted]				
Estimated staff cost (n° of years)	[redacted]				
Estimated external sub-contracting (n° of years)	[redacted]				
Other(s) [please specify]	[redacted]				
Total operating cost *(n° of years)*	[redacted]				

Financing approach and funding sources	
Please describe in detail the envisaged financing approach, including the different funding sources (e.g. own funds, grants from VARCITIES project, soft loans, (bank) loans, guarantees, external investments, etc.) and the stage of commitment (i.e. consulted, ongoing, negotiations, contracted). Please indicate the planned funding sources for the investment in the table below[148], including requested funding.	
Total investment cost	[redacted]
Own funding of the promoter / local cluster	[redacted]
VARCITIES project	[redacted]
Other sources [please specify]	[redacted]

148 All values incl. VAT, if not reclaimable.

VS1 - 2 - 3 – 4 - 5 Table B – Business Model Canvas

<table>
<tr><td>Key activities

Create an outdoor classroom.

Install intelligent lighting and sensors (data useable for schools).

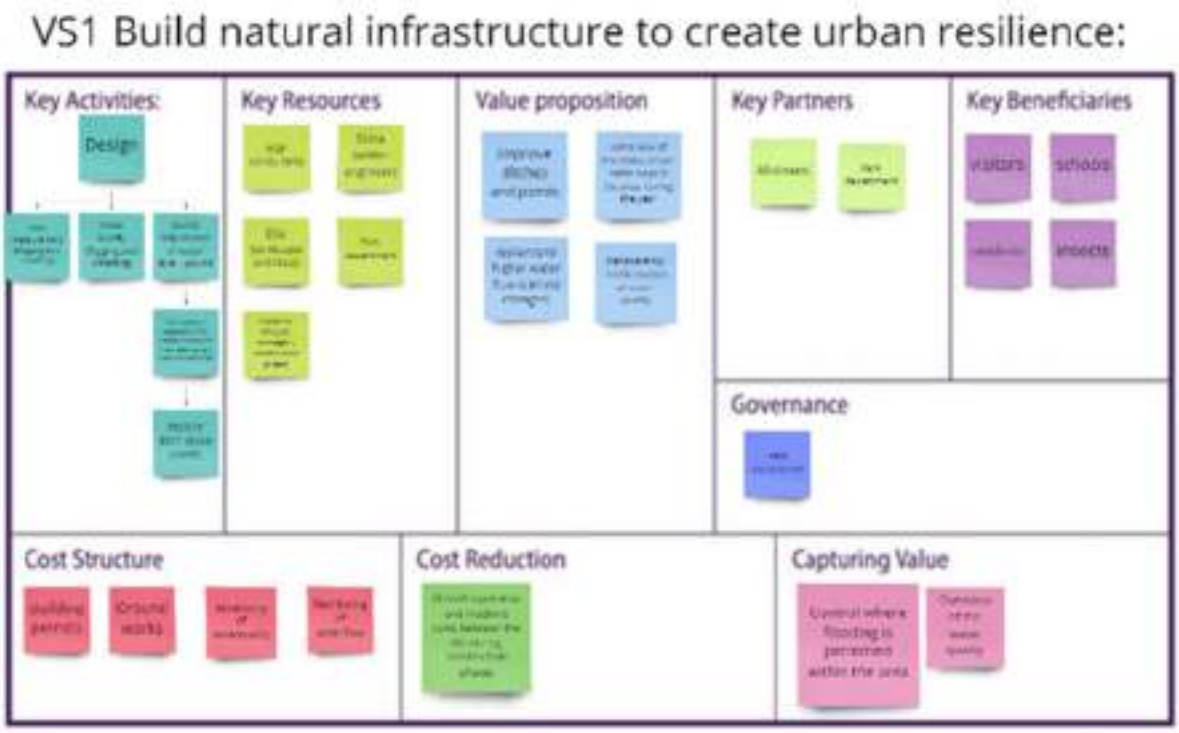
Increase habitats for local species.</td><td>Key resources</td><td colspan="2">Value proposition

By making the park more attractive for increased health and wellbeing of visitors to the park.

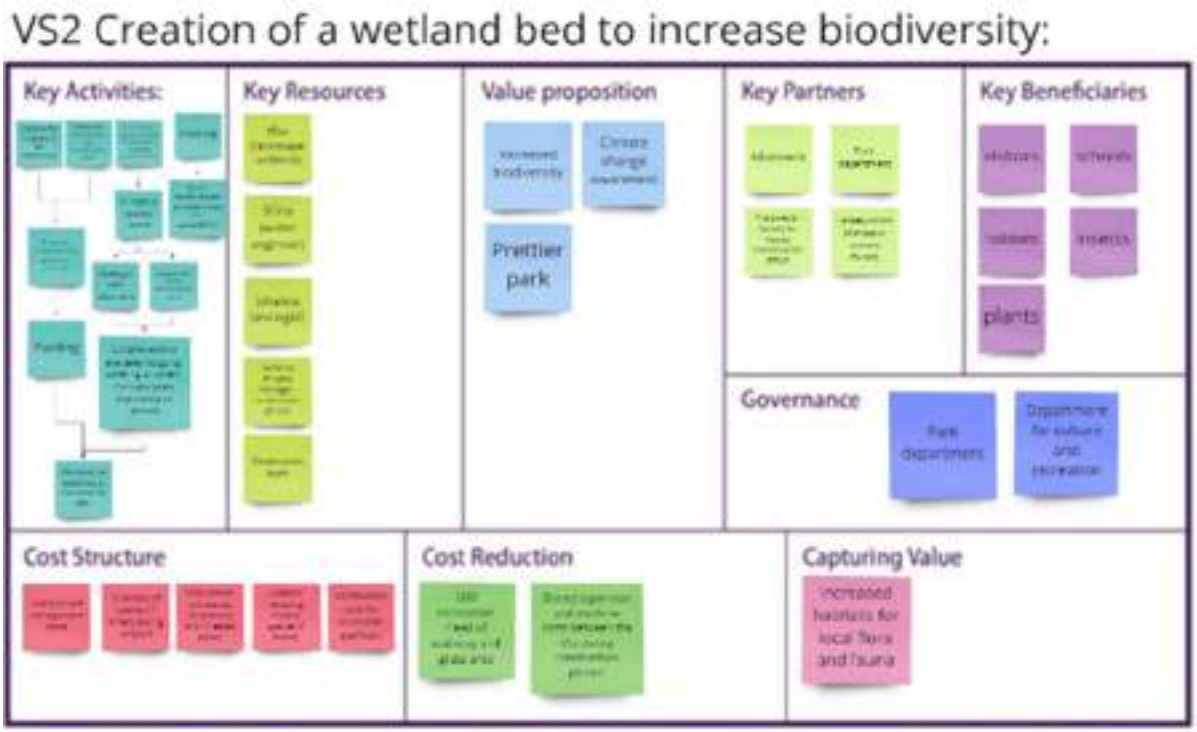
Using the natural systems to mitigate stormwater flows.

Hinder species losses by increase habitat locations for local species (through the forest edge and meadows).</td><td>Key partners
Local allotment
Skellefteå Kraft (local electricity company)
Exploratoriet (works towards schools)</td><td>Key beneficiaries</td></tr>
<tr><td colspan="3" rowspan="2">Cost structure</td><td colspan="2">Channels
Local newspapers
Municipal website
LinkedIn
Instagram/Facebook (municipal channels)</td><td colspan="2">Governance structure</td></tr>
<tr><td colspan="2">Cost reduction</td><td colspan="2" rowspan="2">Capturing value</td></tr>
</table>

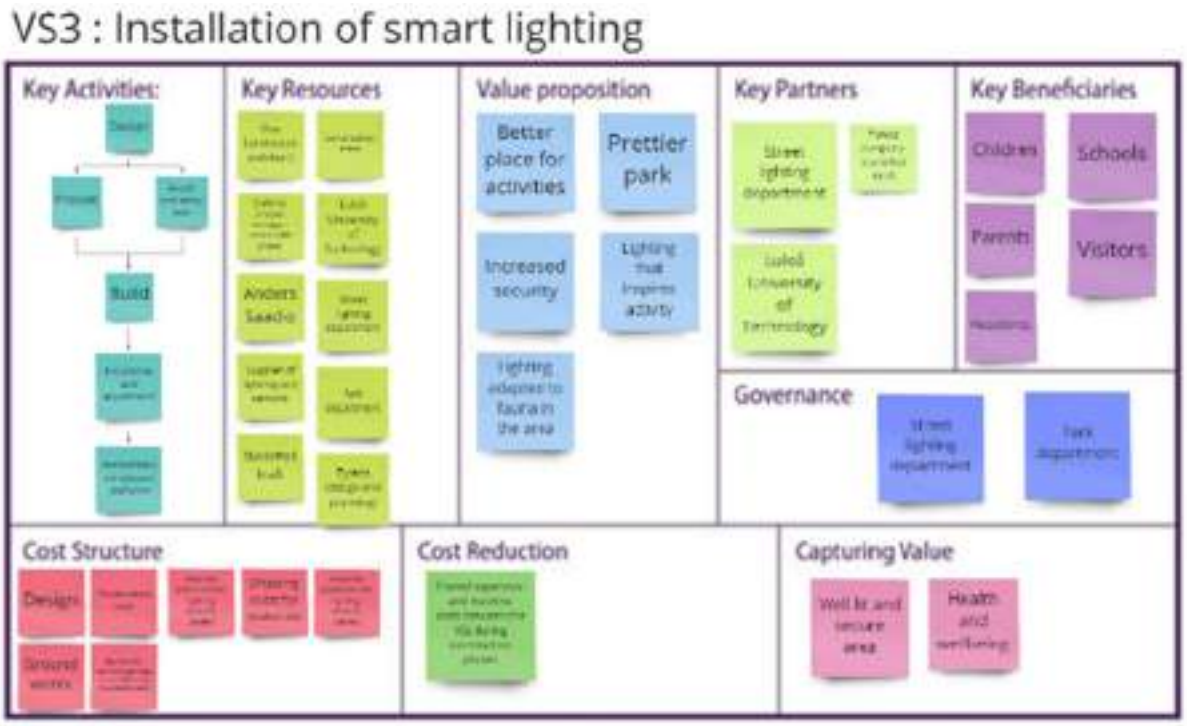
Skelleftea: VS1 Business model canvas



Skelleftea: VS2 Business model canvas

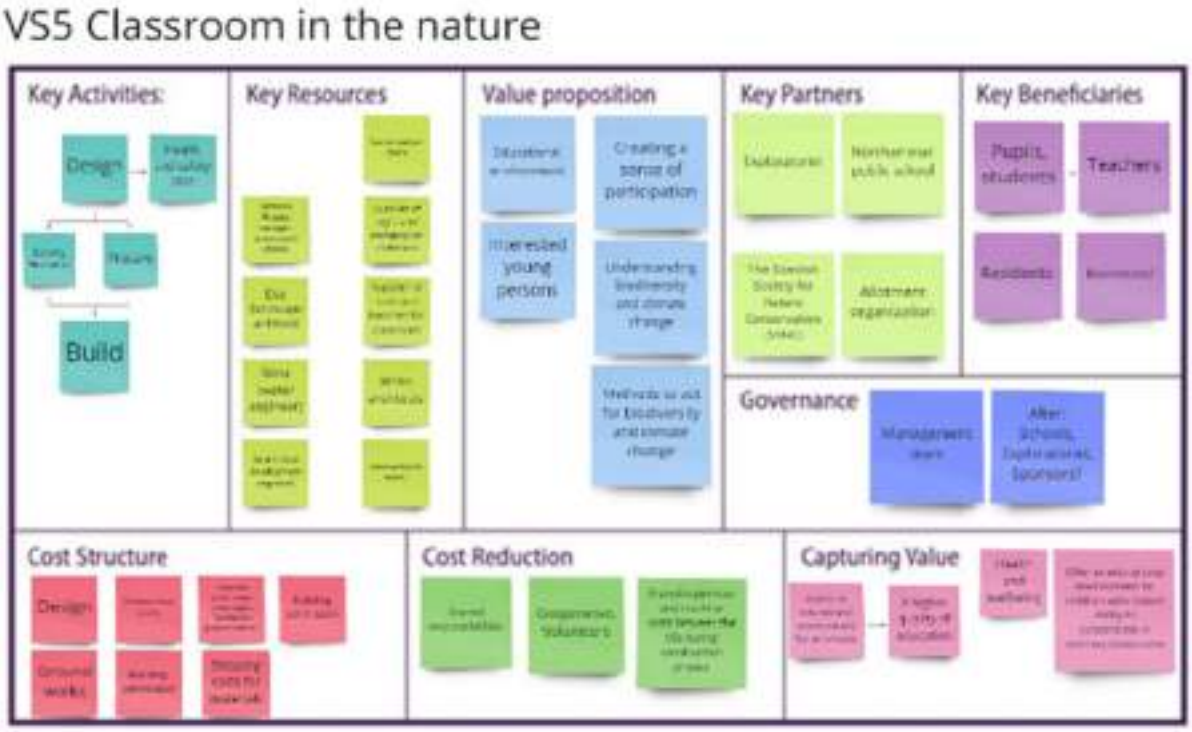


Skelleftea: VS3 Business model canvas



Skelleftea: VS4 Business model canvas

Skelleftea: VS5 Business model canvas



Conclusions

Deliverable 3.6 marks the completion of the co-identification and co-design phase for the VARCITIES pilots. In this deliverable, the sketched VARCITIES Visionary Solutions have been transcribed under a feasibility, managerial, and financial perspective through the Annexes provided within D3.5 “Guidelines for sketching of solutions”. The input in the different fields of the provided templates was given on a voluntary basis, having in mind though that too many empty fields may indicate unaddressed issues which can be linked to possible risks. The process of filling in the various templates has allowed each responsible institution to gain awareness of the strengths and weaknesses of their plans. At this point, the filled in templates (Annexes of D3.5) presented for the pilots of Castelfranco (IT), Chania (GR), Dundalk (IE), Gzira (MT), Leuven (BE), Novo mesto (SI) and Skelleftea (SE), provide key information that constitutes initial implementation packages for the Visionary Solutions.
As a next step, and in order to ensure the successful realisation of the VARCITIES Visionary Solutions, the key objective will be to optimise the quality of interventions and the effectiveness of the implementation process, also considering the time and money spent on maintenance. These aspects will be addressed in the context of the co-implementation phase of VARCITIES project, through an integrated approach including technology, spatial, regulatory, legal, financial, environmental and social perspectives.
The main beneficiaries of this document are the local clusters referring to the 7 pilot cities directly involved in the VARCITIES project, although this approach can also serve as an example to be followed by other cities addressing similar challenges for transcribing their ambitious solutions.

Annex: Digital components

Annex I: Castelfranco (IT)- A "Healing Garden" for elderly and people suffering from Alzheimer

VS2_2: Portable eye-tracker

Model	Tobii Pro Glasses - 3
Sensors/variables	16 Infra-Red illuminators and 4 eye cameras integrated into lenses; ST™ LSM9DS1 sensors: Gyroscope and Accelerometer (sampled at 100Hz); Magnetometer: (sampled at 10 Hz)
Dimensions	153 ×168 ×51 mm
Weight	76.5 gr
Power source	Rechargeable 18650 Li-ion, Capacity: 3 400 mAh
Energy Autonomy	105 min
Connectivity	s 802.11 a/b/g/n Wi-Fi standard
Connectivity network availability	available now
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Usage temperature: 5°C to +45°C / 23°F to 113°F
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

VS2_3: Portable electroencephalography system (EEG)

Model	Brain products LiveAmp 64 system with actiCAP slim
Sensors/variables	Active electrodes
Dimensions	Amplifier: 83 mm x 102 mm x 14 mm (+ cap)
Weight	120 gr
Power source	Built-in rechargeable battery Capacity: 1,000 mAh.
Energy Autonomy	> 3 hours (wireless data transfer only and passive electrodes) > 4.5 hours (storage on memory card only and passive electrodes)

Connectivity	2.402-2.480 GHz ISM band
Connectivity network availability	-
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Temperature: 10 °C to 40 °C (50 °F to 104 °F) Relative humidity: 45 % to 85 %, non-condensing Atmospheric pressure: 700 hPa to 1,050 hPa
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

VS2_4 Portable physiological measures (e.g., ECG, EDA, LUX, EMG)

Model	biosignalsplux Explorer
Sensors/variables	4-channel sensors: Electromyography EMG (Bandwidth: 25-500Hz); Electrocardiography ECG (Bandwidth: 25-100Hz); Electrodermal Activity EDA (Bandwidth: 0-3Hz); Light LUX (Range: 400-700 nm [550 nm | peak spectral wavelength])
Dimensions	4-Channel Hub: 85x54x10mm Cable Length: 100cm±0.5cm
Weight	4-Channel Hub: 45g (without sensors)
Power source	700mA 3.7V LiPo rechargeable (up to 12h in continuous streaming)
Energy Autonomy	Battery life: ~10h streaming
Connectivity	Bluetooth 2.0+EDR (Class II); USB cable to download stored data from memory (optional extra)
Connectivity network availability	-
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Usage temperature: +10°C to + 40°C
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted]
Number of units	2

Maintenance cost	-

VS2_5 Actigraphy

Model	MotionWatch 8
Sensors/variables	Tri-axial Accelerometer, MEMs technology. 0.01g to 8g range, 3 – 11Hz
Dimensions	36(l) x 28.2(w) x 9.4(d) excluding strap
Weight	9.1 grams (including battery, excluding strap)
Power source	CR2032 Lithium Coin Cell
Energy Autonomy	Battery life: 3 4Mbits non-volatile (91 days recording @ 1min epoch – activity and light, uncompressed)
Connectivity	Micro USB, generic drivers
Connectivity network availability	-
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Usage temperature: +5°C to + 40°C
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted] (including all 10 units and software)
Number of units	10
Maintenance cost	Not estimated yet (probably the cost of CR2032 batteries. Each pair of batteries costs ~4€)

VS2_6 Virtual reality headsets: Oculus Quest 2

Oculus Quest 2	
Model	Oculus Quest 2
Sensors/variables	Display LCD 1832 x 1920 per eye @ 120 Hz; Software: Oculus Mobile, based on Android; Memory: 256GB
Dimensions	Headset: 191.5 mm x 102 mm x 142.5 mm (295.5 mm with fully-unfolded strap)
Weight	503 g
Power source	3,640 mAh (14.0 Wh) lithium-ion
Energy Autonomy	Battery life: ~3h streaming
Connectivity	Wi-Fi b/g/n/ac(5)/ax(6), 60 GHz Wi-Fi ay module (currently not in use); Bluetooth 5.0 LE; Type-C USB port, with USB Host support; 3.5mm audio jack.

Connectivity network availability	Yes
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Usage temperature: 0°C to + 40°C
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted] (including software)
Number of units	2
Maintenance cost	-

VS2_7 Smartphone

Model	Blackview BV4900 Pro
Sensors/variables	Display LCD 5.7 '' HD+IPS; Software: Android 10; Memory: 4GB RAM and 64GB ROM; Cameras: 5MP+13MP
Dimensions	157.5 x 78.1 x 13.7 mm
Weight	261g
Power source	5580mAh, Li-Polymer
Energy Autonomy	Battery life: ~23h
Connectivity	a,b,g,n,n 5GHz, ac, Dual band, Wi-Fi Hotspot, Wi-Fi Direct, Wi-Fi Display; Bluetooth 5.0 LE; 2.0, USB Type-C; audio jack.
Connectivity network availability	Yes
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Usage temperature: -22°C to 50°C
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted] €

Number of units	2
Maintenance cost	-

VS2_8 Computational units

Sensor type	High-performance computational unit + screens
Variable range / sensor	-
Accuracy	-
Refresh rate	-
Max. dimensions	-
Max. weight	-
Power source	Power supply unit
Energy Autonomy	-
Connectivity	Wi-Fi
Location of installation	Padova Neuroscience Center (PNC)
Environmental conditions	Room temperature
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted]€
	2
	-

VS2_9 Virtual reality + eye-tracking headset

Model	HTC Vive pro eye Virtual reality + eye-tracking headset
Sensor type	It includes the following sensors: SteamVR Tracking, G-sensor, Gyroscope, Proximity, Eye Comfort Setting (IPD), Eye tracking
Variable range / sensor	110° field of view
Accuracy	0.5°-1.1° 5-point calibration
Refresh rate	90 Hz
Max. dimensions	-
Max. weight	-
Power source	Rechargeable battery
Energy Autonomy	2.5-3hours

Connectivity	Wi-Fi
Location of installation	Portable device
Environmental conditions	-
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted]

VS3_1 Devices and wireless sensor network for key data gathering (IoT microclimatic + air quality + solar radiation + noise sensor + wind speed/direction; gateway; and related accessories)

Model	enLink Air-X LoRaWAN Outdoor Air Quality Monitor
Sensors/variables	Temperature, Relative Humidity, VOC's, Barometric Pressure. CO2. Oxygen. Particulate Matter - PM1, 2.5, 4, 10 (MCERTS Certified), Nitrogen Dioxide, 0-5 ppm, Ozone, 0 - 2 ppm. Single digit PPB resolution.
Dimensions	340mm x 294mm x 161mm
Weight	Ca. 1.8 kg
Power source	100-240VAC, 1 Amp (max)
Energy Autonomy	
Connectivity	LoRaWAN
Connectivity network availability	To be installed
Integration protocol of existing ICT systems	
Location of installation	2 on the two extremities of the garden 1 to be used on the ground rover (?)
Environmental conditions	-10 – 40°C, 0 – 95%RH, Non-Condensing
Permit required	no
Estimated life span of system	Between 5 and 15 years
Cost of Unit	Ca. [redacted] (estimated)
Number of units	3
Maintenance cost	Not available
Model	IoTSens sound level monitor
Sensors/variables	Noise (dBA) LAeq, LAmax, LAmin, LAp (01-10-50-90-99)

Dimensions	200x120x60 mm
Weight	610 g
Power source	Passive power over Ethernet: 12/24 VDC Power supply with 12/24 VDC
Energy Autonomy	N/A
Connectivity	Ethernet WiFi LoRaWAN NarrowBand IoT
Connectivity network availability	To be installed
Integration protocol of existing ICT systems	
Location of installation	2 the same positions of the air quality sensors (on the two extremities of the garden) 1 to be used on the ground rover
Environmental conditions	-40°C to + 65°C
Permit required	no
Estimated life span of system	Not available
Cost of Unit	[redacted]
Number of units	3
Maintenance cost	Not available

Wind speed, direction, and maximum wind speed IoT sensors	
Model	DL-ATM41-001
Sensors/variables	Solar radiation Precipitation Lightning strike count, average distance Wind speed, direction, maximum wind speed Air temperature Vapor pressure Barometric pressure Relative humidity, internal sensor temperature Tilt angle, X and Y orientation North wind speed, east wind speed
Dimensions	Enclosure: 135 × 81 × 70 mm Sensor: 340 mm, diameter: 100 mm
Weight	1290 g including batteries and sensor
Power source	2 × alkaline C batteries (LR14)
Energy Autonomy	10.2 months (10 min interval, SF7) 8.5 months (10 min interval, SF12) 10.6 months (60 min interval, SF7) 10.2 months (60 min interval, SF12)
Connectivity	LoRaWAN

Connectivity network availability	To be installed
Integration protocol of existing ICT systems	
Location of installation	2 the same positions of the air quality sensors (on the two extremities of the garden) 1 to be used on the ground rover
Environmental conditions	- 20°C + 50°C
Permit required	no
Estimated life span of system	Not available
Cost of Unit	[redacted]
Number of units	3
Maintenance cost	Not available

Solar radiation IoT sensors	
Model	DL-PYR-001
Sensors/variables	Solar radiation
Dimensions	Transmitter: 135 × 81 × 70 mm (not including sensor / cable) Sensor head: Diameter: 25 mm, height: 33 mm Leveling plate: Diameter: 80 mm, height: 8 mm
Weight	620 g including batteries and sensor
Power source	2 × alkaline C batteries (LR14)
Energy Autonomy	11.7 years (10 min interval, SF7) 4.3 years (10 min interval, SF12) 16.8 years (60 min interval, SF7) 11.9 years (60 min interval, SF12)
Connectivity	LoRaWAN
Connectivity network availability	To be installed
Integration protocol of existing ICT systems	
Location of installation	2 the same positions of the air quality sensors (on the two extremities of the garden) 1 to be used on the ground rover 4 on the benches in the garden
Environmental conditions	- 20°C + 50°C
Permit required	no
Estimated life span of system	Not available
Cost of Unit	[redacted]
Number of units	7
Maintenance cost	Not available

VS3_5 Wireless autonomous ground and water mobile measuring stations equipped with specific sensors and accessories

Ground rover	
Model	Robot Base Magni Silver with LiDAR and GPS
Sensors/variables	
Dimensions	439x417x265mm
Weight	13 000gr
Power source	battery 24v 35Ah
Energy Autonomy	
Connectivity	
Connectivity network availability	
Integration protocol of existing ICT systems	
Location of installation	
Environmental conditions	
Permit required	no
Estimated life span of system	5 years
[redacted]	[redacted]
Number of units	1
Maintenance cost	

Water rover	
Model	RCFISHINGBOAT PREDATOR GPS
Sensors/variables	
Dimensions	650x370x250mm
Weight	4500gr
Power source	battery 12v 13Ah
Energy Autonomy	3h
Connectivity	5,8ghz Fhss
Connectivity network availability	GPS 30 waypoints +/- 1m
Integration protocol of existing ICT systems	
Location of installation	
Environmental conditions	

Permit required	no
Estimated life span of system	5 years
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	

VS3_6 Fix recording devices (non IoT) and related accessories

Model	Wildlife Acoustics Song Meter Micro
Sensors/variables	Audio signals recorded into 16-bit PCM .wav
Dimensions	101 mm x 74 mm x 28 mm
Weight	73 g w/ batteries / 195 with batteries
Power source	3 AA-size alkaline or NiHM batteries
Energy Autonomy	Depending on the sample rate and resolution set
Connectivity	Bluetooth, but only for setting and switching on and off the device
Connectivity network availability	Yes
Integration protocol of existing ICT systems	-
Location of installation	To be defined
Environmental conditions	-20°C to 85°C
Permit required	no
Estimated life span of system	Not available
Cost of Unit	[redacted]
Number of units	4
Maintenance cost	Not available

VS4_1 Devices (smartphones) and related accessories)

Model	Blackview BV4900 Pro
Sensors/variables	Display LCD 5.7 '' HD+IPS; Software: Android 10; Memory: 4GB RAM and 64GB ROM; Cameras: 5MP+13MP
Dimensions	157.5 x 78.1 x 13.7 mm
Weight	261g
Power source	5580mAh, Li-Polymer

Energy Autonomy	Battery life: ~23h
Connectivity	a,b,g,n,n 5GHz, ac, Dual band, Wi-Fi Hotspot, Wi-Fi Direct, Wi-Fi Display; Bluetooth 5.0 LE; 2.0, USB Type-C; audio jack.
Connectivity network availability	Yes
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Usage temperature: -22°C to 50°C
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted]
Number of units	2
Maintenance cost	-

VS5_3 Visual and sound systems for interactive information to visitors and citizens

Interactive screens	
Model	To be defined – depending also from the budget
Sensors/variables	The interactive screen will not collect any environmental parameter, the monitor will show data from internal cameras, recorded videos or from H&W platform
Dimensions	Depending on the model that will be chosen – Around 1.000x600 mm
Weight	Depending on the model that will be chosen – Around 100 kg
Power source	Depending on the model that will be chosen and on the budget - Power grid or photovoltaic panel
Energy Autonomy	NA
Connectivity	Optical fiber
Connectivity network availability	LoraWan network will be installed with sensors; wi-fi is already available inside the Villa
Integration protocol of existing ICT systems	NA
Location of installation	Tob e defined – South external wall, preferably
Environmental conditions	- 5°C to + 40°C
Permit required	Yes (most likely also from the local authority)
Estimated life span of system	NA
Cost of Unit	Depending on the solution chosen – In a range from

	[redacted] €
Number of units	1
Maintenance cost	NA

Annex II: Chania (GR): Creation of a Mobile Urban Living Room in open public spaces

VS1_3 Power generation equipment

Description	Autonomous photovoltaic system, batteries
What data/ information will be presented	Power production, state of charge
From where the data/information will be taken?	system
How it will be presented to the users	Screen, webpage
Can the user interact with it	no
Technical specification	• PV panels 410W • MPPT changer • Inverter • Lion battery
Power source	Sun
Connectivity	Lan, RS485
Integration protocol of existing ICT systems	-
Operating system or backend platform	-
Connectivity network availability	
Location of installation	On/in the converted minivan
Permit required	No
Estimated life span of system	5 yrs
Cost of Unit	2000
Number of units	1
Maintenance cost	0

VS1_4 Visual and audio systems (Interactive projector, smart screens, audio equipment for events (microphones, speakers etc), live stream equipment)

Description	Interactive projector
What data/ information will be presented	be used for education and dissemination activities
From where the data/information will be taken?	H&WB platform
How it will be presented to the users	Projection screen (>60”)
Can the user interact with it	touchscreen
Technical specification	Resolution: >= 1280x800; Brightness >= 3000lumens; Contrast Ratio: >= 12000:1; interactive pen
Power source	AC
Connectivity	WiFi, VGA, HDMI
Integration protocol of existing ICT systems	-
Operating system or backend platform	-
Connectivity network availability	Yes
Location of installation	MULR
Permit required	No

Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

Description	Smart screen
What data/ information will be presented	be used for education and dissemination activities
From where the data/information will be taken?	H&WB platform
How it will be presented to the users	touchscreen (>=50")
Can the user interact with it	touchscreen
Technical specification	Resolution: >= 3840 x 2160; Dynamic Contrast Ratio >= 5000:1; CPU >i5 or equivalent; RAM: >= 8GB
Power source	AC
Connectivity	WiFi, VGA, HDMI, Ethernet
Integration protocol of existing ICT systems	-
Operating system or backend platform	Windows
Connectivity network availability	Yes
Location of installation	MULR
Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

Description	Audio equipment for events
What data/ information will be presented	be used for education and dissemination activities
From where the data/information will be taken?	-
How it will be presented to the users	-
Can the user interact with it	-
Technical specification	Wireless Microphones; audio console; speakers
Power source	AC
Connectivity	-
Integration protocol of existing ICT systems	-
Operating system or backend platform	-
Connectivity network availability	-
Location of installation	MULR

Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

VS1_5 ICT equipment (Tablets, laptop, robotics kit, WIFI access point, printer)

Description	Interactive projector
What data/ information will be presented	be used for education and dissemination activities
From where the data/information will be taken?	H&WB platform
How it will be presented to the users	Projection screen (>60")
Can the user interact with it	touchscreen
Technical specification	Resolution: >= 1280x800; Brightness >= 3000lumens; Contrast Ratio: >= 12000:1; interactive pen
Power source	AC
Connectivity	WiFi, VGA, HDMI
Integration protocol of existing ICT systems	-
Operating system or backend platform	-
Connectivity network availability	Yes
Location of installation	MULR
Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

Description	Smart screen
What data/ information will be presented	be used for education and dissemination activities
From where the data/information will be taken?	H&WB platform
How it will be presented to the users	touchscreen (>=50")
Can the user interact with it	touchscreen
Technical specification	Resolution: >= 3840 x 2160; Dynamic Contrast Ratio >= 5000:1; CPU >i5 or equivalent; RAM: >= 8GB
Power source	AC
Connectivity	WiFi, VGA, HDMI, Ethernet
Integration protocol of existing ICT systems	-
Operating system or backend platform	Windows

Connectivity network availability	Yes
Location of installation	MULR
Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

Description	Audio equipment for events
What data/ information will be presented	be used for education and dissemination activities
From where the data/information will be taken?	-
How it will be presented to the users	-
Can the user interact with it	-
Technical specification	Wireless Microphones; audio console; speakers
Power source	AC
Connectivity	-
Integration protocol of existing ICT systems	-
Operating system or backend platform	-
Connectivity network availability	-
Location of installation	MULR
Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

Description	Tablet
What data/ information will be presented	be used for education, data collection and dissemination activities
From where the data/information will be taken?	H&WB platform
How it will be presented to the users	tablet
Can the user interact with it	touchscreen
Technical specification	Android ; >10" HD; >= RAM 4 GB
Power source	Battery, AC
Connectivity	WiFi
Integration protocol of existing ICT systems	-
Operating system or backend platform	Android

Connectivity network availability	Yes
Location of installation	MULR
Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	10
Maintenance cost	-

Description	Laptop
What data/ information will be presented	be used for education and AR/VR activities
From where the data/information will be taken?	H&WB platform
How it will be presented to the users	screen
Can the user interact with it	no
Technical specification	CPU >i7 or equivalent; >15" Full HD; >=16GB RAM; GPU with >=8GB dedicated RAM
Power source	AC, battery
Connectivity	WiFI
Integration protocol of existing ICT systems	-
Operating system or backend platform	Windows
Connectivity network availability	Yes
Location of installation	MULR
Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

Description	robotics kit
What data/ information will be presented	be used for education activities
From where the data/information will be taken?	-
How it will be presented to the users	Interaction with the robot, tablet
Can the user interact with it	Yes
Technical specification	Programmable (python, Java) central control unit; actuators (motors, servos); sensor (ultrasonic, light)
Power source	battery
Connectivity	Bluetooth
Integration protocol of existing ICT systems	-

Operating system or backend platform	-
Connectivity network availability	Yes
Location of installation	MULR
Permit required	No
Estimated life span of system	4yrs
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	-

VS1_6 AR/VR equipment (VR headsets, AR headsets)

Model	Oculus Quest 2
Sensors/variables	Display LCD 1832 x 1920 per eye @ 120 Hz; Software: Oculus Mobile, based on Android; Memory: 256GB
Dimensions	Headset: 191.5 mm x 102 mm x 142.5 mm (295.5 mm with fully-unfolded strap)
Weight	503 g
Power source	3,640 mAh (14.0 Wh) lithium-ion
Energy Autonomy	Battery life: ~3h streaming
Connectivity	Wi-Fi b/g/n/ac(5)/ax(6), 60 GHz Wi-Fi ay module (currently not in use); Bluetooth 5.0 LE; Type-C USB port, with USB Host support; 3.5mm audio jack.
Connectivity network availability	Yes
Integration protocol of existing ICT systems	-
Location of installation	Portable device
Environmental conditions	Usage temperature: 0°C to + 40°C
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted] including software)
Number of units	2
Maintenance cost	-

Model	HoloLens 2
Sensors/variables	See-through holographic lenses; IR esolution: 2k 3:2 light engines; Holographic density >2.5k radiants (light points per radian) ; Camera: 8-MP stills, 1080p30 video Head tracking: 4 visible light camera, Eye tracking: 2 IR cameras, Depth: 1-MP time-of-flight (ToF) depth sensor, IMU: Accelerometer, gyroscope, magnetometer
Dimensions	Fits over glasses)
Weight	566g
Power source	lithium-ion
Energy Autonomy	2–3 hours of active use
Connectivity	Wi-Fi: Wi-Fi 5 (802.11ac 2x2); Type-C USB port, with USB Host support; 3.5mm audio jack.
Connectivity network availability	Yes
Integration protocol of existing ICT systems	Gonature Game
Location of installation	Portable device
Environmental conditions	Usage temperature: 0°C to + 40°C
Permit required	no
Estimated life span of system	-
Cost of Unit	[redacted]
Number of units	2
Maintenance cost	-

VS2_1 Sensors on public and private (STKs') bikes (Pycom Board bearing the following sensors (PMx, acceleration, noise, temperature, humidity), GPS, batteries)

Sensor type	GPS Module
Variable range / sensor	-
Accuracy	-
Refresh rate	-
Max. dimensions	40mm x20mm x13mm
Max. weight	G.W 17g
Power source	3.3V or 5V

Energy Autonomy	Consumption (TX): 19mA Consumption (RX): 24mA Standby mode:<200µA
Connectivity	Grove UART
Location of installation	CHANIA
Environmental conditions	-
Permit required	no
Estimated life span of system	100 uA
Cost of Unit	[redacted]
Number of units	45
Maintenance cost	202.5

Sensor type	Particulate Matter Sensor (Dust)
Variable range / sensor	50% - 0.3 µm 98% - 0.5 µm and larger
Accuracy	1 µg/m³
Refresh rate	-
Max. dimensions	50x38x21mm
Power source	4.5V to 5.5V
Energy Autonomy	Power consumption (work): below 100mA Power consumption (standby): below 200µA
Connectivity	UART / TTL Serial
Location of installation	CHANIA
Environmental conditions	od -10 °C do 60 °C Humidity: 0-99%
Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	45
Maintenance cost	1,013€

Sensor type	Temperature/Humidity Sensor
Variable range / sensor	-40°C to 125°C
Accuracy	Temperature Accuracy ±0.3% Humidity Accuracy ±2%
Refresh rate	-
Max. dimensions	89mm x140mm x7.5mm
Max. weight	G.W 10g
Power source	3.3V or 5V
Energy Autonomy	100 uA
Connectivity	Grove I2C
Location of installation	CHANIA

Environmental conditions	od -10 °C do 60 °C Humidity: 0-99%
Permit required	no
Estimated life span of system	7yrs
Cost of Unit	[redacted]
Number of units	45
Maintenance cost	202.5

Description	Li Lion cell
Can the user interact with it	no
Technical specification	Samsung 35E INR18650 3500mAh
Power source	3.7 Nominal
Integration protocol of existing ICT systems	-
Location of installation	CHANIA
Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	324
Maintenance cost	0

Sensor type	Microphone Amplifier board
Accuracy	-
Refresh rate	-
Max. dimensions	26 x 14mm
Max. weight	-
Power source	2.7V or 5V
Energy Autonomy	-
Connectivity	Analog
Location of installation	CHANIA
Environmental conditions	-40°C to +85°C
Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	45
Maintenance cost	121.5

Description	**Single Board Computer**
What data/ information will be presented	**Particulate Matter, GPS location, Noise Data, Temperature/Humidity**
From where the data/information will be taken?	**sensors**
How it will be presented to the users	**- (Pybites)**

Can the user interact with it	no
Technical specification	WiFi, BLE and cellular LTE–CAT M1/NB1
Power source	Vin Pin
Connectivity	Pin connector
Integration protocol of existing ICT systems	-
Operating system or backend platform	MicroPython
Connectivity network availability	available now, will be installed with the system
Location of installation	CHANIA
Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	84.375

VS2_3 Fixed stations sensor kits combined with weather station data and prediction models (Pycom Board bearing the following sensors (SO2, NOx, O3, CO, NH3, Cl, CO2 levels, organic substances (including PAH) levels), GPS, batteries, WiFi Access Point)

Sensor type	Particulate Matter Sensor (Dust)
Variable range / sensor	50% - 0.3 µm 98% - 0.5 µm and larger
Accuracy	1 µg/m³
Refresh rate	-
Max. dimensions	50x38x21mm
Power source	4.5V to 5.5V
Energy Autonomy	Power consumption (work): below 100mA Power consumption (standby): below 200µA
Connectivity	UART / TTL Serial
Location of installation	CHANIA
Environmental conditions	od -10 °C do 60 °C Humidity: 0-99%
Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	45
Maintenance cost	1,013€

Sensor type	Temperature/Humidity Sensor
Variable range / sensor	-40°C to 125°C

Accuracy	Temperature Accuracy ±0.3% Humidity Accuracy ±2%
Refresh rate	-
Max. dimensions	89mm x140mm x7.5mm
Max. weight	G.W 10g
Power source	3.3V or 5V
Energy Autonomy	100 uA
Connectivity	Grove I2C
Location of installation	CHANIA
Environmental conditions	od -10 °C do 60 °C Humidity: 0-99%
Permit required	no
Estimated life span of system	7yrs
[redacted]	[redacted]
Number of units	45
Maintenance cost	202.5

Sensor type	NO2 gas sensor
Variable range / sensor	0 – 20 ppm
Accuracy	0.1 ppm NO2
Refresh rate	-
Max. dimensions	20.9 x 18 mm
Max. weight	5g
Power source	max 1.3V
Connectivity	Analog
Location of installation	CHANIA
Environmental conditions	Temperature Range: -20°C to +50°C Operating Humidity: 15 – 90% RH (non-condensing)
Estimated life span of system	24 months
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	219.375

Sensor type	SO2 gas sensor
Variable range / sensor	0 – 20 ppm
Accuracy	0.1 ppm NO2
Refresh rate	-
Max. dimensions	20.9 x 18 mm
Max. weight	5g
Power source	max 1.3V

Connectivity	Analog
Location of installation	CHANIA
Environmental conditions	Temperature Range: -20°C to +50°C Operating Humidity: 15 – 90% RH (non-condensing) Pressure range: 90 to 110 kPa
Estimated life span of system	24 months
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	[redacted]
Sensor type	O3 gas sensor
Variable range / sensor	0 – 20 ppm
Accuracy	0 to -0.5 ppm equivalent
Refresh rate	-
Max. dimensions	ø23.5mm*24.5mm
Power source	DC 5±0.1V
Connectivity	UART Output (TTL electrical level,3V) Analog Voltage
Location of installation	CHANIA
Environmental conditions	Temp.: -20～50°C Humidity.: 15%RH-90%RH (no condensation)
Estimated life span of system	24 months
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	315

Sensor type	NH3 gas sensor
Variable range / sensor	0 - 100 ppm
Accuracy	±10%
Refresh rate	-
Max. dimensions	20.9 x 18 mm
Max. weight	5g
Power source	max 1.3V
Location of installation	CHANIA
Environmental conditions	Temperature Range -40°C to +50°C Pressure Range 800 to 1200 mbar Operating Humidity Range 15% to 90% RH
Estimated life span of system	24 months
Cost of Unit	[redacted]

Number of units	5
Maintenance cost	[redacted]
Sensor type	CL2 gas sensor
Variable range / sensor	0 - 10 ppm
Accuracy	< ±2% CL2 equivalent
Refresh rate	-
Max. dimensions	20.9 x 18 mm
Max. weight	5g
Power source	max 1.3V
Location of installation	CHANIA
Environmental conditions	Temperature Range -20°C to +50°C Pressure Range 800 to 1200 mbar Operating Humidity Range 15% to 90% RH
Estimated life span of system	12 months
Cost of Unit	[redacted]
Number of units	10
Maintenance cost	337.5

Sensor type	Air Quality Sensor Breakout - VOC Index
Variable range / sensor	0.3 – 30 ppm
Accuracy	<±5
Refresh rate	-
Power source	3.3VDC 5VDC
Connectivity	Digital
Location of installation	CHANIA
Environmental conditions	-10 C - 50C
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	[redacted]

Description	Single Board Computer
What data/ information will be presented	Particulate Matter, GPS location, Noise Data, Temperature/Humidity
From where the data/information will be taken?	sensors
How it will be presented to the users	- (Pybites)
Can the user interact with it	no
Technical specification	WiFi, BLE and cellular LTE–CAT M1/NB1
Power source	Vin Pin

Connectivity	Pin connector
Integration protocol of existing ICT systems	-
Operating system or backend platform	MicroPython
Connectivity network availability	available now, will be installed with the system
Location of installation	CHANIA
Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	[redacted]

Description	microSD Flash Memory Card for data storage
What data/ information will be presented	Particulate Matter, GPS location, Noise Data, Temperature/Humidity
From where the data/information will be taken?	sensors
How it will be presented to the users	- (Pybites)
Can the user interact with it	no
Technical specification	16Gb micro SD flash memory card
Power source	board power
Connectivity	SD card slot
Integration protocol of existing ICT systems	-
Operating system or backend platform	-
Connectivity network availability	available now, will be installed with the system
Location of installation	CHANIA
Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	[redacted]

Description	3G wireless access point
Can the user interact with it	no
Technical specification	3G: B1 (2100 MHz), B8 (900 MHz) 2G: B2 (1900 MHz), B3 (1800 MHz), B5 (850 MHz), B8 (900 MHz) WiFi 2.4GHz
Power source	12v
Integration protocol of existing ICT systems	-
Location of installation	CHANIA

Permit required	no
Estimated life span of system	7 yrs
Cost of Unit	[redacted]
Number of units	5
Maintenance cost	[redacted]

Annex III: Dundalk (IE)- Dundalk Library and Museum Quarter

VS1_5 Installation of Virtual Learning Pod Sensors to collate data on visitor numbers

Model	SensMax TAC-B 3D-W
Sensors/variables	Individual people moving past certain points
Dimensions	80x80x35 mm
Weight	N/A
Power source	12VDC 0.5A
Energy Autonomy	N/A
Connectivity	WiFi 2.4 GHz / WPA2-PSK / WPA2-ENTERPRISE (PEAP-MSCHAPv2)
Connectivity network availability	Will be installed with the sensors
Integration protocol of existing ICT systems	N/A
Location of installation	Inside entrance to learning pod (see map)
Environmental conditions	N/A
Permit required	No
Estimated life span of system	N/A
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	0

VS1_6 Installation of new Software to record PV savings from existing PV roof panels on Museum roof

Solar PV Panel Power Generation Meter	
Model	Efergy Engage Mini Sensor and transmitter
Sensors/variables	kW
Dimensions	Sensor: 31x57x21mm, transmitter 64x95x28mm
Weight	Sensor: 60g, transmitter: 140g (with batteries)
Power source	Sensor powered by transmitter. Transmitter powered by 3 x AA batteries
Energy Autonomy	N/A
Connectivity	WiFi 2.4 GHz
Connectivity network availability	Will be installed with the sensors

Integration protocol of existing ICT systems	N/A
Location of installation	On top of Dundalk library roof (see map)
Environmental conditions	N/A
Permit required	No
Estimated life span of system	N/A
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	0

Solar PV Panel Power Data Storage HuB	
Model	Efergy Engage Hub HH2.0
Sensors/variables	N/A
Dimensions	84x80x27mm
Weight	Sensor: 60g, transmitter: 140g (with batteries)
Power source	Mains via 1 x AC/DC Adaptor
Energy Autonomy	N/A
Connectivity	WiFi 2.4 GHz. Also API available to allow external software to use data. See this link: https://www.domoticz.com/forum/viewtopic.php?t=6177
Connectivity network availability	Will be installed with the sensors
Integration protocol of existing ICT systems	N/A
Location of installation	Location TBD
Environmental conditions	N/A
Permit required	No
Estimated life span of system	N/A
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	0

VS2_4 Rainwater harvesting data sensors collected and transmitted in a suitable format

Water flow meter	
Model	IEI - Bigfoot
Sensors/variables	Water flow m/s

Dimensions	125x38x16mm
Weight	N/A
Power source	N/A
Energy Autonomy	N/A
Connectivity	cellular, radio, satellite, WiFi, LAN
Connectivity network availability	Will be installed with the sensors
Integration protocol of existing ICT systems	N/A
Location of installation	TBD – require location of drainage sewer to be known.
Environmental conditions	-20oC - 60oC
Permit required	No
Estimated life span of system	N/A
Cost of Unit	[redacted]
Number of units	3
Maintenance cost	0

VS2_7 Sensors to collate data on visitor numbers

Wifi/Bluetooth sniffer	
Model	Wanesy Wave
Sensors/variables	Number of people and duration
Dimensions	100 x 75 x 22 mm
Weight	200g
Power source	USB Micro-B connector (5VDC) Internal backup battery (1mAh
Energy Autonomy	N/A
Connectivity	WiFi, LoRaWAN
Connectivity network availability	Will be installed with the sensors
Integration protocol of existing ICT systems	N/A
Location of installation	See map
Environmental conditions	-20°C to +55°C
Permit required	No
Estimated life span of system	N/A
Cost of Unit	[redacted]

Number of units	TBD
Maintenance cost	0

VS2_8 Sensors to collate data on Air Quality and noise

Noise Sensor	
Model	LIBELIUM NOISE LEVEL SENSOR
Sensors/variables	Decibels
Dimensions	N/
Weight	N/A
Power source	3.3V solar battery
Energy Autonomy	Solar with 3.3V Battery
Connectivity	LoRaWAN, 4G
Connectivity network availability	Will be installed with the sensors
Integration protocol of existing ICT systems	N/A
Location of installation	See map
Environmental conditions	-10 to 50 °C
Permit required	No
Estimated life span of system	N/A
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	0

VS2_9 New Touchscreen Monitor to display green learnings

Size	20 in
Location/position	See map
Durability	Water proof, dust proof and vandalism resistant
Power source	Mains power
Connectivity	wifi
Environmental conditions	-10 to 50 °C
Permit required	No
Estimated life span of system	10 yrs
Cost of Unit	[redacted]
Number of units	1

Maintenance cost	0

VS3_4 Sensors to collate data on cyclist numbers and duration of stay

Model	Cyclepods Bike Detection System –Physical pressure sensors
Sensors/variables	Presence of bicycle in the rack and duration of stay

Annex IV: Gzira (MT)- Regeneration of a high traffic road in the Gzira locality in Malta

VS2_1 Fixed sensors

Air quality sensors (fixed) - short campaign duration	
Model	VAISALA AQT400
Sensors/variables	NO2, NO, CO, O3, SO2, and H2S, Humidity, temperature, pressure
Dimensions	208 x 132mm diameter
Weight	
Power source	Photovoltaic + battery or mains
Energy Autonomy	1 day
Connectivity	3G
Connectivity network availability	available
Integration protocol of existing ICT systems	http
Location of installation	See map
Environmental conditions	10°C to 45°C
Permit required	No
Estimated life span of system	20yrs
Cost of Unit	[redacted]
Number of units	3
Maintenance cost	Depends on the fault. Calibration can be done in house

Ultrasonic wind anemometer (fixed) - short campaign duration	
Model	Ultrasonic anemometer 3D
Sensors/variables	Wind speed m/s, Wind direction °, temperature
Dimensions	600mmx300mm
Weight	3.4kg
Power source	Mains
Energy Autonomy	N/A
Connectivity	USB
Connectivity network availability	N/A
Integration protocol of existing ICT systems	N/A

Location of installation	See map
Environmental conditions	10°C to 45°C And < 20m/s wind speed
Permit required	No
Estimated life span of system	20years
Cost of Unit	[redacted]
Number of units	1
Maintenance cost	Depends

VS2_2: Citizen science campaign

Sensor type	Air-quality
Variable range / sensor	- AQI: Range 0 to 500; Accuracy ±15% - Particulate matter; Accuracy ±15% - NO2: Range 20 ppb to 500 ppb; Accuracy ±15%
Accuracy	- AQI ±15% - Particulate matter ±15% - NO2 ±15%
Refresh rate	5 min
Max. dimensions	3cm x 3cm x 30cm
Max. weight	5kg
Power source	Battery, PV panel
Energy Autonomy	At least 12hours
Connectivity	LoRaWAN 868 MHz
Location of installation	Variable depending on citizens to be engaged
Environmental conditions	Typical operation: 10°C - 40°C
Permit required	No
Estimated life span of system	10years or better
Cost of Unit	[redacted]
Number of units	10
Maintenance cost	

Annex V: Leuven (BE)- Hertogensite- Regeneration of the former hospital site

VS2_1 Monitoring local climate conditions (weather station)

Sensor type	Weather station
Variable range / sensor	• Temperature: -40℃-60℃ • Rel. humidity: 1% - 99% • Rain volume • Wind speed: 0-50m/s • Wind direction • Air pressure: 300-1100hPa
Accuracy	• Temperature: -/+ 1℃ • Rel. humidity: -/+ 5% • Rain volume: -/+ 1mm • Wind speed: -/+ 10% • Air pressure: -/+ 3 hPa
Refresh rate	5 min
Max. dimensions	490 x 320 x 150 mm
Max. weight	5kg
Power source	Battery
Energy Autonomy	6 months
Connectivity	Lan
Location of installation	To be defined
Environmental conditions	Typical operation: -40℃-60℃
Permit required	No
Estimated life span of system	10years or better
Cost of Unit	[redacted]
Number of units	10
Maintenance cost	Periodic replacement of batteries (2xAA)

Annex VI: Novo mesto (SI)- Sports and recreational park Češča vas

VS1_4 Measurements of Air/ambient quality and environmental parameters

Vendor	uRADMonitor
Model	City
Sensors/variables	Temperature, Barometric pressure, Relative Humidity, PM1, PM2.5, PM10, O3, CO, NO2, SO
Dimensions	200x200x250 mm (+ Power supply)
Weight	900 g
Power source	9V Power supply
Energy Autonomy	/
Connectivity	LoRaWAN
Connectivity network availability	
Integration protocol of existing ICT systems	HTTP, MQTT, FIWARE
Location of installation	
Environmental conditions	Temperature: -20°C to +65°C, Humidity: 0RH to 95RH
Permit required	No
Estimated life span of system	Maintenance is recommended after the shortest sensor lifespan interval (2 years).
Cost of Unit	[redacted]
Number of units	2
Maintenance cost	

Sensor type	microclimate
Variable range / sensor	-40 to 80 °C 0-100% RH 900-1100 hPa
Accuracy	±0.5 °C, ±2% RH, ±1.5 hPa
Refresh rate	10 min
Max. dimensions	250 x 100 x 50 mm

Max. weight	200
Power source	Battery
Energy Autonomy	5 years lifetime
Connectivity	Class A LoRaWAN
Location of installation	To be defined
Environmental conditions	-40 to 70 °C
Permit required	no
Estimated life span of system	
Cost of Unit	
Number of units	10
Maintenance cost	

VS2_4, VS4_3 Monitoring of visitor data

Vendor	IMBUILDINGS
Model	LoRaWAN people counter
Sensors/variables	Infrared sensor / counting people both ways
Dimensions	116 x 69 x 22mm
Weight	
Power source	Battery
Energy Autonomy	Approx. 1 year
Connectivity	LoRaWAN
Connectivity network availability	Yes
Integration protocol of existing ICT systems	
Location of installation	Coordinates + height or mark on a map
Environmental conditions	Temperature: -20°C to +70°C, Humidity: 0RH to 95RH
Permit required	
Estimated life span of system	
Cost of Unit	[redacted]
Number of units	4 or more, depends on the exact route of the trail
Maintenance cost	

VS4_4 Public Screens

32-inch diagonal screen size, resolution 1920x1080, 1 screen with casing suitable for outdoor application

VS5_1 Wearables

Vendor	FitBit
Model	Charge 5
Sensors/variables	Optical heart rate monitor, accelerometer, GPS, Oxygen saturation, light senor
Dimensions	Small: Fits wrist 130mm - 170mm in circumference Large: Fits wrist 170mm - 210mm in circumference
Weight	/
Power source	Rechargeable battery
Energy Autonomy	Up to 7 days
Connectivity	BT, Wi-Fi
Connectivity network availability	
Integration protocol of existing ICT systems	
Location of installation	
Environmental conditions	-10° to 45° C
Permit required	
Estimated life span of system	
Cost of Unit	[redacted]
Number of units	20
Maintenance cost	

Annex VII: Skelleftea (SE)- Transforming old land fill area into a residential and educational area using green/blue solutions

VS1_1 Measurement of water quality and flow

Manufacturer	IEI - Bigfoot
Range	0.12 - 3 m/s
Accuracy	±0.25%
Refresh rate	Not provided
Dimensions	125x38x16mm
Weight	Not provided
Environmental	-20 to 60°C
Energy Autonomy	PSU (10-26 VDC)
Connectivity	cellular, radio, satellite, WiFi, LAN
Integrability	Open
Price range	On inquiry

VS3_1 Installation of smart light poles

Measuring number of visitors in the park

Manufacturer	PCR2 LoRaWAN [89]
Sensor	Radar
Range	Up to 10 m
Accuracy	Cannot count groups only single objects moving by
Refresh rate	1-1440 min
Dimensions	100 x 40mm
Weight	195 g
Environmental conditions	-20 to 70°C
Energy Autonomy	5 – 12 VDC or Micro USB or Solar
Connectivity	Class A LoRaWAN
Integrability	Open
Price range	[redacted]

Measure local temperature and humidity	
Manufacturer	MCF-LW12TERWP [23]
Temperature sensor	-10 to 70 °C

Humidity sensor	0-100% RH
Air pressure	300-1100 hPa
Accuracy	±0.5 °C, ±3-5% RH, ±1 hPa
Refresh rate	10 min (default)
Dimensions	150 x 150 x 40 mm
Weight	Not provided
Environmental conditions	-30 to 70 °C
Energy Autonomy	Battery (5 years lifetime)
Connectivity	Class A LoRaWAN
Integrability	Not provided
Price range	[redacted]

Measure local wind speed	
Manufacturer	DL-ATM22(DECENTLAB) [20]
Range	0 - 30 m/s, 0-359º
Accuracy	Velocity: 3% Direction: ±5°
Refresh rate	10 min
Dimensions	135 × 81 × 70 mm + sensor
Weight	1020 g
Environmental conditions	-20 to 50 °C
Energy Autonomy	2x C Battery (19 months of lifetime)
Connectivity	Class A LoRaWAN
Integrability	Open
Price range	[redacted]

Measure local snow depth	
Manufacturer	Lufft Snow Depth Sensor SHM31
Range	Snow depth 0-15m
Accuracy	± (5 mm + 0.06 %
Refresh rate	Not provided
Dimensions	302 × 130 × 234 mm
Weight	2.35kg
Environmental conditions	-40 ... +50 °C
Energy Autonomy	12 or 24 VDC
Connectivity	Not provided
Price range	On inquiry

VS5_2 Bee hotels/insect habitats

Manufacturer	Hive genie
Parameters measured	The number of bees inside and outside of your hives The temperature inside of the hive and at the location of your hive The humidity level inside of the hive and at the location of your hive The weight of your hives The location of your hives
Range	Not provided
Accuracy	Not provided
Refresh rate	5mins
Dimensions	Not provided
Weight	Not provide
Environmental conditions	Not provided
Energy Autonomy	Not provided
Connectivity	WIFI, cellular
Price range	[redacted]