



D6.4: Report on all of the Pilots' visionary solutions and associated implementation

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Authors

Eleni Goni; Georgia Papamarkou, Sara Van Rompaey (E2ARC), Pilots representatives: CHANIA, UM, CCV MONM, LEUVEN, LCC, SKN
Pilot experts: TUC, CLP, UNIPD, EURAC, UNISMART, KORONA, DCNM, IES

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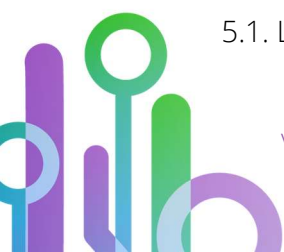


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Abbreviation list

Term	Description
BE	Belgium
CA	Contracting Authority
CAPEX	Capital Expenditure
CCV	Comune di Castelfranco Veneto
EC	European Commission
EIA	Environmental Impact Assessment
EU	European Union
GPP	Green Public Procurement
GR	Greece
H&WB	Health and Well-Being
ICT	Information and Communications Technology
IE	Ireland
IoT	Internet of Things
IT	Italy
KPI	Key Performance Indicator
LCA	Life Cycle Assessment
MT	Malta
NbS	Nature- based Solution
NPV	Net Present Value
OPEX	Operational expenditure
PPP	Public Private Partnership
SE	Sweden
SI	Slovenia
SPP	Sustainable Public Procurement
SROI	Social Return On Investment
SWOT	Strengths, Weaknesses, Opportunities, Threats
UNIPD	University of Padova
VS	Visionary Solution
WP	Work Package



Executive Summary

The vision of VARCITIES is to implement real, visionary ideas and add value by establishing sustainable models for increasing the H&WB of citizens that are exposed to diverse climatic conditions and challenges around Europe, through shared public spaces that make cities liveable and welcoming. In the seven VARCITIES pilots (Castelfranco- IT, Chania- GR, Dundalk- IE, Gzira-MT, Leuven- BE, Novo mesto- SI, Skelleftea- SE) innovation is advanced across different urban scales by fully exploiting Nature-based Solutions from a digital, social and cultural perspective. This document presents an overview of the implemented Visionary Solutions in the seven VARCITIES pilots, according to the developed individual implementation plans, as those were presented in D6.2. The implemented Visionary Solutions have been the outcome of an integrated approach that included the creation of a knowledge baseline and sketching of solutions (WP3), with the active contribution of STKs (WP4), along with the support from WP5 (specifications of ICT components) and from WP7 (development of a monitoring framework). The implementation framework that was presented in D6.1 served as a guidance document for all pilots to follow. The individual implementation and execution plans presented in D6.2 supported the procurement, implementation and handover of the planned Visionary Solutions in the seven VARCITIES pilots. The present deliverable D6.4 is a public report on all the Visionary Solutions and associated implementation. It is coupled by D6.3 (confidential) report on the cost management program and maintenance for the Visionary Solutions and D6.5 (a demonstrator).



Introduction

The present report is part of Task 6.2 “Implementation of solutions at all pilots”. It is a public deliverable that provides an overview of the implemented Visionary Solutions in the seven VARCITIES pilots. D6.4 comes after the sketching of the solutions as reported in D3.6 [1] and the development of the individual implementation plans as presented in D6.2 [2].

The individual implementation plans presented in D6.2 included the following:

- General Workplan incorporating cost and time perspectives.
- Risk management plan including roles and responsibilities.
- Procurement plan.
- Cost management plan with revision of implementation budget (following the detail design/execution plans, technical specifications and ICT requirements).
- Execution, including considerations for accessibility, sustainability and circular economy practices.
- Handover (Verification) and Operation & Maintenance concept.

Based on the above, over the past 24 months, the seven VARCITIES pilots have been implementing their Visionary Solutions, supported by the pilot experts and under the close supervision by E2ARC, T6.2 leader. A main objective, and an important accomplishment, of this collective effort has been ensuring that the Visionary Solutions meet the pilots’ set objectives and that the VS are delivered on time and within the available budget. Considering that the implementation process is also a learning opportunity, the experiences of the Pilot Leaders were collected with respect to the following:

1. Changes made in the concept design.
2. The level of required expertise (in-house and from external providers).
3. Any significant budget variances.
4. Experienced delays.
5. Key take-aways from the implementation process.

The lessons learned from the overall experiences from the implementation process will be drawn as part of Task 6.3 activities to support the successful replication of the Visionary Solutions.

The report on the Visionary Solutions and associated implementation is structured as follows per pilot:

- Implementation status of the Visionary Solutions.
- Overview of the Visionary Solutions, including latest visualisations.
- Analytic Work Plan for each VS.
- Procurement Plan for all VS.
- Realised Risks & Identified Opportunities.
- Received feedback with respect to the implementation process.
- Operation and Maintenance.



1 Castelfranco (IT): Blue and green areas for citizens' Health and Wellbeing

1.1. Castelfranco (IT)- Implementation status of the Visionary Solutions

Five out of the six Visionary Solutions envisioned for Castelfranco, have currently been fully implemented (VS2, VS3, VS4, VS5 & VS6). Part of VS1 is operational, with certain components still in execution stage. These solutions are to be fully exploited from a digital and socio-cultural perspective.

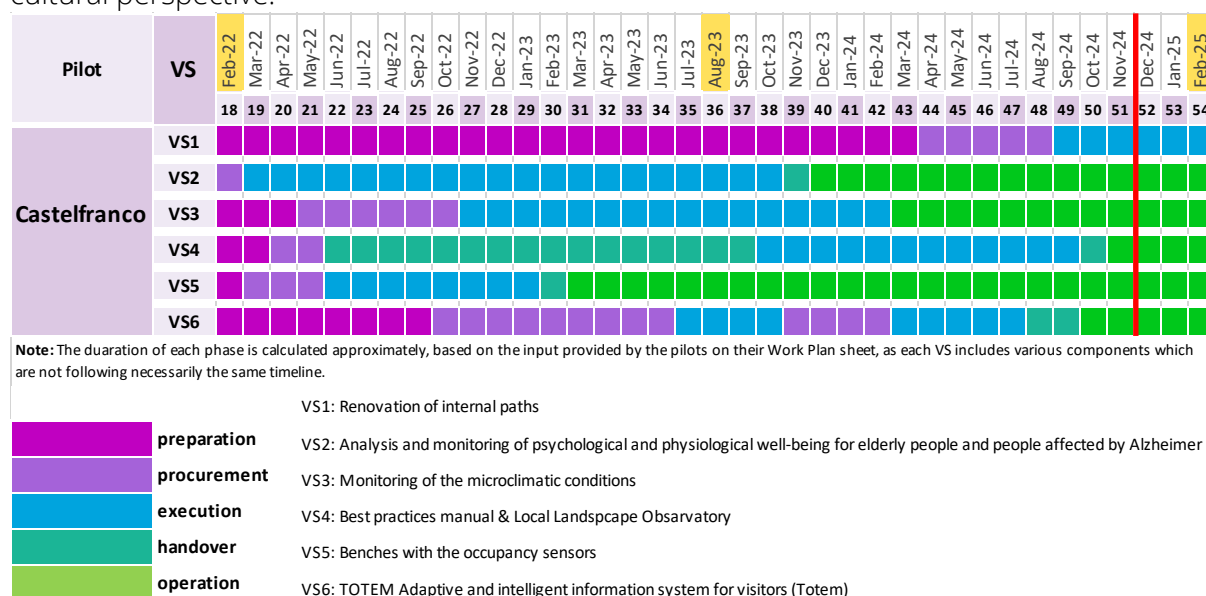


Figure 1: Castelfranco (IT)- VS implementation status

1.1.1. Overview of the Visionary Solutions

VS 1: Creation of garden access routes to ensure an improved access according to the needs of the garden users

Status: Execution stage

The goal of VS1 is to ensure improved accessibility to the users of the garden (visitors, elderly people, and people with special mobility needs). The new access road to the villa and the improvement of the internal paths of the garden will allow a direct, safe, and comfortable visit of the Villa Bolasco historic garden. An increase in the number of visitors and an improved beneficial experience of the visit are expected. The project includes the design of the construction works, the research for further funding, administration tasks 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. The leader of this visionary solution is the Municipality of Castelfranco Veneto, who coordinates the design, construction, and maintenance of the external road (external funding). This part of the solution has been finalized. The works were made possible thanks to the Municipality of

Castelfranco Veneto's ability to secure fundings from the NEXT Generation EU. The inauguration of the new pedestrian and cycling route was held in September 2024.

The University of Padova is responsible for the renovation works on the internal network of paths. The construction works for the internal accessibility of the garden are currently in execution stage. The procurement procedure is closed and there are ongoing negotiations with the company selected for the finalization of the execution plans. The VS is expected to be fully operational by March 2025.



Figure 2: Castelfranco (IT)- External and internal paths

VS2: Analysis and monitoring of psychological and physiological Well-being for elderly people and people affected by Alzheimer

Status: Operational

VS2 aims to analyse the effects of natural environments on well-being, behaviour and physiological states in elderly and people with dementia, to support the design of green



spaces and to foster nature-based psychological and clinical interventions. A series of psychological measures such as self-reported questionnaires, and cognitive tests were deployed for the goals of VS2. Moreover, behavioural and physiological measures obtained by wearable tools (i.e., eye tracker and electroencephalograph system), were included to monitor psychological and psychophysiological states in people with dementia. The University of Padova is the leading organization of the VS2, which was implemented with the support of the Department of General Psychology (DPG) and the Padova Neuroscience Centre (PNC).

This VS was completed in December 2023. In the past months, researchers from the University of Padova have been planning and conducting numerous on-site research activities inside the garden of the Villa Bolasco. In this context, healthy elderly visitors of Villa Bolasco were recruited in order to monitor several psychological parameters (April to June 2022). During this period, there was also a close collaboration with the Residential Care home "Domenico Sartor", situated next to the pilot site, for the recruitment of older people with dementia. The collection and analysis of psychophysiological data of people with dementia exposed to the natural environment in the garden of Villa Bolasco followed.

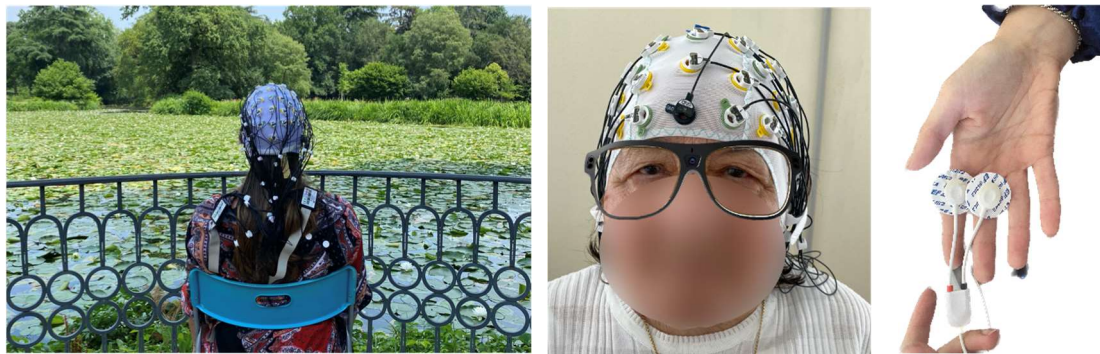


Figure 3: Castelfranco (IT)- Monitoring of well-being with sensors

VS3: Full monitoring of microclimatic conditions in the different areas of the garden (forest area, Open area, lake area)

Status: Operational

The activities conducted in the context of VS3 enabled the collection and monitoring of the microclimatic and environmental conditions in the different areas of the garden of Villa Bolasco (forest area, Open area, lake area). This was done in order to carry out an assessment of the effect of green and blue areas on health and Well-being of elderly people and people with Alzheimer over a medium-term period. The VS3 leader has been the Department of Land, Environment, Agriculture and Forestry (TESAF) of the University of Padova, whose research and development activities are strongly oriented to the study, conservation, effective management, and sustainable use of agricultural, forest and natural resources. VS3 has been fully operational since March 2024. The solution included the purchase and installation of the sensors needed to perform the field research phase. Data is being collected with respect to the soundscapes while the related biodiversity in the garden is collected using fixed recording devices. The data analysis is ongoing. In late spring 2022 an odours and scents survey were performed in the garden, to identify possible sources. During the summer period of 2022 a first set of data about air quality, solar radiation and microclimate was collected along the internal path and the lake with the use of land and water rovers.



Figure 4: Castelfranco (IT)- Monitoring of microclimatic conditions

VS4: Development of a green public spaces (re)design toolbox and establishment of the “Local observatory on therapeutic effects of the landscape “

Status: Operational

Based on the outputs of the activities conducted in other visionary solutions (particularly from VS2, VS3 and VS5) VS4 aimed at developing a “best-practices manual for the (re)design of green public spaces in relation to human health and Well-being”. VS4 will enable the establishment of a “Local Landscape Observatory” with a focus also on the therapeutic effects of green and blue areas. This Visionary Solution, led by the Municipality of Castelfranco Veneto, contributes to the further development of the town and its surroundings, promoting a new concept of urban green spaces centred on health and Well-being principles.

In the second half of 2021, the Municipality of Castelfranco Veneto and the Veneto Region signed a Memorandum of understanding to recognize the Local Landscape Observatory of Castelfranco Veneto as a member of the Veneto Observatories Network. This allowed the Municipality to receive in May 2022 a contribution of 4.000 € for supporting the local initiatives defined in the two years programme defined by the Monitoring Committee of the Observatory since the beginning of its action. The programme foresees a specific pathway for the identification of local projects connected with the therapeutic effects of waterways and vegetation located in Castelfranco Veneto and the Closed municipalities part of the surrounding “Castellana” area. For 2023 and 2024, the Veneto Region has allocated €5,000 (per year) to implement the initiatives carried out during these two years.

Barchessa degli Strepiti, located outside of the garden of the Villa (see pictures below), will become from 2026 the new headquarters of the Observatory of Castellana (as called the area around Castelfranco Veneto). Its renovation has started in September 2024 thanks to the capacity of the Municipality of Castelfranco Veneto to attract Next Generation EU and national funds. The 1,200-square-meter complex will include flexible, multi-purpose spaces, such as: Areas for exhibitions, events, and conferences; Classrooms for educational, workshop, and recreational activities; Offices, meeting rooms, archives; Reception, ticketing, and a bookshop for park visitors; Rest and refreshment areas for social interaction; Restrooms and technical rooms. It will provide the community of Castelfranco with spaces for civic, social, and cultural engagement in line with the Observatory's mission. The surrounding outdoor area will serve as urban green space accessible to the public and will enhance connectivity with nearby pedestrian and cycling paths.

Currently, the final “best practices manual” is being finalised. It has already been printed in Italian, while the English translation is under way.



Figure 5: Castelfranco (IT)- Barchessa degli Strepiti”, future headquarters of the Local Observatory



Figure 6: Castelfranco (IT)- Best-practices manual for (re)design of green public spaces and blue areas in relation to human health and wellbeing (Italian language version)

VS5: Implementation of virtual and ICT tools to support a rewarding experience of garden users & for the assistance of visitors with disabilities

Status: Operational

The goal of VS5 is to use technology (i.e., sensors, smartphones, and apps) to ensure an increased safety and enjoy ability of the visitors in the garden. The implementation of the VS makes the garden more accessible over the long-term period to any category of visitors, also including people with a certain level of disability increasing the inclusiveness of the venue. Visitors' behaviour is being monitored via sensors and Android devices that also provide the means for improved safety interactions like calls to specific emergency numbers. Data are being collected in a server through the smartphone WIFI / data stream. These are being shown on a map in real time, with location data being used in case of emergency, but also for understanding which part of the garden is visited, correlating with data from VS3. The VS leader is the Department of Land, Environment, Agriculture and Forestry (TESAF) of the University of Padova. VS5 is fully operational since March 2023 with all the sensors installed and data collection ongoing.

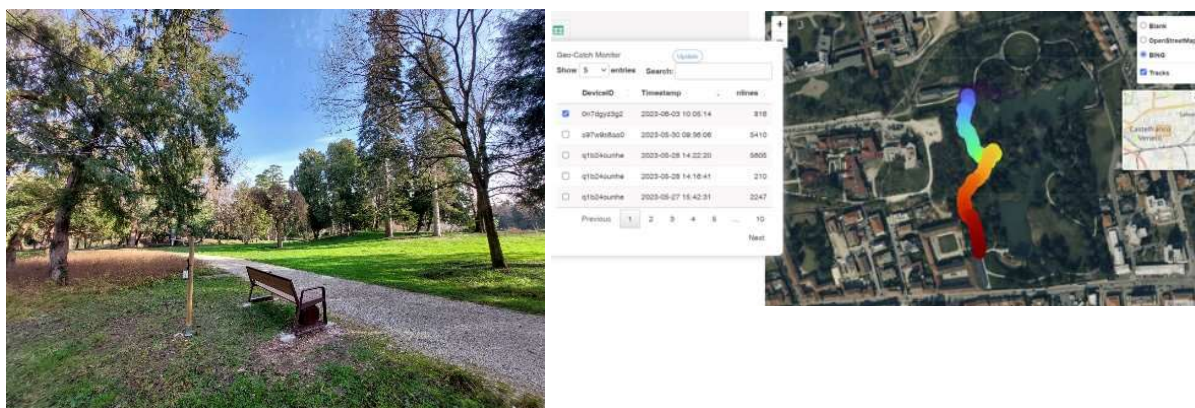


Figure 7: Castelfranco (IT)- "Smart" bench with occupancy rate sensors & data loggers

VS6: Adaptive & intelligent visitor information systems

Status: Operational

VS6, led by EURAC, concerns the installation of a digital (interactive) screen located outside the walls of the park of Villa Bolasco as part of an adaptive and intelligent information system for visitors of the garden. The system displays images, videos and sounds of the garden. The interest of citizens and visitors is stimulated through the visualisation of environmental monitored data. Visitors are informed of the cultural natural value of the garden and can perceive the benefits provided by nature on health and well-being. VS6, the totem, was presented to public on September 2024, in a specially designed event, along with the start of the renovation works of "Barchessa degli Strepiti" - future headquarters of the Observatory of the landscape.

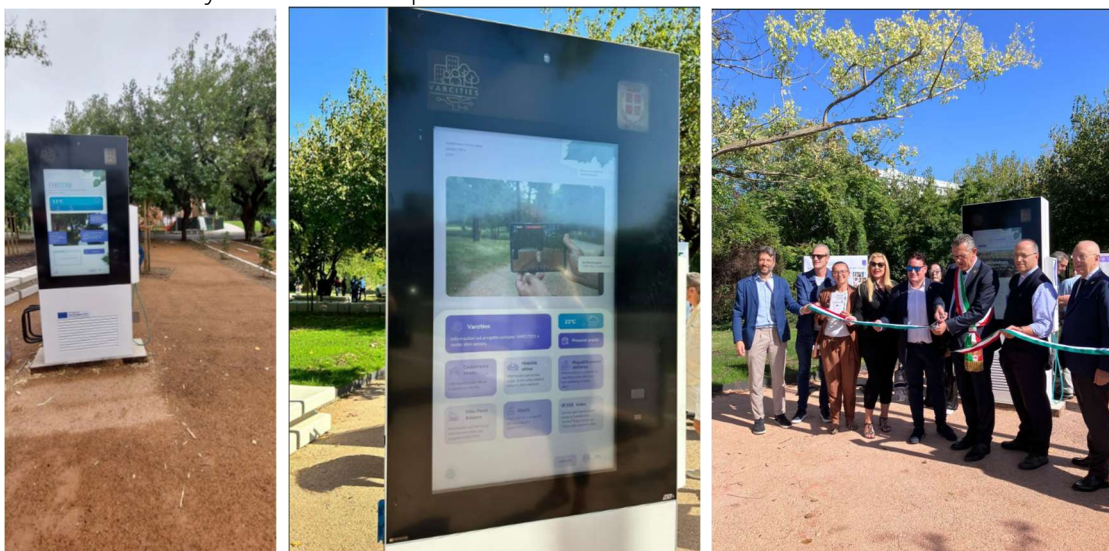


Figure 8: Castelfranco (IT)-Informational Totem



1.2. Castelfranco (IT)-VS Work Plan

1.2.1. Detailed workplan for VS1

Table 1: Castelfranco (IT)- Work Plan VS1





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A3	Preparation stage							
A1	Definition of permit(s) required	Clarification of legal requirements concerning permits and accompanying reports (planning, EIA,)	UNIPD Raffaele Cavalli	VS Planned and designed; funding & approvals obtained	24M	Jul-22	Jun-24	Closed
A2	Preparation Study/ Architectural / Stability / Implementation Plans for renovation of the garden internal paths' network	Planning of the interventions required for renovating of the garden internal paths' network	UNIPD Raffaele Cavalli		22M	Nov-22	Aug-24	Closed
A3	Market analysis of the most suitable technical solution that can be implemented for renovation of the garden internal paths' network	Identifying the solution that best meets the needs of the intervention	UNIPD Raffaele Cavalli		20M	Nov-22	Jun-24	Closed
B1- B4	Selection of Service providers							
B1	Analysis of the Public Administration's Electronical Market (MEPA) for the interventions needed for renovating of the garden internal paths' network	First market analysis in the institutional market for the University of Padova	UNIPD Raffaele Cavalli	Definition of tenders	17M	Feb-23	Jun-24	Closed
B2	Analysis of the free market for the interventions needed for renovating of the garden internal paths' network that could not be provided by MEPA	Market Analysis of the private services' providers	UNIPD Raffaele Cavalli		17M	Feb-23	Jun-24	Closed
B3	Tender for the selection of the company to carry out the interventions needed for renovating of the garden internal paths' network	The company that is going to provide the intervention needed for renovating of the garden internal paths' network is selected through a tender	UNIPD Raffaele Cavalli		16M	Mar-23	Jun-24	Closed
B4	Entrusting the work for renovating of the garden internal paths' network to the selected company	The selected company is commissioned to carry out the interventions needed for renovating of the garden internal paths' network	UNIPD Raffaele Cavalli		15M	Jun-23	Aug-24	Closed
C1	Execution process							





Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
C1	Monitoring of execution of the interventions needed for renovating of the garden internal paths' network	Regular inspection of construction quality	UNIPD Raffaele Cavalli	To be implemented	4M	Aug-24	Nov-24	Open
D1- D4	Handover							
D1	Final inspection and reception of the garden internal paths' network	Inspection and test of the garden internal paths' network	UNIPD Raffaele Cavalli	The implementation for the VS is ensured	7M	Aug-24	Feb-25	Open
D2	Setting up a list of defects (if relevant)	Identification of possible defects	UNIPD Raffaele Cavalli		7M	Aug-24	Feb-25	Open
D3	Definition and coordination of the rectification of defects	Company involvement in rectifying defects	UNIPD Raffaele Cavalli		7M	Aug-24	Feb-25	Open
D4	Acceptance of interventions carried out	Evaluation and acceptance of interventions carried out including possible remedies for defects	UNIPD Raffaele Cavalli		2M	Nov-24	Dec-24	Open
E1	Operation / Social & Cultural Solutions							
E1	Presentation of the intervention and of the solution adopted	Contribution to the general knowledge with presentation of the outcomes and experience related to the VS		The experience of the VS is disseminated	9M	Jun-24	Feb-25	Planned

1.2.2. Detailed workplan for VS2



Table 2: Castelfranco (IT)-Work Plan VS2

	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A7	Preparation stage							
A1	Design the VS	Definition of the objective and activities of VS2	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	The VS are designed	18M	Sep-20	Feb-22	Closed
A2	Define the set of variables to be measured	Define the psychological and psychophysiological variables to be recorded on young, older adults, and people with dementia - before, during, and after exposure to the garden	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Variables are set	18M	Sep-20	Feb-22	Closed
A3	Define the requirements & technical specifications of the measurements needed	Definition and specification of the characteristics of the self-reported measures and psychophysiological measures	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Self-reported, cognitive tests and psychophysiological measures are identified	18M	Sep-20	Feb-22	Closed
A4	Analysis of the activities that needed to be implemented	Definition of the activities for the recruitment of the study participants	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Strategy is decided and recruitment started	15M	Apr-21	Jun-22	Closed
A5	Preliminary budget and cost plans	Estimates of the budget to be dedicated to the purchase of sensors, equipment, and materials	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Sensors and materials are identified and purchased	19M	Nov-20	May-22	Closed
A6	Risk assessment	Assessment of the risk entailed in the implementation of the measures	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Collateral requirements and propedeutical actions are targeted	12M	Apr-21	Mar-22	Closed
A7	Test the psychophysiological measures	Testing the reliability of the simultaneous acquisition of data from different wearable sensors	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Reliability of signals verified.	15M	Apr-21	Jun-22	Closed

Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
B1- B3	Selection of Service providers							
B1	Analysis of the Public Administration’s Electronical Market (MEPA) for the equipment needed	First market analysis in the institutional market for the University of Padova	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	The current market's offers have been analysed	9M	Sep-20	May-21	Closed
B2	Analysis of the free market for the equipment that could not be provided by MEPA	Market Analysis of the private services' providers	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	The current market's offers have been analysed	21M	Sep-20	May-22	Closed
B3	Selection and purchase of the sensors and the equipment	Procurement of the sensors	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Sensors are selected and purchased	21M	Sep-20	May-22	Closed
C1- C12	Execution process							
C1	Preparation works on-site and offsite	Testing the wearable sensors offsite and onsite + agreement with the operators of the Nursing Home "Domenico Sartor"	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Installation and setting up works are finalised	5M	Mar-22	Jul-22	Closed
C2	Deployment of the sensors	Study of the optimal application of the wearable sensors and understanding of the output signal	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi		5M	Mar-22	Jul-22	Closed
C3	Elaboration and analysis of data	Elaboration and analysis of data collected through the sensors	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Data are collected	34M	Mar-22	Dec-24	Open
C4	Recruitment of participants study 1	Recruitment of younger participants based on inclusion criteria	UNIPD Francesca Pazzaglia; Enrico Sella	Participants are recruited	5M	Mar-21	Jul-21	Closed
C5	Data collection on field study 1	Participants completed questionnaires and cognitive tests before and after exposure to the garden	UNIPD Francesca Pazzaglia; Enrico Sella	Data are collected	2M	Jun-21	Jul-21	Closed
C6	Elaboration of data collected study 1	Statistical analyses	UNIPD Francesca Pazzaglia; Enrico Sella	Analyses are done	28M	Jul-21	Oct-23	Closed

Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
C7	Recruitment of participants study 2	Recruitment of older participants based on inclusion criteria	UNIPD Francesca Pazzaglia; Enrico Sella	Participants are recruited	4M	Mar-22	Jun-22	Closed
C8	Data collection on field study 2	Participants completed questionnaires and cognitive tests before and after exposure to the garden	UNIPD Francesca Pazzaglia; Enrico Sella	Data are collected	2M	May-22	Jun-22	Closed
C9	Elaboration of data collected study 2	Statistical analyses	UNIPD Francesca Pazzaglia; Enrico Sella	Analyses are done	16M	Jul-22	Oct-23	Closed
C10	Recruitment of participants study 3	Recruitment of participants from Nursing Home "Domenico Sartor" based on inclusion criteria	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Participants are recruited	20M	Mar-22	Oct-23	Closed
C11	Data collection on field study 3	Collection of brain signals, behavioural data and psychophysiological data from wearable sensors	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Data are collected	20M	Mar-22	Oct-23	Closed
C12	Elaboration of data collected study 3	Statistical analyses	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	Analyses are done	34M	Mar-22	Dec-24	Open
D1- D2	Handover							
D1	Startup	Installation of neurophysiological devices and tests for data collection	UNIPD Enrico Sella; Andrea Zangrossi	Handover of VS2	5M	Mar-22	Jul-22	Closed
D2	Maintenance	Maintenance of neurophysiological devices	UNIPD Enrico Sella; Andrea Zangrossi		20M	Mar-22	Oct-23	Closed
E1- E2	Operation / Social & Cultural Solutions							
E1	Scientific article writing	Scientific articles are written based on the results and outcomes of the experimental phase of the VS2	UNIPD Maurizio Corbetta; Francesca Pazzaglia; Enrico Sella; Andrea Zangrossi	The experience of the VS is disseminated	33M	Jun-22	Feb-25	Open
E2	Presentation of the project idea and results at conferences and events	Contribution to the scientific and general knowledge with presentation of the outcomes and experience related to the VS	UNIPD Enrico Sella; Andrea Zangrossi		29M	Oct-22	Feb-25	Open

1.2.3. Detailed workplan for VS3

Table 3: Castelfranco (IT)-Work Plan VS3



	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A10	Preparation stage							
A1	Design the VS	Definition of the objective and activities of VS 3	UNIPD Raffaele Cavalli	The VS are designed	13 M	Feb-21	Feb-22	Closed
A2	Define the set of variables to be measured	Define the environmental and microclimatic variables that will be put in relation with the responses of visitors to the garden	UNIPD Alessia Portaccio	Specific aims and needs are set	8 M	Jul-21	Feb-22	Closed
A3	Define the requirements & technical specifications of the sensors needed	Definition and specification of the characteristics of the sensors and instruments that will be implemented on the site to improve the market analysis	UNIPD Francesco Pirotti		6 M	Sep-21	Feb-22	Closed
A4	Analysis of the activities that needed to be implemented	Definition of all the supporting activities for the implementation of sensors and data collection and elaboration	UNIPD Alessia Portaccio		6 M	Sep-21	Feb-22	Closed
A5	Preliminary budget and cost plans	Estimates of the budget to be dedicated to the purchase of sensors, equipment, and materials	UNIPD Raffaele Cavalli	Collateral requirements and propedeutical actions are targeted	6 M	Oct-21	Mar-22	Closed
A6	Risk assessment	Assessment of the risk entailed in the implementation of the sensors	UNIPD Raffaele Cavalli		9 M	Oct-21	Jun-22	Closed
A7	Test the sensors	Testing the functioning of the sensors for a better calibration of their deployment and the measurements	UNIPD Francesco Pirotti	The preparedness phase to the execution phase is accomplished	4 M	Mar-22	Jun-22	Closed
A8	Define the locations for the deployment of the sensors	Sensors spatial distribution	UNIPD Alessia Portaccio		4 M	Feb-22	May-22	Closed
A9	Installation of the sensors on the rovers	Some of the sensors similar to those that are deployed in the garden are going to be mounted on the rovers in order to collect all the relevant information while simulating the experience of visitors to the garden	UNIPD Marco Sozzi	Collateral requirements and propedeutical actions are targeted	6 M	May-22	Oct-22	Closed





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A10	Building the support structures for the deployment of the sensors	In order to deploy the sensors in a way that they work properly and that they do not affect too much the experience of the visitors, customized structures need to be built	UNIPD Raffaele Cavalli	Collateral requirements and propedeutical actions are targeted	2 M	Jun-22	Jul-22	Closed
B1- B10 Selection of Service providers								
B1	Internal assessment for the staff needed for the implementation of the electrical and internet network	Definition of the staff that is carrying out the on-site and off- site works for the implementation of the sensors and the LoRaWAN network	UNIPD Raffaele Cavalli	The current market's offers have been analysed	4 M	Dec-21	Mar-22	Closed
B2	Analysis of the Public Administration's Electronical Market (MEPA) for the equipment needed	First market analysis in the institutional market for the University of Padova	UNIPD Alessia Portaccio		6 M	Oct-21	Mar-22	Closed
B3	Analysis of the free market for the equipment that could not be provided by MEPA	Market Analysis of the private services' providers	UNIPD Alessia Portaccio		6 M	Oct-21	Mar-22	Closed
B4	Selection and purchase of the sensors and the equipment	Procurement of the sensors	UNIPD Alessia Portaccio	Sensors are selected and purchased	7 M	Oct-21	Apr-22	Closed
B5	Market analysis for the perfume survey service	Market Analysis of the private services' providers	UNIPD Alessia Portaccio	The current market's offers have been analysed	2 M	Feb-22	Mar-22	Closed
B6	Selection of the perfume service provider	Subcontracting the selected service provider	UNIPD Alessia Portaccio	Services are evaluated and selected	9 M	Feb-22	Oct-22	Closed
B7	Tender for the selection of a Lidar flight service's provider	The company that is going to collect spatial data through the lidar flight is selected through a tender	UNIPD Francesco Pirotti	The current market's offers have been analysed	4 M	Apr-21	Jul-21	Closed
B8	Selection and subcontracting of the Lidar flight services' provider	Subcontracting the selected service provider	UNIPD Francesco Pirotti	Services are evaluated and selected	2 M	Jun-21	Jul-21	Closed
B9	Tender for the selection of a land and a water rover	The rovers are going to be bought through a tender	UNIPD Marco Sozzi	The current market's offers have been analysed	5 M	Nov-21	Mar-22	Closed
B10	Selection and purchase of a land and a water rover	Selection and purchase of the rovers	UNIPD Marco Sozzi	Sensors are selected and purchased	4 M	Mar-22	Jun-22	Closed



Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

C1- C11 Execution process								
C1	Preparation works on site ad offsite	Building of supports and structures for the sensors, setting of the networks for the functioning and energy supplies of the sensors	UNIPD Raffaele Cavalli	Installation and setting up works are finalised	4 M	Feb-22	May-22	Closed
C2	Setting of the LoRaWAN network	Installation of the antenna, the gateway and the launching of the LoRaWAN connection at the site level	UNIPD Francesco Pirotti		3 M	Feb-22	Apr-22	Closed
C3	Deployment of the sensors	Positioning of the sensors in the defined locations and starting the measurements	UNIPD Alessia Portaccio		5 M	Feb-22	Jun-22	Closed
C4	Collecting of data on field	Data collection of the set variables and parameters	UNIPD Alessia Portaccio	Data are collected	28 M	Aug-21	Nov-23	Closed
C5	Elaboration and analysis of data	Elaboration and analysis of data collected through the sensors	UNIPD Alessia Portaccio	Data are elaborated and analysed	31 M	Aug-21	Feb-24	Closed
C6	Perfume survey implementation	Technical survey provided by a company of experts on perfume service	UNIPD Alessia Portaccio	Data are collected	13 M	Oct-21	Oct-22	Closed
C7	Elaboration of data	Analysis and elaboration of the data collected through sensors and surveys	External consultant	Data are elaborated and analysed	16 M	Aug-22	Nov-23	Closed
C8	Lidar flight execution	The selected company drives the drone over the pilot site to collect spatial data	UNIPD Francesco Pirotti	Data are collected	1 M	Jul-21	Jul-21	Closed
C9	Elaboration and analysis of the data collected through the drone flight	Elaboration and analysis of the data collected through the drone flight	UNIPD Francesco Pirotti	Data are elaborated and analysed	7 M	Jul-21	Jan-22	Closed



	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
C10	Data collection through land and water rovers	Rovers are going to be run over the paths in the historical garden and over the lake in the pilot site, in order to simulate the experience of a visitor and collect all the relevant information	UNIPD Marco Sozzi	Data are collected	17 M	Jul-22	Nov-23	Closed
C11	Elaboration and analysis of the data collected through the running of the rovers	Elaboration and analysis of the data collected through the sensors mounted on the rovers	UNIPD Francesco Pirotti	Data are elaborated and analysed	20 M	Jul-22	Feb-24	Closed
D1- D4	Handover							
D1	Operation and Maintenance concept	Design and definition of the operation and maintenance plan	UNIPD Raffaele Cavalli	The implementation of the VS is ensured	17 M	Mar-22	Jul-23	Closed
D2	Final inspection and reception of all the components	To ensure a successful implementation of the VS, all the components are checked, tested and made operational	UNIPD Raffaele Cavalli	The implementation of the VS is ensured	15 M	Mar-22	May-23	Closed
D3	Setting up a list of defects (if relevant)	During the implementation phase, any defects or issue should be noted down	UNIPD Raffaele Cavalli	The implementation of the VS is ensured	12 M	Mar-22	Feb-23	Closed
D4	Concluded Budget with dated revisions	Once the whole procurement phase is concluded an updated version of the budget used is made	UNIPD Raffaele Cavalli	The implementation of the VS is ensured	17 M	Mar-22	Jul-23	Closed
E1- E2	Operation / Social & Cultural Solutions							
E1	Scientific article writing	Scientific articles are written based on the results and outcomes of the experimental phase of the VS	UNIPD Raffaele Cavalli	The experience of the VS is disseminated	37 M	Jul-21	Decl-24	Open
E2	Presentation of the project idea and results at conferences and events	Contribution to the scientific and general knowledge with presentation of the outcomes and experience related to the VS	UNIPD Alessia Portaccio		33 M	Nov-21	Dec-24	Open

1.2.4. Detailed workplan for VS4

Table 4: Castelfranco (IT)-Work Plan VS4



	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A7	Preparation stage							
A1	Design the VS	Definition of the objective and activities of VS4	CVV Luca Pozzobon	VS designed	14M	Jan-21	Feb-22	Closed
A2	Define the set of variables to be measured	Definition of the actions focusing on the overall activity of the Local Observatory among the City of Castelfranco Veneto and the Closed municipalities.	CVV Luca Pozzobon	Overall action Planned	3M	Mar-21	May-21	Closed
A3	Analysis of the activities that needed to be implemented	Mayors and Local administrators of municipalities of Castelfranco Veneto and its surroundings met in order to define how to setting up the activities to be implemented. A two- year programme was set up in cooperation with the Regional Administration	CVV Luca Pozzobon	Specific activities defined	5M	Mar-21	Jul-21	Closed
A4	Preliminary budget and cost plans	The costs of the activities were foreseen and included in the two-year programme	CVV Luca Pozzobon	Preliminary costs identified	5M	Mar-21	Jul-21	Closed
A5	Request of inclusion of the Local Landscape Observatory of Castelfranco Veneto in the Veneto Observatories Network for the promotion of the different regional territories	Signature of a memorandum of understanding among Veneto Region and the Municipality of Castelfranco Veneto which recognise the formal constitution of the Local Landscape Observatory of Castelfranco Veneto	CVV Luca Pozzobon	Membership accepted by the Veneto Region	3M	Jun-21	Aug-21	Closed
A6	Monitoring Committee definition	Nomination of the persons in charge to carry out the activities in the framework of the Local Landscape Observatory of Castelfranco Veneto Definition of the Monitoring Committee	CVV Luca Pozzobon	Board set up	9M	Aug-21	Apr-22	Closed





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A7	Define the topics and organisation of the best practices manual	Define the main sections and contents of the best practices manual which will be the outcome of the whole VARCITIES experience of the Castelfranco Veneto Pilot	UNIPD Raffaele Cavalli	Manual's context fully defined	8M	Oct-23	May-24	Closed
B1	Selection of Service providers							
B1	Definitive Budget & Cost Request	4.000 € obtained from Veneto Region	CVV Luca Pozzobon	Funding obtained	1M	May-22	May-22	Closed
C1- C2	Execution process							
C1	Writing of the manual	Through a collaboration among the partners collaborating to the Castelfranco Veneto Pilot activities the manual will be written	UNIPD Raffaele Cavalli	Manual written & printed	12M	Oct-23	Sep-24	Closed
C2	Printing of the manual	The manual will be printed and also a digital copy will be set up	UNIPD Raffaele Cavalli		5M	May-24	Sep-24	Closed
D1- D4	Handover							
D1	Task responsibilities	Definition of the tasks' responsibilities in the framework of the Observatory	CVV Luca Pozzobon	Tasks managers defined	21M	Aug-21	Apr-23	Closed
D2	Activities analyses	- Analysis of the territorial landscape (e.g., therapeutic effects of waterways and vegetation) for the detection of: a) well-being and health indicators and tools; b) a new concept of public space - Engagement of local associations, organisations and entities through workshops, events and focus groups - Definition of the guidelines for the pathway's requalification	CVV Luca Pozzobon	Well-being indicators defined	38M	Jun-21	Jul-24	Closed
D3	Translation in English	Translated version of the best practices manual in English	CVV Luca Pozzobon	Manual written & printed	6M	Sep-24	Dec-24	Open





Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
D3	Projects recognition and potential	Definition - along with local municipalities, administrations, associations and organisations - of the different local projects to be requalified and connected in order to create the strategy to requalify and promote and disseminate them as a unique network	CVV Luca Pozzobon	Well-being indicators defined	38M	Jun-21	Jul-24	Closed
D4	The draft copy of the manual is checked and approved	Phases preliminary to the distribution of the manual	UNIPD Raffaele Cavalli	Manual's context fully defined	3M	May-24	Jul-24	Closed
E1- E3	Operation / Social & Cultural Solutions							
E1	Local co-design - stakeholders' engagement	Scheduling of participatory initiatives with local associations/organisations for better setting up the priority interventions for improving the town sustainability in terms of mobility, environment and wellbeing	CVV Luca Pozzobon	Well-being indicators defined	40M	Nov-21	Feb-25	Open
E2	The manual is distributed	Sharing of the manual through specific events or reaching out interested actors	UNIPD Raffaele Cavalli	The experience of the VS is disseminated	8M	Jul-24	Feb-25	Open
E3	Dissemination activities	Promotion to the citizenship of the Local Observatory activities	CVV Luca Pozzobon	Well-being indicators defined	40M	Nov-21	Feb-25	Open

1.2.5. Detailed workplan for VS5

Table 5: Castelfranco (IT)-Work Plan VS5



	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A9	Preparation stage							
A1	Design the VS	Definition of the objective and activities of VS5	UNIPD Raffaele Cavalli	The VS are designed	13 M	Feb-21	Feb-22	Closed
A2	Define the set of variables to be measured	Define the variables and information that are going to be surveyed during the experimental phase	UNIPD Francesco Pirotti	Specific aims and needs are set	10 M	Apr-21	Feb-22	Closed
A3	Define the requirements & technical specifications of the sensors and material needed	Definition and specification of the characteristics of the sensors and instruments that will be implemented on the site to improve the market analysis	UNIPD Francesco Marinello		10 M	Apr-21	Feb-22	Closed
A4	Analysis of the activities that needed to be implemented	Definition of all the supporting activities for the implementation of sensors and data collection and elaboration	UNIPD Alessia Portaccio		10 M	Apr-21	Feb-22	Closed
A5	Preliminary budget and cost plans	Estimates of the budget to be dedicated to the purchase of sensors, equipment, and materials	UNIPD Raffaele Cavalli	Collateral requirements and propedeutical actions are targeted	9 M	Jul-21	Mar-22	Closed
A6	Risk assessment	Assessment of the risk entailed in the implementation of the sensors	UNIPD Alessia Portaccio		5 M	Feb-22	Jun-22	Closed
A7	Test the sensors and the app	Testing the functioning of the sensors for a better calibration of their deployment and the measurements	UNIPD Francesco Marinello	The preparedness phase to the execution phase is accomplished	19 M	Apr-21	Oct-22	Closed
A8	Set and prepare the benches with the occupancy sensors	Material and equipment preparedness phase	UNIPD Raffaele Cavalli		6 M	May-22	Oct-22	Closed
A9	Installing the benches	The ergonomic benches are installed in seating locations defined during the preliminary study carried out in VS2	UNIPD Alessia Portaccio	The preparedness phase to the execution phase is accomplished	8 M	Jun-22	Jan-23	Closed
B1- B6	Selection of Service providers							
B1	Internal assessment for the staff needed for the installation of the sensors and benches	Definition of the staff that is carrying out the on-site and off-site works for the implementation of the sensors and the benches for the measurements required by the VS	UNIPD Raffaele Cavalli	The current market offer has been analysed	6 M	Dec-21	May-22	Closed





Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
B2	Analysis of the Public Administration’s Electronical Market (MEPA) for the equipment needed	First market analysis in the institutional market for the University of Padova	UNIPD Francesco Marinello	The current market offer has been analysed	9 M	Jul-21	Mar-22	Closed
B3	Analysis of the free market for the equipment that could not be provided by MEPA	Market Analysis of the private services' providers	UNIPD Francesco Marinello		9 M	Jul-21	Mar-22	Closed
B4	Selection and purchase of the equipment	Procurement of the sensors and the rugged phones	UNIPD Alessia Portaccio	Sensors and rugged phones are selected and purchased	3 M	Feb-22	Apr-22	Closed
B5	Market analysis for the seating options	Market Analysis of the private services' providers of benches and seating options that are suited to the target of the VS	UNIPD Raffaele Cavalli	The current market offer has been analysed	4 M	Dec-21	Mar-22	Closed
B6	Selection and purchase of the benches	Selection and purchase of the benches and seating options that are suited to the target of the VS	UNIPD Raffaele Cavalli	Benches are selected and purchased	3 M	Feb-22	Apr-22	Closed
C1- C4	Execution process							
C1	Handing over the rugged phones with the tracking to the visitors to the garden	Th visitors will use the app while carrying the rugged phones with them during the visits to the historical garden	UNIPD Francesco Pirotti	Data are collected	7 M	May-23	Nov-23	Closed
C2	Collecting the data from the app	Through the app the visitors' path within the historical garden is tracked to assess the preferred routes and locations	UNIPD Francesco Pirotti		7 M	May-23	Nov-23	Closed
C3	Collecting the data from the sensors on the benches	Occupancy rates are estimated as well as the microclimatic conditions of the seating locations	UNIPD Francesco Pirotti		7 M	May-23	Nov-23	Closed
C4	Elaborating and analysing the data	Elaboration and analysis of the collected data through the app and the sensors	UNIPD Francesco Pirotti	Data are elaborated and analysed	20 M	May-23	Dec-24	Open
D1- D4	Handover							
D1	Operation and Maintenance concept	Design and definition of the operation and maintenance plan	UNIPD Francesco Pirotti	The implementation of the VS is ensured	13 M	Mar-22	Mar-23	Closed
D2	Final inspection and reception of all the components	To ensure a successful implementation of the VS, all the components are checked, tested and made operational	UNIPD Francesco Pirotti		9 M	Mar-22	Nov-22	Closed
D3	Setting up a list of defects (if relevant)	During the implementation phase, any defects or issue should be noted down	UNIPD Francesco Pirotti		36 M	Mar-22	Feb-25	Open





Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
D4	Concluded Budget with dated revisions	Once the whole procurement phase is concluded an updated version of the budget used is made	UNIPD Francesco Pirotti		10 M	Mar-22	Dec-22	Closed
E1- E2	Operation / Social & Cultural Solutions							
E1	Scientific articles are written based on the results and outcomes of the operational phase of the VS	Scientific outcomes	UNIPD Francesco Pirotti	The experience of the VS is disseminated	37 M	Jul-21	Jul-24	Closed
E2	Contribution to the scientific and general knowledge with presentation of the outcomes and experience related to the VS	Dissemination activities	UNIPD Alessia Portaccio		33 M	Nov-21	Jul-24	Closed

1.2.6. Detailed workplan for VS6

Table 6: Castelfranco (IT)-Work Plan VS6



	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1- A12	Preparation stage							
A1	Design VS6	Defining goals and activities concerning VS6	EURAC Adriano Bisello, Alice Borsari	VS6 design	12 M	Mar-21	Feb-22	Closed
A2	Definition of the installation site and type of monitors	Internal discussion with UNIPD, CCV, EURAC	EURAC Adriano Bisello, Alice Borsari		10 M	Apr-21	Feb-22	Closed
A3	Clarify legal requirements concerning permits and accompanying reports	Acquisition and understanding of the building permit to be requested from the Municipality, and request for landscape authorization from the Municipality / Superintendency with relative compatibility report	CVV Luca Pozzobon	Collateral requirements and propedeutical actions are targeted	7 M	Apr-23	Oct-23	Closed
A4	Clarify requirements regarding procurement, accounting rules	Compliance with the H2020 rules for purchases, and compliance with public regulations for purchases made by CVV or UNISMART	EURAC Adriano Bisello, Alice Borsari		11 M	Apr-21	Feb-22	Closed
A5	Supporting actions	Definition of the budget use allocated to subjects	EURAC Adriano Bisello, Alice Borsari		13 M	Feb-21	Feb-22	Closed
A6	Designs	Drafting of the design project and the related landscape report	CVV Luca Pozzobon		33 M	Feb-21	Oct-23	Closed
A7	Specification	1. LCD screen 55" = 1211.6 x 682.4 mm or 75" = 928.26 x 1650.24 mm: 2. LCD touch screen (as above, but with the possibility for the user of direct interaction). 3. Webcam/presence sensor to recognize presence of users, and provide target actions or messages: 3. Sound system, to provide environmental sounds enhancing the perception of the garden or voice messages. 4. 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	EURAC Adriano Bisello, Alice Borsari		13 M	Feb-21	Feb-22	Closed



Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A8	Preliminary budget and cost plan	EURAC Adriano Bisello, Alice Borsari	The preparedness phase to the execution phase is accomplished	9 M	Jul-21	Mar-22	Closed
A9	Risk assessment	UNISMART Tommaso Dall'Acqua		37 M	Feb-22	Feb-25	Open
A10	Record keeping	EURAC Adriano Bisello, Alice Borsari		37 M	Feb-22	Feb-25	Open
A11	Preliminary market survey	EURAC Adriano Bisello, Alice Borsari		5 M	Oct-21	Feb-22	Closed
A12	CCV - Amendment						
B1-B6	Selection of Service providers						
B1	Preparation and planning (Monitor development, Software interface development and construction works)	EURAC Adriano Bisello, Alice Borsari	Supplier selection	4M	Nov-23	Feb-24	Closed
B2	Publication and transparency	CVV Luca Pozzobon		4M	Nov-23	Feb-24	Closed
B3	Evaluation and award	CVV Luca Pozzobon		1M	Feb-24	Feb-24	Closed
B4	Contract implementation	CVV Luca Pozzobon		1M	Feb-24	Feb-24	Closed





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
B5	Risk management plan	Possible risks assessed and mitigation strategies	UNISMART Tommaso Dall'Acqua		3M	Apr-23	Jun-23	Closed
B6	Record keeping	Weekly update to create a contemporaneous history of what happened during the course of the project	EURAC Adriano Bisello, Alice Borsari		13 M	Feb-23	Feb-24	Closed
C1-C10	Execution process							
C1	Landscape authorization	Request and obtaining of the Landscape authorization	CVV Luca Pozzobon	Preparation of project documentation for implementation	7M	Mar-23	Sep-23	Closed
C2	Permits	Request and obtaining of the necessary permits	CVV Luca Pozzobon		7M	Mar-23	Sep-23	Closed
C3	Health and Safety plan	Create health and safety plan	CVV Luca Pozzobon		7M	Mar-23	Sep-23	Closed
C4	Preparation works on site	Define necessary preparation on site	CVV Luca Pozzobon		9 M	Sep-23	Sep-24	Closed
C5	Data connectivity	Power supply, and connection to the data network	CVV Luca Pozzobon		5 M	Jan-24	Sep-24	Closed
C6	Electrical connectivity	Power supply, and connection to the data network	CVV Luca Pozzobon		5 M	Jan-24	Sep-24	Closed
C7	Manufacturing and construction of the cabinet / mounting system	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	CVV Luca Pozzobon		3 M	Mar-24	Sep-24	Closed
C8	Installation	Installation of the screen, power supply, and connection to the data network	CVV Luca Pozzobon		1 M	Sep-24	Sep-24	Closed
C9	Risk management plan	Identification, estimation and analysis of exposure to possible risks due to the implementation of VS6	UNISMART Tommaso Dall'Acqua		13 M	Jul-23	Jul-24	Closed
C10	Record keeping	Weekly update to create a contemporaneous history of what happened during the course of the project	EURAC Adriano Bisello, Alice Borsari		20 M	Jul-23	Feb-25	Open
D1-D7	Handover							
D1	Operation and Maintenance concept	Design and definition of the operation and maintenance plan	CVV Luca Pozzobon	Handover VS6 - the	24 M	Mar-23	Feb-25	Open





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
D2	Final inspection and reception of all the components	To ensure a successful implementation of the VS, all the components are checked, tested and made operational	CVV Luca Pozzobon	implementation of the VS is ensured	9 M	Sep-23	Sep-24	Closed
D3	Setting up a list of defects (if relevant)	During the implementation phase, any defects or issue should be noted down	CVV Luca Pozzobon		36 M	Mar-22	Feb-25	Open
D4	Concluded Budget with dated revisions	Once the whole procurement phase is concluded an updated version of the budget used is made	CVV Luca Pozzobon		4 M	Jun-24	November-24	Open
D5	Commissioning (data and electricity)	TBD	CVV Luca Pozzobon		4 M	Feb-24	Sep-24	Closed
D6	Commissioning (software and contents)	TBD	EURAC Adriano Bisello, Alice Borsari		4 M	Feb-24	May-24	Closed
D7	Operation and Maintenance concept + Insurance	TBD	CVV Luca Pozzobon		2 M	Jan-24	Sep-24	Closed
E1- E3	Operation / Social & Cultural Solutions							
E1	Scientific articles - Presentation of VS6 objectives and results at conferences and events	Scientific outcomes	EURAC Adriano Bisello, Alice Borsari	The experience of the VS6 is disseminated	37 M	Feb-22	Feb-25	Open
E2	Contribution to the scientific and general knowledge with presentation of the outcomes and experience related to the VS	Dissemination activities	EURAC Adriano Bisello, Alice Borsari		37 M	Feb-22	Feb-25	Open
E3	Record keeping	Weekly update to create a contemporaneous history of what happened during the course of the project	EURAC Adriano Bisello, Alice Borsari		37 M	Feb-22	Feb-25	Open

1.3. Castelfranco (IT) - Procurement Plan

Table 7: Castelfranco (IT) - Procurement Management Plan

		Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS1	VS1											
	VS1.1	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	Negotiated procedure without prior publication	Works	Yes	Yes	Not yet selected	May-24	Sep-24	3M	Closed
	VS1.3	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	Competitive procedure with negotiation	Works	No	-	Dolomiti strade	Jan-23	Sep-24	21M	Closed
VS2	VS2											
	VS2.1	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.	Open	Works	Yes	No	NA	no purchase was performed, all has been done by internal staff. No invoices or costs bared	no purchase was performed, all has been done by internal staff. No invoices or costs bared	NA	Closed
	VS2.2	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., participants are free to move within a real environment);	Negotiated procedure without prior publication	Supply	Yes	No	Brain Products Italia srl	21/09/2021	21/09/2021	1 D	Closed
	VS2.3	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	Negotiated procedure without prior publication	Supply	Yes	No	Brain Products Italia srl	21/09/2021	21/09/2021	1 D	Closed
	VS2.4	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	Negotiated procedure without prior publication	Supply	Yes	No	Studica Italia FODDIS GUIDO	07/02/2022	07/02/2022	1 D	Closed
	VS2.5	Actigraphy	This is non-invasive method of monitoring human rest/activity cycles (i.e., motor activity, sleep parameters) in real conditions	Negotiated procedure without prior publication	Supply	Yes	No	COSMED srl	01/03/2022	01/03/2022	1 D	Closed

	Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status	
	VS2.6	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	Negotiated procedure without prior publication	Supply	Yes	No	ADPartners srl	12/01/2022	12/01/2022	1 D	Closed
	VS2.7	Smartphone	Two smartphones to take photos of the garden and record the GPS of the participants visiting the garden during the experiment	Negotiated procedure without prior publication	Supply	Yes	No	ULTRAPROMEDIA srl	10/05/2021	10/05/2021	1 D	Closed
	VS2.8	Computational units	High-performance computational units for analysis of simultaneous EEG+ eye tracking data/ PC-related tools (e.g., monitors) / Storage units	Negotiated procedure without prior publication	Supply	Yes	No	Brain Products Italia srl	21/09/2021	21/09/2021	1 D	Closed
VS3	VS3											
	VS3.1	Devices and wireless sensor network for key data gathering (solar radiation + noise + wind speed /direction; gateway; antenna; 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	Negotiated procedure without prior publication	Supply	Yes	No	Marcom (several brands)	Mar-22	14/04/2022	1 M	Closed
	VS3.2	Installation of the gateway	A professional company will install the devices which cannot be installed by University's staff	Negotiated procedure without prior publication	Service	Yes	No	Internal staff	No purchase was performed, all has been done by interna staff. No invoices or costs bared			Closed
	VS3.3	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	Open	Supply	Yes	No	Internal staff				Closed
	VS3.4	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	Competitive procedure with negotiation	Service	Yes	No	Altodrones	01/07/2021	13/07/2021	13 D	Closed
	VS3.5	Wireless autonomous ground mobile measuring stations equipped with specific sensors and accessories	Autonomous ground drone, operated either by a remote controller or by an integrated GNSS system. Provided with devices for monitoring environmental condition during operation, and, therefore, simulating the experience of a user visiting and exploring the garden.	Competitive procedure with negotiation	Supply	Yes	No	Ubiquity robotics Inc	Mar-22	18/05/2022	1 M	Closed
	VS3.6	Wireless autonomous water mobile measuring stations equipped with	Autonomous water drone, operated either by a remote controller or by an integrated GNSS system. Provided with devices for monitoring environmental condition	Competitive procedure with negotiation	Supply	Yes	No	RCFishing boat	Mar-22	15/03/2022	8 D	Closed

	Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status
	specific sensors and accessories	during operation, and, therefore, simulating the experience of a user visiting and exploring the garden.									
VS3.7	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	Restricted	Supply	Yes	No	Scubla (Wildlife Acoustics)	Dec-21	24/01/2022	1 M	Closed
VS3.8	Software licence and technical professional support for the audio files and acoustic indexes analysis and elaboration	Software which allows for the elaboration, analysis and building of acoustic indexes based on the data collected through the fix recording devices	Restricted	Supply	Yes	No	Scubla (Wildlife Acoustics)	Apr-22	26/04/2022	2 W	Closed
VS3.9	Assessment of the odours and perfumes characteristics of the site	Implementation of an advanced specific software for the analysis of the soundscape and the related biodiversity which requests also for training and technical guidance.	Restricted	Service	Yes	No	Osmotecn	19/05/2022	04/07/2022	2 M	Closed
VS3.10	WisNode Track D sensor	Multifunction sensor for preliminary test to run the system	Negotiated procedure without prior publication	Supply	Yes	No	Marcom	30/11/2021	30/11/2021	1 D	Closed
VS3.11	LoRaWAN data system receiver	Components for the installation of antenna and rack to collect data from IoT sensors	Negotiated procedure without prior publication	Supply	Yes	No	Virtual Logic srl	02/02/2022	08/03/2022	1 M	Closed
VS3.12	Antenna	Antenna for the reception of LoRaWAN data	Negotiated procedure without prior publication	Supply	Yes	No	Amazon EU sarl	24/03/2022	24/03/2022	1 D	Closed
VS3.13	Hard disk	Hard disk for data storage	Negotiated procedure without prior publication	Supply	Yes	No	INTERSYSTEM srl	08/03/2022	08/03/2022	1 D	Closed
VS3.14	Various material, equipment and accessories	Material purchased for the installation in the field of the sensors	Negotiated procedure without prior publication	Supply	Yes	No	Berti Alessio e Figli	03/05/2022	03/05/2022	1 D	Closed
VS3.15	Various material, equipment and accessories	Material purchased for the installation in the field of the sensors	Negotiated procedure without prior publication	Supply	Yes	No	Maxi Di srl	03/05/2022	03/05/2022	1 D	Closed
VS3.16	Various material, equipment and accessories	Material purchased for the installation in the field of the sensors	Negotiated procedure without prior publication	Supply	Yes	No	Variuos providers	19/05/2022	19/05/2022	1 D	Closed
VS3.17	Various material, equipment and accessories	Material purchased for the installation in the field of the sensors	Negotiated procedure without prior publication	Supply	Yes	No	Salvarani srl	24/02/2022	24/02/2022	1 D	Closed

	Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status	
	VS3.18	Devices and wireless sensor network for key data gathering (microclimate air quality)	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	Restricted	Supply	Yes	No	Synetica	11/04/2022	11/04/2022	1 D	Closed
	VS3.19	Various materials	Components and materials for the meteo station located in the garden to support and compare the measurements performed by the IoT sensors	Negotiated procedure without prior publication	Supply	Yes	No	RS COMPONENTS SRL	21/01/2022	21/01/2022	1 D	Closed
	VS3.20	Sensor package for replicability	Accessories and components of Arduino IoT sensors for the building of cheap options for replicability	Competitive procedure with negotiation	Supply	Yes	No	FABLAB CASTELFRANCO VENETO SRL	14/06/2023	14/06/2023	1 D	Closed
	VS3.21	Meteo station for climatic data check	Meteo station located in the garden to support and compare the measurements performed by the IoT sensors	Negotiated procedure without prior publication	Supply	Yes	No	Salvarani srl	24/02/2023	24/02/2023	1 D	Closed
VS4	VS4											
	VS4.1	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	Open	Works	Yes	No	NA	TBD	TBD	TBD	Planned
	VS4.6	Printing of dissemination materials	Brochures, roll-up, posters and depliants have been printed to disseminate the concepts and activities of the project at social and cultural events, conferences and other occasions	Negotiated procedure without prior publication	Service	Yes	No	ELIOCART OLIBRERIA BELVEDERE SNC DI MARCOLIN E & MENEGHETTI A E C	24/02/2023	24/02/2023	1 D	Closed
	VS4.7	Accessories for staff of the garden during the welcoming of visitors for the activities of the project	VARCITIES badge cases	Negotiated procedure without prior publication	Supply	Yes	No	Buffetti	26 April 2023	26 April 2023	1 D	Closed
VS5	VS5											
	VS5.1	Devices (rugged phones)	The smartphones are going to be equipped with the due accessories and app and will be provided to the users of the garden.	Open	Supply	Yes	No	Ultrapro media	22/02/2022	23/02/2022	1 D	Closed

	Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status	
							(brand Oscal)					
	VS5.2	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.	Internal assignment	Service	Yes	No	Internal staff	No purchase was performed, all has been done by interna staff. No invoices or costs bared		Closed	
	VS5.3	Ergonomic benches	Deployment of benches designed for people with limited mobility in the areas of the garden with higher value	Restricted	Supply	Yes	No	Metalco srl	31 May 2022	31 May 2022	1 D	Closed
	VS5.4	Main body of the seating occupancy 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	Open	Supply	Yes	No	CM BILANCE snc di Marco Chiavelli e C.	30 May 2022	30 May 2022	1 D	Closed
	VS5.5	Accessories for rugged phones	Portable crossbody phone cases	Open	Supply	Yes	No	Amazon EU sarl	13 April 2023	13 April 2023	1 D	Closed
	VS5.6	Components for the seating occupancy sensors building	Components for the seating occupancy sensors building	Open	Supply	Yes	No	ELETTRO VENETA S.P.A.	14/12/2022	14/12/2022	1 D	Closed
	VS5.7	Components for the seating locations (benches)	Outdoor resistant paint for the case of the occupancy sensors of the benches	Open	Supply	Yes	No	NA	29/03/2023	29/03/2023	1 D	Closed
	VS5.8	Components for the seating locations (benches)	Accessories for the painting and the building processes	Open	Supply	Yes	No	NA	30/03/2023	30/03/2023	1 D	Closed
	VS5.9	Components for the seating occupancy sensors building	Substitution of malfunctioning/broken components of the occupancy sensors (data logger)	Open	Supply	Yes	No	NA	01 June 2023	01 June 2023	1 D	Closed
	VS5.10	Informative material for the participation of visitors to the experimental phase	Printing of informative brochure on the data collection activity of VS5	Open	Supply	Yes	No	BERCHET INGEGNERIA DI STAMPA SAS di SACCUMAN & C.	31 May 2023	31 May 2023	1 D	Closed
VS6	VS6											
	VS6.1	Installation and commissioning	Installation of the screen, power supply, and connection to the data network	Restricted	Works	No	No	CCV	Sep-24	Sep 24-24	1 D	Closed
	VS6.3	Hardware - 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.	Restricted	Supply	No	Yes	CCV	Jan-24	Sep-24	9 M	Closed

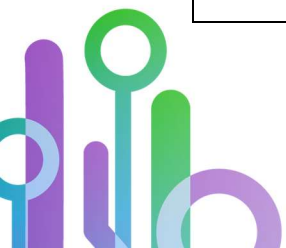
	Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status	
	VS6.4	Software development	Development of a tool and user interface for the real-time analysis and visualization of the data acquired by the monitoring systems in the garden	Open	Supply	No	Yes	EURAC	Sep-23	Feb-24	4 M	Closed
	VS6.5	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.	Open	Service	No	NA	CCV	Sep-23	Feb-24	4 M	Closed

1.4. Castelfranco (IT)- Realised Risks & Identified Opportunities

Following is a list of the realised risks that Castelfranco pilot faced, along with a brief description of how these risks impacted the Visionary Solutions and the mitigation actions that were put in place.

Table 8: Castelfranco (IT)- Realised Risks

Final Risk Report				Date:		31/10/2024	Prepared by:	Tommaso Dall'Acqua UNISMART
Summary of Realised risks			Being in the Execution phase of most of the VS most of the realised risks so far concerned the delay of the implementation of some tasks or the malfunctioning of the technological equipment. Most of the risks were mitigated and faced by rescheduling activities and fixing the equipment.					
ID	Risk Category	Risk Type	Risk Description	VS	Stage	Risk significance	Risk Impact	Mitigation Action
RR019	Technical	Delay	Delay in the implementation of the Totem due to the extended duration of the 2 nd amendment process	6	Execution	Major	Kick off of Totem's implementation delayed	Acceptance of delay- reschedule of the installation
RR09	Scheduling	Delay	There is a risk that the obstacles in the implementation of the VS 2, 3 and 5 and other on-pilot activities from which the input will be taken can create a ripple effect on VS4	4	Execution	Moderate	So that the writing of the best-practices manual is going to be delayed	Production and writing of intermediate results and information is rescheduled (delayed)
RR007	Technical	Damage	There is a risk that the sensors and/or digital components are breaking or malfunctioning because of unforeseen events or internal issues	3	Execution	Moderate	So that there is a need for the reparation or substitution of the components	Technical assistance for fixing or substitution. Use additional care and attention while handling and installing the sensors
RR022	Political	Delay	There is a risk that the renovation of internal paths will be delayed because the Superintendence for Architectural Heritage and Landscape will require more time to evaluate the technical proposal and give authorisation.	1	Execution	Major	Access to the internal routes, which allow easier travel for people with reduced mobility is delayed.	Accept
RR018	Scheduling	General	There is a risk that the outdoor experiments and the ordinary sensors running are halted because of the weather conditions	2	Execution	Minor	So that the outdoor experiments have to be rescheduled	Re-schedule the date of the meeting



Following is a list of the top 5 opportunities that Castelfranco pilot identified, along with a brief description of the opportunity capture strategy adopted.

Table 9: Castelfranco (IT)- Summary of Opportunities

Summary of opportunities		Most of the opportunities identified relate to the possibility of disseminating the results of the research activities carried out, both to an audience of technicians and professionals and to the general public.				
ID	Opportunity Description	VS	Stage	Opportunity Category	Opportunity capture strategy	Status
OR01	To write scientific articles on the results of the sperimental phase	2,3,5	Handover	Technological	Elaboration for dissemination	Open
OR02	To start collaborations with other projects and activities	1,2,3,4,5	Handover	Social	Reach out similar initiative and foster networking	Open
OR03	To share the knowledge of the results of the experimental phase	2,3,5	Handover	Social	Participate to dissemination and social events and conferences	Open
OR05	To involve further participants to the tests thanks to the close relation to the current participants	2	Execution	Technological	Gather the data of potential participants and include them to the next experiments	Closed
OR06	To raise the opportunity of project dissemination events thanks to the Local Landscape Observatory entry to the regional landscape observatory network	4	Handover	Social	Develop networking events to raise awareness on the Local Landscape Observatory	Open



1.5. Castelfranco (IT)- Received feedback with respect to the implementation process

Table 10: Castelfranco (IT)- Changes in the VS concept design

Castelfranco	VS1	VS2	VS3	VS4	VS5	VS6
1. Did any changes occur in the concept design since the initial sketching of your VS?	☒ Yes ☐ No	☐ Yes ☒ No	☐ Yes ☒ No	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No
2. At which stage did the change occur? <i>(multiple choice possible)</i>	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☒ Execution stage	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☒ Execution stage	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☒ Concept design ☐ Preparation stage ☐ Selection of services providers ☒ Execution stage
3. What kind of change occurred? <i>(multiple choice possible)</i>	☒ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☒ Other	☐ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☒ Other: <i>Timing/Postponed to better explain all VSs</i>	☐ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☒ Location ☒ Design ☐ Scale/Downsize ☒ Other: <i>Partner responsible of budget (hardware)</i>
4. Which is the main reason for any changes to occur? <i>(multiple choice possible)</i>	☐ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☒ Other: <i>Collection of more input</i>	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☒ Financial issues ☒ Other: <i>More user friendly and usable in the long-term</i>

5. How did the changes affect the progress of work? (multiple choice possible)	☒ Timeframe ☒ Budget ☒ Procurement procedure ☐ Other	☐ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☐ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☒ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☐ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☒ Timeframe ☒ Budget ☒ Procurement procedure ☐ Other
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Table 11: Castelfranco (IT)- Required expertise

Castelfranco	VS1	VS2	VS3	VS4	VS5	VS6
1. Which experts (in-house & service providers) were involved in the design / implementation of your VS? (multiple choice possible)	☒ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☒ Other: Heritage protection institution needed for authorisations	☐ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☐ IT expert ☐ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☐ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:	☒ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:
2. Which was the highest level of expertise required for in-house experts?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒

3. Which was the highest level of expertise required for service providers?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒
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Table 12: Castelfranco (IT)- Experiences from the procurement process

Castelfranco	VS1	VS2	VS3	VS4	VS5	VS6
1. Did you experience any difficulties with the procurement process?	☒ Yes ☒ No	☐ Yes ☐ No Not applicable	☐ Yes ☐ No Not applicable	☐ Yes ☒ No	☐ Yes ☐ No Not applicable	☐ Yes ☒ No
2. In case of any difficulties, please describe the reason. (multiple choice possible)	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other

Table 13: Castelfranco (IT): Budget variances

Castelfranco	VS1	VS2	VS3	VS4	VS5	VS6
1. Were there any significant variances to the budget needed for your VS? ($\pm 25\%$)	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☒ Yes ☐ No
2. Which was the reason for any significant budget variance? (multiple choice possible)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation)	☒ Change in the concept design ☒ External factors (e.g market conditions, inflation)

	☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other
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Table 14: Castelfranco (IT)- Experienced delays

Castelfranco	VS1	VS2	VS3	VS4	VS5	VS6
1. Were there any delays in your workplan	☒ Yes ☐ No	☐ Yes ☒ No	☐ Yes ☒ No	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No
2. Which was the reason for the delay? <i>(multiple choice possible)</i>	☐ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☒ Approvals ☐ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other: <i>Heritage protection authority delayed assessment of documentation</i>	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other: More time needed to evaluate all VS outcomes	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☒ Change in the concept design ☒ Budget issues ☒ Approvals ☐ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other: Change of the budget responsible

Table 15: Castelfranco (IT)- Key take-aways

Castelfranco	VS1	VS2	VS3	VS4	VS5	VS6
1. Looking back, what aspects of any implementation stage would you approach differently?	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☒ Operation & Monitoring	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☒ Preparation ☒ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring
2.What were the most valuable lessons learned during the development of the concept design and the setting up of the implementation process?	-	-	-	The timeline for the finalisation of the manual should have been set up in a different way (postponed)	-	Tendering and procurement procedures can always change and affect procurement timing and overall costs.
3.Which preventive measures would you recommend for future replication of your VS?	-	-	-		-	Do not underestimate costs. Make necessary adjustments in the budget forecast (based on a market analysis).
4.If you could start over, what would you change about the preparation stage?	-	-	-		-	-
5.If you could start over, what would you change about the procurement stage?	-	-	-		-	-
6.If you could start over, what would you change about the budget planning?	-	-	-		-	Perform thorough market analysis and adjust budget forecast accordingly.

1.6. Castelfranco (IT)- Operation and Maintenance

Maintenance is part of the contracted works/ supplies/ services in 2 out of the 6 Visionary Solutions implemented in Castelfranco. These solutions are: VS1- Creation of garden access routes to ensure an improved access according to the needs of the garden users and VS6- Adaptive & intelligent visitor information systems. In general, UNIPD is responsible for the regular and proactive maintenance of all sensors and ICT components. The maintenance team of Villa Bolasco will share responsibility with UNIPD for the maintenance of the internal paths network. The provider of VS6 Interactive totem is responsible for the maintenance as indicated by the contract.

1.6.1. O&M of Socio/ Cultural Solutions

Table 16: Castelfranco (IT)- O&M of Socio/ Cultural solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Internal paths network	Regular/ Preventive Maintenance	Type of action(s)	1. Visual inspection. 2. Weed control. 3. Erosion check. 4. Drainage maintenance (clean ditches, remove debris to maintain unobstructed water flow). 5. Surface grading. 6. Edge maintenance (trimming back vegetation). 7. Trash removal	400	10+
		Frequency	Weekly		
		Procedure	Visual check and spot-action to fill a pothole or make the pavement even		
		Responsibility	UNIPD - Villa Bolasco maintenance team		
		Solution specific issues	N/A		
	Pro-active care/ Remedial actions	Type of action(s)	1. Gravel replenishment 2. Erosion control- contain gravel	400	10+
		Procedure	When large damage e.g. due to flooding or other erosion factors is identified, the area will be isolated in order to fix eroded parts of the paths' pavement		
		Responsibility	UNIPD - Villa Bolasco maintenance team		
		Solution specific issues	N/A		



1.6.2. O&M of Digital Solutions

Sensors used in Castelfranco VSs are stated in Table 17: sensor ID number, commercial name, measuring unit, quantity used together with the sensor's communication protocol, and the reference link.

Table 17: Castelfranco (IT)- Sensors and devices used

No.	Sensors	Measuring	Quantity	Protocol	Link as reference
1	Synetica enl-air-x	Outdoor Air Quality Sensor	2	LoRaWAN	https://www.alliot.co.uk/product/enlink-air-x/
2	Sensedge Senstick	T, RH, Air pressure	10	LoRaWAN	SENSEEDGE: SENSTICK Microclimate SMC30
3	Decentlab DL_PYR	Total Solar Radiation Sensor	7	LoRaWAN	https://www.decentlab.com/products/total-solar-radiation-sensor-for-LoRaWAN
4	Decentlab DL-ATM22	Wind speed, wind direction and temperature sensor	3	LoRaWAN	https://www.decentlab.com/products/wind-speed-wind-direction-and-temperature-sensor-for-LoRaWAN
5	IOTSENS Sound Monitor	Db, noise levels	2	LoRaWAN	https://www.iotsens.com/en/product/sound-monitor/
6	Weather Meteo Station	Humidity, rainfall, solar energy, wind speed, wind direction, temperature	1	Ethernet	https://www.weatherlink.com/
7	Portable smartphone devices	Geo-location, tracking	10	WiFi/4G/5G	https://www.cirgeo.unipd.it/app01/VARCITIES/

The local governance for Castelfranco follows a fixed schedule of maintenance. Local Pilot Expert / VS manager will manage Planned downtime, rather than emergency downtime. The Castelfranco pilot's central and periodic evaluations of the IoT will also be used for managing the coherent progress of VSs performance.

- Set maintenance dates are as much as possible in-line with the typical battery lifespan used in the sensors, which are part of the local IoT network (VS2, VS3 and VS5).
- Sensedge's Sensor Management Platform is receiving and evaluating the additional local sensor data: battery level, signal-to-noise ratio, and signal strength indicator of the channel to enable local users with alerts on possible unforeseen degradations and miscalibration of IoT devices used in the VS.

Table 18 and Table 19 provide a short description of the local governance strategy and persons or organisations responsible for monitoring and maintaining the local IT infrastructure.



Table 18: Castelfranco (IT)- Local IT infrastructure/ Management

Local governance (Months / Weeks)	Once a month
Short description	The audit will be performed at least once a month. Maintenance of the ICT platform will be managed by Francesco Pirotti and the research team of the Department of Land, Environment, Agriculture and Forestry (TESAF) Department for what concern the IoT sensors network. The correct functioning of the sensors, the plausibility of the measurements, and the battery status will be checked.

Table 19: Castelfranco (IT)- Local IT infrastructure/ Maintenance responsibility

Monitoring Manager / Organisations responsible for maintenance	
Person/Organisation responsible for sensor performance / Data backup verifications	Francesco Pirotti /TESAF Dept, UNIPD
Person/Organisation responsible for on-site scheduled maintenance	Francesco Pirotti /TESAF Dept, UNIPD
Person/Organisation responsible for unscheduled maintenance	Francesco Pirotti /TESAF Dept, UNIPD

Table 20: Castelfranco (IT)- O&M of Digital Solutions

Operation & Maintenance	Activity	Information required	Description	Estimated cost per year (€)	Lifetime (years)
Outdoor Air Quality Sensors	Regular/ Preventive Maintenance	Type of action(s)	Verification of correct data streaming, battery and signal strength	100	5
		Frequency	Quarterly		
		Procedure	Data analysis		
		Responsibility	UNIPD		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally and if needed specified technical assistance will be requested		
	Pro-active care/ Remedial actions	Type of action(s)	Connection and cable check	100	5
		Procedure	Visual verification		
		Responsibility	UNIPD		
		Solution specific issues	Substitute cables or other components		
T, RH, Air pressure	Regular/ Preventive Maintenance	Type of action(s)	Verification of correct data streaming, battery and signal strength	100	TBC
		Frequency	Quarterly		
		Procedure	Data analysis		
		Responsibility	UNIPD		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally		

Operation & Maintenance	Activity	Information required	Description	Estimated cost per year (€)	Lifetime (years)
			and if needed specified technical assistance will be requested		
	Pro-active care/ Remedial actions	Type of action(s)	Connection and cable check	100	
		Procedure	Visual verification		
		Responsibility	UNIPD		
		Solution specific issues	Substitute cables or other components		
Total Solar Radiation Sensors	Regular/ Preventive Maintenance	Type of action(s)	Verification of correct data streaming, battery and signal strength	100	TBC
		Frequency	Quarterly		
		Procedure	Data analysis		
		Responsibility	UNIPD		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally and if needed specified technical assistance will be requested		
	Pro-active care/ Remedial actions	Type of action(s)	Connection and cable check	100	
		Procedure	Visual verification		
		Responsibility	UNIPD		
		Solution specific issues	Substitute cables or other components		
Wind Speed Sensors	Regular/ Preventive Maintenance	Type of action(s)	1. Regular calibration 2. Visual inspection 3. Cleaning 4. Alignment check 5. Lubrication of moving parts 6. Environmental protection (from moisture, humidity, harsh weather conditions) 7. Checking of electrical connections 8. Verification of correct data streaming, battery and signal strength 9. Software updates Documentation/ record keeping	100	TBC
		Frequency	Quarterly		
		Procedure	By implementing these preventive maintenance measures accuracy, reliability and longevity of a wind speed sensor in ensured.		
		Responsibility	UNIPD		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally and if needed specified technical assistance will be requested. The frequency of preventive		



Operation & Maintenance	Activity	Information required	Description	Estimated cost per year (€)	Lifetime (years)
			maintenance tasks should be adapted on the specific conditions.		
	Pro-active care/ Remedial actions	Type of action(s)	Verify wear or damage	100	
		Procedure	On-site visual check		
		Responsibility	TBC		
		Solution specific issues	Substitute cables or other components		
Noise Sensors	Regular/ Preventive Maintenance	Type of action(s)	Verification of correct data streaming, battery and signal strength	100	TBC
		Frequency	Quarterly		
		Procedure	Data analysis		
		Responsibility	UNIPD		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally and if needed specified technical assistance will be requested		
	Pro-active care/ Remedial actions	Type of action(s)	Connection and cable check		
		Procedure	Visual verification		
		Responsibility	UNIPD		
		Solution specific issues	Substitute cables or other components		
VS6 Interactive Totem	Regular/ Preventive Maintenance	Type of action(s)	1. Weatherproofing 2. Cleaning and inspection 3. Software updates 4. Hardware inspections 5. Display calibration 6. Power management 7. Remote monitoring 8. Physical security	55,00/month Euro for cloud + 35,00/month for anima touch app + 7,50/month for support and monitoring= 97,50/month for 24 months= 2.340-euro total	TBC
		Frequency	Monthly		
		Procedure	TBC		
		Responsibility	ACS srl: The totem providers have assured in the budget the maintenance for 2 years (cloud space and assistance) from the installation in terms of hardware maintenance and software basic updates		
		Solution specific issues	TBC		
	Pro-active care/ Remedial actions	Type of action(s)	1. Power outages, 2. Network failures 3. Software glitches 4. Vandalism	50 euros/ every 3 months (ordinary	

Operation & Maintenance	Activity	Information required	Description	Estimated cost per year (€)	Lifetime (years)
			5. Impaired visibility, cooling efficiency and electronic components	maintenance) + 50 euros/year (contents) = 250/year	
		Procedure	Prepare contingency plans and backup solutions		
		Responsibility	CVV		
		Solution specific issues	TBC		



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

2.1. Chania (GR)- Implementation status of the Visionary Solutions

Both Visionary Solutions designed for Chania have been completed and are fully operational.

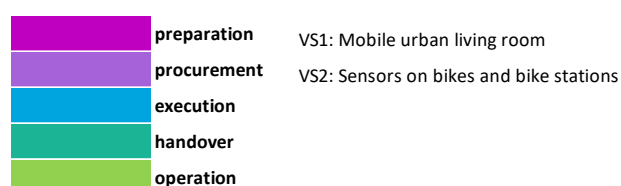
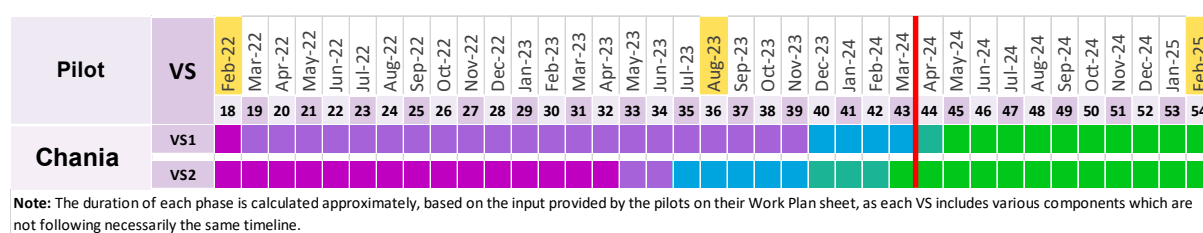


Figure 9: Chania (GR)- VS implementation status

2.1.1. Overview of the Visionary Solutions

VS 1: Mobile urban living room (MULdR)

Status: Operational

VS1- the "Mobil urban living room" (MULdR) is a multifunctional, convertible, portable construction, designed for travelling around the city, raising citizens' excitement about green spaces. MULdR's goal is to revitalize the green spaces it visits by attracting citizens. Acting as a meeting point, MULdR encourages citizens to engage in various activities, increasing the value of the green spaces where it is being hosted. An additional goal is to gather useful data about urban environmental conditions and citizens' Health Well Being. Various sensors installed on MULdR collect environmental data from every neighbourhood MULdR visits. Users are handed questionnaires for self-perceived health well-being information to be collected. Citizens are also able to provide feedback about their MULdR experience. The vision of MULdR is to use all this information to assess the current state of green spaces and propose strategies for their future improvement.

As also outlined in D6.2, MULdR is new structure (dimensions in meters 2.55*6.40*3.00) composed of a metal frame covered with panels. Two folding elements on two of its sides can be used to increase MULdR's width but also for shading and creating semi-outdoor spaces. MULdR carries wooden interior furniture, mobile benches, and seating areas for outside actions. Various sensors are installed on MULdR to monitor air pollution, noise exposure, microclimate condition, etc. Inside MULdR there are screens and all the necessary equipment for audio-visual presentations both in the interior and the exterior of the Mobile

urban living room. During the Town Hall Event that was held on November 2022 in Chania, the STKs selected natural materials (wood), as the preferable option for the façade of MULaR (Figure 10). They also decided about the general equipment, the ICT infrastructure and the furniture that will equip the MULaR. Currently, the MULaR has been finalized and it is in operational stage.

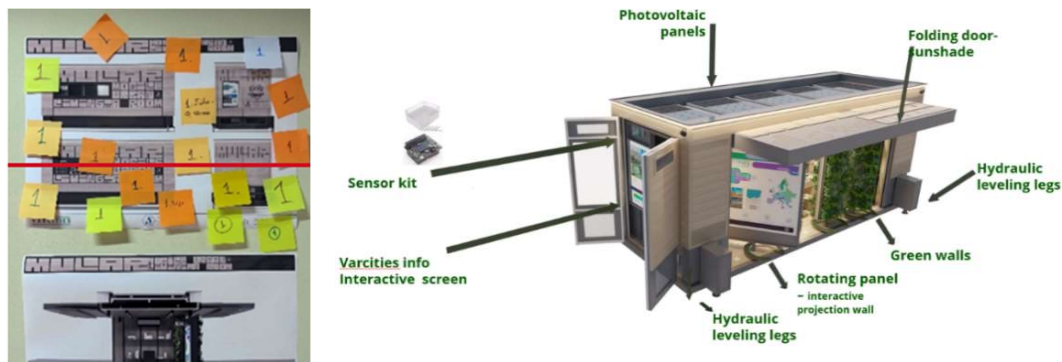


Figure 10: Chania (GR)- STK voting for the façade of the MULaR & Final design.



Figure 11: Chania (GR)- MULaR structure



Figure 12: Chania (GR)- MULaR equipment.



Figure 13: Chania (GR)- MULAR exterior view

VS2 Sensors on bikes and bike stations

Status: Operational stage

VS2 supports the installation of sensor kits measuring air quality (PMs, temperature, humidity, noise and geographical position) on both public (Chania's bike sharing fleet) and private bicycles. Public bicycle stations are also equipped with kits that measure further air pollutants (SO₂, NO_x, O₃, CO, NH₃, Cl, CO₂ levels, organic substances levels). Available data are geolocated to trace possible pollution hotspots. Indications and warnings about the environmental conditions will become available to Chania's citizens and visitors.

Mobile Sensor-Kits

Forty-five mobile sensor-kits have been already delivered (40 for public bikes and 5 for private ones). The majority of them are already installed and operating. Few citizens who had expressed interest for their private bicycles did not respond at multiple nudges for installation, whereas some sensor-kits for public bicycles are waiting for the new CHANIA's bike sharing fleet to be installed (Figure 14).

Stationary Sensor-Kits

Five stationary sensor-kits have been delivered (Figure 15). Four of them are already installed and operating on CHANIA's bike sharing stations at the following locations:

1. Markopoulou Sq., Chania 731 32 (Fourth Bicycle Distribution Station of Chania Municipality),
 2. Defkalionos 14, Chania 731 32 (Third Bicycle Distribution Station of Chania Municipality),
 3. Municipal Garden of Chania city, Chania 731 32 and
 4. MULAR, Chania 731 32.
- The fifth kit will be installed in the Agious Apostolous area, Chania (Oct '24).

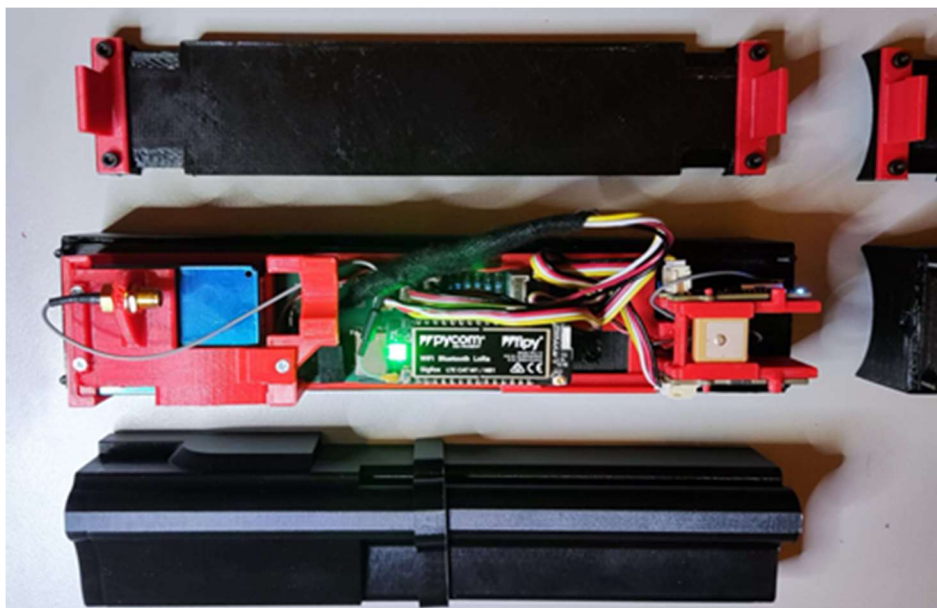


Figure 14: Chania (GR)- Casing of mobile sensor kit



Figure 15: Chania (GR)- Installation of sensors on public bicycles & stations.



2.1.2. Detailed workplan for VS1

Table 21: Chania (GR) - Work Plan VS1





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A5	Preparation stage							
A1	Preliminary sketching	Initial concept designs and technical specifications	Afroditi Papadaki / Margarita Bataki / Lina Manaroli	VS1 defined (WP3)	9M	Jun-21	Feb-22	Closed
A2	Definition permit required for installing the MULaR	Archaeological Service, Urban Planning Department, Municipal Port Fund, Port Authority, Regional directorate of primary education, regional directorate of secondary education, Directorate of Forests	Afroditi Papadaki / Margarita Bataki		9M	Jun-21	Feb-22	Closed
A3	Definition the need for products' type approval	Ministry of Infrastructure and Transport	Afroditi Papadaki / Margarita Bataki		9M	Jun-21	Feb-22	Closed
A4	Preliminary Budget & Cost Plan	Preliminary Budget & Cost Plan	Athina Salappa / Margarita Bataki		9M	Jun-21	Feb-22	Closed
A5	Risk management plan	Risk management plan	Katerina Lilli		9M	Jun-21	Feb-22	Closed
B1-B19	Selection of Service providers							
B1	Preparation and planning	Preparation and planning	Athina Salappa	Assignment of MULaR	3M	Mar-22	May-22	Closed
B2	Definition of procurement process for MULaR study	Clarify requirements regarding procurement, accounting rules	Athina Salappa		3M	Mar-22	May-22	Closed
B3	Definition of procurement process for MULaR construction	Clarify requirements regarding procurement, accounting rules	Athina Salappa		3M	Mar-22	May-22	Closed
B4	Definition of procurement process for MULaR trailer / transportation	Clarify requirements regarding procurement, accounting rules	Athina Salappa		3M	Mar-22	May-22	Closed
B5	Publication and transparency on Website for the study of MULaR	Publication of call for tenders	Athina Salappa / Despina Giannaraki		5D	Jun-22	Jun-22	Closed
B6	Evaluation of tenders and award	Provider selection for MuLar	Sevasti Polychronaki / Athina Salappa		10D	Jun-22	Jun-22	Closed
B7	Contract implementation	Contract implementation	Sevasti Polychronaki / Athina Salappa / Katerina Lilli		11M	Jun-22	Apr-23	Closed
B8	Preparation of Architectural / Stability / Implementation Plans for container	Preparation of Architectural / Stability / Implementation Plans for container	Afroditi Papadaki / Dimiourgiki Ltd		11M	Jun-22	Apr-23	Closed





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
B9	Market analysis for construction or buy trailer	Market analysis for construction or buy trailer	Afroditi Papadaki / Dimiourgiki Ltd		8M	Jun-22	Jan-23	Closed
B10	Preparation of plans for Mobile and folding furniture and event equipment	Preparation of plans for Mobile and folding furniture and event equipment	Afroditi Papadaki / Dimiourgiki Ltd		11M	Jun-22	Apr-23	Closed
B11	Market analysis for visual and audio systems, ICT equipment, mobile and folding furniture	Market analysis for visual and audio systems, ICT equipment, mobile and folding furniture	Kostas Gombakis / George Fragiadakis		10M	Jul-22	Apr-23	Closed
B12	Technical Clauses for visual and audio systems	Requirements & technical specifications for visual and audio systems	George Fragiadakis		9M	Aug-22	Apr-23	Closed
B13	Technical Clauses s for ICT equipment	Requirements & technical specifications for ICT equipment	George Fragiadakis		9M	Aug-22	Apr-23	Closed
B14	Publication and transparency on Website for the construction of MULAR, visual and audio systems, ICT equipment & furniture, sensors kits and grips	Publication of call for tenders	Athina Salappa / Despina Giannaraki		1M	May-23	May-23	Closed
B15	Evaluation of tenders and award.	Providers selection. Related tasks: B16 & B17	Sevasti Polychronaki / Athina Salappa		5M	Jun-23	Oct-23	Closed
B16	Contract implementation1	Direct Contracting for 1) sensors kits and grips & 2) audio systems	Sevasti Polychronaki / Athina Salappa		6M	Jun-23	Nov-23	Closed
B17	Contract implementation2	Contract for the construction of MULAR container and the ICT purchase	Afroditi Papadaki / Margarita Bataki		4M	Nov-23	Mar-24	Closed
B18	Definitive Budget & Cost Plan	Definitive Budget & Cost Plan	Sevasti Polychronaki / Athina Salappa		1M	Mar-24	Mar-24	Closed
B19	Record Keeping	Keep necessary documents of the process	Athina Salappa / Katerina Lilli		21M	Jun-22	Mar-24	Closed
C1- C5	Execution process							
C1	Monitoring of MULAR construction process including the equipment installation	Regular inspection of installation quality	Afroditi Papadaki / George Fragiadiakis / Kostas Gombakis	Implementation of the VS	1M	Apr-24	Apr-24	Open
C2	Workplan updates	Workplan updates	Athina Salappa / Afroditi Papadaki		10D	Apr-24	Apr-24	Open
C3	Budget & Cost Plan updates	Budget & Cost Plan updates	Athina Salappa		20D	Apr-24	Apr-24	Open
C4	Risk Register updates	Risk Register updates	Katerina Lilli / Konstantinos Koryllos		20D	Apr-24	Apr-24	Open
C5	Record keeping	Record keeping	Athina Salappa / Katerina Lilli		1M	Apr-24	Apr-24	Open
D1- D6	Handover							







	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
D1	Final inspection and reception of all the components	Final inspection and reception of all the components	Afroditi Papadaki / George Fragiadiakis / Kostas Gombakis	Initialisation of the VS	1M	Apr-24	Apr-24	Closed
D4	Setting up, Reporting & Record keeping: • AS BUILT plans	Setting up, Reporting & Record keeping: • AS BUILT plans	Afroditi Papadaki / George Fragiadiakis / Kostas Gombakis		1M	Apr-24	Apr-24	Closed
D5	Concluded Budget with dated revisions	Concluded Budget with dated revisions	Sevasti Polychronaki / Athina Salappa / Katerina Lilli		1M	Apr-24	Apr-24	Closed
D6	Operation and Maintenance Plan	Operation and Maintenance Plan	Afroditi Papadaki / George Fragiadiakis		1M	Apr-24	Apr-24	Closed
E1- E7	Operation / Social & Cultural Solutions							
E1	Appointment of facilities management	Appointment of facilities management	Sevasti Polychronaki / Athina Salappa	VS1 successful operation, monitoring & maintenance	11M	Apr-24	Feb-25	Open
E2	Publicity and Events	Schedule of events plan which aim to advertise and promote MULaR's use	Athina Salappa / Despina Giannaraki		11M	Apr-24	Feb-25	Open
E3	Monitoring & Evaluation	Based on WP7 framework	George Fragiadiakis /Elisavet Tsekeri / Konstantinos Koryllos		11M	Apr-24	Feb-25	Open
E4	KPIs based on the WP7 monitoring protocol	KPIs based on the WP7 monitoring protocol	Elisavet Tsekeri / Konstantinos Koryllos		11M	Apr-24	Feb-25	Open
E5	Application of maintenance plan	Application of maintenance plan	George Fragiadiakis / Kostas Gombakis		11M	Apr-24	Feb-25	Open
E6	Revision of maintenance plan if necessary	Revision of maintenance plan if necessary	George Fragiadiakis / Kostas Gombakis		11M	Apr-24	Feb-25	Open
E7	Record Keeping	VS2 data and results outreach	Athina Salappa / Katerina Lilli / Konstantinos Koryllos		11M	Apr-24	Feb-25	Open



2.1.3. Detailed workplan for VS2

Table 22: Chania (GR) - Work Plan VS2





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A8	Preparation stage							
A1	Clarify legal requirements concerning permits	GDPR permits / CE or other certifications	Harris Siakantaris	Permits obtained	3M	Jul-22	Sep-22	Closed
A2	Prepare components list	All components for: i) bike sensor kits, ii) station sensor-kits, iii) smart grips	Orestis Davlias	Final design	3M	Sep-22	Nov-22	Closed
A3	Designs	Final products and services design	Konstantinos Koryllos		25M	Oct-20	Nov-22	Closed
A4	Technical Specifications (RFP)	Products and services' specifications	Orestis Davlias		25M	Oct-20	Nov-22	Closed
A5	Preliminary budget	Includes installation and maintenance for 1,5 y	Orestis Davlias		10M	Feb-22	Nov-22	Closed
A6	Operation and Maintenance Plan	Operation and Maintenance Plan	Konstantinos Koryllos		3M	Sep-22	Nov-22	Closed
A7	Risk management plan	Risk management plan	Konstantinos Koryllos		10M	Feb-22	Nov-22	Closed
A8	Record keeping	Record keeping	Harris Siakantaris		10M	Feb-22	Nov-22	Closed
B1- B3	Selection of Service providers							
B1	RFP issue editing	Call for offers	Sevasti Polychronaki / Athina Salappa	Provider selected and contract implemented	14D	May-23	May-23	Closed
B2	Evaluation of tenders and award	Provider selection	Sevasti Polychronaki / Athina Salappa		15D	May-23	Jun-23	Closed
B3	Contract implementation	VS2 components release by CHANIA	Sevasti Polychronaki / Athina Salappa		4M	Jun-23	Oct-23	Closed
C1- C6	Execution process							
C1	Components delivered to CLP	CHANIA will release all necessary material for the deployment of 50 sensor kits (45 for bicycles, 4 for bicycle stations and 1 for the MULAR (VS1)) and 45 smart grips for bicycles, except for their casing. They will be shipped to CLP	George Fragiadakis / Dimos Anthomelidis	Production and implementation of 45 sensor kits and 40 smart grips	7D	Sep-23	Sep-23	Closed
C2	Sensor-kits production	Goods delivery to CLP who will cater for their assembly, casing, testing etc in order to deliver end products	Orestis Davlias		30D	Sep-23	Oct-23	Closed
C3	Release of the sensors' kits and grips by CLP	End products delivery to CHANIA (50 sensor kits and 45 smart grips)	George Fragiadakis / Dimos Anthomelidis		7D	Oct-23	Oct-23	Closed
C4	Installation	All sensor kits and smart grips installed on bicycles, stations and the MULAR	Orestis Davlias		5M	Oct-23	Aug-24	Open

Tasks			Description	Task Owner	Milestone	Duration	Start	Finish	Status
C4.1	Installation	Mobile sensor kits and smart grips installed on 27 bicycles and 2 stationary sensor-kits on bike stations	Orestis Davlias	Initialisation of the VS	7D	7D	Oct-23	Oct-23	Closed
C4.2	Installation	Installation of 1 stationary sensor kit at the MULAR (VS1)	George Fragkiadakis / Harris Siakantaris			1D	Mar-24	Mar-24	Closed
C4.2	Installation	Installation of 2 stationary sensor kits in 2 different places (Municipal Garden and Agioi Apostoloi)	George Fragkiadakis / Harris Siakantaris			5M	Apr-24	Apr-24	Closed
C4.3`	Installation	Mobile sensor kits and smart grips installed on 18 bicycles of CHANIA's upcoming new fleet	George Fragkiadakis / Harris Siakantaris			7D	Aug-24	Aug-24	Closed
C5	Budget & Cost Plan updates	Budget & Cost Plan updates	Harris Siakantaris			7D	Sep-23	Sep-23	Closed
C6	Record keeping	Keep necessary documents of the process	George Fragkiadakis / Harris Siakantaris			3M	Sep-23	Aug-24	Open
D1- D5	Handover								
D1	Commissioning	Turn everything on, testing	Orestis Davlias	Initialisation of the VS	7D	7D	Oct-23	Oct-23	Closed
D2	Identification & coordination of the rectification of defects	Rectify defective or dysfunctional software and hardware components	Orestis Davlias			6M	Oct-23	Mar-24	Closed
D3	Final inspection of the sensors´ kits and grips	Final tests to ensure the solution's 100% functionality according to the requirements	George Fragkiadakis / Dimos Anthomelidis / Konstantinos Koryllos			6M	Mar-24	Mar-24	Closed
D4	Kick-off: Initialisation of the VS's operation and maintenance process	Initialisation of the VS	Konstantinos Koryllos			1M	Mar-24	Mar-24	Closed
D5	Record keeping / updated plans of installation	Tracking of the installation, operation and maintenance procedures	Orestis Davlias			6M	Oct-23	Mar-24	Closed
E1- E7	Operation / Social & Cultural Solutions								
E1	Appoint facilities management	Appoint facilities management	Athina Salappa / Konstantinos Koryllos	VS successful operation, monitoring & maintenance	2D	2D	Mar-24	Mar-24	Closed
E2	Monitor & Evaluation	Data validation, uptime etc.	Mike Maragkakis			16M	Mar-24	Feb-25	Open
E3	KPIs based on the WP7 monitoring protocol	KPIs based on the WP7 monitoring protocol	Mike Maragkakis			16M	Mar-24	Feb-25	Open
E4	Apply maintenance plan	Apply maintenance plan	Orestis Davlias			16M	Mar-24	Feb-25	Open
E5	Revision of maintenance plan if necessary	Revision of maintenance plan if necessary	Orestis Davlias			16M	Mar-24	Feb-25	Open
E6	Record keeping	Record keeping	Athina Salappa / Mike Maragkakis			16M	Mar-24	Feb-25	Open
E7	Dissemination / Publicity	VS2 data and results outreach	Harris Siakantaris	Publicise VS2's data	16M	Mar-24	Feb-25	Open	

2.2. Chania (GR) - Procurement Plan

Table 23: Chania (GR) - Procurement Plan

Component			Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS1	VS1	Mobile Urban Living Room										
	VS1.1	MULaR study	Design consulting service	Open	Service	No	No	Dimiourgiki Ltd	May-22	Jun-22	3M	Closed
	1st Call of Tender MuLaR		Merge components that will be used for the MuLaR tender									
	VS1.55	Mobile Urban Living Room Construction	Mobile Urban Living Room Construction	Open	Works	Yes	Yes	Dimiourgiki Ltd	May-23	Aug-23	5M	Closed
	VS1.4	Power generation equipment	Autonomous photovoltaic system, batteries, portable generator		Supply	Yes	Yes					
	VS1.5	Alarm system, LED interior lighting, cooling heating systems	Alarm system, LED interior lighting, cooling heating systems		Supply	Yes	Yes					
	VS1.54	ICT equipment for MULR	Interactive screen table		Supply	Yes	Yes					
	VS1.8	Mobile and folding furniture and event equipment	Mobile and folding furniture and event equipment		Supply	Yes	Yes					
	2nd Call of tender: AUDIO SYSTEMS		The components that will be used in the 2nd Call of tender									
	VS1.6	Visual and audio systems	Interactive projector, smart screens, audio equipment for events (microphones, speakers, etc), live stream equipment	Open	Supply	Yes	Yes	Lykos Ioannis	May-23	May-23	3M	Closed
	3rd Call of tender: ICT EQUIPMENT		The components that will be used in the 3rd Call of tender									
	VS1.7	ICT equipment (Tablets, laptop, WIFI access point, printer)	Tablets, laptop, robotics kit, WiFi access point, printer	Open	Supply	Yes	Yes	Avax Computer Applications	May-23	May-23	3M	Closed
	4th Call of Tender: SENSOR KIT		The components that will be used in the 4th Call of tender									
	VS1.10	Gpy	WiFi, BLE and cellular LTE–CAT M1/NB1					Mouser	Jun-23	Oct-23	7M	Closed



				Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status
	VS1.11	Pycom Carrier Board	Pycom Carrier Board	Restricted	Supply		Yes	Eurocircuits	Jun-23	Oct-23	7M	Closed
	VS1.12	ESP32 Development Board			Supply	Yes	Yes	Grobotronics	Jun-23	Oct-23	7M	Closed
	VS1.13	PCB for Stationary Sensor Kit	PCB for the stationary kit, incl. assembly		Supply	Yes	Yes	Eurocircuits	Jun-23	Oct-23	7M	Closed
	VS1.14	Case	Casing for the stationary Sensor Kit		Supply	Yes	Yes	Grobotronics	Jun-23	Oct-23	7M	Closed
	VS1.15	GPS	GPS Development Tools Grove - GPS (Air530)		Supply	Yes	Yes	Hellas Digital	Jun-23	Oct-23	7M	Closed
	VS1.16	Microphone Amplifier	Electret Microphone Amplifier - MAX9814 with Auto Gain Control		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.17	Analog to Digital Converter Breakout Board	Analog to Digital Converter Breakout Board		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.18	Sound Sensor	Waveshare Sound Sensor		Supply	Yes	Yes	Grobotronics	Jun-23	Oct-23	7M	Closed
	VS1.19	Memory Card	16 gB SD Memory Card		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.20	T&H Sensor	Temperature Sensor Development Tools Grove Temp. & Humidity Sensor SHT31		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.21	NO Sensor	Air Quality Sensors 4 Series Nitrogen Dioxide Sensor-30ppm		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.22	NO2 Sensor	Air Quality Sensors 4 series NO2 gas sensor 20ppm		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.23	O3 Sensor	Electrochemical O3 gas sensor		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.24	SO2 Sensor	Air Quality Sensors 4 Series SO2 sensor 1,000ppm		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.25	NH3 Sensor	Air Quality Sensors 4 Series Ammonia sensor - 100ppm		Supply	Yes	Yes	Winson	Jun-23	Oct-23	7M	Closed
	VS1.26	CO & VOC Sensor	Air Quality Sensors MOS Reducing Gases		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.27	CO2 Sensor	Air Quality Sensors CO2 sensor - 10000 ppm		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.28	TVOC Sensor	Air Quality Sensors MOX Sensor		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.29	CL2 Sensor	Air Quality Sensors 4 series CL2 gas sensor - 10ppm		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.30	NO Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.31	NO Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.32	NO2 Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.33	NO2 Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.34	O3 Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.35	O3 Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.36	SO2 Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.37	SO2 Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.38	NH3 Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.39	NH3 Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.40	CO Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.41	CO Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.42	CO2 Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.43	CO2 Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed



Component			Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration	Status
	VS1.44	VOC Sensor			Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.45	CL2 Sensor			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.46	CL2 Sensor Board			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.47	Sensor Fitting			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.48	Sensor Mounting			Supply	Yes	Yes	Alphasense	Jun-23	Oct-23	7M	Closed
	VS1.49	Power Supply			Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.50	Wi-Fi Access Point	Wi-Fi Access Point		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS1.51	Installation	Installation		Service	Yes	Yes	Cyclopolis	Jun-23	Oct-23	7M	Planned
	VS1.52	Maintenance	Maintenance thought out the project (cost/year)		Service	Yes	Yes	Cyclopolis	Jun-23	Oct-23	7M	Planned
	VS1.9	Other unforeseen costs	Other unforeseen expenses	Open					May-23	Feb-25	21M	Open
	VS1.53	AR/VR equipment	Enable the visitor to engage with GoNature game	-				TBD	N/A	N/A	N/A	Closed
VS2	VS2	Sensors on bikes and bike stations										
	VS2.1	Gpy	WiFi, BLE and cellular LTE-CAT M1/NB1	Restricted	Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS2.2	Pycom Carrier Board	Pycom Carrier Board		Supply	Yes	Yes	Eurocircuits	Jun-23	Oct-23	7M	Closed
	VS2.3	ESP32 Development Board			Supply	Yes	Yes	Grobotronics	Jun-23	Oct-23	7M	Closed
	VS2.4	SIM800L GPRS GSM Module			Supply	Yes	Yes	Hellas Digital	Jun-23	Oct-23	7M	Closed
	VS2.5	SIM			Supply	Yes	Yes	TBD	Jun-23	Oct-23	7M	Closed
	VS2.6	PCB for Mobile Sensor Kit	PCB for the mobile kit, incl. assembly		Supply	Yes	Yes	Eurocircuits	Jun-23	Oct-23	7M	Closed
	VS2.7	Analog to Digital Converter Breakout Board	Analog to Digital Converter Breakout Board					Mouser	Jun-23	Oct-23	7M	Closed
	VS2.8	GPS	GPS Development Tools Grove - GPS (Air530)		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS2.9	Microphone Amplifier	Electret Microphone Amplifier - MAX9814 with Auto Gain Control					Mouser	Jun-23	Oct-23	7M	Closed
	VS2.10	PM Sensor	Particulate Matter Sensor (PM1, PM2.5, PM10)		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS2.11	Sound Sensor	Waveshare Sound Sensor		Supply	Yes	Yes	Grobotronics	Jun-23	Oct-23	7M	Closed
	VS2.12	Memory Card	16 gB SD Memory Card		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS2.13	T&H Sensor	Temperature Sensor Development Tools Grove Temp. &Humidity Sensor SHT31		Supply	Yes	Yes	Mouser	Jun-23	Oct-23	7M	Closed
	VS2.14	Smart Grips	Smart grips for heart rate monitoring		Supply	Yes	Yes	Hellas Digital	Jun-23	Oct-23	7M	Closed
	VS2.15	Smart Grips PCB			Supply	Yes	Yes	Eurocircuits	Jun-23	Oct-23	7M	Closed
	VS2.16	Battery Cell	10000 mAh Battery Cell with BMS		Supply	Yes	Yes	Grobotronics	Jun-23	Oct-23	7M	Closed
	VS2.17	PCB for Stationary Sensor Kit	PCB for the stationary kit, incl. assembly		Supply	Yes	Yes	Eurocircuits	Jun-23	Oct-23	7M	Closed
	VS2.18	Case	Casing for the stationary Sensor Kit		Supply	Yes	Yes	Grobotronics	Jun-23	Oct-23	7M	Closed
	VS2.19	NO Sensor	Air Quality Sensors 4 Series Nitrogen Dioxide Sensor-30ppm					Mouser	Jun-23	Oct-23	7M	Closed
	VS2.20	NO2 Sensor	Air Quality Sensors 4 series NO2 gas sensor 20ppm					Mouser	Jun-23	Oct-23	7M	Closed
	VS2.21	O3 Sensor	Electrochemical O3 gas sensor					Mouser	Jun-23	Oct-23	7M	Closed
	VS2.22	SO2 Sensor	Air Quality Sensors 4 Series SO2 sensor 1,000ppm					Mouser	Jun-23	Oct-23	7M	Closed

2.3. Chania (GR)- Realised Risks & Identified Opportunities

Following is a list of the realised risks that Chania pilot faced, along with a brief description of how these risks impacted the Visionary Solutions and the mitigation actions that were put in place.

Table 24: Chania (GR) – Realised Risks

Final Risk Report				Date		31/10/2024	Prepared by:		Harris Siakantaris CLP Elisavet Tsekeri TUC	
Summary of realised risks			Low public awareness / indifference, thefts and vandalisms, inflation							
ID	Risk Category	Risk Type	Risk Description	VS	Stage	Risk significance	Risk Impact		Mitigation Action	
RR020	Technical	General	Due to the complexity of the solution, a special study is needed for the design	1	Preparatory	Moderate	Specific study from external can affect the evaluation of the solution. This may arise increase in the budget.		Unforeseen costs have been included in the cost plan file in order to anticipate such expanses.	
RR020	Scheduling	Delay	There is a risk that the supplier will ask for contact extension (not find the specified technical elements, manufacturing delays, logistic delays etc)	1	Preparatory	Major	There will be delays related to the duration of the contract and an overall delay in the operation of MULR		There is a procedure of the Chania Municipality for accepting equivalent elements	
RP016	Financial	Delay	There is a risk for further delay due to the final check of administrative decentralization (regarding the results of the Open call of tenders)	1	Preparatory	Moderate	There will be delays in terms of the organization of the events, in case of the delated implementation of the VS1.		Chania Municipality informed the administrative decentralization about the MS of the implementation, in order this final check to be in prioritized.	
RR0012	Strategic	General	There is a risk that the existing bike sharing system of CHANIA Municipality will have been depleted before the Pilot ended	2	Preparatory	Major	Poor data, still capital (the moving sensors)		Replace existing bicycle fleet and renovate bicycle stations (kiosks replacement and lockers' anti-rust maintenance)	
RR0022	Technical	General	There is a risk that sensors' data are not reliable	1,2	Implementation	Major	So that data is of no value		Replace existing bicycle fleet and renovate bicycle stations (kiosks replacement and lockers' anti-rust maintenance)	



Following is a list of the top opportunities that Chania pilot identified, along with a brief description of the opportunity capture strategy considered.

Table 25: Chania (GR)- Summary of Opportunities

Summary of opportunities		Scarcity of data available for air quality and noise makes them valuable				
ID	Opportunity Description	VS	Stage	Opportunity Category	Opportunity capture strategy	Status
OR02	Current scarcity of air quality and noise data insight in Chania. Data becomes valuable	2	Preparatory	Economic	Monetise data (Chania Municipality, CLP), develop a robust product (CLP), IPR management	Under scrutiny
OR03	Given that Chania is a popular destination for tourism, the MULR is giving ground to SMEs for funding opportunities by promoting local products/services.	1	Preparatory	Economic	Follow the progress of the project, timely delivery, close collaboration with Chamber of Commerce, low-cost renting to SMEs, special benefits to local SMEs.	the specific needs are taken into account in the design process.
OR04	The MULR is giving ground for collaboration and communication opportunities among citizens inspiring them to organise and implement innovative actions by creating new groups.	1	Preparatory	Social	Close collaboration with STKs, the MULR will travel in various neighbourhoods inspiring the citizens	Highlighting this opportunity in the next workshop.
OR05	Brand new bicycle fleet of CHANIA's bike sharing system will provoke higher demand, more rides and richer data from the sensors	2	Preparatory	Social	Clp with CHANIA collaborate closely for CHANIA's new bike sharing system	Delivery pending



2.1. Chania (GR)- Received feedback with respect to the implementation process

Table 26: Chania (GR)- Changes in the VS concept design

Chania	VS1	VS2
1. Did any changes occur in the concept design since the initial sketching of your VS?	☒ Yes ☐ No	☒ Yes ☐ No
2. At which stage did the change occur? <i>(multiple choice possible)</i>	☒ Concept design ☐ Preparation stage ☐ Selection of services providers ☒ Execution stage (small adaptations)	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☒ Execution stage
3. What kind of change occurred? <i>(multiple choice possible)</i>	☐ Scope ☐ Location ☒ Design: <i>from container to van and then to construction</i> ☐ Scale/Downsize ☒ Other: <i>ways to operate</i>	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other
4. Which is the main reason for any changes to occur? <i>(multiple choice possible)</i>	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☒ Financial issues ☒ Other: <i>Users' safety concerns</i>	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other
5. How did the changes affect the progress of work? <i>(multiple choice possible)</i>	☒ Timeframe ☒ Budget ☒ Procurement procedure ☐ Other	☒ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other

Table 27: Chania (GR)- Required expertise

Chania	VS1	VS2
1. Which experts (in-house & service providers) were involved in the design / implementation of your VS? (multiple choice possible)	☒ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☒ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☒ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☐ Municipal project officer ☒ Other: Electronics, industrial Design
2. Which was the highest level of expertise required for in-house experts?	6. Basic knowledge ☐ 7. Limited experience ☐ 8. Intermediate ☐ 9. Advanced ☒ 10. Expert_ ☒	6. Basic knowledge ☐ 7. Limited experience ☐ 8. Intermediate ☐ 9. Advanced ☐ 10. Expert_ ☒
3. Which was the highest level of expertise required for service providers?	6. Basic knowledge ☐ 7. Limited experience ☐ 8. Intermediate ☐ 9. Advanced ☒ 10. Expert_ ☒	6. Basic knowledge ☐ 7. Limited experience ☐ 8. Intermediate ☐ 9. Advanced ☐ 10. Expert_ ☒

Table 28: Chania (GR)- Experiences from the procurement process

Chania	VS1	VS2
1. Did you experience any difficulties with the procurement process?	☐ Yes ☒ No	☐ Yes ☒ No

Chania	VS1	VS2
2. In case of any difficulties, please describe the reason. (multiple choice possible)	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☒ Other: The tenderer's initial submission was not complete	☐ Tendering process specifications ☐ Bureaucracy ☒ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☒ Other
3. For VS1, VS2 you indicated that you used Quality or LCA evaluation criteria. Please outline the criteria used.	Procurement was based on the lowest price offer but in the technical specifications, quality and LCA criteria were listed. Quality criteria with respect to materials (preference over recyclable/ recycled), Safety, maintenance (included in the contract), portability of the structure	Sensors' brand, Provider's expertise

Table 29: Chania (GR)- Budget variance

Chania	VS1	VS2
1. Were there any significant variances to the budget needed for your VS? ($\pm 25\%$)	☐ Yes ☒ No	☐ Yes ☒ No
2. Which was the reason for any significant budget variance? (multiple choice possible)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other

Table 30: Chania (GR)- Experienced delays

Chania	VS1	VS2
1. Were there any delays in your workplan	☒ Yes ☐ No	☒ Yes ☐ No
2. Which was the reason for the delay? <i>(multiple choice possible)</i>	☐ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☐ Approvals ☒ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other

Table 31: Chania (GR)- Key take-aways

Chania	VS1	VS2
1. Looking back, what aspects of any implementation stage would you approach differently?	☒ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☒ Preparation ☐ Procurement ☒ Execution ☐ Handover ☐ Operation & Monitoring
2. What were the most valuable lessons learned during the development of the concept design and the setting up of the implementation process?	• STK's interest in co-design was high and very vivid • Too many components and functions were difficult to combine and set unnecessary complexity to the mobile living room	• Calibration process always useful (despite sensors coming calibrated) • Take advice from the experts
3. Which preventive measures would you recommend for future replication of your VS?	• Consider choosing a simpler design and less integrated functions	• Calibration process always useful (despite sensors coming calibrated) • Take advice from the experts
4. If you could start over, what would you change about the preparation stage?	• Address more targeted questions to the STKs • Definition of MULAR's functionalities/ operational characteristics: simplification advisable	

Chania	VS1	VS2
5. If you could start over, what would you change about the procurement stage?	-	Order a good time beforehand
6. If you could start over, what would you change about the budget planning?	-	Plan with the worst-case scenario



2.2. Chania (GR)- Operation and Maintenance

Maintenance is part of the contracted works/ supplies/ services in both Visionary Solutions implemented in Chania.

2.2.1. O&M of Socio/ Cultural Solutions

The contractor has supplied a Maintenance Manual of the MULaR. According to the procurement and offer, the contractor is responsible for the maintenance of MULaR for a period of two (2) years from the date of the final receipt of the whole construction. This free of charge maintenance against defects or damage caused by malfunction assures the flawless operation of MULaR. During the 2-year period, the contractor will conduct preventive equipment maintenance, repair of failures and replacement of defective equipment, if any. He will also provide the necessary spare parts for the repairs. After the 2-year good operation period, it will be necessary to sign a new contract for the maintenance of the unit, that will ensure its uninterrupted operation for three (3) more years. The maintenance service operator will run a preventive check test of the MULaR four (4) times/year according to the Maintenance Manual and the scheduled events. The maintenance, among others, includes the check of:

All moving/foldable parts of the MULaR (doors, windows, ramp, walls etc.) and all other mechanical parts

- The photovoltaics and the power generator
- The alarm system
- The lighting
- The cooling/heating systems
- The drains
- The green walls
- The cameras, sound equipment, etc.
- The computers, peripherals (tablets, printers, scanners etc.) and ICT equipment (Wi-Fi, sensors, robotics kits, screen table etc.). In case of any malfunction, he will notify the Project Manager of the Municipality of Chania.
- The furniture and the external shading system

The maintenance operator will also be responsible for the supply of any spare parts and plants needed, which will be paid for only if it is necessary. The estimated budget for the 3-years maintenance is reported in Table 32 as follows:

Table 32: Chania (GR)- Estimated budget for 3 years maintenance

	Number of services	Cost per visit (VAT 24% included)	Total cost (€)
Typical Maintenance	12 (4/year)	200	2.400
Urgent Maintenance	3 (1/year)	300	900
Spare parts/plants			1.700
TOTAL			5.000



After each visit, the maintenance operator will provide a list of the checks and the spare parts needed and will be paid accordingly.

Table 33: Chania (GR)- O&M of Socio/ Cultural solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
MuLaR structural elements, furniture & equipment	Regular/ Preventive Maintenance	Type of action(s)	Regular inspection of: 1) All moving/foldable parts of the MULaR (doors, windows, ramp, walls etc.) and all other mechanical parts 2) The drains 3) The green walls 4) The furniture and the external shading system	1650 €/ yr.	3+
		Frequency	Weekly		
		Procedure	1) Visual inspection of condition to identify any faults, 2) Visual inspection and cleaning 3) Watering, replacing seasonal plants 4) Cleaning		
		Responsibility	Contractor during the first 2 years Appointed maintenance operator for the next 3 years		
	Pro-active care/ Remedial actions	Solution specific issues	TBC		
		Type of action(s)	Repairs/ replacements of faulty parts		
		Procedure	TBC		
		Responsibility	Contractor during the first 2 years Appointed maintenance operator for the next 3 years		
		Solution specific issues	TBC		

2.2.2. O&M of Digital Solutions

Sensors used in Chania VSs are stated in Table 34: sensor ID number, commercial name, measuring unit, quantity used together with the sensor's communication protocol, and the reference link.

Table 34: Chania (GR)- Sensors and devices used

No.	Sensors	Measuring	Quantity	Protocol	Link as reference
1	Bike sensor kits	T, RH, PM, Sound, GPS, Smart Grip (heart rate)	45	WiFi/ LoRaWAN - API / Json	http://www.cyclopolis.gr/index.php/en
2	Fixed stations sensor kits	T, RH, PM, Sound, NO, NO2, O3, SO2, NH3, CO, CO2, TVOC, CL2	4	Internet - API / Json	http://www.cyclopolis.gr/index.php/en
3	Sensedge Traffic Counter	number of visitors	3	LoRaWAN	https://senstick.co
4	Sensedge Senstick	temperature, RH, air pressure		LoRaWAN	https://senstick.co
5	Power management system of MURAL	energy produced, energy stored, energy consumed	1	Wi-Fi	http://www.cyclopolis.gr/index.php/en

The local governance of Chania follows a fixed schedule of maintenance. Local Pilot Expert / VS manager can manage Planned downtime, rather than emergency downtime. The Chania pilot's central and periodic evaluations of the IoT are also used for managing coherent progress of VSs performance.

- Set maintenance dates are as much as possible in-line with the typical battery lifespan used in the sensors which are part of the local IoT network (VS1 and VS2).
- Sensedge's Sensor Management Platform receives and evaluates the additional local sensor data: battery level, signal-to-noise ratio, signal strength indicator of the channel, to enable local users with alerts on possible unforeseen degradations and miscalibration of IoT devices used in VS.

Table 35 and Table 36 provide a short description of the local governance strategy and persons or organisations responsible for monitoring and maintaining the local IT infrastructure.

Table 35: Chania (GR)- Local IT infrastructure/ Management

Local governance (Months / Weeks)	Once every month
Short description	The audit will be performed at least once a month. The status of all IoT sensors will be checked for the battery percentage and functionality



Table 36 : Chania (GR)- Local IT infrastructure/ Maintenance responsibility

Monitoring Manager / Organisations responsible for maintenance	
Person/Organisation responsible for sensor performance/battery statuses on the local dashboard:	VS1: Person assigned by the Chania municipality of the operating the MULR VS2: CLP, external Provider
Person/Organisation responsible for on-site maintenance/work:	VS1: Person assigned by the Chania municipality of the operating the MULR VS2: CLP, external Provider
Person/Organisation responsible for unscheduled maintenance:	VS1: Person assigned by the Chania municipality of the operating the MULR VS2: CLP, external Provider

VS2

Each sensor kit, with its serial number and configuration is logged in a ticketing system as part of the handover process. The ticketing system will also facilitate the regular maintenance process by using auto-generated maintenance tickets for each sensor-kit.

The system will be monitored in an automated way. CLP has communicated to the Provider the necessary IT infrastructure (database, ticketing system, accounting tools) for performing their tasks, train them and, together with CHANIA, maintain the overall control of the process and the Provider's compliance. Details recorded will be at the level of individual functional components within each sensor kit, for example the GPS unit, the battery unit, the main processor board and the environmental sensors will be individually monitored within the sensor-kits' maintenance record. Furthermore, programmed on-site visual inspections will be performed in certain intervals (monthly) to make sure that the equipment is not damaged and performs according to the plan. Non-programmed on-site actions will be being undertaken whenever necessary. Rules defining proper operation will be applied, alerts generated when predefined conditions are not met and Pro-active care/ Remedial actions triggered. All issues arising during the operation and maintenance phase will be logged and will form a permanent historical record throughout the lifecycle of each sensor kit. The Provider's obligations regarding the O&M function will be clearly stated in the RFP document.



Table 37: Chania (GR)- Documentation required in O&M phase

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Sensor kits	Regular Inspections	Type of action(s)	Visual Inspection	4.500,00 € (VAT incl.)	2 yrs. (the sensors and their batteries)
		Frequency	Monthly		
		Procedure	Lock-unlock sensor kit, clean sensors from dust/mist (compressed or not)		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
Sensor kits	Regular Inspections	Type of action(s)	Battery level check		
		Frequency	Daily		
		Procedure	Via automated monitoring tool		
		Responsibility	INNOVENTIA		
		Solution specific issues	Numeric battery level % automatically collected		
Sensor kits	Regular Inspections	Type of action(s)	Check sensor is "online"		
		Frequency	Daily		
		Procedure	Via automated monitoring tool		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
Sensor kits	Regular Inspections	Type of action(s)	Data consistency check		
		Frequency	Daily		
		Procedure	Via automated monitoring tool		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
Sensor kits	Regular maintenance	Type of action(s)	Battery inspection		
		Frequency	Depending on battery level alert		
		Procedure	Physical and electrical inspection of battery		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
	Remedial actions	Type of action(s)	Battery change		
		Frequency	Weekly		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Sensor kits		Procedure	In-situ battery swapping procedure		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
	Regular maintenance	Type of action(s)	Electrochemical sensor inspection		
		Frequency	Yearly		
		Procedure	Via automated monitoring tool, alert		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
	Remedial actions	Type of action(s)	Sensor replacement		
		Procedure	In-situ sensor replacement procedure		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
	Regular Inspections	Type of action(s)	Casing of Mobile and Stationary Kits		
		Frequency	Monthly		
		Procedure	Check mounting mechanism base		
		Responsibility	CLP		
		Solution specific issues	TBC		
	Regular Inspections	Type of action(s)	Wifi Hotspots		
		Frequency	Daily		
		Procedure	Wifi Hotspots Check		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
	Regular Inspections	Type of action(s)	Sensors of Stationary Kit		
		Frequency	Every two years		
		Procedure	Replace Sensors of Stationary Kit		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
	Regular Inspections	Type of action(s)	Mobile & stationary kit temperature		
		Frequency	Daily		
		Procedure	Internal temperature (must be under 70 Celsius degrees)		
		Responsibility	INNOVENTIA		



Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
		Solution specific issues	TBC		
Sensor kits' grips	Regular Inspections	Type of action(s)	Visual Inspection of Grips		
		Frequency	Monthly		
		Procedure	Check Grips mounting, clean from dust/mist/rust using (compressed or not) air		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
Sensor kits	Regular Inspections	Type of action(s)	Sensor Calibration Intervals		
		Frequency	Yearly		
		Procedure	Check Sensor Values		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
Sensor kits	Regular Inspections	Type of action(s)	Check the wired connections		
		Frequency	Monthly		
		Procedure	Check that there is no short circuit or break in the wires		
		Responsibility	INNOVENTIA		
		Solution specific issues	TBC		
Sensor kits	Regular Inspections	Type of action(s)	Measurements are higher than 100% of the measuring scale		
		Frequency	Daily		
		Procedure	Switch Off and On. If that does not work, then calibrate the sensor		
		Responsibility	INNOVENTIA		
		Solution specific issue	TBC		

Table 38. O&M Digital Components-MULAR

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Visual and audio systems (Interactive projector, smart screen,	Regular/ Preventive maintenance	Type of action(s)	Checking generally, repairs if needed and battery change	0	Manufacturer's warranty: - Interactive projector - max 2
		Frequency	Yearly		
		Procedure	Regular control and activation of the equipment, in order to check its correct operation		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
audio equipment for events (microphones, speakers, etc), live stream equipment)		Responsibility	Municipality of Chania/ Supplier		years - Smart screen - max 5 years - Audio equipment for events - max. 1 year - Live streaming equipment - max. 2 years
		Solution specific issues	Maintenance might be done on field if it needs fixing. If there is a fault within the manufacturer's warranty, then the equipment is replaced/repared at zero cost. Otherwise, the municipality of Chania takes care of the repair/maintenance of the equipment at its own expense.		
	Pro-active care/ Remedial actions	Type of action(s)	Preventive control before the Planned event	0	maximum 3 years
		Frequency	max 12 (it depends on the Planned events)		
		Procedure	Visual Verification		
		Responsibility	Municipality of Chania		
		Solution specific issues	Proper handling and care of the device is imperative so that no problems are encountered on the day of the event		
	Regular/ Preventive maintenance	Type of action(s)	Checking generally and equipment charging	0	Manufacturer's warranty: - Tablets/ laptop - max 2 years - Wi-Fi access point - max 2 years - 3D printer - max 1 year - Other equipment - max 2 years
		Frequency	Yearly		
		Procedure	Regular control and activation of the equipment, in order to check its correct operation		
		Responsibility	Municipality of Chania/ Supplier		
		Solution specific issues	Maintenance might be done on the field if it needs fixing. If there is a fault within the manufacturer's warranty, then the equipment is replaced/repared at zero cost. Otherwise, the municipality of Chania takes care of the repair/maintenance of the equipment at its own expense.		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Pro-active care/ Remedial actions	Type of action(s)	Preventive control before the Planned event	0	maximum 3 years
		Frequency	max 12 (it depends on the Planned events)		
		Procedure	Visual verification		
		Responsibility	Municipality of Chania		
		Solution specific issues	Proper handling and care of the device is imperative so that no problems are encountered on the day of the event		



- Sensors are installed to measure the number of visitors, monitoring improvements to the use of the space. The software for the existing solar panels enables the energy generated to be seen by the visitors, encouraging the use of sustainable energy solutions in the area.



Figure 17: Dundalk (IE)- the Learning Pod and the sensory "Cubbie"

VS 2: Outdoor Urban Green Learning and Sensory Garden for health and well-being Status: Operational

VS2 provides enhanced biodiversity to the existing garden and improved ways for the public to appreciate, to ensure visitors have all available means to experience the green spaces and feel the benefit of them. VS2 contains the following components:

- Enhanced garden area a new Sensory Garden (plants, etc.).
- New moveable and non-movable planters.
- New seating area developed throughout the site.
- Rainwater harvesting data sensors collected and transmitted in a suitable format.
- A Rainwater Harvesting System to collect water from the roofs of the Museum and Library.
- Change of Public Lighting in the Outdoor space to low energy lighting and the installation of ambient solar-powered lighting within the site.
- Installation of vertical metal fins in the courtyard area.
- 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.

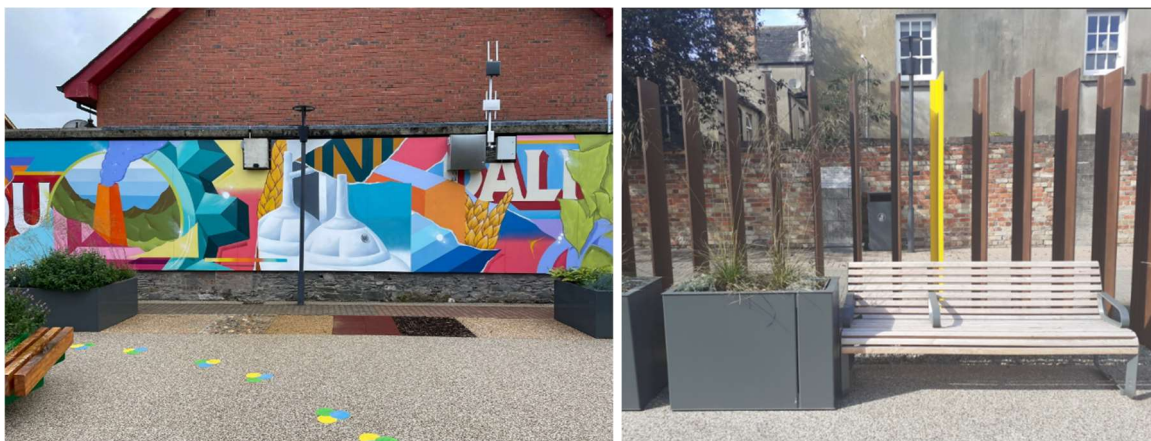


Figure 18: Dundalk (IE)- Installed sensors, planters, metal fins and seating benches



Figure 20: Dundalk (IE)- Planters and rainwater harvesting system



Figure 19: Dundalk (IE)- Touchscreen

VS3: Bike Stations and Sensors on Bikes

Status: Operational stage

VS3 provides a new car free area for pedestrians and cyclists with improved cycling infrastructure for visitors, to encourage active travel, reduce air pollution and encourage urban regeneration. VS3 contains the following components:

- Removal and relocation of the existing car park area.
- Enhancement of this surface area for pedestrian and cycle use.
- Creation of a new Bike Station.
- Cabling for EV charging points for electric bikes and scooters.
- A bike maintenance area.
- Sensors to collate data on cyclist numbers and duration of stay.



Figure 21: Dundalk (IE)- Bike facilities

Sensor Update

In October 2023 Louth County Council installed VARCITES sensors across the pilot site in Dundalk (Figure 22). These include:

- 1 LoRaWAN for the communication protocol and system architecture of the network and communication with the Health & Well-Being Platform
- strategically placed at the front and rear gates to the site along the side gable of the library and along the courtyard to try and capture numbers using the actual pilot site area.
- 1 Air Quality Monitor measuring temperature, relative humidity, VOCs, Barometric pressure, CO₂, Oxygen, Particulate matter, PM₁, 2.5, 4, 10.
- 1 Rainwater monitor.
- 1 Noise and Sensedge Stick to monitor noise in the area.



Figure 22: Dundalk (IE)- Installation of sensors

Construction Works:

Work commenced with regards to the implementation of the three Visionary Solutions at the Library and Museums Courtyard, during the first week November 2023. Initially it was decided to break VS1 into two tendering processes and separate the learning pod. However, after detailed investigations the contractor awarded the contract has undertaken to construct the learning pod, and the works for Visionary Solutions 1, 2 and 3 were all conducted by the same contractor. The council staff parking has been relocated to the public car park at the Co. Library to enable the works. The Still (learning Pod) - VARCITIES pilot site officially opened with a social event in June 2024.



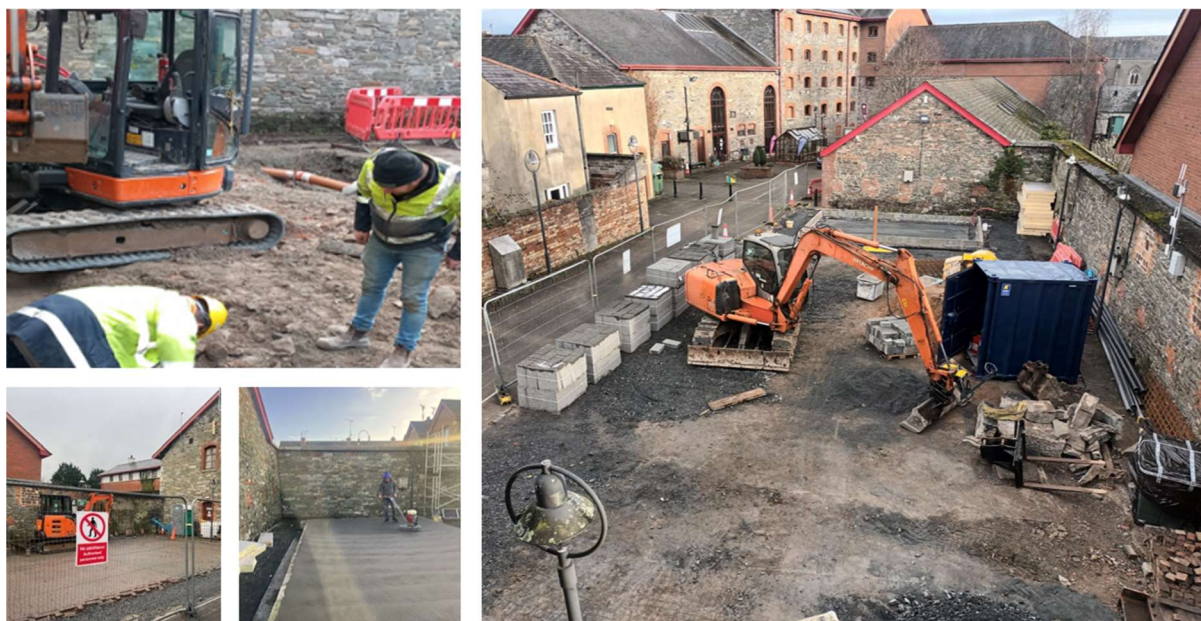
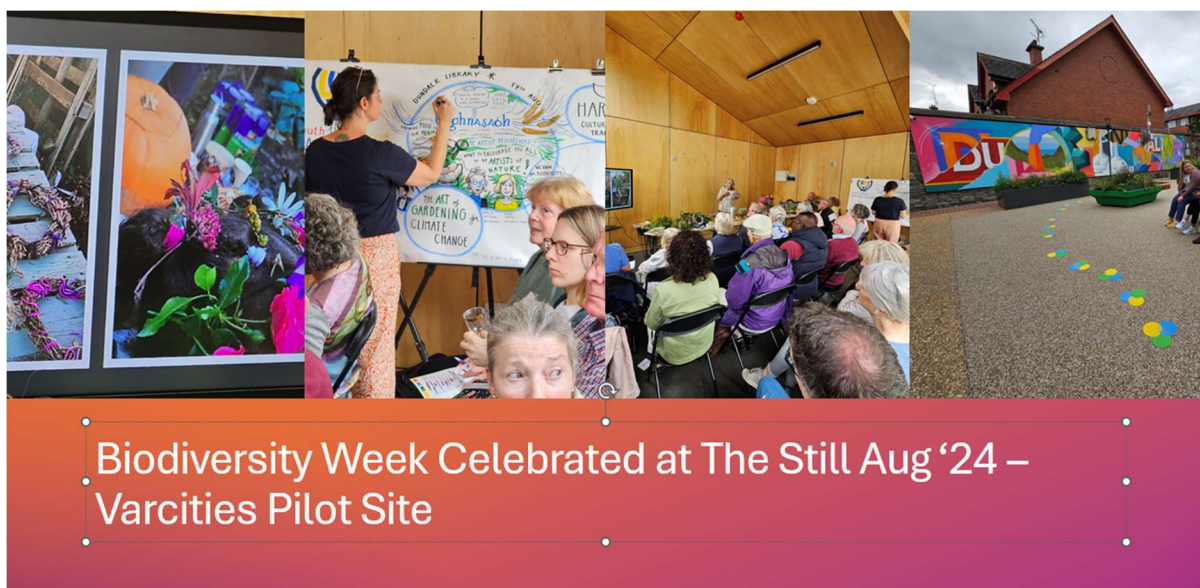


Figure 23: Dundalk (IE)- Construction works at the County Library



Figure 24: Dundalk IE - The Still - VARCITIES pilot site officially opened with a social event in June 2024





Biodiversity Week Celebrated at The Still Aug '24 – Varcities Pilot Site

Figure 25: Dundalk (IE) - Events at The Still – VARCITIES Pilot Site



Varcities 8th Progress Meeting Sept '24 at the Dundalk Pilot Site

Figure 26: Dundalk (IE) - VARCITIES 8th Progress Meeting held at the "Still" in September 2024



3.1.2. Detailed workplan for VS1

Table 39: Dundalk (IE) - Work Plan VS1





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A11 Preparation stage								
A1	Clarify legal requirements (concerning permits and accompanying reports - planning, EIA, Fire Certificate)	Clarify legal requirements concerning permits and accompanying reports (planning, EIA, Fire Certificate)	LCC - Padraig O'Hora	VS1 fully defined/ Planning Permission obtained / Discussion held with CFO	5M	Mar-22	Jul-22	Closed
A2	Preparation and planning	Complete the planning process and obtain planning permission for the project	LCC - Padraig O'Hora		6M	Feb-22	Jul-22	Closed
A3	Preparation and planning	Procure and obtain Fire Certificate for the outdoor space	LCC - Padraig O'Hora		5M	Apr-22	Aug-22	Closed
A4	Confirm funding	Clarify Louth County Council funding contribution and drawdown timeframe	LCC - Padraig O'Hora		4M	Mar-22	Jun-22	Closed
A5	Progress Stakeholder information Dissemination Process	Identify and put in place Stakeholders Steering Group	LCC - Padraig O'Hora		7M	Jan-22	Jul-22	Closed
A6	Develop suitable specification (compatible with what Council already has in place for similar outdoor spaces) for specialist services	Liaise with Louth County Council IT Section to develop suitable specification (compatible with what Council already has in place for similar outdoor spaces) for the provision of WIFI at Library and Museum outdoor space	LCC - Padraig O'Hora		6M	Jan-22	Jun-22	Closed
A7	Obtain / Develop specifications for sensor equipment proposed	Obtain / Develop specifications for sensor equipment proposed	IES - Nick Purshouse		7M	Jan-22	Jul-22	Closed
A8	Finalise Project Preliminary budget	Finalise Project Preliminary budget	LCC - Padraig O'Hora		3M	May-22	Jul-22	Closed
A9	Risk management plan for the project	Develop a Risk management plan for the project, complete design-stage safety documents	IES - Nick Purshouse		3M	May-22	Jul-22	Closed
A10	Record keeping for the project	Develop a plan for Record keeping for the project	LCC - Padraig O'Hora		6M	Feb-22	Jul-22	Closed
A11	Liaise with external stakeholders for the provision of services required	Liaise with EPA to finalise plan for Air Quality monitoring at the site	LCC - Padraig O'Hora		5M	Mar-22	Jul-22	Closed
B1- B11 Selection of Service providers								
B1	Time-location chart listing stages for Selection of service providers	Develop a list of service providers with a date chart to map the stages for selection	LCC - Padraig O'Hora	Evaluation & Award of tenders/ Contracts implemented	7M	Mar-22	Sep-22	Closed
B2	Preparation for procurement	Preparation and approval of Contract Documents with particular emphasis on identifying the complete range of goods and services (service providers) required and how they will be procured.	LCC - Padraig O'Hora		18M	Apr-22	Sep-23	Closed





Tasks			Description	Task Owner	Milestone	Duration	Start	Finish	Status
B3	Procurement of Service Providers (works excluding Learning Pod)	Finalise the tender documents to ensure conditions of Planning and Fire Certificate are incorporated and to clarify the commissioning process. Invite tenders for provision of goods and services required	LCC - Padraig O'Hora		12M	Oct-22	Sep-23	Closed	
B4	Evaluation of tenders and award (works excluding Learning Pod)	Evaluate tenders and award to successful service providers	LCC - Padraig O'Hora		3M	Jul-23	Sep-23	Closed	
B5	Contract implementation (works excluding Learning Pod)	Award contracts to successful service providers and construction programme for the works	LCC - Padraig O'Hora		3M	Sep-23	Nov-23	Closed	
B6	Risk management plan	Seek Risk Management Plan from the various service providers to identify and minimise project risks	LCC - Padraig O'Hora		4M	Jul-23	Oct-23	Closed	
B7	Record keeping	Agree the extent of records to be maintained for the various service providers to ensure risks are minimised	LCC - Padraig O'Hora		24M	Mar-22	Feb-24	Closed	
B8	Preparation for procurement - Learning Pod	Preparation and approval of Contract Documents with particular emphasis on identifying the complete range of goods and services (service providers) required and how they will be procured.	LCC - Padraig O'Hora	Evaluation & Award of tenders/ Contracts implemented for Learning Pod	4M	Jul-23	Nov-23	Closed	
B9	Procurement of Service Providers - Learning Pod	Finalise the tender documents to ensure appropriate form of contract is incorporated for Learning Pod. Invite tenders for provision of goods and services required	LCC - Padraig O'Hora		4M	Jul-23	Nov-23	Closed	
B10	Evaluation of tenders and award - Learning Pod	Evaluate tenders and award to successful service providers	LCC - Padraig O'Hora		2M	Oct-23	Nov-23	Closed	
B11	Contract implementation - Learning Pod	Award contracts to successful service providers and construction programme for the works	LCC - Padraig O'Hora		3M	Dec-23	Feb-24	Closed	
C1- C12	Execution process								
C1	Time-location chart for implementation process	Use Construction Programmes from service providers to develop chart for construction / implementation	LCC - Padraig O'Hora	Construction completed / ICT systems installed	4M	Nov-23	Feb-24	Closed	
C2	Environmental Impact Assessment	Review construction plans to confirm conditions of Planning and Fire Certificate are being met	LCC - Padraig O'Hora		3M	Jun-23	Aug-23	Closed	
C3	Health and Safety plan	Complete the necessary Health and Safety appointments and ensure the provision of Health and Safety plans	LCC - Padraig O'Hora		4M	Nov-23	Feb-24	Closed	
C4	Preparation works on site	Arrange for the site to be set-up for possession to the service providers	LCC - Padraig O'Hora		4M	Nov-23	Feb-24	Closed	
C5	Waste management	Seek suitable waste management plan from service providers as appropriate	LCC - Padraig O'Hora		4M	Nov-23	May-24	Closed	
C6	Manufacturing and construction	Initiate and manage the construction stage for the various service providers	LCC - Padraig O'Hora		4M	Nov-23	May-24	Closed	
C7	Risk management plan	Review Risk Management Plans from the various service providers as part of the construction process	LCC - Padraig O'Hora		4M	Nov-23	Feb-24	Closed	





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
C8	Record keeping	Ensure appropriate records are retained as agreed for the various service providers	LCC - Padraig O'Hora		9M	Jun-23	May-24	Closed
C9	Health and Safety plan - Learning Pod	Complete the necessary Health and Safety appointments and ensure the provision of Health and Safety plans	LCC - Padraig O'Hora	Construction completed for Learning Pod	4M	Nov-23	May-24	Closed
C10	Preparation works on site - Learning Pod	Arrange for the site to be set-up for possession to the service providers	LCC - Padraig O'Hora		4M	Nov-23	May-24	Closed
C11	Waste management - Learning Pod	Seek suitable waste management plan from service providers as appropriate	LCC - Padraig O'Hora		4M	Nov-23	May-24	Closed
C12	Manufacturing and construction - Learning Pod	Initiate and manage the construction stage for the various service providers	LCC - Padraig O'Hora		4M	Nov-23	May-24	Closed
D1- D4	Handover							
D1	Commissioning	Agree the date for substantial completion for the works and the date for commissioning of the works by the various service providers	LCC - Padraig O'Hora	Handover of the VS/ Contracts concluded	2M	May-24	Jun-24	Closed
D2	Operation and Maintenance concept	Agree the date for substantial completion for the works and the date for completion of the maintenance period of the works by the various service providers	LCC - Padraig O'Hora		2M	May-24	Jun-24	Closed
D3	Operation and Maintenance concept	Arrange timely provision of training of Council staff for hand-over of the works and take-in-charge by the Council	LCC - Padraig O'Hora		2M	May-24	Jun-24	Closed
D4	Commissioning - Learning Pod	Agree the date for substantial completion for the works and the date for commissioning of the works by the various service providers	LCC - Padraig O'Hora		2M	May-24	Jun-24	Closed
E1- E3	Operation / Social & Cultural Solutions							
E1	Time-location chart (Gantt)	Use Construction Programmes from service providers to develop chart for Opening the improved site to external stakeholders and public	LCC - Padraig O'Hora	VS successful operation, monitoring & maintenance	2M	May-24	Jun-24	Closed
E2	Health and Safety plan/ Risk assessment	Develop suitable Health and Safety plans and Risk Assessments for use of the site by external stakeholders and the public	LCC - Padraig O'Hora		2M	May-24	Jun-24	Closed
E3	Record keeping	Develop and implement an appropriate process to maintain suitable records for the improved site and it's use	LCC - Padraig O'Hora		16M	Oct-23	Jan-25	Open



3.1.3. Detailed workplan for VS2



Table 40: Dundalk (IE) - Work Plan VS2

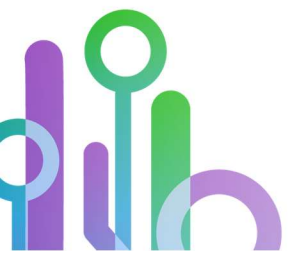
VARCITIES

	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1- A11	Preparation stage							
A1	Clarify legal requirements (concerning permits and accompanying reports - planning, EIA, Fire Certificate)	Clarify legal requirements concerning permits and accompanying reports (planning, EIA, Fire Certificate)	LCC - Padraig O'Hora	VS1 fully defined/ Planning Permission obtained / Discussion held with CFO	5M	Mar-22	Jul-22	Closed
A2	Preparation and planning	Complete the planning process and obtain planning permission for the project	LCC - Padraig O'Hora		6M	Feb-22	Jul-22	Closed
A3	Preparation and planning	Procure and obtain Fire Certificate for the outdoor space	LCC - Padraig O'Hora		5M	Apr-22	Aug-22	Closed
A4	Confirm funding	Clarify Louth County Council funding contribution and drawdown timeframe	LCC - Padraig O'Hora		4M	Mar-22	Jun-22	Closed
A5	Progress Stakeholder information Dissemination Process	Identify and put in place Stakeholders Steering Group	LCC - Padraig O'Hora		7M	Jan-22	Jul-22	Closed
A6	Develop suitable specification (compatible with what Council already has in place for similar outdoor spaces) for specialist services	Liaise with Louth County Council IT Section to develop suitable specification (compatible with what Council already has in place for similar outdoor spaces) for the provision of WIFI at Library and Museum outdoor space	LCC - Padraig O'Hora		6M	Jan-22	Jun-22	Closed
A7	Obtain / Develop specifications for sensor equipment proposed	Obtain / Develop specifications for sensor equipment proposed	IES - Nick Purshouse		7M	Jan-22	Jul-22	Closed
A8	Finalise Project Preliminary budget	Finalise Project Preliminary budget	LCC - Padraig O'Hora		3M	May-22	Jul-22	Closed
A9	Risk management plan for the project	Develop a Risk management plan for the project, complete design-stage safety documents	IES - Nick Purshouse		3M	May-22	Jul-22	Closed
A10	Record keeping for the project	Develop a plan for Record keeping for the project	LCC - Padraig O'Hora		3M	May-22	Jul-22	Closed
A11	Liaise with external stakeholders for the provision of services required	Liaise with EPA to finalise plan for Air Quality monitoring at the site	LCC - Padraig O'Hora		5M	Mar-22	Jul-22	Closed
B1- B7	Selection of Service providers							
B1	Time-location chart listing stages for Selection of service providers	Develop a list of service providers with a date chart to map the stages for selection	LCC - Padraig O'Hora	Evaluation & Award of tenders/ Contracts implemented	7M	Mar-22	Sep-22	Closed
B2	Preparation for procurement	Preparation and approval of Contract Documents with particular emphasis on identifying the complete range of goods and services (service providers) required and how they will be procured.	LCC - Padraig O'Hora		18M	Apr-22	Sep-23	Closed

Tasks			Description	Task Owner	Milestone	Duration	Start	Finish	Status
B3	Procurement of Service Providers	Finalise the tender documents to ensure conditions of Planning and Fire Certificate are incorporated and to clarify the commissioning process. Invite tenders for provision of goods and services required	LCC - Padraig O'Hora		10M	Oct-22	Jul-23	Closed	
B4	Evaluation of tenders and award	Evaluate tenders and award to successful service providers	LCC - Padraig O'Hora		3M	Jul-23	Sep-23	Closed	
B5	Contract implementation	Award contracts to successful service providers and construction programme for the works	LCC - Padraig O'Hora		3M	Sep-23	Nov-23	Closed	
B6	Risk management plan	Seek Risk Management Plan from the various service providers to identify and minimise project risks	LCC - Padraig O'Hora		4M	Jul-23	Oct-23	Closed	
B7	Record keeping	Agree the extent of records to be maintained for the various service providers to ensure risks are minimised	LCC - Padraig O'Hora		21M	Mar-22	Nov-23	Closed	
C1-C9	Execution process								
C1	Time-location chart for implementation process	Use Construction Programmes from service providers to develop chart for construction / implementation	LCC - Padraig O'Hora	Construction completed / ICT systems installed	4M	Nov-23	Feb-24	Closed	
C2	Environmental Impact Assessment	Review construction plans to confirm conditions of Planning and Fire Certificate are being met	LCC - Padraig O'Hora		3M	Jun-23	Aug-23	Closed	
C4	Health and Safety plan	Complete the necessary Health and Safety appointments and ensure the provision of Health and Safety plans	LCC - Padraig O'Hora		3M	Jan-24	Mar-24	Closed	
C5	Preparation works on site	Arrange for the site to be set-up for possession to the service providers	LCC - Padraig O'Hora		2M	Feb-24	Mar-24	Closed	
C6	Waste management	Seek suitable waste management plan from service providers as appropriate	LCC - Padraig O'Hora		2M	Feb-24	Mar-24	Closed	
C7	Manufacturing and construction	Initiate and manage the construction stage for the various service providers	LCC - Padraig O'Hora		5M	Jan-24	May-24	Closed	
C8	Risk management plan	Review Risk Management Plans from the various service providers as part of the construction process	LCC - Padraig O'Hora		4M	Nov-23	Feb-24	Closed	
C9	Record keeping	Ensure appropriate records are retained as agreed for the various service providers	LCC - Padraig O'Hora		10M	Nov-23	May-24	Closed	
D1-D3	Handover								
D1	Commissioning	Agree the date for substantial completion for the works and the date for commissioning of the works by the various service providers	LCC - Padraig O'Hora	Handover of the VS/	4M	May-24	Jun-24	Closed	



Tasks			Description	Task Owner	Milestone	Duration	Start	Finish	Status
D2	Operation and Maintenance concept/ planning	Agree the date for substantial completion for the works and the date for completion of the maintenance period of the works by the various service providers	LCC - Padraig O'Hora	Contracts concluded	4M	May-24	Jun-24	Closed	
D3	Operation and Maintenance concept	Arrange timely provision of training of Council staff for hand-over of the works and take-in-charge by the Council	LCC - Padraig O'Hora		4M	Jan-24	Feb-24	Closed	
E1- E3	Operation / Social & Cultural Solutions								
E1	Time-location chart (Gantt)	Use Construction Programmes from service providers to develop chart for Opening the improved site to external stakeholders and public	LCC - Padraig O'Hora	VS successful operation, monitoring & maintenance	2M	May-24	Jun-24	Closed	
E2	Health and Safety plan/ Risk assessment	Develop suitable Health and Safety plans and Risk Assessments for use of the site by external stakeholders and the public	LCC - Padraig O'Hora		9M	Jun-24	Nov-25	Closed	
E3	Record keeping	Develop and implement an appropriate process to maintain suitable records for the improved site and its use	LCC - Padraig O'Hora		9M	Jun-24	Feb-25	Open	



3.1.4. Detailed workplan for VS3



Table 41: Dundalk (IE) - Work Plan VS3



Tasks

Description

Task Owner

Milestone

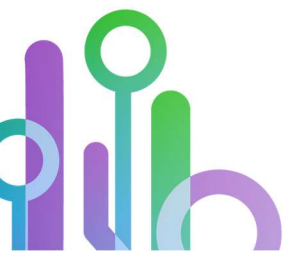
Duration

Start

Finish

Status

A1- A11	Preparation stage							
A1	Clarify legal requirements (concerning permits and accompanying reports - planning, EIA, Fire Certificate)	Clarify legal requirements concerning permits and accompanying reports (planning, EIA, Fire Certificate)	LCC - Padraig O'Hora	VS1 fully defined/ Planning Permission obtained / Discussion held with CFO	5M	Mar-22	Jul-22	Closed
A2	Preparation and planning	Complete the planning process and obtain planning permission for the project	LCC - Padraig O'Hora		6M	Feb-22	Jul-22	Closed
A3	Preparation and planning	Procure and obtain Fire Certificate for the outdoor space	LCC - Padraig O'Hora		5M	Apr-22	Aug-22	Closed
A4	Confirm funding	Clarify Louth County Council funding contribution and drawdown timeframe	LCC - Padraig O'Hora		4M	Mar-22	Jun-22	Closed
A5	Progress Stakeholder information Dissemination Process	Identify and put in place Stakeholders Steering Group	LCC - Padraig O'Hora		7M	Jan-22	Jul-22	Closed
A6	Develop suitable specification (compatible with what Council already has in place for similar outdoor spaces) for specialist services	Liaise with Louth County Council IT Section to develop suitable specification (compatible with what Council already has in place for similar outdoor spaces) for the provision of WIFI at Library and Museum outdoor space	LCC - Padraig O'Hora		6M	Jan-22	Jun-22	Closed
A7	Obtain / Develop specifications for sensor equipment proposed	Obtain / Develop specifications for sensor equipment proposed	IES - Nick Purshouse		7M	Jan-22	Jul-22	Closed
A8	Finalise Project Preliminary budget	Finalise Project Preliminary budget	LCC - Padraig O'Hora		3M	May-22	Jul-22	Closed
A9	Risk management plan for the project	Develop a Risk management plan for the project, complete design-stage safety documents	IES - Nick Purshouse		3M	May-22	Jul-22	Closed
A10	Record keeping for the project	Develop a plan for Record keeping for the project	LCC - Padraig O'Hora		6M	Feb-22	Jul-22	Closed
A11	Liaise with external stakeholders for the provision of services required	Liaise with EPA to finalise plan for Air Quality monitoring at the site	LCC - Padraig O'Hora		5M	Mar-22	Jul-22	Closed
B1- B7	Selection of Service providers							
B1	Time-location chart listing stages for Selection of service providers	Develop a list of service providers with a date chart to map the stages for selection	LCC - Padraig O'Hora	Evaluation & Award of tenders/ Contracts implemented	7M	Mar-22	Sep-22	Closed
B2	Preparation for procurement	Preparation and approval of Contract Documents with particular emphasis on identifying the complete range of goods and services (service providers) required and how they will be procured.	LCC - Padraig O'Hora		18M	Apr-22	Sep-23	Closed



ARCITIES

	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
B3	Procurement of Service Providers	Finalise the tender documents to ensure conditions of Planning and Fire Certificate are incorporated and to clarify the commissioning process. Invite tenders for provision of goods and services required	LCC - Padraig O'Hora		12M	Oct-22	Sep-23	Closed
B4	Evaluation of tenders and award	Evaluate tenders and award to successful service providers	LCC - Padraig O'Hora		3M	Jul-23	Sep-23	Closed
B5	Contract implementation	Award contracts to successful service providers and construction programme for the works	LCC - Padraig O'Hora		3M	Sep-23	Nov-23	Closed
B6	Risk management plan	Seek Risk Management Plan from the various service providers to identify and minimise project risks	LCC - Padraig O'Hora		4M	Jul-23	Oct-23	Closed
B7	Record keeping	Agree the extent of records to be maintained for the various service providers to ensure risks are minimised	LCC - Padraig O'Hora		21M	Mar-22	Nov-23	Closed
C1- C8	Execution process							
C1	Time-location chart for implementation process	Use Construction Programmes from service providers to develop chart for construction / implementation	LCC - Padraig O'Hora	Construction completed / ICT systems installed	5M	Jan-24	May-24	Closed
C2	Environmental Impact Assessment	Review construction plans to confirm conditions of Planning and Fire Certificate are being met	LCC - Padraig O'Hora		5M	Jan-24	May-24	Closed
C3	Permits	Complete the necessary Health and Safety appointments and ensure the provision of Health and Safety plans	LCC - Padraig O'Hora		4M	Jul-23	Oct-23	Closed
C4	Health and Safety plan	Arrange for the site to be set-up for possession to the service providers	LCC - Padraig O'Hora		5M	Jan-24	May-24	Closed
C5	Preparation works on site	Seek suitable waste management plan from service providers as appropriate	LCC - Padraig O'Hora		5M	Jan-24	May-24	Closed
C6	Waste management	Initiate and manage the construction stage for the various service providers	LCC - Padraig O'Hora		5M	Jan-24	May-24	Closed
C7	Manufacturing and construction	Review Risk Management Plans from the various service providers as part of the construction process	LCC - Padraig O'Hora		5M	Jan-24	May-24	Closed
C8	Risk management plan	Ensure appropriate records are retained as agreed for the various service providers	LCC - Padraig O'Hora		5M	Jan-24	May-24	Closed
D1- D3	Handover							
D1	Commissioning	Agree the date for substantial completion for the works and the date for commissioning of the works by the various service providers	LCC - Padraig O'Hora	Handover of the VS/ Contracts concluded	2M	May-24	Jun-24	Closed
D2	Operation and Maintenance concept/ planning	Agree the date for substantial completion for the works and the date for completion of the maintenance period of the works by the various service providers			2M	May-24	Jun-24	Closed



	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
D3	Operation and Maintenance concept	Arrange timely provision of training of Council staff for hand-over of the works and take-in-charge by the Council			2M	May-24	Jun-24	Closed
E1- E3	Operation / Social & Cultural Solutions							
E1	Time-location chart (Gantt)	Use Construction Programmes from service providers to develop chart for Opening the improved site to external stakeholders and public	LCC - Padraig O'Hora	VS successful operation, monitoring & maintenance	2M	May-24	Jun-24	Closed
E2	Health and Safety plan/ Risk assessment	Develop suitable Health and Safety plans and Risk Assessments for use of the site by external stakeholders and the public			9M	Jun-24	Feb-25	Closed
E3	Record keeping	Develop and implement an appropriate process to maintain suitable records for the improved site and it's use			9M	Jun-24	Feb-25	Open



3.2. Dundalk (IE)- Procurement Plan

In the initial stages of the co-implementation phase for the Dundalk Pilot, it became evident that the realisation of certain visionary solutions necessitated specific technical components. These included the procurement of specialised sensors, establishment of an outdoor WIFI system aligning with LCCs rigorous IT security protocols, acquisition of a touch screen monitor, for the presentation of green learning data and the Health and Well-being Platform, and deployment of a new CCTV system. Certain technical prerequisites, such as LoRaWAN and sensor procurement, were new experiences for the Local Authority, while others had been previously addressed in Louth County Council projects. Procurement was carried out, in accordance with Local Government Procurement requirements.

The project demanded the implementation of tasks traditionally undertaken by civil engineering contractors and those less conventional to their (and Louth County Council's) expertise. LCC opted to incorporate design and construct aspects into the contract documents for the construction of the works necessary for the project. An element of the contract documents incorporates a design-and-construct section. Within this section, the contractor is obliged to undertake the design and construction of specified project elements, subject to agreement with Louth County Council.

Consolidating the civil works into a single contract was considered the optimal approach for the Dundalk Pilot. This methodology aligned with the city's prior practices, where a provision for Nominated Specialist Contractors was introduced. In this setup, the principal civil engineering contractor collaborates with, manages, and oversees a specialised subcontractor nominated by the client. The contract documents incorporate a lump sum to encompass the anticipated cost of the designated specialist subcontract.

Based on LCC's previous experience of managing major infrastructural projects, the use of tenders featuring a single contracted entity has demonstrated notable advantages in terms of time efficiency. Some of the key benefits observed in this regard include:

- **Streamlined Coordination:** With a single contractor overseeing the entire project, coordination becomes more streamlined. There is no need to manage multiple entities, reducing the complexity of communication and decision-making processes.
- **Faster Decision-Making:** Decision-making processes are expedited as there is a singular point of contact responsible for all aspects of the project. This minimizes delays that may occur when waiting for approvals or input from multiple parties.
- **Efficient Project Management:** The centralized responsibility allows for more efficient project management. The contractor can quickly address issues, allocate resources, and adapt to changing circumstances without the need for extensive coordination with various subcontractors.
- **Consistent Work Schedule:** A single contractor can establish and maintain a consistent work schedule, optimizing the sequencing of tasks. This helps in avoiding downtime and delays that may arise from coordinating multiple subcontractors with varying schedules.
- **Easier Problem Resolution:** In case of issues or challenges, having a single contractor simplifies the process of problem resolution. The responsibility for finding solutions rests with one entity, making it easier to implement corrective measures promptly.



- **Optimized Resource Allocation:** The singular contractor can efficiently allocate resources, manpower, and equipment based on project requirements. This leads to better resource optimization and utilization, contributing to time savings.
- **Unified Accountability:** A single contractor is accountable for the project's overall success. This accountability fosters a sense of ownership, motivating the contractor to meet deadlines and deliver quality work within the stipulated time frame.

In summary, LCC considered that for the VARCITIES project the choice of a single contractor would significantly contribute to time savings by streamlining project management, decision-making, and problem resolution processes.

Another crucial aspect within the construction phase process involved incorporating enabling costs to execute the construction and ensure effective on-site management of the works. These costs encompass various aspects such as on-site health and safety management and waste management. Termed as Associated Construction Costs, these costs were classified as a component of the Visionary Solutions. The construction works pricing document (Bill of Quantities) provided an opportunity to explicitly outline all preliminary work items (i.e., associated construction costs) essential for the successful completion of the project. This ensured the inclusion of critical elements in the contract documents necessary for the project's proper completion. To succinctly summarize these preliminary cost items, we designate them as 'all associated construction costs' and included them as VS Component costs.

Considering that one contractor can provide the entire works specified in the contract documents, with the inclusion of nominated contracts for the specialist aspects of the works, one contract was offered for tender, on e-tenders as an Open tender.

To address the specialized aspects of the project and identify suitable subcontractors with expertise, verbal or written quotes (RFQ*) directly from one or more interested and competent suppliers were solicited. This method is commonly employed for low-cost works. Typically, at least three companies deemed suitable for the task are invited to submit quotes, aligning with the specified work requirements. Following a thorough evaluation of the quotes, LCC selected the most suitable quote that meets the Council's specifications.



Table 42: Dundalk (IE) - Procurement Management Plan





	Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Start (mm/yy)	Finish (mm/yy)	Duration	Status	
VS1	VS1	Outdoor learning pod									
	VS1.1	Learning pod	Materials and installation construction	Open	Works	No	No	01/12/2022	28/02/2023	4M	Closed
	VS1.2	New security gates/fencing	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS1.3	Installation of CCTV in the courtyard Area (funded separately by LCC)	Purchase of CCTV and installation	Restricted	Works	No	No	01/10/2023	30/11/2023	2M	Closed
	VS1.4	Outdoor Wi-Fi within the courtyard area + All sensors across the Visionary Solutions	Purchase of wifi and installation	Competitive procedure with negotiation	Service	No	No	01/09/2022	30/10/2022	2M	Closed
	VS1.5	Installation of Virtual Learning Pod Sensors to collate data on visitor numbers	Purchase of sensors and installation	Restricted	Supply	No	No	01/07/2023	31/10/2023	2M	Closed
	VS1.6	Installation of new Software to record PV savings from existing PV roof panels on Museum roof	Purchase of software and installation	Innovation partnership	Works	No	No	01/09/2022	31/12/2023	4M	Closed
	VS1.7	Associated construction costs	Preliminaries, Site Insurances, Contingencies, installation costs and general construction contract costs	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
VS2	VS2	Outdoor Urban Green Learning and Sensory Garden for Health and Wellbeing									
	VS2.1	Enhance the existing garden area and develop a new Sensory Garden	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS2.2	Moveable and fixed planters	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS2.3	New seating	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS2.4	Rainwater harvesting	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS2.5	Rainwater harvesting sensors	Purchase and installation of sensors	Restricted	Supply	No	No	01/01/2023	28/02/2023	2M	Closed
	VS2.6	Improved public lighting	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS2.7	Installation of vertical metal fins in the courtyard area	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed





Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Start (mm/yy)	Finish (mm/yy)	Duration	Status	
VS2.8	Visitor, Air quality and noise sensors	Purchase and installation of sensors	Restricted	Supply	No	No	01/09/2022	31/12/2022	4M	Closed
VS2.9	Touchscreen Monitor to display green learnings	Purchase and installation of monitor	Restricted	Works	No	No	01/01/2023	28/02/2023	2M	Closed
	Sensory Cubbie	Purchase of sensory Cubbie	Restricted	Supply	No	No	01/03/24	01/05/24	2m	Closed
VS2.10	Associated Construction costs	Preliminaries site insurance safety etc.	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed

VS3	VS3	Sensors on Bike Stations									
	VS3.1	Removal and relocation of the car park area and the enhancement of this surface area for pedestrian and cycle use	Construction mobilisation and associated costs including clearing site and any delays associated	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS3.2	New bike station (inc. integrated sensors to collate data on cyclist numbers and duration of stay)	Materials and installation	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed
	VS3.3	Air quality and noise sensors	Purchase and installation of sensors	Restricted	Supply	No	No	01/09/2022	31/12/2022	4M	Closed
	VS3.4	Associated Construction costs	Preliminaries site insurance safety etc.	Open	Works	No	No	01/11/2022	28/02/2023	4M	Closed

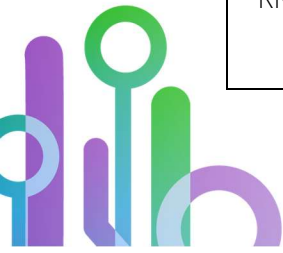


3.3. Dundalk (IE)- Realised Risks & Identified Opportunities

Following is a list of the realised risks that Dundalk pilot faced, along with a brief description of how these risks impacted the Visionary Solutions and the mitigation actions that were put in place.

Table 43: Dundalk (IE) – Realised Risks

Final Risk Report				Date:		31/10/2024	Prepared by:	Ursula Conlon (LCC), Padraig O'Hora (LCC), Koldo Urrutia Azcona (IES)
Summary of realised risks			Inflation, late deliveries, material shortages, permits (right to park), building regulations, health & safety.					
ID	Risk Category	Risk Type	Risk Description	VS	Stage	Risk significance	Risk Impact	Mitigation Action
RR002	Financial	Price	Equipment, installation and labour costs are too high because of inflation	VS 1,2,3	Selection of service providers	Major	Moderate	Conduct effective sourcing and monitor any potential cost increase on materials
RR03	Resources	Delay	Don't have the right people to do the installations because of high demand for their services	VS 1,2,3	Selection of service providers	Major	High	Once requirements are clear, engagement with the right people to do the work should begin as soon as possible
RR10	Adoption	General	VS1 - Loss / relocation of the car-parking area in the courtyard due to the needs of VS1	VS 1	Planning	Moderate	Moderate	Car park has been relocated with no dissatisfied stakeholders
RR017	Legal	Delay	An adjacent landowner is claiming he has a right to park vehicles and to have deliveries within the site area.	VS 1,2,3	Selection of service providers	Moderate	Moderate	Seek agreement to relocate any parking right. Focused engagement has reduced risk
RR018	Scheduling	Delay	Material shortages and delays due to Ukraine war	VS 1,2,3	Selection of service providers	Moderate	Moderate	Begin procurement and planning process as soon as possible once equipment/contractor requirements are clear. QS engaged and waiting for further advice/clarification
RR020	Scheduling	Delay	Uncertainty related to NI protocol (Brexit) and import of goods from EU to non-EU countries (UK & ROI)	VS 1,2,3	Selection of service providers	Low	Low	Begin procurement and planning process as soon as possible once equipment/contractor requirements are clear. QS engaged and waiting for further advice/clarification
RR25	Project Management	Delay	External light fittings corroded so need to be replaced	VS 2	Planning	Moderate	Moderate	Detailed Inspection of Light fittings
RR26	Technical	Delay	Additional components required for measuring success of visionary solutions - 3 phase energy meter required because the existing SPV was installed in 3 phases.	VS 1	Planning	Low	Moderate	Detailed Inspection of SPV prior to construction



RR27	Commercial	Delay	Longer delivery times for materials necessary to construct the works	VS 1,2,3	Execution	Moderate	Moderate	Contractor offered value engineering solutions to fabricate and provide directly with time and cost savings – value engineering offer accepted to mitigate risks.
RR28	Technical	Delay	Health and Safety risks with the installation of project components - Metal Fins (element sharpness and lateral stability issues)	VS 1	Execution	Moderate	Moderate	Proposed and incorporated mitigation measures - increased element thickness and metal stiffeners added
RR30	Reputational	Delay	Building Regulations - Application of Building Regulations to Learning Pod even though it's size determines it to be exempt	VS 1	Planning	Moderate	Moderate	Building Regulations were reviewed to determine if they applied to Learning Pod – exemption confirmed due to the size of L Pod. However, at construction stage – that was reviewed again and to avoid any reputational risk, it was decided to make L Pod subject to Irish Building Regulations
RR31	Technical	Delay	Difficulty locating the route of the watermain on site	VS 1,2	Execution	Moderate	Moderate	Non-invasive investigation undertaken at commencement of construction. However, at construction stage it was confirmed that the watermain is not metal and so was not detected by survey. Watermain investigation revealed the exact path of the WM is under structures – mitigating measure incorporated into construction – new service pipe constructed to enable the proposed new drinking water fountain to be connected to the water main. This will limit risk of delay and significant additional cost
RR32	Commercial	Delay	Difficulty procuring a suitable contractor for the construction of the Learning Pod	VS 1	Tendering	Major	High	Identify and actively engage with specific contractors who undertake such works to explore how best to procure contractor specifically for the Learning Pod works.
RR33	Technical	Delay	Difficulty obtaining specified items for construction - Cyclepod	VS 3	Tendering	Moderate	Moderate	Consider options for specific equipment envisaged for the project and how important such provision is for compliance with grant agreement conditions.



Following is a list of the most significant opportunities identified within the Dundalk pilot, along with a brief description of how these opportunities can be captured.

Table 44: Dundalk (IE) –Identified Opportunities

Summary of opportunities		Encourage cyclists, increase awareness of climate change, promote economic growth, improve access.				
ID	Opportunity Description	VS	Stage	Opportunity Category	Opportunity capture strategy	Status
OR03	VS1 - ease of access to book the pod	1	Selection of service providers	Social	Communication with stakeholders	Ongoing
OR04	VS2 - Potential of economic opportunities and creation of jobs	2	Selection of service providers	Economic	Communication with stakeholders	Under review
OR07	VS3 - Cycling access to the bike sheds, correct design of racks for cyclists	3	Selection of service providers	Technological	Communication with stakeholders and design	Ongoing
OR09	Potential for solar PV to power more on site equipment	1	Selection of service providers	Technological	Consulting within LCC to confirm what can be improved on and what budget exists outside of the project to enhance current VS	Ongoing
OR10	Potential for smart tech to improve VS1 via better smart lighting/smart street furniture	2	Selection of service providers	Technological	Consulting within LCC to confirm what can be improved on and what budget exists outside of the project to enhance current VS	Ongoing



3.4. Dundalk (IE)- Received feedback with respect to the implementation process

Table 45: Dundalk (IE)- Changes in the VS concept design

Dundalk	VS1	VS2	VS3
1. Did any changes occur in the concept design since the initial sketching of your VS?	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No
2. At which stage did the change occur? <i>(multiple choice possible)</i>	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☒ Execution stage	☐ Concept design ☐ Preparation stage ☒ Selection of services providers ☐ Execution stage	☐ Concept design ☒ Preparation stage ☐ Selection of services providers ☐ Execution stage
3. What kind of change occurred? <i>(multiple choice possible)</i>	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other
4. Which is the main reason for any changes to occur? <i>(multiple choice possible)</i>	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other
5. How did the changes affect the progress of work? <i>(multiple choice possible)</i>	☒ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☒ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☐ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other

Table 46: Dundalk (IE)- Required expertise

Dundalk	VS1	VS2	VS3
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1. Which experts (in-house & service providers) were involved in the design / implementation of your VS? (multiple choice possible)	☒ Architect/ Engineer ☒ Landscape designer ☒ Urban planner ☒ NbS expert ☐ Researcher ☒ IT expert ☒ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☐ Municipal project officer ☐ Other:	☒ Architect/ Engineer ☒ Landscape designer ☒ Urban planner ☒ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:	☒ Architect/ Engineer ☒ Landscape designer ☒ Urban planner ☐ NbS expert ☐ Researcher ☒ IT expert ☒ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:
2. Which was the highest level of expertise required for in-house experts?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☒ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒
3. Which was the highest level of expertise required for service providers?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☒ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒



Table 47: Dundalk (IE)- Experiences from the procurement process

Dundalk	VS1	VS2	VS3
1. Did you experience any difficulties with the procurement process?	☒ Yes ☐ No	☐ Yes ☒ No	☐ Yes ☒ No
2. In case of any difficulties, please describe the reason. <i>(multiple choice possible)</i>	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☒ Market analysis ☐ Level of expertise required ☒ Other: Little interest from contractors in offering a quotation for the learning pod, given the bespoke design	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other

Table 48: Dundalk (IE)- Budget variances

Dundalk	VS1	VS2	VS3
1. Were there any significant variances to the budget needed for your VS? ($\pm 20\%$)	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No
2. Which was the reason for any significant budget variance? <i>(multiple choice possible)</i>	☐ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☒ Unforeseen costs ☐ Other	☐ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☒ Unforeseen costs ☐ Other	☐ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☒ Unforeseen costs ☐ Other



Dundalk	VS1	VS2	VS3
	- During the co-design stage, STKs requested additional items to be added which would alleviate their concerns. LCC has match funded these elements. However, the changing of the public lighting was not as simple as predicted, given the corrosion to the existing lamp poles. New lighting, sympathetic to the historic site had to be purchased, which was an unforeseen cost. - An in-depth topographic survey was required. This was more detailed than initially envisaged - Rising costs and labour shortages have increased substantially since the initial Bill of Quantities was prepared		

Table 49: Dundalk (IE)- Experienced delays

Dundalk	VS1	VS2	VS3
1. Were there any delays in your workplan	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No
2. Which was the reason for the delay? (multiple choice possible)	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☒ Approvals ☐ Project complexity ☒ Procurement issues ☒ Labor challenges ☒ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☒ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other
	- Technical issues with metal fins – stability and suitability for interaction with public needed to be considered more carefully at fabrication-stage for construction. Also decided to improve paving in a small area of the site at construction-stage due to a value engineering offer. - Approvals from external bodies e.g. environmental protection agency, parking permits, etc had to be applied during varying phases of the project - Adjacent landowners, parking rights, required resolution. This involved relocating staff and business parking to an area agreeable for all. - Learning pod was originally modular in design. However, to mitigate further time delays the pod is being constructed on site. These changes and the decision making led to delays.		



Table 50: Dundalk (IE)- Key take aways

Dundalk	VS1	VS2	VS3
1. Looking back, what aspects of any implementation stage would you approach differently?	☒ Preparation ☒ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☒ Preparation ☒ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☒ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring
2. What were the most valuable lessons learned during the development of the concept design and the setting up of the implementation process?	The Learning Pod concept started as a low-cost building to facilitate NB and HWB learning ... however the project team may not have fully understood the plan by the project architect ... and the high-quality product expected at construction.	More consideration by the project team for all aspects of the design by the project architect.	The involvement of STKs across all engagement activities was valuable as it gave the community a sense of ownership and thus planning permission was secured without any objections
3. Which preventive measures would you recommend for future replication of your VS?	• Longer design timeframe to enable more detailed co-ordination with implementation team members and with stakeholders – the timeframe for design and implementation on this project was quite rushed because the project team had so many tasks to undertake simultaneously for the project. • Finalised construction drawings should be drawn up in tandem with planning drawings to avoid the delays with ordering materials.		
4. If you could start over, what would you change about the preparation stage?	• Longer design timeframe to enable more detailed co-ordination with implementation team members and with stakeholders. • Assign more staff to assist the architectural design element. This held up ordering materials.		
5. If you could start over, what would you change about the procurement stage?	• Longer timeframe to enable more consideration of procurement process. • Including the Learning Pod into the overall contract initially, rather than separating the works.	Longer timeframe to enable more consideration of procurement process.	
6. If you could start over, what would you change about the budget planning?	• Longer design timeframe to enable more detailed co-ordination with implementation team members and with stakeholders to get a better understanding of the envisaged costs for construction-stage. • A larger contingency budget would be foreseen.		



3.5. Dundalk (IE)- Operation and Maintenance

Louth County Council assumes responsibility for the infrastructure implemented through the VARCITIES project. The Council's Facilities Section will oversee the maintenance aspects of the County Library and County Museum Open space, incorporating them into the Council's overall maintenance plan for its buildings. Furthermore, the operational aspects of certain elements within the Visionary solutions, such as the sensory garden, are anticipated to be primarily overseen by external stakeholders. Louth County Council will play a supportive role in facilitating and ensuring the success of these operational endeavours with maintenance and planting training to be provided by experts.

- For the sensors i.e. noise, and Sensedge stick, people and bicycle counters, the air Quality Monitor measuring temperature, relative humidity, VOCs, Barometric pressure, CO2, Oxygen, Particulate matter, PM1, 2.5, 4, 10 and 1 Rainwater monitor LoRaWAN - maintenance is part of the contract.
- For the smart lighting - the maintenance is part of the general maintenance strategy for all public lighting managed by Louth County Council.
- For the air quality sensors, the maintenance is undertaken by The Irish Environmental Protection Agency, as part of its national air quality management programme.

3.5.1. O&M of NbS

Table 51: Dundalk (IE)- O&M of NbS

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Sensory garden	Regular/ Preventive Maintenance	Type of action(s)	1. Weeding and pruning 2. Irrigation system inspection 3. Monitoring for pests and diseases 4. Mulching 5. Inspection of structures, 6. Adjustment of watering schedules based on seasonal needs	Small budget assigned by LCC (2000/3000€)	5 years
		Frequency	Weekly		
		Procedure	Support to the organisations of the group of volunteers and training for performing the preventive maintenance actions CCTV passive surveillance to protect from vandalism		
		Responsibility	LCC to train volunteers / contractor/ Volunteers within the local community		
		Solution specific issues	A group of volunteers (local community) will take over the sensory garden maintenance works. Planting and Maintenance training will be provided by LCC and the contractor (biodiversity expert).		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Pro-active care/ Remedial actions	Type of action(s)	1. Irrigation system repairs: clear clogged sprinkler heads, replace damage hoses or pipes 2. Replace old/ decomposed mulch with fresh material 3. Repair garden structures, seating areas, fences. 4. Replace damaged or deteriorated materials 5. Repaint/ refinish surfaces as needed		5 years
		Procedure	TBC		
		Responsibility	LCC		
		Solution specific issues	TBC		

3.5.2. O&M of Socio/ Cultural Solutions

The contractor of the learning pod has declared his commitment to provide spare parts, consumables, and maintenance services for at least 1 year after the issue of substantial completion for that work. Thereafter, Louth County Council will be responsible for provision of spare parts, consumables and maintenance services. Louth County Council will nominate its Facilities Section (of the Local Authority) as responsible for the monitoring and the operation of the Learning Pod and other solutions put in place by the VARCITIES Project.

Table 52: Dundalk (IE)- O&M of Socio/ Cultural solutions

Operation & Maintenance	Activity	Information required	Description	Cost per year (€)	Lifetime (years)
Learning pod	Regular/ Preventive Maintenance	Type of action(s)	Monitoring and maintenance of the building: 1. Structural inspection 2. Roof inspection 3. Exterior cleaning 4. HVAC system maintenance 5. Electrical system inspection 6. Door and window maintenance 7. Interior cleaning 8. Security checks 9. Record keeping	TBC	15yrs
		Frequency	Daily		
		Procedure	Integration of the Learning pod into LCC buildings' portfolio. Cleaning, visual inspections, management of equipment.		
		Responsibility	Facilities LCC unit.		
		Solution specific issues	TBC		

Operation & Maintenance	Activity	Information required	Description	Cost per year (€)	Lifetime (years)
	Regular/ Preventive Maintenance	Type of action(s)	1. Daily management of the library. 2. Repair cracks/ leaks/ rot or address insect infestation of pod's structural components. 3. Repair damaged areas of roof-reseal seams, clean gutters and downspouts to ensure proper drainage and prevent water infiltration. 4. Replace worn or damaged components. 5. Replace HVAC filters, clean ducts. 6. Replace damaged weatherstripping, hinges, locks.		
		Frequency	Quarterly		
		Procedure	TBC		
		Responsibility	Library caretaker (LCC)		
		Solution specific issues	TBC		

3.5.3. O&M of Digital Solutions

Sensors used in Dundalk VSs are stated in Table 53: sensor ID number, commercial name, measuring unit, quantity used together with the sensor's communication protocol, and the reference link.

Table 53: Dundalk (IE)- Sensors and devices used

N o.	Sensors	Measuring	Quant ity	Protoc ol	Link as reference
1	SensMax TAC-B 3D-W	number of visitors	1	Wi-Fi	https://sensmax.eu/devices/sensmax-tac-b-real-time-people-counting-radar-sensor/
2	Efergy Engage Hub HH2.0 + Efergy Engage Mini Sensor and transmitter	solar panel energy production	1	Wi-Fi	https://www.enrgtech.co.uk/manufacturer/efergy
3	Libelium noise level sensor	noise	1	LoRaWAN	https://www.libelium.com/libeliumworld/new-sound-level-sensor-to-control-noise-pollution/
4	Wanesy Wave	number of visitors	1	LoRaWAN	https://www.kerlink.com/product/wanesy-wave/
5	IEI – Bigfoot	water flow (from site to combined sewer)	1	Wi-Fi	https://www.inmtn.com/water/water-flow/flow-sensors/bigfoot-installed_2
6	Sensedge Senstick	T, RH, Air pressure	5	LoRaWAN	https://senstick.co/
7	Cyclepods Bike Detection System	Presence of bicycles	1	Wi-Fi	https://www.cyclepods.co.uk/



The local governance for IoT maintenance strategy follows a fixed schedule. Local Pilot Expert or VS manager can manage Planned downtime rather than emergency downtime. The Dundalk pilot's central and periodic evaluations of the IoT are additionally used for managing the coherent progress of VSs performance.

- Set maintenance dates are as much as possible in-line with the typical battery lifespan used in the sensors which are part of the local IoT network (VS1, VS2 and VS3).
- Sensedge's Sensor Management Platform receives and evaluates the additional local sensor data: battery level, signal-to-noise ratio, signal strength indicator of the channel, to enable local users with alerts on possible unforeseen degradations and miscalibration of IoT devices used in the VSs.

Table 54 and Table 55 provide a short description of the local governance strategy and persons or organisations responsible for monitoring and maintaining the local IT infrastructure.

Table 54: Dundalk (IE)- Local IT infrastructure/ Management

Local governance (Months / Weeks)	Once a month
Short description	The audit will be performed once a month. Maintenance of the ICT platform, IoT sensors network, functioning of the sensors, the reliability of the measurements, and the battery status will be checked. This will be managed overall by Padraig O'Hara from Louth County Council (LCC).

Table 55: Dundalk (IE)- Local IT infrastructure/ Maintenance responsibility

Monitoring Manager / Organisations responsible for maintenance	
Person/Organisation responsible for sensor performance / Data backup verifications	Supplier as part of a supply, install and maintain contract
Person/Organisation responsible for on-site scheduled maintenance	Supplier as part of a supply, install and maintain contract
Person/Organisation responsible for unscheduled maintenance	Supplier as part of the warranty for supply, installation and maintenance contract

Table 56: Dundalk (IE)- O&M of Digital Solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Total Solar Radiation Sensors	Regular/ Preventive Maintenance	Type of action(s)	Verification of correct data streaming, battery and signal strength	100	TBC
		Frequency	Quarterly		
		Procedure	Data analysis		
		Responsibility	TBC		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally and if		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Pro-active care/ Remedial actions		needed specified technical assistance will be requested	100	
		Type of action(s)	Connection and cable check		
		Procedure	Visual verification		
		Responsibility	TBC		
		Solution specific issues	Substitute cables or other components		
Noise Sensors	Regular/ Preventive Maintenance	Type of action(s)	Verification of correct data streaming, battery and signal strength	100	TBC
		Frequency	Quarterly		
		Procedure	Data analysis		
		Responsibility	TBC		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally and if needed specified technical assistance will be requested		
	Pro-active care/ Remedial actions	Type of action(s)	Connection and cable check		
		Procedure	Visual verification		
		Responsibility	TBC		
		Solution specific issues	Substitute cables or other components		



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

4.1. Gzira (MT)- Implementation status of the Visionary Solutions

Two out of the three Visionary Solutions envisioned for Gzira, VS1 and VS2 are currently fully operational. Most components of VS3 are fully implemented, while some are in the final stages of execution stage. The Visionary Solutions in Gzira are being exploited from a digital, NbS and socio-cultural perspective.

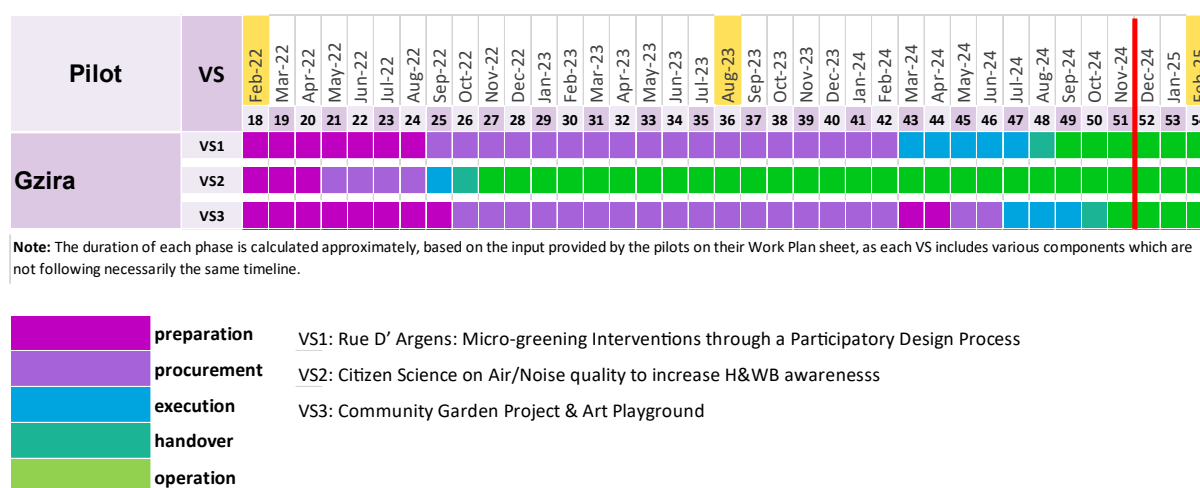


Figure 27: Gzira (MT)- VS implementation status

4.1.1. Overview of the Visionary Solutions

VS 1: Rue D' Argens: Micro-greening Interventions through a Participatory Design Process.
Status: Operational

After a series of field observations to investigate the conditions of the street, residents participated in the regeneration of the area through micro-greening and pop-up NBS solutions. Participants were provided with seeds for native plants, to improve greening in the streetscape. Users of the space and local community members were consulted through three pop-up engagement activities to collect first-hand information about the needs of the locality and inform them of possible NbS to implement greening. The data was evaluated and discussed with the local council to explore ways to improve them. The pop-up activities (Figure 28), which took place during the winter of 2022 (focused on educational science, environmental and cultural events), were combined with temporary greening measures and temporary pedestrianization of specific sites in the intervention area, encouraging citizens to engage with the area in new ways. Another objective behind these temporary interventions was also to test the effects of such interventions on the local community and on the overall infrastructure affected. For example, through these initiatives, impacts on traffic, space distribution and urban aesthetics could be assessed, particularly by the local authorities.

These insights are expected to act as a springboard for future permanent infrastructure that the local authorities could implement using more extensive infrastructural budgets.



Figure 28: Gzira (MT)- Pop-up parks and micro-greening interventions

In addition, a permanent micro-greening project was co-designed near a bus stop on Rue D'Argens, reflecting community preferences. Before the implementation plans, a site survey was conducted, and a preliminary proposal was submitted to the local council to assess feasibility. A landscape architect developed sketches for the intervention, and the council approved the required permit. However, due to the presence of underground services, the original plan was modified to use above-ground planters instead of excavated pits. Meanwhile, the local council, following the momentum that the VARCITIES project produced, started working on a larger plan encompassing a wider area of the bus stop, that could be funded from government funds.

The above-ground planters were designed with adjoining benches, intended for people to sit on, while waiting for the bus. Once the trees mature, they will provide shade, offering shelter from the sun. Figure 29 shows the planter schematic that was requested during the procurement process. Manufacturing of these planters and the procurement of the trees were completed in May 2024. A high-up service was also procured to transfer the planters to their specific spot. The two planters with trees were placed alongside the bus stop in June 2024. A3 posters were designed and affixed to the planters, providing information about the tree species. The posters also indicated that the micro-greening intervention was funded by the VARCITIES project. This VS sets the foundation for the Green Shelter project, which is led by the Research Innovation Unit on behalf of Gzira Local Council and funded by the Project Green Community Greening Grant. The latter aims to reclaim street space for public use, improve citizens' quality of life, and enhance ecosystem services through NBS. Planned features include permeable paving, bioswale planters, native plants to attract pollinators, and a green canopy at the bus station for added shade. Figure 30 and Figure 31 show pictures from the execution and operation phase.



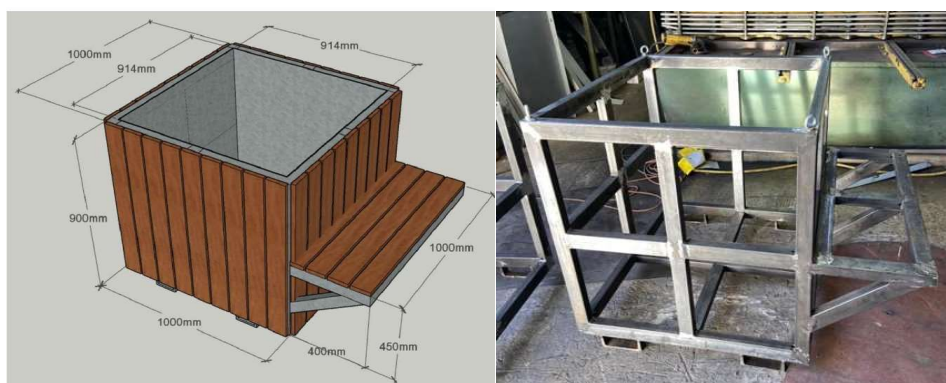


Figure 29: Gzira (MT)- Progress of planters being manufactured for commissioning on site



Figure 30: Gzira (MT)- Execution phase - Planters and trees being delivered to the site and installed



Figure 31: Gzira (MT)- Operational phase: planters installed and in use. Posters providing information about the type of tree, the specific intervention, and how it serves as a stepping stone for further NBS projects in the area, were affixed to the planters.

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

Status: Operational

The use of distributed sensor technologies is the core concept behind this VS, where science is citizen led by means of installations in outdoor areas of people's homes or in public spaces.



Sensors have been installed at various locations throughout Gzira to identify the various pollutants and the quantities of air pollution in interest. Pre-intervention measurements were first carried out at locations corresponding to Gzira Gardens, Rue D'Argens and at the University of Malta as a reference point. Pre-intervention noise measurements were also done along with traffic flow measurements using traffic flow pressure-based sensor measurements. These were carried out using already available equipment. This pre-intervention measurement was used as a basis for the identification of the air quality challenge in Gzira. Fifteen citizens, living within the intervention area, were recruited to host the sensors on their balconies. The engagement process took the form of surveys and workshops involving the use of HoloLens devices procured under the project. Following a procurement procedure, conducted by the University of Malta, another tender was issued and awarded for the provision of sensors. Throughout 2022, the sensors were installed in the resident's homes and public spaces in Gzira. Currently they are all operational, transmitting data on chemical air quality indicators (Figure 32).

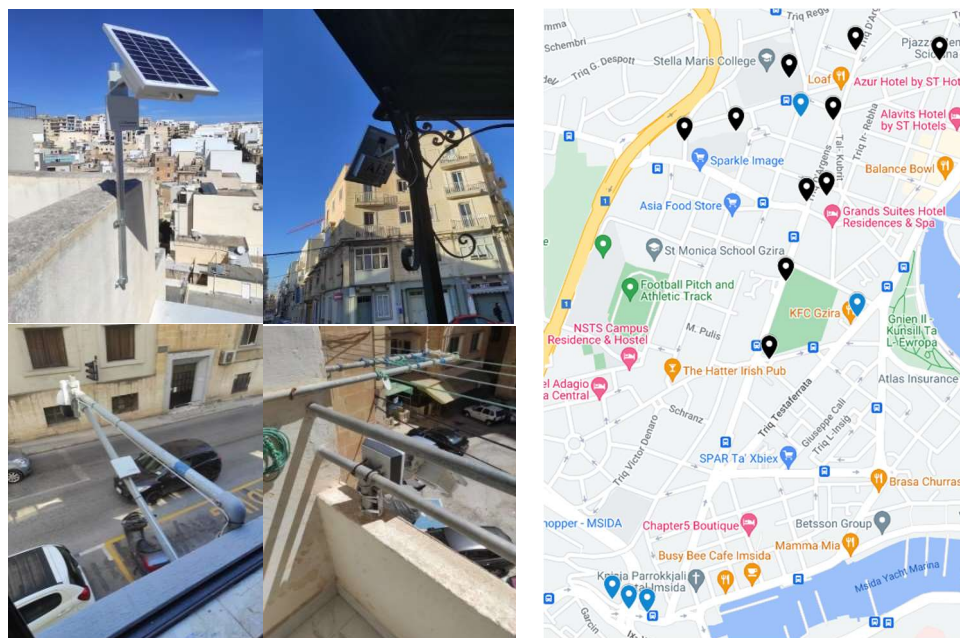


Figure 32: Gzira (MT)- Sensors installed in various locations including households and public spaces (Senstate sensors: black/ Sensedge sensors: blue)

The distribution of sensors around Gzira was also performed to cover as wide an area as possible with a gateway located at the Gzira Local council. Due to the high building density in the area, some issues were encountered with data transmission. Senstate sensors measured air quality while Sensedge sensors measured temperature and relative humidity. Particularly the Sensedge (Temperature and RH) sensors had some difficulties with the signal reaching the gateway, but the remaining gave enough data counts. This issue with signal reach was not deemed to have an effect on evaluation and the volume of data gathered was more than sufficient for a proper evaluation.

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



NbS interventions and citizen engagement activities were implemented at St. Clare Primary and Stella Maris Schools and the Gzira Council of Europe Gardens with the intention of embedding a greener perspective into the area's educational institutions and cultural context. Pop-up initiatives near the primary school were first organized to inform citizens of the intended actions. Several workshops were held with children, parents, and teachers at the school to enable the co-creation of the whole design. Children were encouraged to paint or draw their ideas in a blank canvas activity, among others (Figure 33). Following an area survey, concepts were incorporated into sketches by a landscape architect and were used to produce plans and infrastructural design for the garden in more detail. A playscape cube structure was conceived which can be decorated with plants and allows students to carry out various educational activities during lesson time or even during breaktime (Figure 34, Figure 35). Plants were selected to attract birdlife, bringing nature closer to our urban environments and instil ecological awareness into our younger generations.



Figure 33: Gzira (MT) - Co-creation activities with school children

As part of the preparation phase, consultations were held with the architect on the designs and the permit procedure required was sought to apply for a permit from the local planning authority. After this and following a call for quotations, the playscape cubic structure was built and this part of the visionary solution completed. It must be noted that further funds were sought for this intervention that went beyond the VARCITIES budget so that our budget could be utilized to do more if time allows. Small plays and artistic structures were also created.



Figure 34: Gzira (MT)- Construction works of the playscape cube structure



Another important requirement required by the permit was a health and safety certification by a warranted engineer. The contracted engineer recommended health and safety mats incorporated in the design. These were installed after the construction phase.



Figure 35: Gzira (MT)- Co-implementation of greening of the cube structure with primary school students

Given the available time and remaining budget, the pilot leaders decided to have another small area constructed in the school. Guidance was provided by the procurement office of the University of Malta (UM), to issue a tender for the construction works including excavation and landscaping. Although the tenders were issued and awarded, several hurdles were found from the Ministry of Education to give the go-ahead to this additional intervention. This was due to a change in administration which had a different attitude from the one with which the UM team collaborated during these past three years. The hurdles were mostly related to logistical issues linked primarily to maintenance and infrastructural works.

For some time, it was unclear whether the Ministry of Education was going to provide with the green light to carry on with the intervention. Therefore, to account for this, another intervention was planned for a nearby school, Stella Maris College which has very similar characteristics to St Clare Primary (see description below). When the Ministry of Education gave their go-ahead, preparations for Stella Maris were already underway but given the available budget resources it was decided to proceed with the interventions in both schools.

The excavation at St. Clare Primary was completed in the beginning of November 2024. Landscaping is expected to follow in the second week of November; hence the intervention is planned to be completed by end of November. A co-implementation activity, including planting activities with the children and the school community, is scheduled for December 2024. The co-design phase for the intervention at Stella Maris College involved gathering feedback from both teachers and students to collaboratively create solutions that address the specific needs, challenges, and experiences of the school community. Teachers were provided with a survey questionnaire, which asked about their teaching experiences at the school, explored ways to improve the learning experience for students, and inquired about the frequency of student engagement in activities such as creative expression and outdoor education. Additionally, the survey sought their opinions on how access to green spaces and related interventions could impact their teaching practices. Students participated in a

'Sketching the Solutions' and 'Blank Canvas' activity (Figure 36) where groups engaged in discussions to brainstorm effective ways to improve their school environment. A common theme was to have more activities related to outdoor education such as planting, growing fruit and vegetables and holding lessons in the school garden.

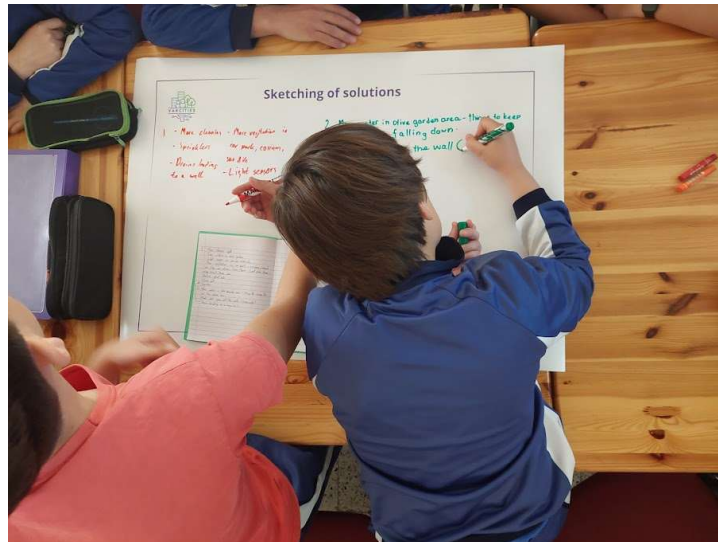


Figure 36: Gzira (MT) Sketching of solutions activity at Stella Maris

Based on the feedback, a landscape architect designed a solution that incorporated “stepped” planters in an underutilized area of the school. A call for quotations for the construction and waterproofing of the planters was issued and awarded. Additionally, a Health & Safety (H&S) officer was brought in to assess risks and prepare a report. The construction of the planters was completed by the end of September (Figure 37). The rendering and laying of soil and other substrates are currently being completed (November 2024). A co-implementation activity, including planting activities with the children and the school community, is scheduled for December 2024.

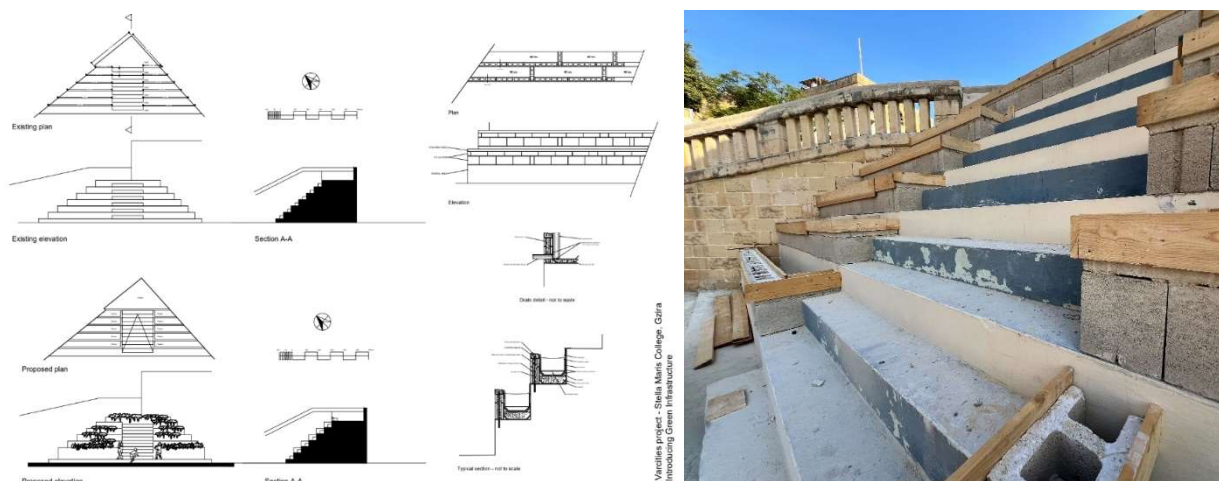


Figure 37: Gzira (MT) Proposed plan and construction of the Stella Maris planters

In overall, this VS serves to generate interest in other upscaled projects and local replications. Another part of this VS concerns the local council's Planned redevelopment of the Gzira Gardens. An outdoor cultural event was held to explore, along with the citizens, the possibilities of using NbS (Figure 38). The outcomes have been considered together with the

Gzira local council and developers to promote a co-creative attitude towards local planning and development.



Figure 38: Gzira (MT)- Photos from the VS3 cultural event



4.1.2. Detailed workplan for VS1.1

Table 57: Gzira (MT) - Work Plan VS1.1





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A8	Preparation stage							
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA...)	Clarification with local council regarding permits	UM Emma Clarke	Data collected from stakeholders and VS1 defined	1M	Feb-22	Feb-22	Closed
A2	Clarify requirements regarding procurement, accounting rules	Clarify requirements with procurement office	UM Emma Clarke		1M	Mar-22	Mar-22	Closed
A3	Supporting actions	Notification and permissions from transport Malta and Gzira local council	UM Emma Clarke		2M	May-22	Jun-22	Closed
A4	Designs	Collected data from local citizens and other stakeholders to create designs for temporary greening measures with landscape architect	UM Emma Clarke		7M	Mar-22	Aug-22	Closed
A5	Specifications	Define exact sites for pop up park events	UM Emma Clarke		2M	May-22	Jun-22	Closed
A6	Preliminary budget	Define preliminary budget	UM Emma Clarke		2M	Jun-22	Jul-22	Closed
A7	Risk management plan	Define risks and mitigation strategies	UM Emma Clarke		2M	Jun-22	Jul-22	Closed
A8	Record keeping	Keep track of data collected from local citizens	UM Emma Clarke		10M	Feb-22	Nov-22	Closed
B1- B6	Selection of Service providers							
B1	Preparation and planning	Issue a call for quotations	UM Emma Clarke	Issue call for quotations	3M	Jul-22	Sep-22	Closed
B2	Publication and transparency	Record keeping of quotations received from different suppliers	UM Emma Clarke		2M	Aug-22	Sep-22	Closed
B3	Evaluation of tenders and award	Chose best supplier from received quotations	UM Emma Clarke		3M	Jul-22	Sep-22	Closed
B4	Contract implementation	Contractors to implement contract	UM Emma Clarke		5M	Oct-22	Feb-23	Closed
B5	Risk management plan	Possible risks assessed and mitigation strategies	UM Emma Clarke		1M	Sep-22	Sep-22	Closed
B6	Record keeping	Keep record of all quotations received	UM Emma Clarke		4M	Jul-22	Oct-22	Closed
C1- C4	Execution process							





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
C1	Waste management	Plan created to reuse materials procured for events. Furniture and Greening to be handed over to St. Clare Primary School	UM Emma Clarke		1M	Sep-22	Sep-22	Closed
C2	Manufacturing and construction	Design process for repeatable assembly of pop ups	UM Emma Clarke		1M	Sep-22	Sep-22	Closed
C3	Risk management plan	Define risks and mitigation strategies	UM Emma Clarke		1M	Sep-22	Sep-22	Closed
C4	Record keeping	Keep track of local citizens who engage with temporary greening	UM Emma Clarke		3M	Nov-22	Jan-23	Closed
D1- D2	Handover							
D1	Commissioning	Commissioning of events in Rue D'Argens	UM Emma Clarke	Host Events	4M	Nov-22	Feb-23	Closed
D2	Operation and Maintenance concept	Trees and furniture handed over to St Clares	UM Emma Clarke		1M	Mar-23	Mar-23	Closed
E1- E4	Operation / Social & Cultural Solutions							
E1	Publicity and Events	Pop-up Greening and Citizen engagement Parks	UM Emma Clarke	Evaluation of intervention	3M	Nov-22	Jan-23	Closed
E2	KPIs to be measured	Measuring KPIs	UM Emma Clarke		13M	Feb-22	Feb-23	Closed
E3	Monitoring and Evaluation	Monitoring and Evaluation	UM Emma Clarke		31M	Feb-22	Aug-24	Open
E4	Record keeping	VS1 data	UM Emma Clarke		19M	Feb-23	Aug-24	Open



4.1.3. Detailed workplan for VS1.2

Table 58: Gzira (MT) - Work Plan VS1.2





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A8	Preparation stage							
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA,...)	Clarification of permit requirements for micro-greening with Gzira local council.	UM Emma Clarke	Data collected from stakeholders and VS1 defined	2M	Sep-23	Nov-23	Closed
A2	Clarify requirements regarding procurement, accounting rules	Clarify requirements with procurement office	UM Emma Clarke		2M	Sep-23	Nov-23	Closed
A3	Supporting actions	Land survey for bus stop area to be greened	UM Emma Clarke		1M	Dec-23	Dec-23	Closed
A4	Designs	work with landscape architect to design micro-greening interventions using inputs previously collected from citizens	UM Emma Clarke		2M	Dec-23	Jan-24	Closed
A5	Specifications	Architect to Identify specifications for greening materials	UM Emma Clarke		2M	Dec-23	Jan-24	Closed
A6	Preliminary budget	Define budget	UM Emma Clarke		5M	Jan-23	May-23	Closed
A7	Risk management plan	Possible risks assessed and mitigation strategies	UM Emma Clarke		11M	Apr-23	Feb-24	Closed
A8	Record keeping	Record of data from citizens, record of permit application and land survey	UM Emma Clarke		14M	Jan-23	Feb-24	Closed
B1- B6	Selection of Service providers							
B1	Preparation and planning	Define specifications for planter construction	UM Emma Clarke	Issue call for quotations	5M	Sep-23	Jan-24	Closed
B2	Sending quotation requests	Sending quotation requests to list of suppliers with specifications for construction	UM Emma Clarke		1W	Jan-24	Jan-24	Closed
B3	Evaluation of quotes for planters and trees	Cheapest quote selected and approved by university procurement team	UM Emma Clarke		2W	Feb-24	Feb-24	Closed
B4	Contract implementation	Contractors to implement contract	UM Emma Clarke		1M	Feb-24	Mar-24	Closed
B5	Risk management plan	Possible risks assessed and mitigation strategies	UM Emma Clarke		1M	Feb-24	Mar-24	Closed
B6	Record keeping	Tender selection process documented online, record of contract and record of risks and mitigation strategies	UM Emma Clarke		7M	Sep-23	Mar-24	Closed
C1- C6	Execution process							

Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
C1	Health and Safety plan	Create health and safety plan for installation of planters	UM Emma Clarke	Installation of greening (through planters)	1M	Feb-24	Apr-24	Closed
C2	Preparation works on site	Define necessary preparation on site for addition of planters	UM Emma Clarke		1M	Feb-24	Apr-24	Closed
C3	Waste management	Create site waste management plan	UM Emma Clarke		1M	Feb-24	Apr-24	Closed
C4	Manufacturing and construction	Monitoring and execution of works on site by selected service provider	UM Emma Clarke		1M	Feb-24	Apr-24	Closed
C5	Risk management plan	Possible risks assessed and mitigation strategies	UM Emma Clarke		1M	Feb-24	Apr-24	Closed
C6	Record keeping	Documentation stored and archived	UM Emma Clarke		1M	Feb-24	Apr-24	Closed
D1- D2	Handover							
D1	Commissioning	Commissioning of Infrastructural intervention, a bus stop area in Rue D'Argens	UM Emma Clarke	handover to Gzira local council	3M	Apr-24	Jun-24	Closed
D2	Operation and Maintenance concept	Agreement being reached with local council	UM Emma Clarke		2M	Feb-24	Mar-24	Closed
E1- E4	Operation / Social & Cultural Solutions							
E1	Publicity and Events	Events Planned in VS1.2	UM Emma Clarke	Evaluation of intervention	2M	May-24	Jun-24	Closed
E2	KPIs to be measured	Measuring KPIs	UM Emma Clarke		29M	Oct-22	Feb-25	Open
E3	Monitoring and Evaluation	Monitoring and Evaluation	UM Emma Clarke		25M	Feb-23	Feb-25	Open
E4	Record keeping	VS1 data	UM Emma Clarke		25M	Feb-23	Feb-25	Open



4.1.4. Detailed workplan for VS2

Table 59: Gzira (MT) - Work Plan VS2





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A8	Preparation stage							
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA,...)	Clarification of permit requirements with local council. Ethics requirements for recruiting volunteers to install sensors.	UM Daniel Micallef	Feedback about intervention is collected	3M	Feb-22	Apr-22	Closed
A2	Clarify requirements regarding procurement, accounting rules	Clarify requirements with procurement office	UM Daniel Micallef		3M	Feb-22	Mar-22	Closed
A3	Stakeholder engagement	Stakeholder engagement and recruitment of research participants from survey conducted with Gzira residents	UM Daniel Micallef		2M	Mar-22	Apr-22	Closed
A4	Planning and locations of sensors	Preparation of locations on Gzira map and exact localisation of sensors at residences and in public spaces	UM Daniel Micallef		1M	Jun-22	Jul-22	Closed
A5	Specifications	Procurement specifications for sensors	UM Daniel Micallef		1M	Feb-22	Feb-22	Closed
A6	Preliminary budget	To specify preliminary budget	UM Daniel Micallef		1M	Feb-22	Feb-22	Closed
A7	Risk management plan	Possible risks assessed and mitigation strategies	UM Daniel Micallef		3M	Feb-22	Apr-22	Closed
A8	Record keeping	N/A	UM Daniel Micallef		3M	Feb-22	Apr-22	Closed
B1- B5	Selection of Service providers							
B1	Preparation and planning	Writing of a Call for Quotations	UM Daniel Micallef	Call for quotations issued	1M	Mar-22	Mar-22	Closed
B2	Publication and transparency	Publication and transparency through e-tenders (the local authority's central platform for the publication of public procurements)	UM Daniel Micallef		1M	Apr-22	Apr-22	Closed
B3	Evaluation and award of quotation	Evaluation board appointed and evaluation carried out	UM Daniel Micallef		2M	May-22	Jun-22	Closed
B4	Contract implementation	Contractors to implement contract	UM Daniel Micallef		2M	Jul-22	Aug-22	Closed
B5	Risk management plan	Possible risks assessed and mitigation strategies	UM Daniel Micallef		3M	Jun-22	Aug-22	Closed
C1- C2	Execution process							
C1	Preparation works on site	Installation of sensor in private premises and networking	UM Daniel Micallef		3M	Jul-22	Sep-22	Closed





Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
C2	Risk management plan	Possible risks assessed and mitigation strategies	UM Daniel Micallef	Networking sensors & Logistics	3M	Jul-22	Sep-22	Closed
D1- D2	Handover							
D1	Commissioning	Commissioning of sensors in Gzira residents' premises	UM Daniel Micallef	Installation of sensors	3M	Mar-23	May-23	Closed
D2	Operation and Maintenance concept	Planned with local council	UM Daniel Micallef		2M	Sep-22	Oct-22	Closed
E1- E4	Operation / Social & Cultural Solutions							
E1	Publicity and Events	Sensors installed in Rue D'Argens residents' balconies	UM Emma Clarke	Evaluation of intervention	25M	Aug-22	Aug-24	Closed
E2	KPIs to be measured	Measuring KPIs	UM Emma Clarke		24M	Aug-22	Aug-24	Open
E3	Monitoring and Evaluation	Monitoring and Evaluation	UM Emma Clarke		18M	Apr-23	Oct-24	Open
E4	Record keeping	VS2 data	UM Emma Clarke		16M	Apr-23	Aug-24	Open

4.1.5. Detailed workplan for VS3

Table 60: Gzira (MT) - Work Plan VS3





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A10	Preparation stage							
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA,...)	Approval from Head of College at St. Clare Primary School, approval from ethics board at UM, clarification of permit requirements with and approval from Gzira Local Council, approval from Malta's Planning Authority	UM Kurt Calleja	Feedback collected from Stakeholders and VS3 defined	7M	Feb-22	Aug-22	Closed
A2	Clarify requirements regarding procurement, accounting rules	Clarify requirements with procurement office	UM Kurt Calleja		7M	Apr-22	Oct-22	Closed
A3	Supporting actions	Land surveys	UM Kurt Calleja		3M	Dec-21	Apr-22	Closed
A4	Designs: Gzira Primary School	Collected data from school children, teachers and parents with an artist, and developed the designs with the landscape architect	UM Kurt Calleja		2M	Jan-22	Mar-22	Closed
A5	Specifications: Gzira Primary School	Procurement specifications for greening and constructions related to the play equipment, multi-sensory areas and outdoor furniture	UM Kurt Calleja		6M	Sep-22	Feb-23	Closed
A6	Preliminary budget	To specify preliminary budget	UM Kurt Calleja		2M	Jul-22	Aug-22	Closed
A7	Risk management plan	Possible risks assessed and mitigation strategies	UM Kurt Calleja		3M	Apr-22	Jun-22	Closed
A8	Record keeping	Documents related to the permit process, number of participants and their social background, amount of green space before the construction/intervention, number of individuals employed (incl. subcontractors), accesses to the public, biodiversity and other H&WB related data	UM Kurt Calleja		13M	Jan-22	Feb-23	Closed
A9	Designs: Stella Maris College replication intervention	Collected data from school children, teachers and school administrators, and developed the designs with the landscape architect	UM Kurt Calleja		2M	Feb-24	Mar-24	Closed
A10	Specifications: Stella Maris College replication intervention	Procurement specifications for greening and constructions related to landscaping and any outdoor furniture	UM Kurt Calleja		13M	Mar-24	Mar-24	Closed
B1- B8	Selection of Service providers							
B1	Preparation and planning	Issuing a tender	UM Kurt Calleja	Issuing tender	22M	Sep-22	Jun-24	Closed





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
B2	Publication and transparency	Publication and transparency through e-tenders (the local authority’s central platform for the publication of public procurements)	UM Kurt Calleja		9M	Oct-23	Jun-24	Closed
B3	Evaluation of tenders	Evaluation board appointed and evaluation carried out	UM Kurt Calleja		1M	May-24	May-24	Closed
B4	Award of tenders	Review of services to be provided and award of tenderer	UM Kurt Calleja		1M	Jun-24	Jun-24	Closed
B5	Contract implementation	Contractors to implement contract.	UM Kurt Calleja		1M	Jun-24	Jun-24	Open
B6	Risk management plan	Possible risks assessed and mitigation strategies	UM Kurt Calleja		1M	Jun-24	Jun-24	Closed
B7	Record keeping	Documents related to the permit process; number of individuals employed (incl. subcontractors)	UM Kurt Calleja		22M	Sep-22	Jun-24	Closed
B8	Request for quotations	Documents related to the permit process; number of individuals employed (incl. subcontractors)	UM Kurt Calleja		2M	Mar-24	Apr-24	Closed
C1- C8	Execution process							
C1	Permits	Permit to be issued by the planning authority following approval of designs by head of College Network at St. Clare Primary School and Gzira Local Council	UM Kurt Calleja	Obtaining permits and certifications	3M	Jul-24	Sep-24	Closed
C2	Health and Safety plan	Certification of play equipment by health and safety engineers, and discussed with the Gzira Local Council	UM Kurt Calleja		3M	Jul-24	Sep-24	Closed
C3	Preparation works on site	Land Survey	UM Kurt Calleja		3M	Jul-24	Sep-24	Closed
C4	Manufacturing and construction	Construction of playscape cube structure and play outdoor furniture	UM Kurt Calleja		3M	Jul-24	Sep-24	Closed
C5	Risk management plan	Possible risks assessed and mitigation strategies	UM Kurt Calleja		3M	Jul-24	Sep-24	Planned
C6	Record keeping	Documents related to the permit process, number of participants and their social background, number of individuals employed (incl. subcontractors), amount of green space after the construction/intervention of the garden, biodiversity and other H&WB related data	UM Kurt Calleja		3M	Jul-24	Feb-24	Open
C7	Commissioning of additional landscaping at Gzira Primary School	Commissioning of landscaping at school provided there is approval from ministry of education	UM Kurt Calleja	Commissioning successfully performed	3M	Jul-24	Dec-24	Open
C8	Commissioning of landscaping and other design elements at Stella Maris College	Commissioning of landscaping and other design elements at the school	UM Kurt Calleja		3M	Jul-24	Dec-24	Open





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
D1- D3	Handover							
D1	Handover of playscape to the school: Gzira Primary School	Commissioning of School Community Garden and handover to the school	UM Kurt Calleja	Commissioning of works	3M	Sep-24	Nov-24	Planned
D2	Handover of intervention to the school: Stella Maris College	Commissioning of School Community Garden and handover to the school	UM Kurt Calleja		3M	Sep-24	Nov-24	Planned
D3	Operation and Maintenance concept	Planned with local council (to be updated)	UM Kurt Calleja		3M	Sep-24	Nov-24	Planned
E1- E4	Operation / Social & Cultural Solutions							
E1	Publicity and Events	Exhibition of nature-based playscape	UM Francesca Mizzi	Evaluation of intervention	1M	Aug-23	Nov-24	Closed
E2	KPIs to be measured	Measuring relevant KPIs	UM Francesca Mizzi		14M	Feb-23	Nov-24	Closed
E3	Monitoring and Evaluation	Monitoring and Evaluation related to the cultural event	UM Emma Clarke		14M	Feb-23	Nov-24	Closed
E4	Record keeping	VS3 data	UM Emma Clarke		14M	Feb-23	Nov-24	Closed



4.2. Gzira (MT)- Procurement Plan

General notes: All interventions follow the local procurement regulations. The type of procurement approach depends on the expected cost of infrastructure. If the cost is expected to be below €5,000, then only three quotations are needed. The cheapest offer is usually chosen unless there are exceptions where appropriate justifications can be made. Some infrastructural interventions to be carried out by the Gzira Pilot for all visionary solutions require the issue of a tender since expected costs were higher than €5,000. Following the specification of the technical requirements and the eventual publishing of the tender document, an evaluation board is appointed to assess the technical compliance of the offers. Contractors needed to submit their quotations via governmental portals by the stipulated deadline. This usually involves submission of administrative documents, technical documents and a financial offer. The evaluation board only considers technical compliance and does not award the tender. For all compliant offers, the *lowest* bid is automatically chosen. Following the award of the tender, the University of Malta liaises with contractors to ensure that they can carry out all the necessary installations in the most efficient and environmentally friendly manner. For works or infrastructure exceeding €10,000, the tendering procedure would have to involve a much longer procedure. In the VARCITIES case, all interventions were small and hence did not require this longer track.

VS1 - The greening of a bus stop area in Rue D 'Argens will be carried out via separate quotations for the planters and the trees/soil respectively. For the temporary Pop-up Parks, which will include citizen engagement activities, shall be done by collecting 3 quotes per service/product.

VS2 – The purchase and installation of sensors was done by means of a tendering procedure. The cheapest compliant offer was awarded.

VS3 – Quotations were sought for the construction of the playscape cube structure. The cheapest compliant quote was chosen for this. For the playscape furniture, the same was done. In view of the remaining time and budget UM went ahead with extending the intervention at the school and two tenders were published for excavation and landscaping. These were awarded but the team found hurdles from the Ministry of Education to proceed further in view of a change over in their administration. Alternatively, the team will be seeking another area in another school that is not administered by government and we will be procuring greening using a three quotations system in view of the remaining budget. A VARCITIES event was also organised at the Council of Europe Gardens (Gzira) hosting several collaborators, stakeholders and the general public by following the collection of 3 quotes for every service or supply of products.

Table 61: Gzira (MT) - Procurement Management Plan

VS 1	Component		Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Milestone	Start (mm/yy)	Finish (mm/yy)	Duration	Status
	VS1												
	VS1.1	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. (indirect cost)	Open	Supply	No	No	ACT - Malta (NGO)	Procurement of services and materials, as well as implementation of interventions	Jan-22	Jan-22	1M	Closed
	VS1.1.1	Land Survey	Land Surveying of bus stop area to design the space	Competitive procedure with negotiation	Service	No	No	Arc International Surveyors Ltd.		Nov-21	Jan-22	3M	Closed
VS1.1.2	Infrastructural design/ google sketch up	Procurement of subscription for the design of the Gzira infrastructural interventions	Open	Service	No	No	Google Sketchup (50% of total amount for VS1)	Jan-22		Jan-22	1M	Closed	



Component		Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Milestone	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS1.2	Greening of a small area in Rue D'Argens	Planters	Competitive procedure with negotiation	Works	No	No	Andrew Vassallo General Trading Ltd		May-24	Jun-24	6M	Closed
VS1.2.1	Rental of a high-up truck	Rental of a high-up truck	Competitive procedure with negotiation	Works	No	No	Hi-Up Rental		Jun-24	Jun-24	2M	Closed
VS1.2.2	Aluminium plaques	Design and production of aluminium plaques to be affixed to the planters	Competitive procedure with negotiation	Supply	No	No	DZYN		Jun-24	Jul-24	2M	Closed
VS1.2.3	Perspex	Perspex	Competitive procedure with negotiation	Supply	No	No	Gesco Signs Ltd.		Jun-24	Jul-24	2M	Closed
VS1.2.4	Printing of posters + lamination	Lamination of posters to place on the planters	Competitive procedure with negotiation	Supply	No	No	Printer		Jul-24	Jul-24	1M	Closed
VS1.3	Pop-up greening & citizen engagement	Multiple locations were selected to create a pop-up where citizens are made more aware of the implementation of NBS in the locality. The total covers transportation, greening and costs for workshops	Innovation partnership	Works	No	No	N/A (to be updated)		Oct-22	Feb-23	4M	Closed
VS1.4	Trees	Trees	Competitive procedure with negotiation	Works	No	No	Piscopo Garden Centre		May-24	Jun-24	2M	Closed

	VS2												
VS 2	VS2.1	Fixed sensors	The fixed sensors campaign will include air quality measurements, wind measurement, noise and traffic flow measurements (funded by UM)	Competitive procedure with negotiation	Supply	No	No	UM	Procurement of services and materials, as well as implementation of interventions	Oct-21	Feb-22	2 years	Closed

Component			Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Milestone	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS2.2	Citizen science campaign and sensors	A number of air quality sensors will be provided to citizens. A series of workshops will be Planned to engage citizens in the VARCITIES VS	Restricted	Supply	No	No	AIS			Oct-22	Feb-23	5M	Closed
VS2.3	Installation poles and wiring for sensors	Additional Materials procured to install sensors	Restricted	Supply	No	No	SENSEEDGE			Mar-23	Apr-23	2M	Closed
VS2.4	HoloLens	The HoloLens are used for virtual reality applications. This is used in the pilot as a demonstration activity. Procurement done through quotations and awarded to Asystel Italia Spa	Competitive procedure with negotiation	Supply	No	No	Asystel Italia spa			Feb-23	May-23	3M	Closed

VS 3

VS3												
VS3.1	School community garden and green playscape following co-design workshops with school children: Outdoor learning space partly covered by VARCITIES and furniture	The development of a school outdoor learning space 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.	Competitive procedure with negotiation	Works	No	No	Vassallo Joiners/ Tom Van Malderen		Mar-22	Feb-23	11M	Closed
VS3.1.1	Infrastructural design/ google sketch up	Procurement of subscription for the design of the Gzira infrastructural interventions	Open	Service	No	No	Google Sketchup (50% of total amount for VS3)		Jan-22	Jan-22	1 year	Closed

	Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Milestone	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS3.1.2	Land Survey	Land Surveying of school courtyard to design the space	Competitive procedure with negotiation	Service	No	No	GeoMatix Surveyors		Nov-21	Feb-22	4M	Closed
VS3.4	Engineering Health & Safety Fees	Engineering Fees for Review of Design & Setting-up of the minimum requirements and for Final Certification after installation	Competitive procedure with negotiation	Service	No	No	Structural Engineer		Dec-22	Jun-23	7M	Closed
VS3.5	Purchase and Installation of safety mats	Purchase and Installation of safety mats as instructed by H&S engineer	Open	Works	No	No	Tip-Top Ltd.		Jul-23	Oct-23	1M	Closed
VS3.6	School co-design workshop (with school children, teachers and parents)	Data collection and educational workshops with school stakeholders	Innovation partnership	Service	No	No	Collaboration with artist and NGO for Workshops		Jan-22	Mar-22	3M	Closed
VS3.2	Council of Europe Gardens cultural event	An outdoor event organised to invite citizens to co-create the garden area and organisation of an educational event to increase awareness on the benefits NBS	Innovation partnership	Service	No	No	NGOs and Freelancers		Jun-23	Aug-23	3M	Closed
VS3.3	Pop-up engagement materials	Costs divided between VS1 and 3 due to materials being donated to the St. Clare Primary School as an additional component to the outdoor learning space.	Competitive procedure with negotiation	Service	No	No	Artist/Designer		Dec-22	Jun-23	7M	Closed
VS3.7.1	Replication of green landscape in Stella Maris school: Planters	Procurement of planters	Competitive procedure with negotiation	Works	No	No	Delta Ltd.	Procurement of services and materials, as well as implementation of interventions	Feb-24	Apr-24	3M	Closed

	Component		Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Milestone	Start (mm/yy)	Finish (mm/yy)	Duration	Status
	VS3.7.2	Replication of green landscape in Stella Maris school: Greening	Landscaping/waterproofing	Competitive procedure with negotiation	Works	No	No	WP Ltd.		May-24	Jul-24	3M	Closed
	VS3.7.3	Replication of green lanscape in Stella Maris school: Co-creation materials	Co-design and co-implementation activity materials	Competitive procedure with negotiation	Service	No	No	Ambient Malta		Oct-24	Nov-24	2M	Closed
	VS3.7.4	Drilling + Rendering	Finalising works for Stella Maris planters	Competitive procedure with negotiation	Service	No	No	Delta Ltd.		Sep-24	Sep-24	1M	Closed
	VS3.7.5	Soil and other substrates	Soil and other substrates for Stella Maris Planters	Competitive procedure with negotiation	Service	No	No	TBC		Oct-24	Nov-24	2M	Open
	VS3.8.1	Excavation of Planting pit at St Claire Primary School	A School community garden/landscaping intervention is planned to utilise the saved budget.	Competitive procedure with negotiation	Works	No	No	Derek Garden Centre		Feb-24	Apr-24	3M	Closed
	VS3.8.2	Construction of a retaining wall and carting in of soil at St Claire Primary School	A School community garden/landscaping intervention is planned to utilise the saved budget.	Competitive procedure with negotiation	Service	No	No	Delta Ltd.		Feb-24	Apr-24	3M	Closed
	VS3.8.3	Health and Safety Fees	Health and Safety Report as per the Building and Construction Authority Requirement for St Clare Gzira Primary and as a precautionary measure for Stella Maris	Competitive procedure with negotiation	Service	No	No	Joseph Camilleri O.H.S.E. Advisor		Jun-24	Jul-24	2M	Closed



Component			Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Milestone	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS3.8.4	Insurance	Contractors' all risk policy as per the Building and Constructing Authority requirements (for St Clare Gzira Primary)	Competitive procedure with negotiation	Service	No	No		Atlas Insurance		Jul-24	Jul-24	1M	Closed



4.4. Gzira (MT)- Realised Risks & Identified Opportunities

Following is a list of the realised risks that Gzira pilot faced, along with a brief description of how these risks impacted the Visionary Solutions and the mitigation actions that were put in place.

Table 62: Gzira (MT)- Realised risks

Final Risk Report				Date:	31/10/2024	Prepared by:	Emma Clarke UM	
Summary of realised risks			Most of the risks are linked to uncertainties regarding implementation, such as; accidental damage to equipment or injuries to the installers, low turnout to events, delays in permit process or in the outcomes due to inflation of prices					
ID	Risk Category	Risk Type	Risk Description	VS	Stage	Risk significance	Risk Impact	Mitigation Action
RR010	Strategic	Delay	There is a risk that there are delays in permitting process for the bus stop intervention because of lengthy bureaucratic processes	1	Execution	Moderate	Permitting process extended, which resulted in delays	Adapt VS1 intervention following delays during permitting process
RR016	Strategic	Delay	Tender publication related to the bus stop area has been delayed due to the presence of utility network cables in the area.	1	Execution	Major	Delays and design issues necessitate changes to the intervention	Intervention to be altered
RR017	Strategic	General	There is a risk that part of the works at the school will be delayed due to a change in governance and request for extra legal documentation	3	Execution	Major	Change of location which could impact scope of intervention	Intervention transferred to a different school



Following is a list of the most significant opportunities identified within the Gzira pilot, along with a brief description of how these opportunities can be captured.

Table 63: Gzira (MT) –Identified Opportunities

Summary of opportunities		The opportunities are linked to the co-creation element by involving multiple stakeholders, including internal UM departments and ecological services in the Gzira pilot				
ID	Opportunity Description	VS	Stage	Opportunity Category	Opportunity capture strategy	Status
OR03	Accessibility to academic resources and literature of the collected data	1,2,3	Preparation	Social	Close collaboration with educational institutions and local council	Open
OR16	Use tools for citizen science to report biodiversity, environmental issues, etc interactively	1, 2	Execution	Technological	Collaboration with educational institutions, stakeholders and local council	Closed
OR18	Support local species	1, 3	Handover	Environmental	Collaboration with UM departments	Open
OR20	Decrease flooding related risks in Rue D'Argens	1	Handover	Environmental	Design function in VS1	Closed
OR25	Increased private and public entity collaborations	1 ,2, 3	Handover	Economic	Collaboration with stakeholders and local council	Open



4.5. Gzira (MT)- Received feedback with respect to the implementation process

Table 64: Gzira (MT)- Changes in the VS concept design

Gzira	VS1	VS2	VS3
1. Did any changes occur in the concept design since the initial sketching of your VS?	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No
2. At which stage did the change occur? <i>(multiple choice possible)</i>	☐ Concept design ☒ Preparation stage ☒ Selection of services providers ☒ Execution stage	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☐ Concept design ☐ Preparation stage ☒ Selection of services providers ☒ Execution stage
3. What kind of change occurred? <i>(multiple choice possible)</i>	☒ Scope ☒ Location ☐ Design ☒ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☒ Location ☒ Design ☐ Scale/Downsize ☐ Other
4. Which is the main reason for any changes to occur? <i>(multiple choice possible)</i>	☐ STK input ☒ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☒ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other
5. How did the changes affect the progress of work? <i>(multiple choice possible)</i>	☒ Timeframe ☐ Budget ☒ Procurement procedure ☐ Other	☐ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☒ Timeframe ☒ Budget ☒ Procurement procedure ☐ Other

Table 65: Gzira (MT)- Required expertise

Gzira	VS1	VS2	VS3
1. Which experts (in-house & service providers) were involved in the design / implementation of your VS? <i>(multiple choice possible)</i>	☒ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☐ IT expert ☒ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☒ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☐ Other:	☒ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☐ Other:	☒ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☐ IT expert ☐ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☐ Other:
2. Which was the highest level of expertise required for in-house experts?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒
3. Which was the highest level of expertise required for service providers?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☒

Table 66: Gzira (MT)- Experiences from the procurement process

Gzira	VS1	VS2	VS3
1. Did you experience any difficulties with the procurement process?	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No
2. In case of any difficulties, please describe the reason. <i>(multiple choice possible)</i>	☒ Tendering process specifications ☒ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☒ Tendering process specifications ☒ Bureaucracy ☒ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other

Table 67: Gzira (MT)- Budget variances

Gzira	VS1	VS2	VS3
1. Were there any significant variances to the budget needed for your VS? ($\pm 25\%$)	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No
2. Which was the reason for any significant budget variance? <i>(multiple choice possible)</i>	☒ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☒ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☒ Other: Delays due to regulations

Table 68: Gzira (MT)- Delays

Gzira	VS1	VS2	VS3
1. Were there any delays in your workplan	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No
2. Which was the reason for the delay? (multiple choice possible)	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☒ Approvals ☒ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☒ Equipment failure ☐ Weather ☒ Other: Difficulty in recruiting residents in citizens- science approach. Sensors more "invasive" than expected.	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☒ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other

Table 69: Gzira (MT)- Key take-aways

Gzira	VS1	VS2	VS3
1. Looking back, what aspects of any implementation stage would you approach differently?	☒ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☒ Execution ☐ Handover ☐ Operation & Monitoring	☒ Preparation ☒ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring
2. What were the most valuable lessons learned during the development of the concept design and the setting up of the implementation process?	Central government approval is key Need to carefully assess the existing infrastructure in the area. Small interventions are easier to implement and to replicate.	More thought should have been given to how the sensors would be installed. Flexibility over the type of sensors. Citizen involvement strategy is very important.	Need to sign official agreements directly with the government/ Memorandum of understanding should be in place to avoid issues
3. Which preventive measures would you recommend for future replication of your VS?	Liaise early on with transport officials to determine what is possible.	Specify sensors that are easy to install in residential settings. Implement citizen engagement strategy focusing on sensors' installation	Ensure support from decision makers.
4. If you could start over, what would you change about the preparation stage?	Early engagement with Ministers.	Offer flexibility over the selection of sensors	Start conversations with Ministry of Education earlier
5. If you could start over, what would you change about the procurement stage?	Templates can facilitate the process.		Technical details to be specified.
6. If you could start over, what would you change about the budget planning?			Factoring the cost of delays.

4.6. Gzira (MT)- Operation and Maintenance

An operation and maintenance plan has been set up in collaboration with the local council for VS1. The local council contracts maintenance services of all the locality to companies following a public call for tenders. Following execution, the intervention in Rue D'Argens will be part of the Gzira area and as such will form part of the overall maintenance plan of the entire Gzira area. Therefore, following the end of VARCITIES, the maintenance of this intervention will be secure in that maintenance costs are necessarily allocated as part of each annual budget.

With respect to VS2: An operation and maintenance concept will be developed with the local council in order to allow the sensors to keep collection information. This will result in a maintenance procedure which the local council can follow as a handover takes place near the end of the project. The data from the sensors will be a useful source of information from the local council as this will be the basis for future decision making in relation to traffic flows and road management. As such the operation and maintenance of these sensors is required by the local council in order to continue with their vision of smartification of the locality through the use of sensors, satellite data and the like.

With respect to VS3 and in particular the interventions at the school, the interventions are part of the school premises and as such fall within the school administration. Appropriate personnel are available at the schools to carry out continuous maintenance and as such the operation and maintenance of the interventions is guaranteed within the framework of the operational procedures of the schools. In addition, given that the interventions have provided an educational value, children will be encouraged and engaged to play an active role in caring for the plants in the playscape.

4.6.1. O&M of NbS

Table 70: Gzira (MT)- O&M of NbS

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Greening of a small area in Rue D'Argens	Regular/ Preventive Maintenance	Type of action(s)	Landscaping maintenance	1200	20
		Frequency	Monthly		
		Procedure	Tree maintenance, pruning, watering of trees		
		Responsibility	Gzira Local Council		
		Solution specific issues	N/A		
	Pro-active care/ Remedial actions	Type of action(s)	Material protection	200	N/A
		Procedure	Lacquering once a year		
		Responsibility	Gzira Local Council		
		Solution specific issues	N/A		



4.6.2. O&M of Socio/ Cultural Solutions

Table 71: Gzira (MT)- O&M of Socio/ Cultural solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
School community garden and green playscape	Regular/ Preventive Maintenance	Type of action(s)	Plant maintenance	80	10
		Frequency	Monthly		
		Procedure	Watering		
		Responsibility	School administration and school community		
		Solution specific issues	N/A		
	Pro-active care/ Remedial actions	Type of action(s)	Structure maintenance	50	15
		Procedure	Check bolts and connections, material degradation,		
		Responsibility	School administration		
		Solution specific issues	N/A		

4.6.3. O&M of Digital Solutions

Sensors used in Gzira VS are stated in Table 72: sensor ID number, commercial name, measuring unit, quantity used together with the sensor's communication protocol, and the reference link. Additionally, IoT sensors (IoT No2) are provided to citizens participating in the environmental measurements in the municipality.



Table 72 : Gzira (MT): Sensors and devices used

No.	Sensors	Measuring	Quantity	Protocol	Link as reference
IoT Sensors					
1	Sensedge Senstick	temperature, RH, air pressure	5	LoRaWAN /TTN	https://senstick.co/support/
2	Senstate Urban air quality monitor	PM1.0, PM2.5, PM4.0, PM10, AQI	10	LoRaWAN /TTN	https://senstate.com/products/senstate-urban-air-quality-station/
Data Loggers used in the pre-intervention case (not procured through VARCITIES)					
1	Thiesclima Ultrasonic Anemometer	Wind speed and direction	2	csv	https://www.thiesclima.com/pdf/en/Products/Wind-Ultrasonic-Anemometer/?art=809
2	Vaisala AQT400, (Datalogger, handheld device)	NO2 (ppm) SO2 (ppm) CO (ppm) O3 (ppm) PM2.5 (µg/m3) PM10 (µg/m3) Air Temp. (°C) Air Hum. (RH%) Air Pres. (mbar)	10	csv	https://www.vaisala.com/sites/default/files/documents/AQT400_Series_Datasheet_B211581EN_0.pdf
3	Svantek SV 977 Class 1 Sound & Vibration Level Meter	dB	1	csv	https://svantek.com/products/svan-977-class-1-sound-vibration-level-meter/
4	Metrocount RoadPod VT	car count	6	csv	https://metrocount.com/products/roadpod-vehicle-tube-classifier/

The local governance of Gzira follows a fixed schedule of maintenance. Local Pilot Expert/VS manager can manage Planned downtime, rather than emergency downtime. The Gzira pilot's central and periodic evaluations of the IoT are also used for managing coherent progress of VSs performance.

- Set maintenance dates are as much as possible in-line with the typical battery lifespan used in the sensors which are part of the local IoT network (VS2).
- Sensedge's Sensor Management Platform receives and evaluates the additional local sensor data: battery level, signal-to-noise ratio, signal strength indicator of the channel, to enable local users with alerts on possible unforeseen degradations and miscalibration of IoT devices used in VS.

Table 73 and Table 74 provide a short description of the local governance strategy and persons responsible for monitoring and maintaining the local IT infrastructure.



Table 73: Gzira (MT)- Local IT infrastructure/ Management

Local governance (Months / Weeks)	Monthly
Short description	The sensor governance plan will utilise a schedule of monitoring and maintenance. Monitoring will be carried out monthly to ensure that data is being correctly gathered. Any maintenance to the sensors will have to be done by appointment with the residents meaning that there might be some downtime once the problem is identified.

Table 74: Gzira (MT)- Local IT infrastructure/ Maintenance responsibility

Monitoring Manager / Organisations responsible for maintenance	
Person/Organisation responsible for sensor performance / Data backup verifications	UM Daniel Micallef
Person/Organisation responsible for on-site scheduled maintenance	UM Daniel Micallef
Person/Organisation responsible for unscheduled maintenance	UM Daniel Micallef

Table 75: Gzira (MT)- O&M of Digital Solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Sensedge Weather	Regular/ Preventive Maintenance	Type of action(s)	Checking signal strength, battery life	180	10+
		Frequency	Bimonthly		
		Procedure	Via platform checking sensor health – LoRaWAN signal rate, battery life. With stronger signal the battery will last longer.		
		Responsibility	Gzira Local council		
		Solution specific issues	Maintenance might be done on field if LoRaWAN gateway needs fixing.		
	Pro-active care/ Remedial actions	Type of action(s)	Battery change on average span of 5-7 years		
		Procedure	Opening the sensor and changing the two AAA alkaline batteries with new ones. (Industrial grade recommended) Tutorial on battery change can be seen HERE .		
		Responsibility	Gzira local council		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
		Solution specific issues	The proper handling and care of the device are imperative.		
Senstate Air Quality	Regular/ Preventive Maintenance	Type of action(s)	Data gathering checks, repairs if needed, battery change	N/A	10
		Frequency	Monthly		
		Procedure	Review data gathered		
		Responsibility	Gzira Local council		
		Solution specific issues	N/A		
	Pro-active care/ Remedial actions	Type of action(s)	Cleaning	200	10
		Procedure	Cleaning of solar PV panels		
		Responsibility	Gzira Local council		
		Solution specific issues	The proper handling and care of the device are imperative.		



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

5.1. Leuven (BE)- Implementation status of the Visionary Solutions

Four out of the five Visionary Solutions envisioned for Leuven, have been fully implemented (VS1, VS2, VS3, VS5). VS4 is currently in execution stage. These solutions are to be fully exploited from a digital and socio-cultural perspective.

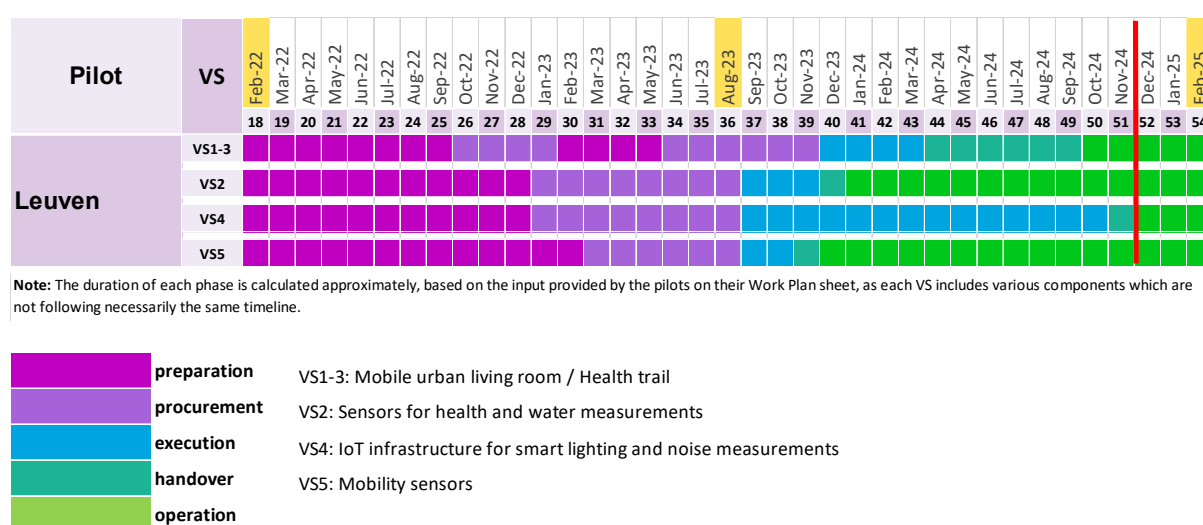


Figure 39: Leuven (BE)- Implementation status of the Visionary Solutions

5.2. Overview of the Visionary Solutions

VS1 - VS3: Mobile urban living room for cultural activities - Health trail: the "Olevodroom"

Status: Operational

A health trail is being realized 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 stimulate movement for different ages, this health trail will motivate people to work on their physical condition. The health trail connects different areas for an engaging tour within the park: 1) The urban living room (VS1) + integrated exercise elements (VS3) 2) The accessible embankment of the river 3) A play garden for children, with special attention for children with disabilities 4) The surrounding grass field that can stimulate different activities (frisbee, soccer, yoga...).

With respect to the socio-cultural Visionary Solutions in Leuven, and to link the interventions to the cultural history of the site, along the main north-south path crossing of the regenerated area, a riverside urban living room was initially co-designed to be placed on the tracks of the old city wall (Figure 40). Plans fell through during the permit process because of

a political decision prohibiting any construction along the opened-up river, before the overall regeneration project in Hertogensite is completed.



Figure 40: Leuven (BE) – Visualisation of the rejected project, the “Moving wall”

As a mitigation action, a mobile urban living room in the form of an ephemeral light construction was designed as part of VS1. In a circular approach, the construction materials of the existing city's Velodroom (deconstructed to give its place to the new project) were reclaimed for VS1. The urban living room is materialised with contemporary elements, consisting of a simple versatile structure based on recyclable materials, combining accessible resting and exercise elements (as part of VS3), while also being able to host various cultural, social and sports activities designed for different age groups.

The overall objective of the mobile urban living room is to vitalize and make attractive the new public space in this new part of the city still to be discovered. This solution aims to stimulate and facilitate social contact and promote physical activity for all users in the heart of the city. The project has been co-designed with the participation of various local stakeholders, during workshops and neighbourhood gatherings. A local artist has co-implemented the mobile urban living room with the participation of residents and youngsters coming from underprivileged environments.

Co-implementation of the mobile urban living room- known as the “Olevodroom” kicked off in early February 2024 and was finalized in the end of March 2024, with a big inauguration event. Sixty-nine socio-cultural events were organised in the Olevodroom, from April until October 2024, covering a wide range of activities and spectacles, such as, theatre, dance, performances, workshops, circus, children and family events, concerts, city camping and more.



Figure 41: Leuven (BE)- the “Olevodroom”

According to the city's plans, the Olevodroom will be dismantled from its current location when the works for the construction of the Center of Performing Arts will start. The Olevodroom will be relocated in the "heart" of the new park once the regeneration works are over.



Figure 42: Leuven (BE)- Hertogensite masterplan with the current and future location of the Olevodroom indicated



Figure 43: Leuven (BE) - VS1-VS3 The "Olevodroom" - inauguration event

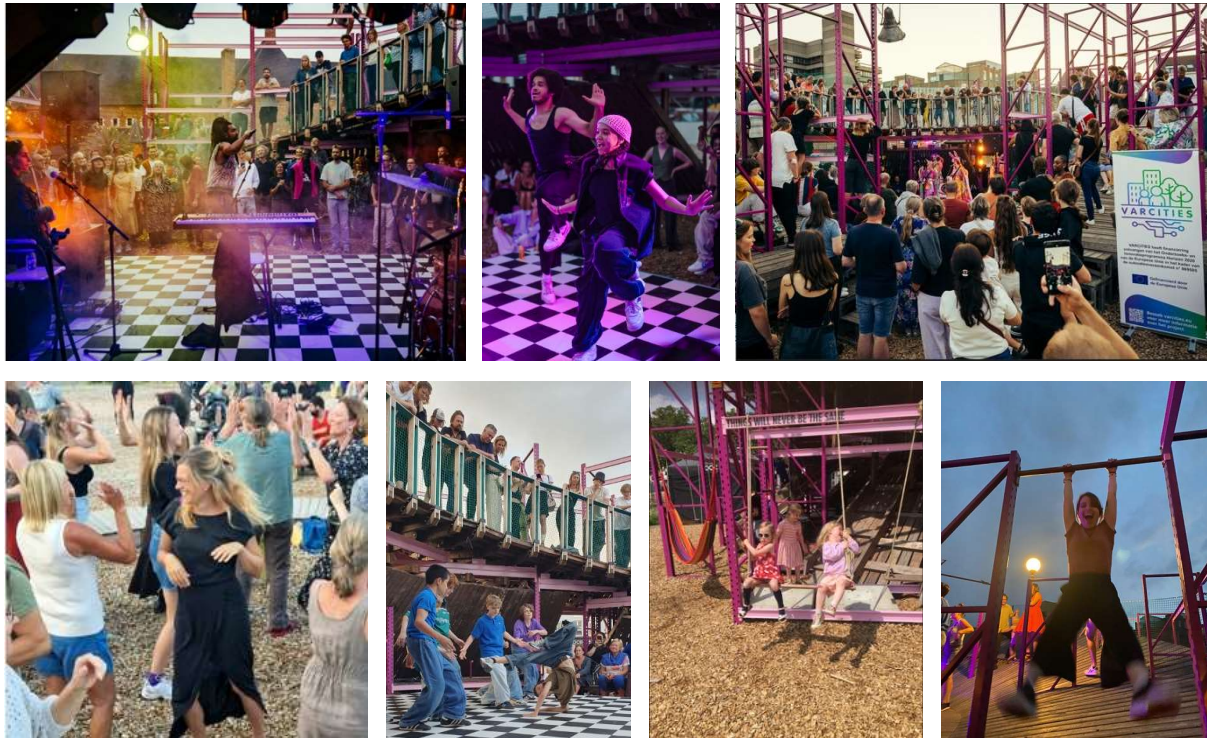


Figure 44: Leuven (BE) - Photos from the socio-cultural events held in the Olevodroom

The allocated VARCITIES budget in VS3 was used to integrate exercise elements and activities in the Olevodroom (Figure 44).

The above outlined Visionary Solutions implemented in Leuven, (VS1 and VS3) are more infrastructural: VS1 is about the urban living room facilitating social interaction and VS3 is the health trail facilitating exercise. During the design stage both solutions were integrated into one architectural element. Therefore, in the work plan and cost plan, both solutions were addressed commonly as VS1-3.

VS2: Sensors for Health and Water measurements

Status: Operational

Until the regeneration of the area started, Hertogensite had been a completely hardened surface. The general revitalization project, which is still under way, creates extensive green spaces and reopens the covered Dyle River. The City of Leuven wants to know what the impact will be on the living quality of this area by measuring the water quality and the climatic conditions, to demonstrate the project's positive impact. By installing sensors and through the measurement of surrounding microclimatic factors, like temperature, wind and air humidity, the comfort conditions in the area are being monitored. Two weather sensors are installed: one within green surroundings and the other within a courtyard with hard surfaces (reference weather station) as indicated in **Error! Reference source not found.. SENSEEDGE sticks** (outdoor microclimate sensors), are also operational and connected to the platform providing data with regards to temperature, dew temperature, air pressure, relative humidity (also precipitation & wind). The data is also processed to measure the exposure of citizens to the UHI effect.





Figure 45: Leuven (BE)- Reference weather station.



Figure 46: Leuven (BE)- Sensedge stick

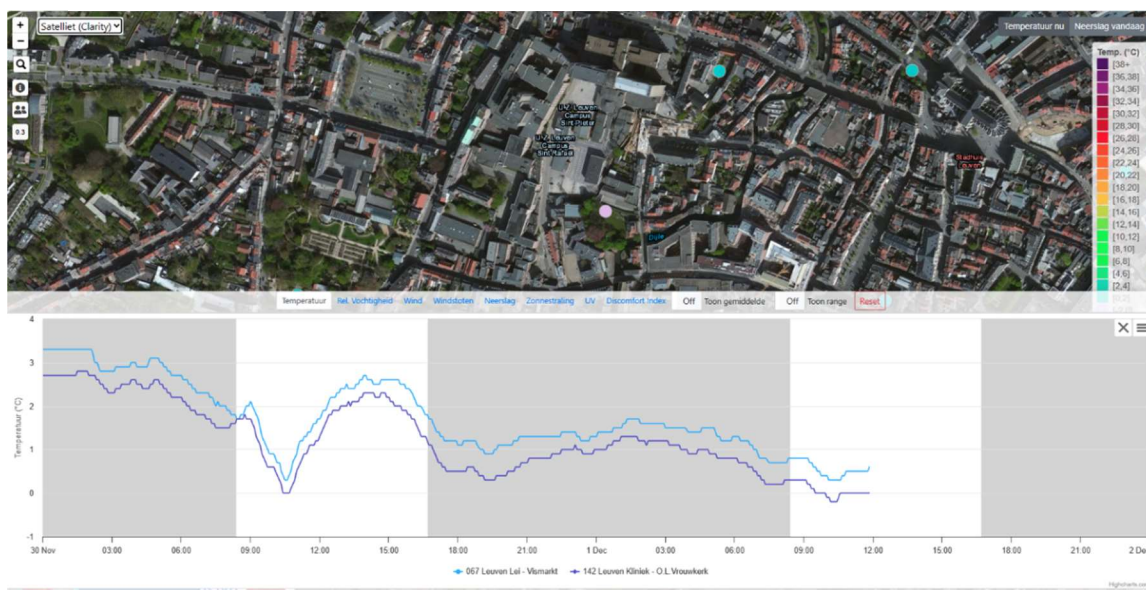


Figure 47: Leuven (BE)- Comparative chart of temperatures in the 2 weather stations.

Regarding water measurements, the reopening works of the river Dijle-branch started in November 2022. The pilot city specified the method and location of the sample collection and concluded a collaboration agreement with VMM (Flanders Environment Agency), in November 2023. The collection of the first samples (baseline measurements) is currently underway. The physical water quality parameters included in the analysis package include field measurements (conductivity), field observations (including odour, colour, turbidity, etc.), suspended matter, and chlorophyll analysis (as a measure for green algae). The samples are



being collected and analysed monthly and reported to the pilot on a 3-month basis. The first results were reported at the end of February 2024.

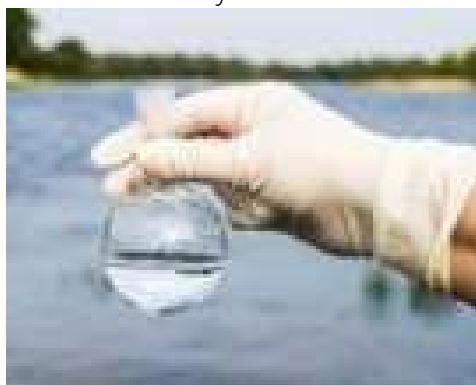


Figure 48: Leuven (BE)- Collection of water samples example.

VS4: IoT infrastructure for smart lighting and noise measurements

Status: Execution imminent

This Visionary Solution provides smart infrastructure to the city over the years to integrate sensors in lighting poles for noise management. VS4 aims to mitigate noise problems in the city of Leuven, where popular places often create nuisance for inhabitants. Therefore, the objectives of this Visionary Solution are linked to the need for increased Health and Well-being of park users and nearby residents. Four smart-ready lighting poles will be installed aside the main north-south path crossing the park. In 2 of these smart lighting poles noise sensors will be integrated. These sensors will 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. 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, called Urban Sense, managed by a consortium of technical partners of the City of Leuven. Based on predefined criteria (e.g. night noise exceeding 80dB (a) for more than two seconds), a trigger will be sent from the 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.

“Fluvius”, the Flemish network operator, has been assigned with the delivery and installation of the light poles, which are currently under construction. The VS is expected to be operational by the end of 2024. The exact location is currently being defined, as works on the general site are advancing.



Figure 49: Leuven (BE)- Noise sensor to be integrated in the lighting poles

VS5: Measuring sustainable mobility

Status: Operational

This Visionary Solution provides data to the city on the flows of pedestrians and bikers visiting the park over a year to know the impact of the project on sustainable mobility. VS5 works on the impact of slower traffic by introducing new, better paths to the network of foot and bicycle paths in the neighbourhood. The City of Leuven will measure, on the one hand, the use of the paths and the park with sensors and on the other hand, the air quality checking the positive impact of less motorized traffic in the neighbourhood and the addition of green spaces and trees.

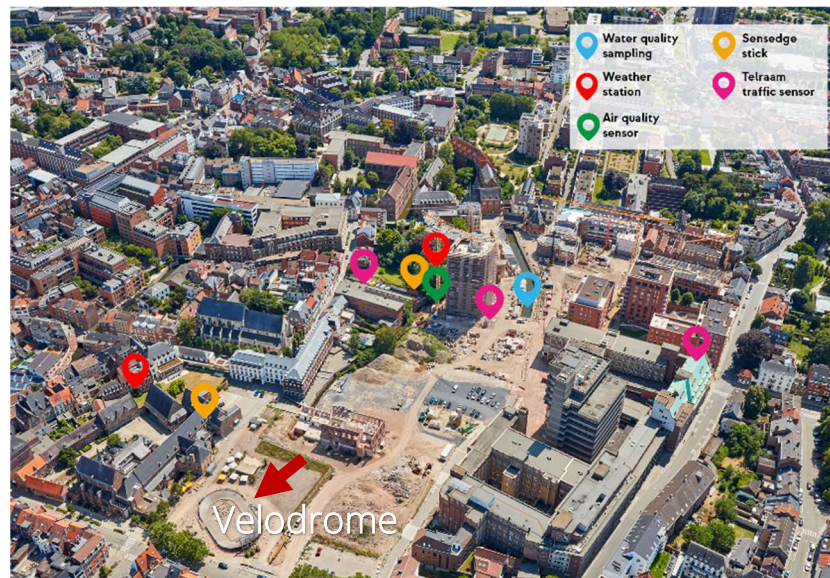


Figure 50 Leuven (BE)- Overview of all installed sensors.

Two traffic counters (Figure 52) are installed in the location shown in Figure 50, across the main street traversing the site, providing with live data the city's platform. One air quality sensor has been installed (Figure 50, Figure 51) and is fully connected to the platform. Several parameters are being monitored to calculate the pre- and post-interventional change in air quality, and looking at the changes in PM2.5, PM10 concentrations.



Figure 52: Leuven (BE)- Traffic sensor.



Figure 51: Leuven (BE)- Air quality sensor.



5.2.1. Detailed workplan for VS1- VS3

Table 76: Leuven (BE) - Work Plan VS1-VS3





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A10	Preparation stage							
A1	Definition of permit(s) required	For traffic sensors & air quality sensor	LEUVEN Tim Guily	• VS fully defined	10M	Jul-22	Apr-23	Closed
A2	Writing tender	For traffic sensors & air quality measurement sensors			3M	Mar-23	May-23	Closed
A3	Writing permit occupation of public domain for sensors	NA			3M	Mar-23	May-23	Closed
A4	Definition of location of sensors	NA			2M	Jan-23	Feb-23	Closed
A5	Infrastructural preparation	For power supply & data transition of sensors			3M	Mar-23	May-23	Closed
A6	Preliminary Workplan for all the components	NA			3M	Jan-23	Mar-23	Closed
A7	Preliminary Budget & Cost Plan (based on quantities' measurements)	Estimation of the cost based on quantities' measurements			3M	Jan-23	Mar-23	Closed
A8	Risk Register	NA			14M	Jul-22	Aug-23	Closed
A9	ICT requirements & technical specifications	Preparation of the specifications of the ICT components		• Permits obtained	2M	Mar-23	Apr-23	Closed
A10	Record Keeping	Keeping record of the main acts of the phase			14M	Jul-22	Aug-23	Closed
B1- B14	Selection of Service providers							
B1	Definition of procurement process for traffic sensors in the park	Direct assignment			3M	Mar-23	May-23	Closed
B2	Definition of procurement process for crowd counting sensors	Tender			3M	Mar-23	May-23	Closed
B3	Definition of procurement process for air quality measurement stations	Tender			3M	Mar-23	May-23	Closed
B4	Market Analysis	For all sensors			7M	Jun-22	Dec-22	Closed
B5	Definitive Workplan	Coordinating all components listing stages for Selection of service providers			3M	Jan-23	Mar-23	Closed
B6	Definitive Budget & Cost Plan	NA			3M	Jan-23	Mar-23	Closed
B7	ICT Procurement Plan	NA			3M	Jan-23	Mar-23	Closed
B8	ICT & design of solutions fully coordinated	NA			3M	Jan-23	Mar-23	Closed

Tasks			Description	Task Owner	Milestone	Duration	Start	Finish	Status
B9	Administration Clauses	NA		• Contracts implemented	3M	Jan-23	Mar-23	Closed	
B10	Technical Clauses	NA			3M	Jan-23	Mar-23	Closed	
B11	Submission of procurement file	NA			2M	Jun-23	Jul-23	Closed	
B12	Publication of call for tenders	NA			1M	Aug-23	Aug-23	Closed	
B13	Evaluation & Award of tenders	Contracts implementation			1M	Aug-23	Aug-23	Closed	
B14	Record Keeping	Keeping record of the main acts of the phase			14M	Jul-22	Aug-23	Closed	
C1- C8	Execution process								
C1	Monitoring of the installation progress	For traffic sensors & air quality sensor	LEUVEN Tim Guily	• Construction completed	2M	Aug-23	Sep-23	Closed	
C2	Health and Safety plan	NA			2M	Aug-23	Sep-23	Closed	
C4	Workplan updates	For traffic sensors & air quality sensor			3M	Aug-23	Oct-23	Closed	
C5	Budget & Cost Plan updates	NA			3M	Aug-23	Oct-23	Closed	
C6	Risk Register updates	NA			3M	Aug-23	Oct-23	Closed	
C7	Monitor ICT and solutions on-site coordination	NA			1M	Sep-23	Sep-23	Closed	
C8	Record keeping	Keeping record of the main acts of the phase			16M	Jan-23	Apr-24	Open	
D1- D6	Handover								
D1	Final inspection and reception	For traffic sensors & air quality sensor	LEUVEN Tim Guily	• Handover of the VS. • Contracts concluded	1M	Sep-23	Sep-23	Closed	
D2	Setting up a list of defects (if relevant)	NA			2M	Oct-23	Nov-23	Closed	
D3	Definition & Coordination of the rectification of defects	NA			2M	Nov-23	Dec-23	Closed	
D4	Setting up, Reporting & Record keeping	NA			18M	Sep-23	Feb-25	Open	
D5	Concluded Budget with dated revisions	NA			1M	Sep-23	Sep-23	Closed	
D6	Operation and Maintenance Plan	Create an operation and maintenance plan for the VS			5M	Sep-23	Jan-24	Closed	
E1- E5	Operation / Social & Cultural Solutions								
E1	Appointment of facilities management	NA	LEUVEN TBD	• VS successful operation, monitoring & maintenance	13M	Jan-24	Jan-25	Open	
E2	Monitoring & Evaluation	KPIs based on the WP7 monitoring protocol			13M	Jan-24	Jan-25	Open	
E3	Application of maintenance plan	NA			13M	Jan-24	Jan-25	Open	
E4	Revision of maintenance plan	If necessary			13M	Jan-24	Jan-25	Open	

	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
E5	Record Keeping	Keeping record of the main acts of the phase	TBD		15M	Nov-23	Jan-25	Open

5.2.2. Detailed workplan for VS2

Table 77: Leuven (BE) - Work Plan VS2





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A9 Preparation stage								
A1	Definition of permit(s) required	Clarify if permit occupation of public domain for weather station is needed (depends on the location of the weather station)	LEUVEN Tim Guily	• VS fully defined	3M	Aug-22	Oct-22	Closed
A2	Preliminary Workplan for all the components	Drafting of analytic workplan	LEUVEN Tim Guily		15M	Jun-22	Aug-23	Closed
A3	Preliminary Budget & Cost Plan	Drafting of a preliminary budget, informing the cost control masterfile, based on quantities' measurements	LEUVEN Tim Guily		15M	Jun-22	Aug-23	Closed
A4	Risk Register	Regular Updates of the Risk Register	LEUVEN Tim Guily		18M	Jun-22	Nov-23	Closed
A5	ICT requirements & technical specifications	Preparation of the specifications of the ICT components	LEUVEN Tim Guily		15M	Jun-22	Aug-23	Closed
A6	Submission application permit occupation of public domain	For the weather station: If needed (see supra)	LEUVEN Tim Guily		11M	Jan-23	Nov-23	Closed
A7	Set up contract with VMM for collection of water samples	Preparation of the tendering procedure of the water analysis	LEUVEN Karen Landuydt		11M	Dec-22	Oct-23	Closed
A8	Preparation of ICT data flow	Ensuring the conditions are met for the data flow from the sensors to the local database and to the H&WB platform	LEUVEN Tim Guily		17M	Jul-22	Nov-23	Closed
A9	Record Keeping	Ensuring that the workplan, cost control masterfile and risk register are up to date	LEUVEN Karen Landuydt E2ARC Georgia Papamarkou		17M	Jul-22	Nov-23	Closed
B1-B6 Selection of Service providers								
B1	Weather station Installation Plans & Details	Definition of the location of the weather station in consultation with researchers of KU Leuven (Eva Beele) + connection of weather station with the Leuven.cool network	LEUVEN Tim Guily	• Evaluation & Award of tenders	9M	Jan-23	Sep-23	Closed
B2	Definitive Budget & Cost Plan	Updating budget according to latest information, informing the cost control masterfile	LEUVEN Tim Guily		8M	Jan-23	Aug-23	Closed
B3	ICT & design of solutions fully coordinated	Ensuring data flow from the sensors to the H&WB platform	LEUVEN Tim Guily		8M	Jan-23	Aug-23	Closed

B4	Administration Clauses	Documentation for the tendering procedure	LEUVEN Tim Guily		8M	Jan-23	Aug-23	Closed
B5	Technical Clauses		LEUVEN Tim Guily		8M	Jan-23	Aug-23	Closed
B6	Record Keeping	Ensuring that the workplan, cost control masterfile and risk register are up to date	LEUVEN Tim Guily		9M	Jan-23	Sep-23	Closed
C1-C3	Execution process							
C1	Monitoring of execution/installation progress of weather station	Ensuring that the installed weather station performs well and that the data flow to the Leuven.cool network is continuous.	LEUVEN Tim Guily	• Installation completed	3M	Sep-23	Nov-23	Closed
C2	Coordination of collection water samples by VMM (on monthly basis)	Follow-up of sampling + data transfer retrieved from samples towards H&WB platform	LEUVEN Karen Landuydt		14M	Nov-23	Dec-24	Open
C3	Record keeping	Ensuring that the workplan, cost control masterfile and risk register are up to date	LEUVEN Karen Landuydt		16M	Sep-23	Dec-24	Open
D1-D6	Handover							
D1	Final inspection and reception of all the components (weather station & water samples)	Ensuring that the conditions of the contract with the service providers have been met	LEUVEN Tim Guily & Karen Landuydt	• Handover of the VS	2M	Oct-23	Nov-23	Closed
D2	Setting up a list of defects (if relevant)	NA	LEUVEN Tim Guily & Karen Landuydt		2M	Oct-23	Nov-23	Closed
D3	Definition & Coordination of the rectification of defects of the weather station	NA	LEUVEN Tim Guily		1M	Nov-23	Nov-23	Closed
D4	Concluded Budget with dated revisions	NA	LEUVEN Tim Guily		2M	Nov-24	Dec-24	Planned
D5	Receive the final report on the water quality analysis	NA	LEUVEN Karen Landuydt & Tim Guily		1M	Feb-25	Feb-25	Planned
D6	Operation and Maintenance Plan	Create an operation and maintenance plan for the VS	LEUVEN Tim Guily	• Contracts concluded	2M	Oct-23	Nov-23	Closed
E1-E3	Operation / Social & Cultural Solutions							
E1	Monitoring and evaluation	Data analysis of weather station data & water sampling, effect of NB solutions on parameters	LEUVEN Tim Guily & Karen Landuydt	• VS successful operation, monitoring & maintenance	15M	Nov-23	Jan-25	Open
E2	Application of maintenance plan	Decision-making whether sampling of VMM is interesting to continue after the VARCITIES endpoint. Maintenance of weather station provided by KU Leuven after VARCITIES?	LEUVEN Tim Guily & Karen Landuydt		2M	Dec-24	Jan-25	Planned
E3	Record Keeping	Ensuring that the workplan, cost control masterfile and risk register are up to date	LEUVEN Karen Landuydt		15M	Nov-23	Jan-25	Open

5.2.3. Detailed workplan for VS4

Table 78: Leuven (BE) - Work Plan VS4





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A8	Preparation stage							
A1	Definition of permit(s) required	Clarify if permit occupation of public domain is needed	LEUVEN Elke Raë	• VS fully defined	14M	Aug-22	Sep-23	Closed
A2	Tender Smart City Data Platform (SCDP)	Urban Sense	LEUVEN Tim Guily		2M	Jul-22	Aug-22	Closed
A3	Writing permit installation lighting poles	Including noise sensors	LEUVEN Elke Raë		3M	Oct-22	Dec-22	Closed
A4	Writing tender for Smart City Data Platform	Urban Sense	LEUVEN Tim Guily		3M	Oct-22	Dec-22	Closed
A5	Preparation of ICT data flow	Data flow from noise sensors to Smart City Data platform and to H&WB platform	LEUVEN Tim Guily		10M	Jul-23	Apr-24	Open
A6	Infrastructural preparation	For power supply & data transition of lighting poles	LEUVEN Elke Raë		21M	Jul-22	Mar-24	Open
A7	Risk Register	Regular Updates of the Risk Register file	LEUVEN Karen Landuydt	• Permits obtained	21M	Jul-22	Mar-24	Open
A8	Record Keeping	Keeping record of the main acts of the phase	LEUVEN Elke Raë & Tim Guily		21M	Jul-22	Mar-24	Open
B1- B5	Selection of Service providers							
B1	Direct assignment	Fluvius (lighting poles - Schreder Shuffle)	LEUVEN Elke Raë	• Evaluation & Award of tenders	2M	Feb-22	Mar-22	Closed
B2	Direct assignment	Urban Sense (Smart City Data Platform)	LEUVEN Tim Guily		2M	Feb-22	Mar-22	Closed
B3	Definitive Budget & Cost Plan	Depending on offer of Fluvius	LEUVEN Elke Raë		24M	Jan-23	Dec-24	Open
B4	ICT & design of solutions fully coordinated	Ensure the coordination of the VS with the rest of solutions	LEUVEN Tim Guily		16M	Jan-23	Apr-24	Open
B5	Record Keeping	Keeping record of the main acts of the phase	LEUVEN Tim Guily		16M	Jan-23	Apr-24	Open
C1- C6	Execution process							
C1	Monitoring of execution	Monitoring the installation progress	TBD	• Construction completed	8M	Sep-23	Apr-24	Open
C2	Workplan updates	Depending on the progress of regeneration project	TBD		8M	Sep-23	Apr-24	Open
C3	Budget & Cost Plan updates	NA	TBD		8M	Sep-23	Apr-24	Open





Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status	
C4	Risk Register updates	NA	TBD	• ICT systems installed	8M	Sep-23	Apr-24	Open
C5	Monitor ICT and solutions on-site coordination	Set-up of integration with SCDP	LEUVEN Tim Guily		8M	Sep-23	Apr-24	Open
C6	Record keeping	Keeping record of the main acts of the phase	TBD		8M	Sep-23	Apr-24	Open
D1- D5	Handover							
D1	Final inspection and reception of all the components	Depending on the progress of regeneration project	TBD	• Handover of the VS	2M	May-24	Jun-24	Planned
D2	Setting up a list of defects (if relevant)	Depending on the progress of regeneration project	TBD		2M	May-24	Jun-24	Planned
D3	Definition & Coordination of the rectification of defects	Depending on the progress of regeneration project	TBD		2M	May-24	Jun-24	Planned
D4	Concluded Budget with dated revisions	NA	TBD		2M	May-24	Jun-24	Planned
D5	Operation and Maintenance Plan	Create an operation and maintenance plan for the VS	TBD	• Contracts concluded	2M	May-24	Jun-24	Planned
E1- E5	Operation / Social & Cultural Solutions							
E1	Appointment of facilities management	NA	TBD	• VS successful operation, monitoring & maintenance	13M	Jan-24	Jan-25	Open
E2	Monitoring & Evaluation	KPIs based on the WP7 monitoring protocol	TBD		13M	Jan-24	Jan-25	Open
E3	Application of maintenance plan	NA	TBD		2M	Dec-24	Jan-25	Planned
E4	Revision of maintenance plan (if necessary)	NA	TBD		2M	Dec-24	Jan-25	Planned
E5	Record Keeping	Keeping record of the main acts of the phase	TBD		13M	Jan-24	Jan-25	Open

5.2.4. Detailed workplan for VS5



Table 79: Leuven (BE) - Work Plan VS5

ARCTITEES

Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A10	Preparation stage						
A1	Definition of permit(s) required	LEUVEN Tim Guily	• VS fully defined	10M	Jul-22	Apr-23	Closed
A2	Writing tender			3M	Mar-23	May-23	Closed
A3	Writing permit occupation of public domain for sensors			3M	Mar-23	May-23	Closed
A4	Definition of location of sensors			2M	Jan-23	Feb-23	Closed
A5	Infrastructural preparation			3M	Mar-23	May-23	Closed
A6	Preliminary Workplan for all the components			3M	Jan-23	Mar-23	Closed
A7	Preliminary Budget & Cost Plan (based on quantities' measurements)			3M	Jan-23	Mar-23	Closed
A8	Risk Register			14M	Jul-22	Aug-23	Closed
A9	ICT requirements & technical specifications		• Permits obtained	2M	Mar-23	Apr-23	Closed
A10	Record Keeping			14M	Jul-22	Aug-23	Closed
B1- B14	Selection of Service providers						
B1	Definition of procurement process for traffic sensors in the park		• Contracts implemented	3M	Mar-23	May-23	Closed
B2	Definition of procurement process for crowd counting sensors			3M	Mar-23	May-23	Closed
B3	Definition of procurement process for air quality measurement stations			3M	Mar-23	May-23	Closed
B4	Market Analysis			7M	Jun-22	Dec-22	Closed
B5	Definitive Workplan			3M	Jan-23	Mar-23	Closed
B6	Definitive Budget & Cost Plan			3M	Jan-23	Mar-23	Closed
B7	ICT Procurement Plan			3M	Jan-23	Mar-23	Closed
B8	ICT & design of solutions fully coordinated			3M	Jan-23	Mar-23	Closed
B9	Administration Clauses		• Contracts implemented	3M	Jan-23	Mar-23	Closed
B10	Technical Clauses			3M	Jan-23	Mar-23	Closed

Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
B11	Submission of procurement file	NA			2M	Jun-23	Jul-23	Closed
B12	Publication of call for tenders	NA			1M	Aug-23	Aug-23	Closed
B13	Evaluation & Award of tenders	Contracts implementation			1M	Aug-23	Aug-23	Closed
B14	Record Keeping	Keeping record of the main acts of the phase			14M	Jul-22	Aug-23	Closed
C1- C8	Execution process							
C1	Monitoring of the installation progress	For traffic sensors & air quality sensor	LEUVEN Tim Guily	• Construction completed	2M	Aug-23	Sep-23	Closed
C2	Health and Safety plan	NA			2M	Aug-23	Sep-23	Closed
C4	Workplan updates	For traffic sensors & air quality sensor			3M	Aug-23	Oct-23	Closed
C5	Budget & Cost Plan updates	NA			3M	Aug-23	Oct-23	Closed
C6	Risk Register updates	NA		• ICT systems installed	3M	Aug-23	Oct-23	Closed
C7	Monitor ICT and solutions on-site coordination	NA			1M	Sep-23	Sep-23	Closed
C8	Record keeping	Keeping record of the main acts of the phase			16M	Jan-23	Apr-24	Open
D1- D6	Handover							
D1	Final inspection and reception	For traffic sensors & air quality sensor	LEUVEN Tim Guily	• Handover of the VS. • Contracts concluded	1M	Sep-23	Sep-23	Closed
D2	Setting up a list of defects (if relevant)	NA			2M	Oct-23	Nov-23	Closed
D3	Definition & Coordination of the rectification of defects	NA			2M	Nov-23	Dec-23	Closed
D4	Setting up, Reporting & Record keeping	NA			18M	Sep-23	Feb-25	Open
D5	Concluded Budget with dated revisions	NA			1M	Sep-23	Sep-23	Closed
D6	Operation and Maintenance Plan	Create an operation and maintenance plan for the VS			5M	Sep-23	Jan-24	Closed
E1- E5	Operation / Social & Cultural Solutions							
E1	Appointment of facilities management	NA	LEUVEN TBD	• VS successful operation, monitoring & maintenance	13M	Jan-24	Jan-25	Open
E2	Monitoring & Evaluation	KPIs based on the WP7 monitoring protocol			13M	Jan-24	Jan-25	Open
E3	Application of maintenance plan	NA			13M	Jan-24	Jan-25	Open
E4	Revision of maintenance plan	If necessary			13M	Jan-24	Jan-25	Open
E5	Record Keeping	Keeping record of the main acts of the phase	TBD		15M	Nov-23	Jan-25	Open

5.3. Leuven (BE)- Procurement Management Plan

General notes: Following the rejection of the building permit of the initially envisioned VS1-3, the city worked in developing a concept of an alternative solution, which would maintain all the qualitative characteristics of the old one, materialized as an ephemeral construction (no permit required). A procurement process to select an artist to implement the art installation involving stakeholders was launched.

For VS2 and VS4 the provider is already evident:

- 1) For the water quality measurements, the City of Leuven will collaborate with the VMM, which is the Flemish agency for the environment and manager of the watercourses. As manager of the Dyle River, it is evident they do the monitoring of the water quality in the river. It is their core business and they have the necessary expertise. Through a non- institutionalized horizontal cooperation between two authorities VMM will conduct the measurements for the VARCITIES project.
- 2) For the smart lighting poles, the City of Leuven collaborates with Fluvius which is the intermunicipal company responsible for the management of the public lighting. They place and maintain and operate all the public lights and they will therefore order and install the smart lighting poles answering to the specifications of the VARCITIES project.

Table 80: Leuven (BE) - Procurement Management Plan

		Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of the contract	Start (mm/yy)	Finish (mm/yy)	Duration	Status
	VS1/3	Mobile urban living room / Health trail									
VS1/3	VS1/3.19	Art installation - design and material	The art installation will be co-designed by the artist and local youngsters. Provision of eco-friendly materials.	Negotiated procedure without prior publication	Works	Yes	Yes	May-23	Nov-23	7M	Closed
	VS1/3.20	Art installation - building on site	Covering the building related costs								
	VS1/3.21	Art installation -moving of the installation	Costs related to dismantling and setting up the installation in a new location.								
	VS1/3.22	Mobile toilets	Public toilets during events	Negotiated procedure without prior publication	Service	No	No	Feb-24			Planned
	VS1/3.23	Lighting	Complementary lighting around the living room	Negotiated procedure without prior publication	Supply	No	No				Planned
	VS1/3.24	Fencing	Fencing around the structure (permanent)	Restricted	Supply	No	No				Planned
	VS1/3.25	Furniture	Benches/ chairs/ tables around the urban living room	Restricted	Supply	No	No				Planned
	VS1/3.26	Examination	Audit of installation	Restricted	Service	No	No				Planned
	VS1/3.27	Mobile technic set	Sound and lights for events	Negotiated procedure without prior publication	Supply	No	No				Planned
	VS1/3.28	Dance floor	Material	Negotiated procedure without prior publication	Supply	No	No				Planned

VS2	VS2	Sensors for health and water measurements									
	VS2.1	Monitoring local climate conditions/ weather station	Supply and installation	Restricted	Supply	No	Yes	Jan-23	Aug-23	8M	Closed
	VS2.4	Water samples	Analysis and reporting: Q1	Restricted	Service	No	No	Jan-23	Oct-23	10M	Closed
	VS2.5	Biological monitoring	1st inventarisation								
	VS2.6	Water samples	Analysis and reporting: Q2								

		Component	Description	Procurement procedure	Procurement category	Quality or LCA evaluation criteria used?	Maintenance part of the contract	Start (mm/yy)	Finish (mm/yy)	Duration	Status
	VS2.7	Water samples	Analysis and reporting: Q3								
	VS2.8	Water samples	Analysis and reporting: Q4								
	VS2.9	Biological monitoring	2nd inventarisation								
VS4	VS4	IoT infrastructure for smart lighting and noise measurements									
	VS4.1	Smart lighting poles	With integrated noise measurement module (sensor)	Restricted	Supply	No	Yes	Feb-22	Aug-23	20M	Closed
	VS4.2	Use and management of the sensors	Opex cost sensors Munisense for 2 years	Restricted	Service	No	Yes	Feb-22	Aug-23	20M	Closed
	VS4.3	Influencing light intensity	Operation management	Restricted	Service	No	Yes	Feb-24	Apr-24	3M	Closed
	VS4.4	Connection Data platform	Smart city data platform connection Urban Sense		Service	No	Yes				
VS5	VS5	Mobility sensors									
	VS5.1	Traffic sensors - capex	Sensor	Restricted	Service	No	Yes	Jan-23	Jun-23	6M	Closed
	VS5.2	Traffic sensors – opex	Data license		Service	No		Jan-23	Jun-23		
	VS5.3	Air quality sensors - capex	Supply & Installation	Restricted	Supply	No	No	Jan-23	Jun-23		
	VS5.5	Hosting of API and data platform	External hosting of the platform solution	Low value procedure (restricted)	Service	Yes	Yes	Nov-23	Feb-24	4M	Closed



5.1. Leuven (BE)- Realised risks & Identified Opportunities

Following is a list of the realised risks that Leuven pilot faced, along with a brief description of how these risks impacted the Visionary Solutions and the mitigation actions that were put in place.

Table 81: Leuven (BE) – Realised Risks

Final Risk Report				Date:		31/10/2024	Prepared by:		Karen Landuydt LEUVEN Georgia Papamarkou E2ARC
Summary of realised risks			Rejection of the initial design causing delay of the implementation of VS1-3						
ID	Risk Category	Risk Type	Risk Description	VS	Stage	Risk significance	Risk Impact	Mitigation Action	
RR018	Scheduling	Delay	Unavailability of location: Due to the timeline of the site project, the park is not ready to receive the installation.	1/3, 4	Preparation	Major	The implementation of the VS has been delayed as a new location had to be found.	Find alternative location for the VS and make the solution moveable.	
RR017	Political	Delay	Permit rejection: Decision makers only in a late stage of the project expressed that they did not want to proceed with the moving wall design.	1/3	Procurement	Major	The implementation of the VS has been delayed, as the project had to restart nearly from scratch, cancelling 15M of preparation work.	Re-design the VS, as a moveable structure, go through the preparation & procurement phase for a second time.	

Following is a list of the most significant opportunities identified within the Leuven pilot, along with a brief description of how these opportunities can be captured.

Table 82: Leuven (BE)- Identified opportunities

Summary of opportunities		Creation and enhancement of links to other local programs to make the VSs even more impactful.				
ID	Opportunity Description	VS	Stage	Opportunity Category	Opportunity capture strategy	Status
OR01	New attractive place to be	1/3	Monitoring	Social	Branding	Open
OR06	Local sport & cultural events on the new site	1/3	Monitoring	Social	Dissemination	Planned
OR04	Expanding VS4 in the city	4	Evaluation	Environmental	Evaluating	Planned
OR07	5G network	All	Preparation	Technological	Networking	Planned
OR05	Linking with other programs around the site	All	Preparation	Social	Networking	Open



5.2. Leuven (BE)- Received feedback with respect to the implementation process

Table 83: Leuven (BE)- Changes in the VS concept design

Leuven	VS1-3	VS2	VS4	VS5
1. Did any changes occur in the concept design since the initial sketching of your VS?	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No
2. At which stage did the change occur? (multiple choice possible)	☐ Concept design ☐ Preparation stage ☒ Selection of services providers ☐ Execution stage	☐ Concept design ☒ Preparation stage ☐ Selection of services providers ☐ Execution stage	☐ Concept design ☒ Preparation stage ☐ Selection of services providers ☒ Execution stage	☒ Concept design ☐ Preparation stage ☒ Selection of services providers ☒ Execution stage
3. What kind of change occurred? (multiple choice possible)	☐ Scope ☒ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☒ Location ☐ Design ☐ Scale/Downsize ☐ Other	☒ Scope ☒ Location ☐ Design ☒ Scale/Downsize ☐ Other
4. Which is the main reason for any changes to occur? (multiple choice possible)	☐ STK input ☒ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☒ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☒ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other
5. How did the changes affect the progress of work? (multiple choice possible)	☒ Timeframe ☐ Budget ☒ Procurement procedure ☐ Other	☐ Timeframe ☒ Budget ☐ Procurement procedure ☐ Other	☒ Timeframe ☒ Budget ☒ Procurement procedure ☒ Other: Location of lighting poles	☒ Timeframe ☒ Budget ☒ Procurement procedure ☒ Other: Location of sensors

Table 84: Leuven (BE)- Required expertise

Leuven	VS1-3	VS2	VS4	VS5
1. Which experts (in-house & service providers) were involved in the design / implementation of your VS? (multiple choice possible)	☒ Architect/ Engineer ☐ Landscape designer ☒ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☒ Other: Community builder	☐ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☒ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☒ Other: Public light manager	☐ Architect/ Engineer ☐ Landscape designer ☒ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☒ Other: Mobility expert
2. Which was the highest level of expertise required for in-house experts?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☒ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐
3. Which was the highest level of expertise required for service providers?	6. Basic knowledge ☐ 1. Limited experience ☐ 2. Intermediate ☐ 3. Advanced ☐ 4. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐

Table 85: Leuven (BE)- Experiences from the procurement process

Leuven	VS1-3	VS2	VS4	VS5
1. Did you experience any difficulties with the procurement process?	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☒ Yes ☐ No
2. In case of any difficulties, please describe the reason. (multiple choice possible)	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☒ Tendering process specifications ☒ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☒ Market analysis ☐ Level of expertise required ☐ Other
3. For certain components of VS1-3 you indicated that you used Quality or LCA evaluation criteria. Please outline the criteria used.	• Artistic and conceptual quality • Co-operation/ Co-creation/ Participation/ Action plan • Practical Feasibility (technical & timing) • Financial Feasibility			

Table 86: Leuven (BE)- Budget variances

Leuven	VS1-3	VS2	VS4	VS5
1. Were there any significant variances to the budget needed for your VS? (±25%)	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☒ Yes ☐ No
2. Which was the reason for any significant budget variance? (multiple choice possible)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☒ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other

Table 87: Leuven (BE)- Experienced delays

Leuven	VS1-3	VS2	VS4	VS5
1. Were there any delays in your workplan	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No
2. Which was the reason for the delay? (multiple choice possible)	☐ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☒ Approvals ☒ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other: <i>Postponing because of lack of time</i>	☐ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☒ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other: Political decisions	☐ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☒ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other: <i>Political decision</i>

Table 88: Leuven (BE)- Key take-aways from the implementation process

Leuven	VS1-3	VS2	VS4	VS5
1. Looking back, what aspects of any implementation stage would you approach differently?	☒ Preparation ☒ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☒ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☒ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring
2. What were the most valuable lessons learned during the development of the concept design and the setting up of the implementation process?	Stakeholder engagement in the selection of service provider		Focussing more on the problem that needs solving instead of the solutions proposed	

Leuven	VS1-3	VS2	VS4	VS5
3. Which preventive measures would you recommend for future replication of your VS?	Engaging the decision makers from the beginning and regularly		Better agreements with politicians/ decision makers	
4. If you could start over, what would you change about the preparation stage?	Engaging the decision makers from the beginning and regularly			
5. If you could start over, what would you change about the procurement stage?	Stakeholder engagement in the selection of service provider			
6. If you could start over, what would you change about the budget planning?				



5.3. Leuven (BE)- Operation and Maintenance

For the infrastructure and digital components that form part of all the implemented Visionary Solutions in Leuven, maintenance has been included in the signed contracts. The maintenance department of the city will be responsible to follow through the activities.

5.3.1. O&M of Socio/ Cultural Solutions

For VS1-3 the maintenance of infrastructure is part of the public domain and is included in the general maintenance plan of the city for all its public domain and building. Operation of the infrastructure will mainly consist of organising and facilitating activities linked to the Olevodroom.

Table 89: Leuven (BE)- O&M of Socio/ Cultural solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Mobile Urban Living Room	Regular/ Preventive Maintenance	Type of action(s)	Maintenance of the structure, security and safety check of the structure, cleaning up, watering the plants	5000	5
		Frequency	Weekly		
		Procedure	Weekly check-up		
		Responsibility	Maintenance department of the city, technical manager of the site (cultural center), green department of the city		
		Solution specific issues	TBC		
	Pro-active care/ Remedial actions	Type of action(s)	Vandalism, repair broken elements of the structure, sanding and threatening of roughened wood, touch up of the painted structure and repairing of the safety nets	8000	
		Procedure	TBC		
		Responsibility	Maintenance department of the city together with the technical director of the cultural center.		
		Solution specific issues	TBC		



5.3.2. O&M of Digital Solutions

Sensors used in Leuven VSs are stated in Table 90: sensor ID number, commercial name, measuring unit, quantity used together with the sensor's communication protocol, and the reference link.

Table 90: Leuven (BE)- Sensors and devices used

No.	Sensors	Measuring	Quantity	Protocol	Link as reference
1	Renkforce WH2600	T, RH, wind, air pressure, rain, solar radiation, uv index	2	Wi-Fi	https://www.conrad.com/p/renkforce-renkforce-wh2600-wireless-digital-weather-station-forecasts-for-12-to-24-hours-1267654
2	Noise	dB A eq 1 sec	2	LTE-M (4G)	https://munisense.com/measuring-noise
3	Telraam S2	number of cyclists in the area, pedestrians	2	NB-IoT	https://telraam.net/en/S2
4	Outdoor Particulate and Air Quality Sensor (Enginko LoRaWAN)	Carbon dioxide, CO2 Nitrogen oxide, NOx PM2.5 PM10	1	LoRaWAN	https://connectedthings.store/gb/LoRaWAN-sensors/outdoor-environmental-sensors/enginko-LoRaWAN-outdoor-particulate-and-environmental-sensor.html
5	Sensedge Senstick	temperature, RH, air pressure	1	LoRaWAN	https://senstick.co

The local governance of Leuven follows a fixed schedule of maintenance. Local Pilot Expert / VS manager can manage Planned downtime, rather than emergency downtime. The Leuven pilot's central and periodic evaluations of the IoT are also used for managing the coherent progress of VSs performance.

- Set maintenance dates are as much as possible in-line with the typical battery lifespan used in the sensors, which are part of the local IoT network (VS2, VS4 and VS5).
- Sensedge's Sensor Management Platform receives and evaluates the additional local sensor data: battery level, signal-to-noise ratio, signal strength indicator of the channel, to enable local users with alerts on possible unforeseen degradations and miscalibration of IoT devices used in VS.

Table 91 and Table 92 provide a short description of the local governance strategy and persons or organisations responsible for monitoring and maintaining the local IT infrastructure.



Table 91: Leuven (BE)- Local IT infrastructure/ Management

Local governance (Months / Weeks)	Once every month OR with reported problems/issues
Short description	The audit will be performed once a month. Maintenance of the ICT platform will be done by the ICT service of the city of Leuven under the supervision of Ulrich Merckx. The IoT sensors network, the functioning of the sensors, the reliability of the measurements, and the battery status will be checked by the smart city business unit through the monitoring of the various IoT service providers under the supervision of Tim Guily.

Table 92: Leuven (BE)- Local IT infrastructure/ Maintenance responsibility

Monitoring Manager / Organisations responsible for maintenance	
Person/Organisation responsible for sensor performance / Data backup verifications	Data backup: Ulrich Merckx of the city of Leuven via the hosting contract with Inetum/ RealDolmen that was made for the TUC gathering the data from the different sensor platforms via the offered API and data platform from TUC Sensor performance: Tim Guily of the city of Leuven
Person/Organisation responsible for on-site scheduled maintenance	VS2_Water samples: No maintenance required VS2_Weather station: Included in the cooperation agreement with the KU Leuven in the project leuven.cool VS2_Sensedge stick: Maintenance by Smart City Business Unit VS4: Maintenance is part of the general budget of the city to maintain public lighting (City of Leuven) VS5_Telraam S2: Included in the installation contract (Contractor) VS5_Airquality sensor: Maintenance by Smart City Business Unit
Person/Organisation responsible for unscheduled maintenance	VS2_Water samples: No maintenance required VS2_Weather station: Included in the cooperation agreement with the KU Leuven in the project leuven.cool VS2_Sensedge stick: Maintenance by Smart City Business Unit VS4: Maintenance is part of the general budget of the city to maintain public lighting (City of Leuven) VS5_Telraam S2: Included in the installation contract (Contractor) VS5_Airquality sensor: Maintenance by Smart City Business Unit

Regarding VS2, the weather station maintenance will be part of the contract.

Regarding VS4, the smart lighting poles the maintenance is part of the general maintenance strategy for all public lighting in the city.

Regarding VS5, with respect to the traffic and air quality sensors, the maintenance is included in the initial contract. The specific maintenance needs/ responsibilities and associated costs for the digital components of VS2,4 and VS5 are outlined in Table 93.

Table 93: Leuven (BE)- O&M of Digital Solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Weather station – Sensedge stick	Regular/ Preventive Maintenance	Type of action(s)	1. Check if sensor is sending data 2. Check battery life	180	10+
		Frequency	Bimonthly		

		Procedure	Via platform (Things Network of local API and data platform) checking sensor health – LoRaWAN signal rate, battery life. With stronger signal the battery will last longer.		
		Responsibility	Smart City Business Unit		
		Solution specific issues	Maintenance might be done on field if LoRaWAN gateway needs fixing.		
	Pro-active care/ Remedial actions	Type of action(s)	Battery change on average span of 5-7 years		
		Procedure	Opening the sensor and changing the two AAA alkaline batteries with new ones. (industrial grade recommended)		
		Responsibility	Smart City Business Unit		
		Solution specific issues	The proper handling and care of the device are imperative.		
	Weather station – RenkForce WH2600	Type of action(s)	1. Check if sensor is sending data 2. Check battery life 3. Check drift of sensor		
		Frequency	1.-2. Weekly 3. Algorithm running by KU Leuven		
		Procedure	Check running on platform		
		Responsibility	Leuven.cool project owners		
		Solution specific issues	1. Check connectivity of base station 2. Changing batteries 3. Adjusting parameters in algorithm		
		Type of action(s)	Battery change on average span of 4 years		
		Procedure	Changing batteries		
		Responsibility	Leuven.cool project owners		
		Solution specific issues	The proper handling and care of the device are imperative.		



Noise sensors	Regular/ Preventive Maintenance Pro-active care/ Remedial actions	Type of action(s)	Check connectivity Check power supply	1.000€/ sensor/year (all-in rental formula)	5-6 years
		Frequency	Monthly		
		Procedure	Check platform of service provider		
		Responsibility	Done by service provider		
		Solution specific issues	Realtime alerting is configurable		
	Pro-active care/ Remedial actions	Type of action(s)	Included in renting of solution		
		Frequency	NA		
		Procedure	Onsite visit		
		Responsibility	Service provider		
		Solution specific issues	Vandalism		
Traffic sensors	Regular/ Preventive Maintenance	Type of action(s)	Check connectivity Check power supply	300€/2year license on data	5-6 years
		Frequency	Quarterly		
		Procedure	Check platform of service provider		
		Responsibility	Done by service provider		
		Solution specific issues	-		
	Pro-active care/ Remedial actions	Type of action(s)	Included in renting of solution		
		Procedure	Onsite visit		
		Responsibility	Service provider		
		Solution specific issues	Vandalism		
Air quality sensors	Regular/ Preventive Maintenance	Type of action(s)	1. Check if sensor is sending data 2. Check battery life 3. Drift of the sensor	TBD	TBD
		Frequency	1., 2. Bimonthly, 3. Yearly		
		Procedure	1.,2 Via platform (Things Network or local API and data platform) checking sensor health – LoRaWAN signal rate, battery life. With stronger signal the battery will last longer. 3. Checking with official measuring station data of VMM		
		Responsibility	Smart City Business Unit		
		Solution specific issues	1. Maintenance might be done on field if LoRaWAN gateway needs fixing.		



			2. Replacing batteries, checking solar panel 3. Analysis of possibility of drifting measurements		
	Pro-active care/ Remedial actions	Type of action(s)	1. Battery change on average span of 3 years 2. Cleaning filter of sensor		
		Procedure	1. Opening the sensor and changing the two AAA alkaline batteries with new ones. (industrial grade recommended) 2. Opening the sensor and try to clean or change filter		
		Responsibility	Smart City Business Unit		
		Solution specific issues	The proper handling and care of the device are imperative.		



IoT equipment were detailed for future public procurement processes. There are no substantial changes to the VS1 design.



Figure 54: Novo mesto (SI)- Landscaping of the degraded area



Figure 55: Novo mesto (SI) - Visualizations of the implemented solution

VS2: Creating sustainable forest trails

Status: Operational

Sustainable trails in the surrounding mixed forest have been created in order to connect the facilities. Public awareness, educational events and information campaigns are initiated to promote and facilitate the creation of sustainable forest trails. The sustainable forest path is carried out in length of 1 km. The trim track is equipped with information stations providing visitors with information on healthy lifestyles. The route is also equipped with sensors for tracking and detecting the movement of visitors for counting and analysis. There were no substantial changes regarding planning of the VS2, in process of project documentation location and implementation of the trail path was detailed.



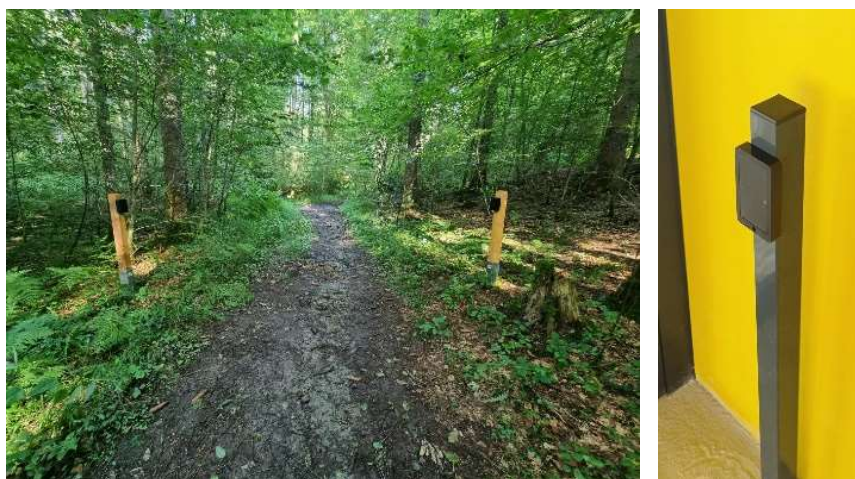


Figure 56: Novo mesto (SI) - Visitor tracking sensors

Technical specifications for IoT equipment were detailed for future public procurement processes. There are no substantial changes to the VS2 design.



Figure 57: Novo mesto (SI) - Visualizations of the implemented solution

VS3: Interconnectedness of sports, recreational and therapeutic facilities

Status: Operational

The interconnection of objects and contents primarily focuses on their programmatic, communication and technical connection. The main components of the solution are the development of integrated business and environmental programs, information equipment for connecting the 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 has been created, offering healthy leisure time for all generations. In cooperation with stakeholders for special

target groups (children – motor development, elderly – health strengthening) a special part of the programme has been created. At the same time, routing tables are set up for shaping the users' physical space paths. The facilities are marketed and managed as one entity through development of integrated business and environmental programs. Synergies between the offered activities and therapeutic services are 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) are 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 Well-being. Regular social and educational events and meetings with STKs have been organized to facilitate knowledge and experience exchange between the facilities. Inter-departmental collaboration and Institutional learning are assessed through surveys & questionnaires. The development process of the VS3 is being implemented according to plan, with processes including coordination with STKs and evaluation of proposed programs. Activities on VS3 also meshed with activities of VS2 and other activities for integrating facilities and analysis for further possible integration. There are no substantial changes to the VS3 design.



Figure 58: Novo mesto (SI)- Sustainable Forest trails & Disabled -friendly access to sports facilities.





Figure 59: Novo mesto (SI) - Visualizations of the implemented solution

VS4: Integrated management of the facilities

Status: Operational

Sports and recreational facilities at ŠRC Češča vas are being 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 visitor's flow overview and management. Additionally, public screens are placed in the check-in area of the park where the visitors flow data is displayed as well as statistics from the aggregated data collected from other IoT sensors deployed at the park. In the course of activities of VS4 comprehensive specification for ICT system was defined necessary for further public procurement processes and technical dialogue with STKs. There are no substantial changes to the VS4 design.

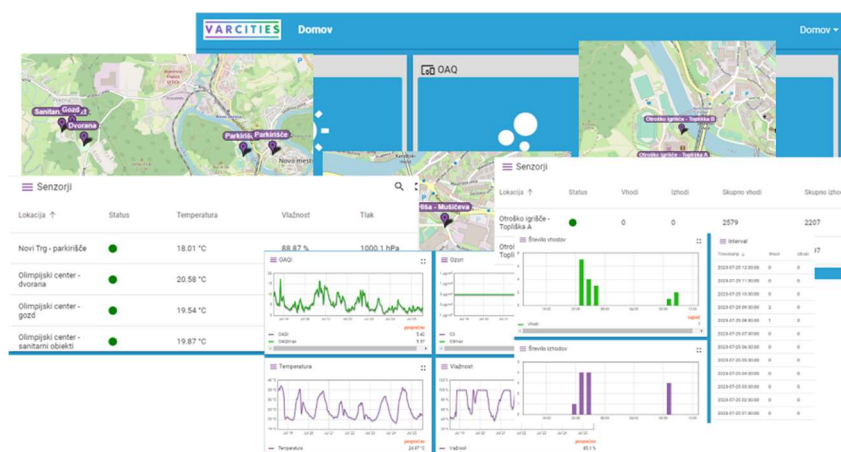


Figure 60: Novo mesto (SI) - ICT Platform

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

Status: Operational

Wearables have been acquired to actively track the activities and directly monitor the H&WB of visitors. Additionally, visitor tracking sensors have been placed at the pilot site to track the movement of visitors more accurately. There are no substantial changes to the VS5 design, active analysis of market and possible technical solutions were researched confirming proof of the concept.

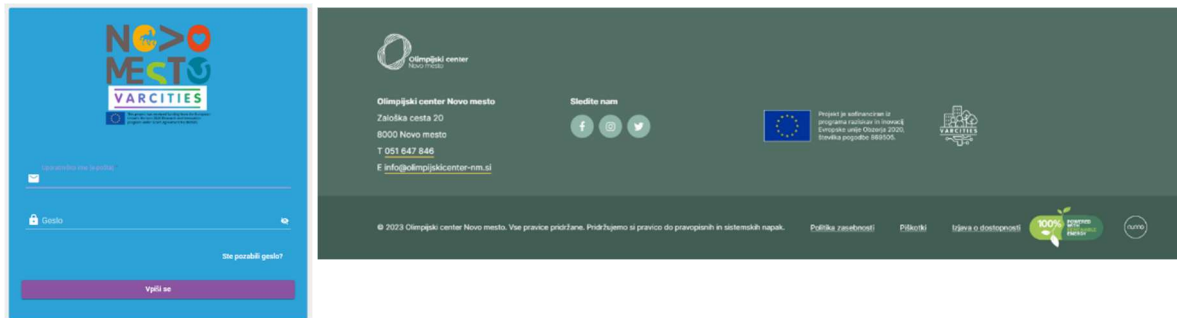


Figure 61: Novo mesto (SI) - Digital tools

6.1.2. Detailed workplan for VS1

Table 94: Novo mesto (SI) - Work Plan VS1





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A8	Preparation stage							
A1	VS design	Defining goals and activities for VS1	MONM Peter Geršič	VS design	13M	Feb-21	Feb-22	Closed
A2	Analysis and preparation of an action plan for the management of the degraded area	Analysis of the area and preparation of a plan of activities for the removal of shrubs and levelling of the degraded area	MONM Nina Kotar		7M	Dec-21	Jun-22	Closed
A3	Selection of trees for purchase and planting at the Natura 2000 site	Selection of 20 trees to be purchased and planted at the Natura 2000 area	MONM Nina Kotar		4M	Dec-21	Mar-22	Closed
A4	Determination of sensor specifications for microclimatic parameters	Determining the specifications of the required sensors for microclimatic parameters	MONM Peter Geršič		1M	Apr-22	Apr-22	Closed
A5	Determination of air quality sensor specifications	Determining the specifications of the required air quality sensors	MONM Peter Geršič		1M	May-22	May-22	Closed
A6	Risk assessment	Risk assessment in tree selection and in the selection of microclimatic and air quality sensors	MONM Peter Geršič		3M	Mar-22	May-22	Closed
A7	Preliminary budget and cost plan	Estimation of the budget for the purchase of sensors of microclimatic parameters, air quality sensors, purchase of trees, planting of trees, management of the degraded area	MONM Tjaša Bezenšek		6M	Mar-22	Aug-22	Closed
A8	Determining sensor locations	Determining the locations where we will install sensors for microclimatic parameters and air quality sensors	MONM Peter Geršič		5M	Mar-22	Jul-22	Closed
B1- B8	Selection of Service providers							
B1	Preparation of an order for the purchase and planting of trees	Based on the specifications of the required trees, preparation of the order in accordance with the internal rules of MONM	MONM Vanja Lakner	Supplier selection	4M	Nov-23	Feb-24	Closed
B2	Preparation of an order for the purchase of sensors of microclimatic parameters	Based on the specifications of the required sensors of microclimatic parameters, preparation of the order in accordance with the internal rules of MONM	MONM Vanja Lakner		5M	Feb-23	Jun-23	Closed
B3	Preparation of an order for the purchase of air quality sensors	Based on the specifications of the required air quality sensors, preparation of the order in accordance with the internal rules of MONM	MONM Vanja Lakner		2M	Oct-23	Dec-23	Closed
B4	Preparation of an order for the management of the degraded area	Based on the needs for the regulation of the degraded area, preparation of an order in accordance with the internal rules of MONM	MONM Vanja Lakner		4M	Dec-23	Feb-24	Closed
B5	Publication of orders and transparency	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		15M	Dec-22	Feb-24	Closed
B6	Evaluation of bids and selection of the most appropriate bid	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		13M	Feb-23	Feb-24	Closed
B7	Preparation of contracts	Based on the internal rules of MONM and based on the subject of the orders	MONM Vanja Lakner		12M	Mar-23	Feb-24	Closed





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

B8	Risk assessment	Risk assessment in the selection of contractors	MONM Vanja Lakner		20M	Jun-22	Jan-24	Closed
C1- C7	Execution process							
C1	Preparation of project documentation for the implementation of the project tasks	Preparation documentation for the implementation of the project tasks	MONM Peter Geršič	Preparation of project documentation for implementation	2M	Jul-22	Aug-22	Closed
C2	Planting selected trees	Planting of selected trees specified in the order	MONM Nina Kotar	Execution of VS1 project tasks	13M	Feb-23	Feb-24	Closed
C3	Managing the degraded area	Managing the degraded area, as described in the order	MONM Miroslav Strniša		7M	Aug-23	Feb-24	Closed
C4	Purchase of sensors for measuring microclimatic parameters	Purchase of sensors for measuring microclimatic parameters with the necessary specifications prepared in the order	MONM Miroslav Strniša		7M	Jul-23	Jan-24	Closed
C5	Purchase of sensors for measuring air quality	Purchase of sensors for measuring air quality with the necessary specifications prepared in the order	MONM Miroslav Strniša		7M	Jul-23	Jan-24	Closed
C6	Sensor functionality testing	Checking all sensor functionalities	MONM Miroslav Strniša		5M	Sep-23	Jan-24	Closed
C7	Installation of sensors at locations	Installation of sensors at locations prepared in the planning phase	MONM Miroslav Strniša		12M	Feb-23	Jan-24	Closed
D1- D2	Handover							
D1	Startup	Arranged degraded area and planted trees, installed sensors for measuring microclimatic parameters and installed sensors for measuring air quality	MONM Miroslav Strniša	Handover VS1	12M	Mar-23	Feb-24	Closed
D2	Maintenance	Sensor maintenance	MONM Miroslav Strniša		25M	Feb-23	Mar-25	Open
E1 - E1	Operation / Social & Cultural Solutions							
E1	Presentation of the project idea and results at conferences and events	Presentation of VS1 goals and results at conferences and events	MONM Miroslav Strniša		25M	Feb-23	Mar-25	Open

6.1.3. Detailed workplan for VS2



Table 95: Novo mesto (SI) - Work Plan VS2



Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A11	Preparation stage							
A1	VS design	Defining goals and activities for VS2	MONM Peter Geršič	VS design	12M	Feb-21	Jan-22	Closed
A2	Designing information points that are on the trim track	Planning content to support the track and its functions, giving it an educational purpose	MONM Nina Kotar		3M	Dec-21	Feb-22	Closed
A3	Preparation of a trim track plan	Planning a 1km long trim track with an educational trail for the purpose of learning healthy living	MONM Nina Kotar		4M	Mar-22	Jun-22	Closed
A4	Acquisition of the right to build a trim track	Preparation of documentation required to obtain the right to build a trim track	MONM Nina Kotar		11M	Feb-23	Dec-23	Closed
A5	Determining the specifications of people counting sensors	Determining the necessary sensors to detect human movement	MONM Peter Geršič		3M	Dec-22	Feb-23	Closed
A6	Preparation of promotional events and activities	Two promotional events will be held for the purpose of communication and public awareness	MONM Peter Geršič		1M	Aug-22	Aug-22	Closed
A7	Preparation of surveys and questionnaires	Two sets of surveys will measure preference and understanding of the solutions covered by the route	MONM Peter Geršič		12M	Feb-23	Jan-24	Closed
A8	Information campaigns	Expanding the understanding of the park's vision and its nature-based solutions	MONM Peter Geršič		7M	Jul-23	Jan-24	Closed
A9	Risk assessment	Risk assessment in the implementation of the trim track and sensor items and other activities of the VS2 assembly	MONM Peter Geršič		10M	Mar-23	Dec-23	Closed
A10	Preliminary budget and cost plan	Estimation of the budget for the purchase of sensors, preparation of the trim track plan, editing and setting up the trim track, preparation and implementation of promotional events and activities, implementation and preparation of an information campaign	MONM Tjaša Bezenšek		6M	Mar-22	Aug-22	Closed
A11	Determining the locations of the sensors for counting people	Determining the locations where we will place sensors for counting people	MONM Peter Geršič		5M	Mar-22	Jul-22	Closed
B1- B7	Selection of Service providers							
B1	Preparation of an order for the purchase of sensors for counting people	Based on the specifications of the necessary sensors for counting people, preparation of an order in accordance with the internal rules of MONM	MONM Vanja Lakner	Supplier selection	8M	Mar-23	Oct-23	Closed
B2	Preparation of an order for arranging and setting up a trim track with trim stations	Based on the needs for setting up and arranging a trim track with trim stations, preparation of an order in accordance with the internal rules of MONM	MONM Vanja Lakner		7M	Jul-23	Jan-24	Closed
B3	Publication of orders and transparency	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		7M	Jul-23	Jan-24	Closed
B4	Evaluation of bids and selection of the most appropriate bid	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		12M	Feb-23	Jan-24	Closed

Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
B5	Preparation of contracts	Based on the internal rules of MONM and based on the subject of the orders	MONM Vanja Lakner		11M	Mar-23	Jan-24	Closed
B6	Preparation of orders for the implementation of promotional events and activities	Based on the needs for the implementation of promotional events and activities, preparation of the order, which is in accordance with the internal rules of MONM	MONM Vanja Lakner		13M	Apr-23	Apr-24	Open
B7	Risk assessment	Risk assessment in the selection of contractors	MONM Vanja Lakner		18M	Jul-22	Dec-23	Closed
C1- C7	Execution process							
C1	Preparation of project documentation for the implementation of the project tasks	Preparation documentation for the implementation of the project tasks	MONM Nina Kotar	Preparation of project documentation for implementation	8M	May-23	Dec-23	Closed
C2	Setting up and arranging a trim track with trim stations	Setting up and arranging a trim track with trim stations based on a plan made	MONM Miroslav Strniša	Execution of VS2 project tasks	8M	May-23	Dec-23	Closed
C3	Surveys and questionnaires placed in prominent places	Surveys and questionnaires available to users	MONM Miroslav Strniša		13M	Apr-23	Apr-24	Open
C4	Implementation of promotional events and activities	Implementation of promotional events and activities	MONM Miroslav Strniša		7M	Oct-23	Apr-24	Open
C5	Purchase sensors for counting people	Purchase sensors to count people with specifications prepared in the order	MONM Miroslav Strniša		6M	May-23	Oct-23	Closed
C6	Testing the functionality of people counting sensors	Checking all functionalities of people counting sensors	MONM Miroslav Strniša		3M	Oct-23	Dec-23	Closed
C7	Installation of sensors to count people at locations	Installation of sensors for counting people at locations that we prepared in the planning phase	MONM Miroslav Strniša		2M	Nov-23	Dec-23	Closed
D1- D2	Handover							
D1	Startup	Installed and arranged trim track with trim stations, installed sensors for counting people, implementation of promotional events and activities	MONM Miroslav Strniša	Handover VS2	7M	Oct-23	Apr-24	Open
D2	Maintenance	Maintenance of sensors for counting people	MONM Miroslav Strniša		25M	Feb-23	Mar-25	Open
E1- E1	Operation / Social & Cultural Solutions							
E1	Presentation of the project idea and results at conferences and events	Presentation of VS2 objectives and results at conferences and events	MONM Miroslav Strniša		25M	Feb-23	Mar-25	Open



6.1.4. Detailed workplan for VS3

Table 96: Novo mesto (SI) - Work Plan VS3



Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A12 Preparation stage								
A1	VS design	Defining goals and activities for VS3	MONM Peter Geršič	VS design	12M	Feb-21	Jan-22	Closed
A2	Determining the course of development of integrated business and environmental programs	Determining the method and materials for the implementation of developed integrated business and environmental programs	MONM Peter Geršič		13M	Feb-23	Feb-24	Closed
A3	Random design of shared resources and facilities	Shared resources and facilities (rest areas) will be designed and strategically placed to promote spontaneous encounters and interactions between different user groups.	MONM Peter Geršič		13M	Feb-23	Feb-24	Closed
A4	Planning disability-friendly access to and around facilities	Analysis and mitigation measures for disabled access in the park	MONM Peter Geršič		19M	Jun-22	Dec-23	Closed
A5	Planning social and educational events	Planning social and educational events	MONM Peter Geršič		16M	Jan-23	Apr-24	Open
A6	Determining the specifications of LoRaWAN gateways	Determining the specifications of LoRaWAN gateways	MONM Peter Geršič		1M	Mar-22	Mar-22	Closed
A7	Choice of WiFi hotspots	It provides an internet connection for the users of the complex in Češča vas	MONM Peter Geršič		9M	Feb-23	Oct-23	Closed
A8	Preparation of surveys and questionnaires	Support campaigns for conducting surveys and questionnaires	MONM Peter Geršič		14M	Mar-23	Apr-24	Open
A9	Planning meetings with STKs	Sustainable monitoring of programs - analysis and setting up further development of programs of special and general groups for healthy living	MONM Peter Geršič		14M	Mar-23	Apr-24	Open
A10	Risk assessment	Risk assessment in the implementation of the interconnection of facilities and segments that are part of VS3	MONM Peter Geršič		5M	Mar-23	Jul-23	Closed
A11	Preliminary budget and cost plan	Estimation of the budget for the purchase of LoRaWAN gateways, WiFi hotspots, implementation of social and educational events, events with STKs, connection of the entire complex in Češča vas	MONM Tjaša Bezenšek		5M	Mar-22	Jul-22	Closed
A12	Determining the locations of WiFi hotspots and LoRaWAN gateways	Determining the locations where we will place WiFi hotspots and LoRaWAN gateways	MONM Peter Geršič		5M	Mar-22	Jul-22	Closed
B1- B7 Selection of Service providers								
B1	Preparation of an order for the purchase of LoRaWAN gateways and WiFi hotspots	Based on the specifications of the required LoRaWAN gateways and WiFi hotspots, preparation of the order in accordance with the internal rules of MONM	MONM Vanja Lakner	Supplier selection	5M	Mar-22	Jul-22	Closed
B2	Preparation of the order for the development and integration of business and environmental programs	Based on the needs for connecting business and environmental programs, preparation of an order in accordance with the internal rules of MONM	MONM Vanja Lakner		14M	Mar-23	Apr-24	Open
B3	Publication of orders and transparency	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		14M	Mar-23	Apr-24	Open



Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
B4	Evaluation of bids and selection of the most appropriate bid	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		14M	Mar-23	Apr-24	Open
B5	Preparation of contracts	Based on the internal rules of MONM and based on the subject of the orders	MONM Vanja Lakner		14M	Mar-23	Apr-24	Open
B6	Preparation of the order for the implementation of social and educational events and meetings with STKs	Based on the needs for the implementation of social, educational and meetings with STKs, preparation of the order, which is in accordance with the internal rules of MONM	MONM Vanja Lakner		15M	Feb-23	Apr-24	Open
B7	Risk assessment	Risk assessment in the selection of contractors	MONM Vanja Lakner		12M	Apr-22	Mar-23	Closed
C1- C7	Execution process							
C1	Preparation of project documentation for the implementation of the project tasks	Preparation documentation for the implementation of the project tasks	MONM Peter Geršič	Preparation of project documentation for implementation	10M	Apr-23	Jan-24	Closed
C2	Linking business and environmental programs	Meaningful integration of business and environmental programs	MONM Miroslav Strniša	Execution of VS3 project tasks	15M	Apr-23	Jun-24	Open
C3	Surveys and questionnaires placed in prominent places	Surveys and questionnaires available to users	MONM Miroslav Strniša		15M	Apr-23	Jun-24	Open
C4	Implementation of social and educational events and meetings with STKs	Implementation of social and educational events and meetings with STKs	MONM Miroslav Strniša		15M	Apr-23	Jun-24	Open
C5	Purchase LoRaWAN gateways and WiFi hotspots	Purchase LoRaWAN gateways and WiFi hotspots with specifications prepared in the order	MONM Miroslav Strniša		14M	May-22	Jun-23	Closed
C6	Testing the functionality of LoRaWAN gateways and WiFi hotspots	Check all the functionality of LoRaWAN gateways and WiFi hotspots	MONM Miroslav Strniša		13M	Jun-22	Jun-23	Closed
C7	Installation of LoRaWAN gateways and WiFi hotspots at locations	Installation of LoRaWAN gateways and WiFi hotspots at locations prepared in the planning phase	MONM Miroslav Strniša		13M	Jun-22	Jun-23	Closed
D1- D2	Handover							
D1	Startup	Connected business and environmental programs and launch of LoRaWAN gateways and WiFi hotspots	MONM Miroslav Strniša	Handover VS3	12M	Jul-23	Jun-24	Open
D2	Maintenance	Maintenance of LoRaWAN gateways	MONM Miroslav Strniša		19M	Aug-23	Mar-25	Open
E1- E1	Operation / Social & Cultural Solutions							
E1	Presentation of the project idea and results at conferences and events	Presentation of VS3 goals and results at conferences and events	MONM Miroslav Strniša		19M	Aug-23	Mar-25	Open

6.1.5. Detailed workplan for VS4



Table 97: Novo mesto (SI) - Work Plan VS4

Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A9	Preparation stage							
A1	VS design	Defining goals and activities for VS4	MONM Peter Geršič	VS design	12M	Feb-21	Jan-22	Closed
A2	Determining the functionality of the ICT platform and individual components	Defining individual components of the ICT platform and defining the method of integration of these components	MONM Peter Geršič		3M	Mar-22	May-22	Closed
A3	Determining technical specifications of sensors and screens	Preparation of technical documentation with specifications of required sensors and screens	MONM Peter Geršič		5M	Nov-22	Mar-23	Closed
A4	Determining the mode of operation of the ICT system	Preparation of the specification of the required ICT platform, which will enable the operation of the combined sets (website, booking system, IoT system)	MONM Peter Geršič		3M	May-22	Jul-22	Closed
A5	Analysis of activities required to connect sets with the ICT platform	Detailed analysis of activities and processes required for the configuration and operation of the ICT platform	MONM Peter Geršič		6M	Feb-23	Jul-23	Closed
A6	Risk assessment	Risk assessment in the implementation of the ICT platform	MONM Peter Geršič		8M	Jul-22	Feb-23	Closed
A7	Preliminary budget and cost plan	Estimation of the budget for the purchase of sensors, screens, website development, booking system, IoT platform, establishment of ICT platform operation and installation at locations	MONM Tjaša Bezenšek		5M	Mar-22	Jul-22	Closed
A8	Determining sensor and display locations	Determining the locations where we will place tablets and sensors	MONM Peter Geršič		5M	Mar-22	Jul-22	Closed
A9	Determining the method of displaying data obtained with sensors, and determining the graphic design and information that will be displayed within the ICT platform	Method of displaying data obtained from sensors, displaying information of the entire complex in Češča vas (events, occupancy of facilities, etc.) and adjusting the graphic design to the project and displaying user-friendly data	MONM Peter Geršič		5M	Mar-22	Jul-22	Closed
B1- B7	Selection of Service providers							
B1	Preparation of the order for the establishment of an ICT platform	Based on the specifications of the necessary sets for the operation of the ICT platform and the operation of the ICT platform itself, the preparation of an order in accordance with the internal rules of MONM	MONM Vanja Lakner	Supplier selection	7M	Jul-22	Jan-23	Closed
B2	Preparing an order to purchase sensors	Based on the specifications of the required sensors, preparation of the order in accordance with the internal rules of MONM	MONM Vanja Lakner		3M	Dec-22	Feb-23	Closed
B3	Preparing an order to purchase screens	Based on the specifications of the required screens, preparation of the order in accordance with the internal rules of MONM	MONM Vanja Lakner		3M	Dec-22	Feb-23	Closed
B4	Publication of orders and transparency	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		3M	Feb-23	Apr-23	Closed
B5	Evaluation of bids and selection of the most appropriate bid	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		1M	Dec-22	Dec-22	Closed
B6	Preparation of the contract	Based on the internal rules of MONM and based on the subject of the order	MONM Vanja Lakner		1M	Dec-22	Dec-22	Closed

Tasks			Description	Task Owner	Milestone	Duration	Start	Finish	Status
B7	Risk assessment	Risk assessment in purchasing and selecting a contractor	MONM Vanja Lakner		8M	Jul-22	Feb-23	Closed	
C1- C7	Execution process								
C1	Preparation of project documentation for the implementation of the project tasks	Preparation documentation for the implementation of the project tasks	MONM Peter Geršič	Preparation of project documentation for implementation	6M	Jan-23	Jun-23	Closed	
C2	Preparation of ICT platform	Development of an ICT system based on the Planned operating system	MONM Miroslav Strniša	Execution of VS4 project tasks	6M	Jan-23	Jun-23	Closed	
C3	Connecting individual sets with the ICT platform	Connecting the prepared parts of the system with the entire ICT system	MONM Miroslav Strniša		6M	Jan-23	Jun-23	Closed	
C4	Purchase sensors and screens	Purchase of sensors and screens with specifications specified in the public procurement	MONM Miroslav Strniša		6M	Jan-23	Jun-23	Closed	
C5	Testing the functionality of the ICT platform	Checking all functionalities of the ICT system	MONM Miroslav Strniša		6M	Jan-23	Jun-23	Closed	
C6	Testing on-screen displays	Checking the display of desired data on tablets	MONM Miroslav Strniša		6M	Jan-23	Jun-23	Closed	
C7	Installation screens and sensors at locations	Installation of tablets and sensors at locations prepared in the planning phase	MONM Miroslav Strniša		2M	May-23	Jun-23	Closed	
D1- D2	Handover								
D1	Startup	Launch of the ICT platform	MONM Miroslav Strniša	Handover VS4	1M	Jul-23	Jul-23	Closed	
D2	Maintenance	ICT platform maintenance	MONM Miroslav Strniša		18M	Aug-23	Mar-25	Open	
E1- E1	Operation / Social & Cultural Solutions								
E1	Presentation of the project idea and results at conferences and events	Presentation of VS4 goals and results at conferences and events	MONM Miroslav Strniša		18M	Aug-23	Mar-25	Open	



6.1.6. Detailed workplan for VS5

Table 98: Novo mesto (SI) - Work Plan VS5





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A9	Preparation stage							
A1	VS design	Defining goals and activities for VS5	MONM Peter Geršič	VS design	12M	Feb-21	Jan-22	Closed
A2	Defining the set of variables, we want to measure and display	Defining variables and information to be collected by sensors and displayed to the user	MONM Peter Geršič		3M	May-22	Jul-22	Closed
A3	Determining technical specifications of sensors and tablets	Preparation of technical documentation with specifications of required sensors and tablets	MONM Peter Geršič		3M	May-22	Jul-22	Closed
A4	Determining how the bracelet system works	Preparation of the specification of the necessary bracelet system, which will enable the display and collection of data from bracelets	MONM Peter Geršič		4M	Dec-22	Mar-23	Closed
A5	Analysis of the activities required to connect the bracelets to the system	Detailed analysis of the activities and processes required for the configuration and operation of the bracelet system	MONM Peter Geršič		4M	Jan-23	Apr-23	Closed
A6	Risk assessment	Risk assessment in the implementation of the bracelet system	MONM Peter Geršič		9M	May-22	Jan-23	Closed
A7	Preliminary budget and cost plan	Estimation of the budget for the purchase of sensors, tablets, production of the bracelet system, establishment of the operation of the entire system and installation at locations	MONM Tjaša Bezenšek		5M	Mar-22	Jul-22	Closed
A8	Determining the locations of tablet and bracelet items	Determining the locations where we will place tablets and sensors	MONM Peter Geršič		5M	Mar-22	Jul-22	Closed
A9	Determining how to display data obtained with bracelets on tablets	Method of displaying data obtained from sensors, and adjusting the graphic design to the project and displaying data that will be user-friendly	MONM Peter Geršič		16M	Mar-22	Jun-23	Closed
B1- B6	Selection of Service providers							
B1	Preparation of an order for the purchase of bracelets and the establishment of a bracelet system	Based on the specifications of the required bracelets and the operation of the bracelet system, preparation of an order in accordance with the internal rules of MONM	MONM Vanja Lakner	Supplier selection	3M	Jan-22	Apr-22	Closed
B2	Preparing an order to buy a tablet	Based on the specifications of the required tablets, preparation of the order in accordance with the internal rules of MONM	MONM Vanja Lakner		3M	Jan-23	Mar-23	Closed
B3	Publication of orders and transparency	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		4M	Mar-23	Jun-23	Closed
B4	Evaluation of bids and selection of the most appropriate bid	Based on MONM's internal rules for public procurement and national legislation (ZJN3)	MONM Vanja Lakner		1M	Dec-22	Dec-22	Closed
B5	Preparation of the contract	Based on the internal rules of MONM and based on the subject of the order	MONM Vanja Lakner		1M	Dec-22	Dec-22	Closed
B6	Risk assessment	Risk assessment in purchasing and selecting a contractor	MONM Vanja Lakner		5M	Dec-22	May-23	Closed





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

C1- C7	Execution process							
C1	Preparation of project documentation for the implementation of the project tasks	Preparation documentation for the implementation of the project tasks	MONM Peter Geršič	Preparation of project documentation for implementation	7M	Dec-22	Jun-23	Closed
C2	Preparation of the bracelet system	Production of a bracelet system based on the Planned operating system	MONM Miroslav Strniša	Execution of VS5 project tasks	7M	Dec-22	Jun-23	Closed
C3	Connecting the bracelet and bracelet system	Connecting the prepared bracelet system with bracelets	MONM Miroslav Strniša		7M	Dec-22	Jun-23	Closed
C4	Buy bracelets	Purchase of bracelets with specifications specified in the public procurement	MONM Miroslav Strniša		7M	Dec-22	Jun-23	Closed
C5	Testing the functionality of the bracelet system	Checking all the functionalities of the bracelet system	MONM Miroslav Strniša		5M	Feb-23	Jun-23	Closed
C6	Testing displays on tablets	Checking the display of desired data on tablets	MONM Miroslav Strniša		5M	Feb-23	Jun-23	Closed
C7	Installation of tablets in locations	Installation of tablets at locations prepared in the planning phase	MONM Miroslav Strniša		2M	May-23	Jun-23	Closed
D1- D2	Handover							
D1	Startup	Starting the bracelet system	MONM Miroslav Strniša	Handover VS5	1M	Jul-23	Jul-23	Closed
D2	Maintenance	Bracelet system maintenance	MONM Miroslav Strniša		18M	Aug-23	Mar-25	Open
E1- E1	Operation / Social & Cultural Solutions							
E1	Presentation of the project idea and results at conferences and events	Presentation of VS5 goals and results at conferences and events	MONM Miroslav Strniša		18M	Aug-23	Mar-25	Open



6.2. Novo mesto (SI)- Procurement Plan

General notes: At first, the description of the order was defined, i.e., what is the subject of the order and who are the potential bidders. Based on the order specifications, a market analysis was performed and an estimation of the value was made. Based on the estimated value, the order process was selected. Based on the order process, the relevant documentation was prepared, which the legal department looked at and commented on. When all these processes were completed, the order was published. When ordering, a deadline for application was always specified. After the application deadline, the possible providers were examined and the most suitable one based on the specified criteria was selected.

Table 99: Novo mesto (SI) - Procurement Management Plan

		Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS1	VS1										
	VS1.1	Preparatory documentation	Preparation of technical documentation and visualisations for obtaining required permits and expert opinions	Competitive dialogue	Service	No	No	Feb-21	Feb-22	13M	Closed
	VS1.2	Basic landscaping of the degraded area	Removal of scrubs and levelling of the degraded area	Competitive dialogue	Works	No	No	Avg-23	Jan-24	6M	Closed
	VS1.3	Planting of trees and bushes native to the Nature 2000 area	Purchase & planting of trees and bushes	Competitive dialogue	Works	No	No	Feb-23	Jan-24	11M	Closed
	VS1.4	Measurements of Air/ambient quality and environmental parameters	Selection, purchase & installation of air quality and microclimate sensors	Competitive procedure with negotiation	Works	No	Yes	Apr-22	Dec-23	20M	Closed
VS2	VS2										
	VS2.1	Preparatory documentation	Preparation of technical documentation and visualisations for obtaining required permits and expert opinions	Competitive dialogue	Service	No	No	Feb-21	Feb-22	12 M	Closed
	VS2.2	Programmatic setup (H&WB content)	Design & content of informative spots of the sustainable trail	Competitive procedure with negotiation	Service	No	No	Apr-23	Jan-24	9 M	Closed
	VS2.3	Construction of sustainable forest trails	Construction work for execution of the trail	Competitive procedure with negotiation	Works	No	No	Dec-21	Oct-23	22 M	Closed
	VS2.4	Monitoring of visitor data	4 Infrared (IR) people counters with LoRaWAN connectivity	Competitive dialogue	Works	No	No	Jul-22	Jan-23	6 M	Closed
	VS2.5	Public awareness and educational events	Promotional events design & activities	Competitive dialogue	Service	No	No	Apr-23	Jan-24	9 M	Closed
	VS2.6	Surveys & questionnaires	Supporting actions for execution of survey and questionnaires	Competitive dialogue	Service	No	No	Apr-23	Jan-24	9 M	Closed
	VS2.7	Information campaigns	Social media & mass media information	Competitive dialogue	Service	No	No	Sep-22	Mar-25	30 M	Closed

		Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Start (mm/yy)	Finish (mm/yy)	Duration	Status
VS3	VS3										
	VS3.1	Development of integrated business and environment programmes	Consumables for implementing the developed integrated business and environment programmes	Competitive dialogue	Service	No	No	Apr-23	Jun-24	14 M	Closed
	VS3.2	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	Competitive dialogue	Service	No	No	Apr-23	Jun-24	14 M	Closed
	VS3.3	Disabled friendly access in and around facilities	Analysis and mitigating measures of disabled friendly access in the park	Competitive dialogue	Supply	No	No	Feb-22	Jul-23	17 M	Closed
	VS3.4	Social and educational events	Performing events that will market and show facilities in the interconnectedness	Competitive dialogue	Service	No	No	Apr-23	Jun-24	14 M	Closed
	VS3.5	LoRaWAN Gateways	LoRaWAN Gateways	Competitive dialogue	Works	No	Yes	Mar-22	Jul-23	16 M	Closed
	VS3.6	Strategic placement of WiFi hotspots	Enabling connectivity for all users	Competitive dialogue	Works	No	No	May-22	Jul-23	14 M	Closed
	VS3.7	Surveys & questionnaires	Supporting actions for execution of survey and questionnaires	Competitive dialogue	Service	No	No	Apr-23	Jun-24	14 M	Closed
	VS3.8	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	Competitive dialogue	Service	No	No	Apr-23	Jun-24	14 M	Closed
VS4	VS4										
	VS4.1	Preparatory documentation	Preparation of mock-ups and other visualizations required for the implementation of ICT platform	Competitive dialogue	Service	No	No	Feb-21	Jul-23	29 M	Closed
	VS4.2	ICT platform	Main ICT platform for managing facilities, bookings, programmes and CRM	Competitive procedure with negotiation	Service	No	Yes	May-22	Jul-23	14 M	Closed
	VS4.3	IoT Sensors	Sensors for tracking and detecting the movement of visitors will give an overview and manage the people flow	Competitive dialogue	Works	No	No	May-21	Jul-23	14 M	Closed
	VS4.4	Public Screens	Public touchscreens as information points of the centre, functional part of the VS5	Competitive dialogue	Works	No	No	May-21	Jul-23	14 M	Closed
VS5	VS5										
	VS5.1	Wearables	Wearables will be acquired to actively track the activities and directly monitor the H&WB of visitors	Competitive dialogue	Supply	No	No	May-21	Jul-23	14 M	Closed
	VS5.2	Tablet computer	Tablet computer s with WiFi and BLE connectivity which will serve as a network getaway for wearables	Competitive dialogue	Supply	No	No	May-21	Jul-23	14 M	Closed

6.3. Novo mesto (SI)-Realised risks and identified opportunities

Following is a list of the realised risks that Novo mesto pilot faced, along with a brief description of how these risks impacted the Visionary Solutions and the mitigation actions that were put in place.

Table 100: Novo mesto (SI)- Realised risks

Final Risk Report				Date:	31/10/2024	Prepared by:	Peter Geršič NOVOMESTO	
Summary of realised risks								
ID	Risk Category	Risk Type	Risk Description	VS	Stage	Risk significance	Risk Impact	Mitigation Action
RR005	Quality	General	Forest trails are difficult to maintain and trail planning could prove difficult due to diverse terrain. The natural trim path crosses the transport road and proposed solution are well mark passages and severely limited speed.	VS2	Evaluation / Monitoring	Moderate	The Park wants to maintain natural ambient and large crowds of people can easily damage fragile nature. The VARCITIES sensors network must track and detect the movement of visitors for the management of people flow in the park facilities. We need analysis on how visitors affect the forest.	Timely action to correct errors and constant track trim control
RR007	Technical	Price	Problems with strict rules of procurement of technical equipment in SI and offers from subcontractors for hosting and managing of pilot's data with dump prices and aggressive competition.	VS1, VS2, VS3, VS4, VS5	Evaluation / Monitoring	Moderate	The providers must be able to host and program the applications for VARCITIES, but Slovene public procurements are focused on price and not enough on quality of execution. Quality of execution and maintenance of VARCITIES local applications could be compromised and would require expensive overhauls and maintenance.	Searching for several suppliers and preparing orders ahead of time so that we have time to think
RR009	Technical	General	Problem with the reliability of air quality sensors. Sensor prices are very high if we want to get accurate and precise data.	VS1	Evaluation / Monitoring	High	Credibility of collected data	Buy precision sensors.
RR012	Financial	Price	Higher prices on the Slovenian market than expected. Other suppliers from abroad cannot prepare the required documentation in Slovenian for tender application.	/	Evaluation / Monitoring	High	Exceeding initially foreseen budget.	Use extra budget allocated from the Bergen pilot. Any extra amount needed will be obtained from other funds (STK workshops, cultural and social events, local dissemination material, infrastructure).



Table 101: Novo mesto (SI)- Identified opportunities

Summary of opportunities		The interventions in Novo mesto present environmental, social, economic and technological opportunities for the area around the sports center and for the users of the facilities.				
ID	Opportunity Description	VS	Stage	Opportunity Category	Opportunity capture strategy	Status
OR01	To start collaborations with other projects and activities.	VS1, VS2, VS3, VS4, VS5	Evaluation / Monitoring	Technological	Follow the project process and looking for opportunities to connect with other projects and activities	Ongoing
OR02	The impact of the trim track on business sustainable development and the promotion of healthy living by schools and other stakeholders.	VS2, VS3	Evaluation / Monitoring	Economic	With the help of the trim track, we will promote a healthy lifestyle and present other segments of the complex in Češča vas, thus enabling development and financial gain.	Ongoing
OR03	Visibility of air quality measurement data and microclimatic parameters. Data becomes valuable.	VS1, VS4	Evaluation / Monitoring	Environmental	Data collection with the sensors in urban and natural environment, and their comparison, which is expected to show better results in natural environment and based on that information people will spend more time in the natural environment	Ongoing
OR04	The bracelet rental system in Češča vas will enable the acquisition of more users who will participate in the development of a healthy lifestyle and well-being.	VS5	Evaluation / Monitoring	Social	System will gain public awareness of being active and living healthy life in the nature	Ongoing



6.4. Novo mesto (SI)- Received feedback with respect to the implementation process

Table 102: Novo mesto (SI)- Changes in the VS concept design

Novo mesto	VS1	VS2	VS3	VS4	VS5
1. Did any changes occur in the concept design since the initial sketching of your VS?	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No
2. At which stage did the change occur? <i>(multiple choice possible)</i>	☐ Concept design ☒ Preparation stage ☐ Selection of services providers ☒ Execution stage	☐ Concept design ☒ Preparation stage ☐ Selection of services providers ☒ Execution stage	☐ Concept design ☒ Preparation stage ☒ Selection of services providers ☒ Execution stage	☐ Concept design ☒ Preparation stage ☒ Selection of services providers ☒ Execution stage	☐ Concept design ☐ Preparation stage ☒ Selection of services providers ☒ Execution stage
3. What kind of change occurred? <i>(multiple choice possible)</i>	☐ Scope ☒ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☒ Location ☒ Design ☐ Scale/Downsize ☐ Other	☒ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☒ Other: Time planning	☒ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☒ Other: Time planning
4. Which is the main reason for any changes to occur? <i>(multiple choice possible)</i>	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☒ STK input ☐ Political decision ☒ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☒ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other	☒ STK input ☐ Political decision ☐ Legal issues ☒ Technical issues ☐ Financial issues ☐ Other
5. How did the changes affect the progress of work? <i>(multiple choice possible)</i>	☒ Timeframe ☐ Budget ☒ Procurement procedure ☐ Other	☒ Timeframe ☐ Budget ☒ Procurement procedure ☐ Other	☒ Timeframe ☐ Budget ☒ Procurement procedure ☐ Other	☒ Timeframe ☐ Budget ☒ Procurement procedure ☐ Other	☒ Timeframe ☒ Budget ☒ Procurement procedure ☐ Other



Table 103: Novo mesto (SI)- Required expertise

Novo mesto	VS1	VS2	VS3	VS4	VS5
1. Which experts (in-house & service providers) were involved in the design / implementation of your VS? <i>(multiple choice possible)</i>	☒ Architect/ Engineer ☒ Landscape designer ☒ Urban planner ☒ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☒ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☐ Other:	☒ Architect/ Engineer ☒ Landscape designer ☒ Urban planner ☒ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☒ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☒ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☒ Researcher ☒ IT expert ☐ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☒ NbS expert ☐ Researcher ☒ IT expert ☐ Surveyor ☒ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☒ Communication expert ☒ Municipal project officer ☐ Other:
2. Which was the highest level of expertise required for in-house experts?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☒ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐
3. Which was the highest level of expertise required for service providers?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☐ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☒



Table 104: Novo mesto (SI)- Experiences from the procurement processes

Novo mesto	VS1	VS2	VS3	VS4	VS5
1. Did you experience any difficulties with the procurement process?	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No
2. In case of any difficulties, please describe the reason. <i>(multiple choice possible)</i>	☒ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☒ Market analysis ☐ Level of expertise required ☐ Other	☒ Tendering process specifications ☒ Bureaucracy ☒ Regulations ☐ Eligibility of offers ☒ Market analysis ☐ Level of expertise required ☐ Other	☒ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☒ Eligibility of offers ☒ Market analysis ☐ Level of expertise required ☐ Other	☒ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☒ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☒ Market analysis ☒ Level of expertise required ☐ Other

Table 105: Novo mesto (SI)- Budget variance

Novo mesto	VS1	VS2	VS3	VS4	VS5
1. Were there any significant variances to the budget needed for your VS? ($\pm 25\%$)	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
2. Which was the reason for any significant budget variance? <i>(multiple choice possible)</i>	☐ Change in the concept design ☐ External factors (e.g. market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g. market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g. market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g. market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g. market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other



Table 106: Novo mesto (SI)- Experienced delays

Novo mesto	VS1	VS2	VS3	VS4	VS5
1.Were there any delays in your workplan	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No	☐ Yes ☒ No
2. Which was the reason for the delay? <i>(multiple choice possible)</i>	☒ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☒ Approvals ☒ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☒ Weather ☐ Other	☒ Inaccurate forecasting ☒ Change in the concept design ☐ Budget issues ☒ Approvals ☒ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☒ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☒ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☒ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☒ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☒ Budget issues ☐ Approvals ☒ Project complexity ☐ Procurement issues ☒ Labor challenges ☒ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other



Table 107: Novo mesto (SI)- Key take-aways from the implementation process

Novo mesto	VS1	VS2	VS3	VS4	VS5
1. Looking back, what aspects of any implementation stage would you approach differently?	☒ Preparation ☐ Procurement ☒ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☒ Procurement ☒ Execution ☐ Handover ☐ Operation & Monitoring	☒ Preparation ☐ Procurement ☐ Execution ☐ Handover ☒ Operation & Monitoring	☐ Preparation ☐ Procurement ☒ Execution ☒ Handover ☐ Operation & Monitoring	☒ Preparation ☐ Procurement ☒ Execution ☐ Handover ☐ Operation & Monitoring
2. What were the most valuable lessons learned during the development of the concept design and the setting up of the implementation process?	Include biodiversity experts sooner in the process Good spatial planning needed	More interactive actions between departments and teams Important of securing access to people with disabilities	IT procurement can stay within budget Process of sensors' development	Integrating systems and programs is hard Process of STK involvement	GDPR poses challenges
3. Which preventive measures would you recommend for future replication of your VS?	Assess in advance required expertise	Testing spatial planning solutions Getting approvals in advance	Strengthening multidisciplinary project teams	More coordination	Involving legal expert sooner
4. If you could start over, what would you change about the preparation stage?	Not much	Securing approvals before starting project	Selection of sensors' location	More analysis, contractual definition	Perform market analysis already from preparation stage
5. If you could start over, what would you change about the procurement stage?	Define boundaries and scope earlier Selection of services providers	Selection of services providers	Specify more locations for sensors	Nothing	Nothing
6. If you could start over, what would you change about the budget planning?	Consider cost increases (6-year inflation budget for maintenance)	Consider cost increases (6-year inflation budget for maintenance)	Consider cost increases (6-year inflation budget for maintenance)	Consider cost increases (6-year inflation budget for maintenance)	Consider cost increases (6-year inflation budget for maintenance)



6.5. Novo mesto (SI)- Operation and Maintenance

VS1 – In February 2024, the degraded area was arranged and trees were planted. Sensors were installed and data collection started. Maintenance of the sensors is Planned until the end of the project. For after the end of the project, maintenance contracts have been prepared.

VS2 – At the end of 2023, the installation and arrangement of the trim track with stations was finished, as well as the installation of sensors for counting people. The implementation of promotional events and activities are Planned in the first half of 2024. It is Planned to maintain the sensors until the end of the project. For after the end of the project, maintenance contracts have been prepared.

VS3 – By June 2024 the connection of business and environmental programs will be made. LoRaWAN gateways and WIFI hotspots are already installed. All equipment will be maintained until the end of the project by MONM. A contract for the maintenance of technical elements with a provider has been prepared for after VARCITIES project finishes.

VS4 – ICT platform is implemented. A contract with the provider for maintaining the platform has been prepared.

VS5 – Bracelet system is implemented. A contract with the provider for maintaining the bracelet system has been prepared.

6.5.1. O&M of Nature-based Solutions

Table 108: Novo mesto (SI)- O&M of NbS

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Forest trails	Regular/ Preventive Maintenance	Type of action(s)	1. Trail cleaning (fallen trees, branches...) 2. Trash and litter removal 3. Ensuring structural integrity, safety and accessibility of trail structures 4. Safety inspections 5. Seasonal maintenance	500	10+
		Frequency	Weekly		
		Procedure	Various preventive measures are needed to ensure safety, accessibility and environmental sustainability of the forest trail.		
		Responsibility	TBD		
		Solution specific issues	Recommended preventive maintenance varies depending of factors such as trail usage,		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Pro-active care/ Remedial actions		environmental conditions, trail characteristics. Regular visual inspections should be conducted at least once a week. A comprehensive maintenance plan outlining specific tasks, frequencies, responsible partners and resources for each maintenance activity is needed.		
		Type of action(s)	1.Vegetation management (addressing obstructions of pathway) 2.Invasive species management 3.Erosion control 4.Surface maintenance (repairs)		
		Procedure	TBD		
		Responsibility	TBD		
		Solution specific issues	Maintenance activities should be scheduled in response to specific events such as severe weather events, heavy trail usage or natural disasters that may require immediate attention to address damage or safety concerns.		
Indigenous plant species	Regular/ Preventive Maintenance	Type of action(s)	1. Weeding 2. Watering 3. Mulching 4. Pruning and trimming 5. Fertilization 6. Documentation of maintenance activities		
		Frequency	Weekly		
		Procedure	Attention is required to support the growth, health and diversity of the native plant species, while minimising the impact of invasive species.		
		Responsibility	TBD		
		Solution specific issues	TBD		
	Pro-active care/ Remedial actions	Type of action(s)	1. Pest and disease management 2. Periodic habitat restoration 3. Invasive species management		
		Procedure	TBD		
		Responsibility	TBD		
		Solution specific issues	TBD		



6.5.2. O&M of Socio/ Cultural Solutions

Table 109: Novo mesto (SI)- O&M of Socio/ Cultural solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
LoRaWAN gateways & WiFi Spots	Regular/ Preventive Maintenance	Type of action(s)	1. Firmware updates. 2. Antenna inspection. 3. Power supply check. 4. Environmental monitoring (check of operating environment). 5. Network connectivity check. 6. Security audit. 7. Log analysis. 8. Documentation & record keeping.	1150	TBD
		Frequency	Monthly		
		Procedure	TBD		
		Responsibility	TBD		
		Solution specific issues	The recommended frequency for preventive maintenance varies depending on factors such as the specific environment, usage patterns, manufacturer recommendations and network requirements.		
	Pro-active care/ Remedial actions	Type of action(s)	1. Performance monitoring to track key metrics/ analyse trends to identify degradation in performance and take corrective action if needed. 2. Predictive maintenance to identify potential issues before they occur. 3. Environmental protection (e.g. weather proof enclosures). 4. Upgrades/ replacements of key components of the gateway. 5. Regular update of security protocols, encryption algorithms and access controls.		
		Procedure	The above actions should be incorporated into the maintenance strategy.		
		Responsibility	TBD		
		Solution specific issues	Regular monitoring, analysis, and optimization help maximize the efficiency and effectiveness of LoRaWAN and WiFi spots.		



6.5.3. O&M of Digital Solutions

Sensors used in Novo mesto VSs are stated in Table 110: sensor ID number, commercial name, measuring unit, quantity used together with the sensor's communication protocol, and the reference link.

Table 110: Sensors and devices used in Novo mesto

No.	Sensors	Measuring	Quantity	Protocol	Link as reference
1	Sensedge Senstick	T, RH, Air pressure	10	LoRaWAN	https://senstick.co/
2	LoRa people counter	No. of visitors	4	LoRaWAN	https://lora-alliance.org/lora_products/people-counter/
3	Air quality	Temperature, Barometric pressure, Relative Humidity, PM1, PM2.5, PM10, O3, CO, NO2, SO	2	LoRaWAN	https://www.uradmonitor.com/products/
4	FitBit5	Optical heart rate monitor, accelerometer, GPS, Oxygen saturation, light sensor	20	BT, Wi-Fi	https://www.fitbit.com/global/us/products/trackers/charge5

The local governance for Novo mesto follows a fixed schedule of maintenance. Local Pilot Expert / VS manager can manage Planned downtime, rather than emergency downtime. The Novo mesto pilot's central and periodic evaluations of the IoT are also used for managing the coherent progress of VSs performance.

- Set maintenance dates are as much as possible in-line with the typical battery lifespan used in the sensors, which are part of the local IoT network (VS1, VS2, VS3, VS4 and VS5).
- Sensedge's Sensor Management Platform is receiving and evaluate the additional local sensor data: battery level, signal-to-noise ratio, signal strength indicator of the channel, to enable local users with alerts on possible unforeseen degradations and miscalibration of IoT devices used in VS.

Table 111 and Table 112 briefly describe the local governance strategy and persons or organisations responsible for monitoring and maintaining the local IT infrastructure.

Table 111: Novo mesto (SI)- Local IT infrastructure/ Management

Local governance (Months / Weeks)	Once every week.
Short description	The audit will be performed at least once a week. Maintenance of the ICT platform will be subcontracted throughout the duration of the project, but Novo mesto Spatial and Development Office Strniša will oversee the process. We will check the operation of the sensors at least once a week, we will pay attention to the battery percentage during the check, and we will plan the necessary maintenance accordingly.



Table 112 : Novo mesto (SI)- Local IT infrastructure/ Maintenance responsibility

Monitoring Manager / Organisations responsible for maintenance	
Person/Organisation responsible for sensor performance / Data backup verifications	Novo mesto Spatial and Development Office Strniša / MONM
Person/Organisation responsible for on-site scheduled maintenance	Novo mesto Spatial and Development Office Strniša / MONM
Person/Organisation responsible for unscheduled maintenance	Novo mesto Spatial and Development Office Strniša / MONM
Person/Organisation responsible for the local web and booking system performance, developed in NM	Novo mesto Spatial and Development Office Strniša / MONM

Table 113: Novo mesto (SI)- O&M of Digital Solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Sensedge Stick	Regular/ Preventive Maintenance	Type of action(s)	Checking signal strength, battery life	180 /	10+ /
		Frequency	Bimonthly		
		Procedure	Via platform checking sensor health – LoRaWAN signal rate, battery life. With stronger signal the battery will last longer.		
		Responsibility	Novo mesto Spatial and Development Office		
		Solution specific issues	Maintenance might be done on field if LoRaWAN gateway needs fixing.		
	Pro-active care/ Remedial actions	Type of action(s)	Battery change on average span of 5-7 years		
		Procedure	Opening the sensor and changing the two AAA alkaline batteries with new ones. (industrial grade recommended) Tutorial on battery change can be seen HERE .		
		Responsibility	Novo mesto Spatial and Development Office		
		Solution specific issues	The proper handling and care of the device are imperative.		
People counter	Regular/ Preventive Maintenance	Type of action(s)	Cleaning lens and enclosure	400	3
		Frequency	Quarterly		
		Procedure	Using normal cleaning equipment to clean outside of the sensor		
		Responsibility	Novo mesto Spatial and Development Office		
		Solution specific issues	The proper handling and care of the device are imperative.		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Pro-active care/ Remedial actions	Type of action(s)	Ensuring a strong Wi-fi connection		
		Procedure	Checking signal of Wi-Fi Strength. Can be done via phone.		
		Responsibility	Novo mesto Spatial and Development Office		
		Solution specific issues	Needs visits on-site to check signal strength		
Air quality sensors	Regular/ Preventive Maintenance	Type of action(s)	Checking signal strength, battery life	400	2
		Frequency	Choose an item.		
		Procedure	Via platform checking sensor health		
		Responsibility	Novo mesto Spatial and Development Office		
	Pro-active care/ Remedial actions	Solution specific issues	The proper handling and care of the device		
		Type of action(s)	Weekly sensor checks		
		Procedure	Connection to the device and review of acquired data		
		Responsibility	Novo mesto Spatial and Development Office		
Fitbit	Regular/ Preventive Maintenance	Solution specific issues	Needs visits on-site to check signal strength		2-5 yrs.
		Type of action(s)	Charging and checking battery		
		Frequency	Weekly		
		Procedure	Checking battery every week and put Fitbit on charging.		
	Pro-active care/ Remedial actions	Responsibility	Novo mesto Spatial and Development Office		
		Solution specific issues	The proper handling and care of the device		
		Type of action(s)	Testing device once peer week		
		Procedure	Try some activities with device		
	Pro-active care/ Remedial actions	Responsibility	Novo mesto Spatial and Development Office		
		Solution specific issues	The proper handling and care of the device		



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

7.1. Skellefteå (SE)- Implementation status of the Visionary Solutions

Five Visionary Solutions have been implemented in Skellefteå. These solutions are now fully operational and are being fully exploited from a digital, Nature-based Solution (NbS), and socio-cultural perspective.

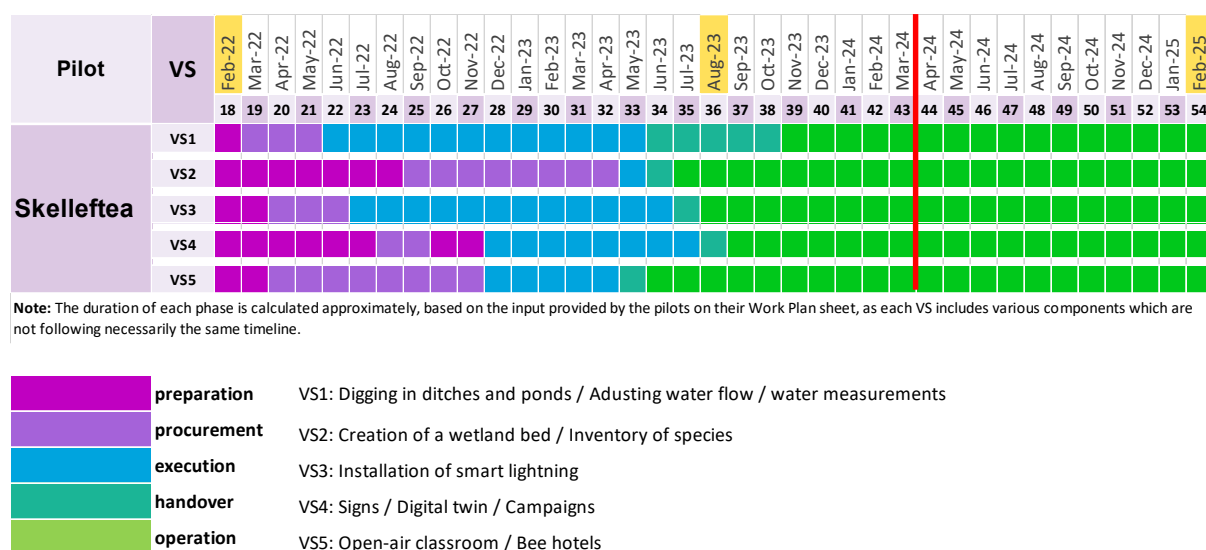


Figure 62: Skellefteå (SE)- Implementation status of the Visionary Solutions

7.1.1. Overview of the Visionary Solutions

VS1: Build natural infrastructure to create urban resilience.

Status: Operational

VS1 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. Improved riverbank green also enhances biodiversity and has an educational effect on the public.

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 from the two ponds, and restoring the ditch by covering the rubber lining with stone material. The solution includes adjustment of the outflow from the second pond. The project also measures water flow and quality by placing measuring devices at four points and incorporating results from existing measuring points (another project). The number of water flow and quality measuring points has been adjusted since the project started. The location of the measuring points is shown in Figure 63.



Figure 63 Skellefteå (SE)- Location of water flow and water quality monitors.

As indicated, there are four points for measuring water quality (yellow dots) and five for water flow (blue dots, previously six). Orange dots indicate groundwater measurements performed in the context of another project.

VS2: Creation of a wetland bed to increase biodiversity.

Status: Operational

VS2 provides a wetland bed to improve biodiversity. This Solution also includes planting of indigenous species. An inventory of species has been conducted within the pilot area (including invasive species that should be eliminated). Existing flora was complemented by a selection of indigenous plants. The enhanced biodiversity makes the park more attractive and the area more functional for the allotments since pollination will increase. The lower areas of the park have been converted from traditional lawn areas to diverse meadows. In a total area of 1600 + 300 square meters, carefully selected species have been planted or sown, having in mind their characteristics and requirements in terms of wet and moist conditions. Invasive species (*Lupinus polyphyllus* and *Impatiens glandulifera*) are being located and eradicated with the method suited to each. A path has been constructed to make the wetland bed more accessible for visitors. A lot of work on the green space areas has already been done also in the context of another project, promoting biodiversity, and creating a wetland bed. VS2 continued this work, with a second round of invasive plants removal, that took place during summer 2024.



Figure 64: Skellefteå (SE)- Wetland bed to increase biodiversity.

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

Status: Operational

VS3 implemented smart lighting in the park to provide an inviting environment for the visitors and encourage activities in the park. As Skellefteå is far north, the winter months from late October through March have many hours of darkness, restricting outdoor activities. Smart lighting that promotes activity in the park while reducing light pollution is one way to ensure people still have the possibility to be active outdoors. Additionally, by giving visitors access to sensors and the lighting itself, via the H&WB platform, the VS aims to improve interactivity and increase citizens' engagement.



Figure 65: Skellefteå (SE)- Light poles

The number of lighting poles has decreased from the initially 10-15 foreseen, to nine, due to the severe increase of costs. Nine light points have been installed, incorporating sensors that detect the number of visitors (Figure 65). Other sensors have been applied in the park, measuring activities in availability at the parking-lot, if firewood is available at the barbeque area, the number of visitors in the park, local temperature, wind speed, air humidity, and snow depth. Design and location of the lighting poles has been determined during a co-creation process with the Department for Lighting, Department of Green Spaces, and the partner for delivering sensors, the power company Skellefteå Kraft. Pole locations can be seen in Figure 66 .

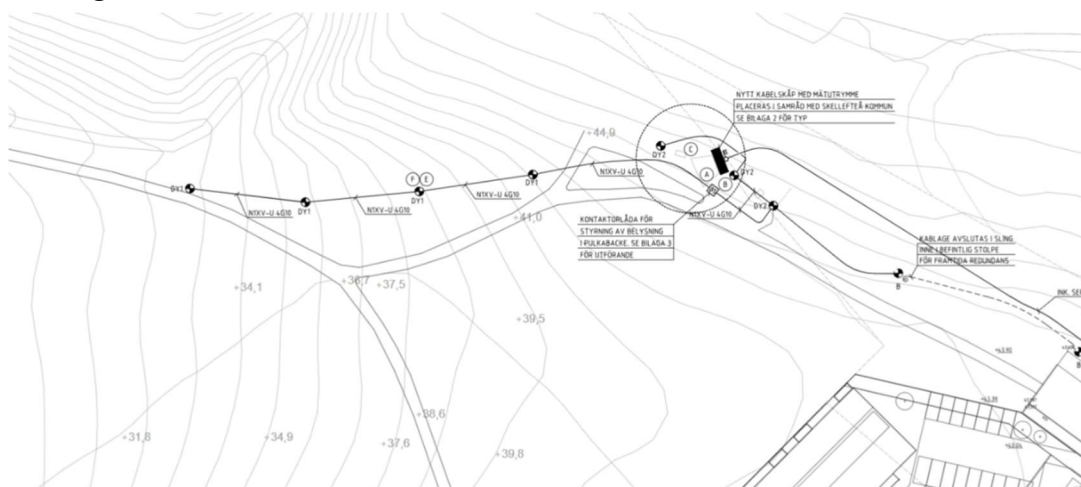


Figure 66: Skellefteå (SE)- Location of light poles.

VS4: Educating and engaging citizens in the area to level up their awareness of climate change and the importance of biodiversity

Status: Operational

VS4 provides information, educational material, and interactive solutions to educate and engage citizens on the solutions in the park. An information campaign was addressed to nearby residents, pre-schools, schools, and city residents to impart knowledge about pilot goals, and to enable them to get project updates. Information signs installed in the park help engage and educate visitors about the NbS. The users can also use the VARCITIES Health and Well-being platform to download and create maps of the pilot with their own data, for example with species they have found. The strategy for the educational part is to use signs in the pilot area. These signs inform pre-school/school children and other visitors about why the city lets parts of the lawn transform into wetland beds and connect that information to education about the water cycle and the effects of climate change (Figure 67). There is also information about the distinct species in the area, as well as pollinators and why they are important. The information signs are in place in the pilot area with only minor adjustments still to make. At a later stage, information will be provided about the recreational area called Vitberget, and for that, a co-creation process will engage the department for recreation.

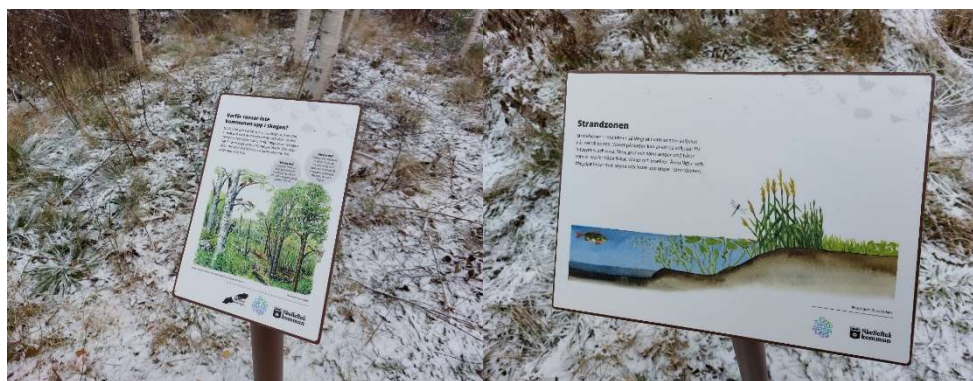


Figure 67: Skellefteå (SE)- Information signs.

VS5: Creation of space in the park with bee hotels/insect habitats, permanent school-material

Status: Operational

VS5 provided Open-air educational infrastructure for young students so that they may experience learning in natural settings. It includes creation of space in the park with bee hotels/insect habitats plus building material that students can use to create hotels/habitats, and permanent educational material such as signs about distinct species.



Figure 68: Skellefteå (SE)- Facilities for open air learning



The pilot area includes two separate spaces for outdoor learning and playing (Figure 68). One between the two ponds offering seats and containing a large bee hotel (Figure 69). School material is available in boxes that teachers can unlock, as well as building material for making bee/insect hotels.



Figure 69: Skelleftea (SE)- Bee hotel area

The second space for outdoor learning, which contains the outdoor classroom (Figure 70), was built close to the barbeque area in spring 2023. The contractor is a local entrepreneur, and a drawing of the classroom can be seen in the figure below. The classroom has seating places for 25 people and a table for six. It is wheelchair accessible. The teachers can connect to power and internet in the outdoor classroom and use the wall to show pictures. This outdoor classroom can also be used outside of school hours by visitors.



Figure 70: Skelleftea (SE)- Open air classroom

The outdoor classroom has become smaller compared to early visualizations, both due to available land for the purpose and due to raised costs.



7.1.2. Detailed workplan for VS1

Table 114: Skellefteå (SE) - Work Plan VS1





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A5 Preparation stage								
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA,...)	Taking water samples, installing flow meters, improving ditches. Dialogue is needed with Environmental department if permits is needed.	SKELLEFTEA Stina	VS1 fully designed	2M	Jan-22	Feb-22	Closed
A2	Clarify requirements regarding procurement, accounting rules	Which companies can be contracted according to the municipality's framework agreement? Contact several or ask one company from that agreement.	SKELLEFTEA Stina		2M	Jan-22	Feb-22	Closed
A3	Supporting actions	Use of land own by the power company Skellefteå Kraft for rain measurement? Take contact with Skellefteå Kraft.	SKELLEFTEA Stina		2M	Jan-22	Feb-22	Closed
A4	Designs	Are improvements in ditches needed? Where should the samples for water analysis be taken and what should be analysed? In what spots should the water flow be measured and how can the metres be installed?	SKELLEFTEA Stina		2M	Jan-22	Feb-22	Closed
A5	Preliminary budget	How much can we spend, how many samples can we get?	SKELLEFTEA Stina		2M	Jan-22	Feb-22	Closed
B1- B4 Selection of Service providers								
B1	Inquiry for consultant help	Take contact with the consultant/-s and give them a description of assignment according to the design.	SKELLEFTEA Stina	Contract implemented	4M	Feb-22	May-22	Closed
B2	Preparation and planning	Description of the assignment, teams-meeting with the consultant	SKELLEFTEA Stina		4M	Feb-22	May-22	Closed
B3	Contract implementation	Signing of contract	SKELLEFTEA Stina Jonsson		1M	May-22	May-22	Closed
B4	Risk management plan	All consultants in framework agreement are obligated to have their own risk management plan	SKELLEFTEA Stina Jonsson		4M	Feb-22	May-22	Closed
C1- C6 Execution process								
C1	Time-location chart for implementation process	2022: Water analysis 1: May, 2: June, 3: July, 4: august, 5: September, Measurement of waterflow: 1: august, 2: September, 3: October	WSP	Construction completed	6M	May-22	Oct-22	Closed
C2	Environmental Impact Assessment	In order to instal the measurements some work in ditches may be needed and then the consult will do a notification if they are doing any environmental impact	Sweco		1M	Aug-22	Aug-22	Closed





Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
C4	Health and Safety plan	All consultants in framework agreement are obligated to have their own risk management plan	SKELLEFTEA Stina Jonsson		4M	Feb-22	May-22	Closed
C5.1	Preparation works on site	Installing the flow meter in concrete or plastic devices	SKELLEFTEA Stina Jonsson		1M	Aug-22	Aug-22	Closed
C5.2	Preparation works on site	Getting the flow metres going	Sweco, SKELLEFTEA Stina Jonsson	ICT systems installed	3M	Aug-22	Oct-22	Closed
C6	Risk management plan	All consultants in framework agreement are obligated to have their own risk management plan	SKELLEFTEA Stina Jonsson	Construction completed	4M	Feb-22	May-22	Closed
D1- D3	Handover							
D1	Commissioning	Document that shows the result from the measurements to the H&W-platform	SKELLEFTEA Stina Jonsson, Sweco & WSP	Contract concluded	6M	Apr-23	Oct-23	Closed
D2	Operation and Maintenance concept	Municipality department of green space management	SKELLEFTEA Stina Jonsson	VS successful operation, monitoring & maintenance	3M	Oct-23	Dec-23	Closed
D3	Handover solutions	Handover of solutions to department for green space management	SKELLEFTEA Stina Jonsson		2M	Jan-24	Feb-24	Closed
E1- E2	Operation / Social & Cultural Solutions							
E1	Appoint facilities' management	Write agreements municipal departments	SKELLEFTEA Stina Jonsson	Agreement with department of green space management	2M	Jan-24	Feb-24	Closed
E2	Monitor & evaluate	Documentation of results	SKELLEFTEA Stina Jonsson	VS successful operation, monitoring & maintenance	6M	Apr-23	Oct-23	Closed

7.1.3. Detailed workplan for VS2

Table 115: Skellefteå (SE) - Work Plan VS2





	Tasks	Description	Task Owner	Milestone	Duration	Start	Finish	Status
A1-A4	Preparation stage							
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA,...)	Dialogue is needed with Environmental department about whether or not permits are needed.	SKELLEFTEA Elsa Karlberg	Permits obtained	3M	Apr-22	Jun-22	Closed
A2	Clarify requirements regarding procurement, accounting rules	Which companies can be contracted according to the municipality's framework agreement? Contact several or ask one company from that agreement.	SKELLEFTEA Elsa Karlberg	VS2 fully defined	3M	Apr-22	Jun-22	Closed
A3	Supporting actions	Permit from stakeholders for inventory of invasive species. Prepare communications strategies about upcoming actions to stop the invasive species on site. Where should the communications be presented? How is the wetland bed evolving? Should complimentary planting be executed?	SKELLEFTEA Elsa Karlberg		6M	Jan-22	Jul-22	Closed
A4	Preliminary budget	How big is the budget for the VS? Crosscheck the cost estimate based on the blue prints with the budget of the VS.	SKELLEFTEA Stefanos Neopoulos		3M	Apr-22	Jun-22	Closed
B1- B2	Selection of Service providers							
B1	Preparation and planning	What species are expected to be found? What inventory methods are needed? Will any service providers be needed for sanitations of invasive species?	SKELLEFTEA Elsa Karlberg / Johanna Engström	Evaluation & Award of tenders	4M	Jan-22	May-22	Closed
B2	Record keeping	How was the procurement made?	SKELLEFTEA Elsa Karlberg	Contract implemented	4M	Jan-22	May-22	Closed
C1- C7	Execution process							
C1	Time-location chart for implementation process	Are any invasive species found? How should they be removed? If needed, reserve time for removal. How is the wetland bed evolving? If complimentary planting is needed, when is the area suitable for construction.	SKELLEFTEA Elsa Karlberg	Construction completed	13M	Jul-22	May-23	Closed

C2	Health and Safety plan	Assess all risks for workers and public during the construction phase of this specific project. Make further investigations of the site, materials and such if needed. Make a Health and Safety plan according to the municipal standards.	SKELLEFTEA Elsa Karlberg		1M	Jun-22	May-23	Closed
C3	Site waste management plan	Are any invasive species that require digging for removal found? How should the contaminated soil be handled? Where can it be sent?	SKELLEFTEA Stefanos Neopoulos		6M	May-23	May-23	Closed
C4	Construction	Complementary planting if needed 2023. Removal of invasive species if needed 2023-2024	SKELLEFTEA Stefanos Neopoulos		15M	Aug-23	Oct-24	Closed
C5	Record keeping	Take photos before, during and after. Also make as-built documents.	SKELLEFTEA Stefanos Neopoulos		28m	Jul-22	Oct-24	Closed
C6	Control of what is built	Assign construction manager	SKELLEFTEA Stefanos Neopoulos		2M	Feb-23	Mar-23	Closed
C7	Plan operation and maintenance	How should the greenspace evolve? Create greenspace maintenance plan.	SKELLEFTEA Elsa Karlberg		24M	Oct-22	Nov-24	Open
D1- D3 Handover								
D1	Commissioning	As-built document handed over	SKELLEFTEA Stefanos Neopoulos	Contracts concluded	2M	Oct-22	Nov-22	Closed
D2	Monitoring and evaluation	Are the invasive species returning? How is the wetland bed evolving? Is the local biodiversity increasing?	SKELLEFTEA Elsa Karlberg / Johanna Engström	VS successful operation, monitoring & maintenance	4M	Jun-24	Sep-24	Open
D3	Handover of Maintenance concept	Maintenance plan is created and handed over at commissioning to the department of green spaces.	SKELLEFTEA Karin Lundqvist	Handover of the VS	24M	Oct-22	Oct-24	Open
E1- E4 Operation / Social & Cultural Solutions								
E1	Time-location chart (Gantt)	Social & cultural events based on the GoNature game to be Planned.	SKELLEFTEA Berith Juvonen	VS successful operation, monitoring & maintenance	21M	Feb-23	May - 25	Open
E2	Record keeping	Documentation of all events must be made.	SKELLEFTEA Berith Juvonen		15M	Aug-23	May - 25	Open
E3	Apply maintenance plan	What is going to be maintained and what is ending with VARCITIES? After that: make maintenance plan.	SKELLEFTEA Elsa Karlberg		3M	Feb-25	Apr-25	Planned

E4	Appoint facilities management	Agreement with department of green space management	SKELLEFTEA Elsa Karlberg	Agreement with department of green space management	3M	Feb-25	Apr-25	Planned
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7.1.4. Detailed workplan for VS3

Table 116: Skellefteå (SE) - Work Plan VS3





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A5	Preparation stage							
A1	Clarify requirements regarding procurement, accounting rules	Which companies can be contracted according to the municipality's framework agreement? Contact several or ask one company from that agreement.	SKELLEFTEA Elsa Karlberg / Anders Saadio	VS3 fully designed	9M	Aug-22	Apr-23	Closed
A2	Supporting actions	How does the municipal business model for IOT stipulate the contracts and providers for IOT solutions?	SKELLEFTEA Elsa Karlberg		13M	Mar-22	Mar-23	Closed
A3	Designs	What qualities should the new lighting provide? Where do we need light and where should it be avoided? What does the project want to measure with the sensors? What values can the measurements provide for users, visitors and the municipality? How is this met in the best way on this specific site? Are the solutions scalable in the municipality?	SKELLEFTEA Elsa Karlberg		4M	Feb-22	May-22	Closed
A4	Specifications	What technical requirements is needed for the sensors to fit in to the municipal strategy for IOT?	SKELLEFTEA Elsa Karlberg		14M	Feb-22	Mar-23	Closed
A5	Preliminary budget	How big is the budget for the VS? Crosscheck the cost estimate based on the blue prints with the budget of the VS.	SKELLEFTEA Stefanos Neopoulos		6M	Aug-22	Jan-23	Closed
B1- B4	Selection of Service providers							
B1	Preparation and planning	Describe the assignment. What resources and materials does the service providers need to complete the tasks?	SKELLEFTEA Elsa Karlberg	Evaluation & Award of tenders	5M	Dec-22	Apr-23	Closed
B2	Contract implementation	Signing of contract	SKELLEFTEA Elsa Karlberg	Contract implemented	3M	Feb-23	Apr-23	Closed
B3	Risk management plan	All consultants in framework agreement are obligated to have their own risk management plan	SKELLEFTEA Elsa Karlberg		13M	Jun-22	Jun-23	Closed
B4	Record keeping	How was the procurement made?	SKELLEFTEA Elsa Karlberg		10M	Sep-22	Jun-23	Closed
C1- C5	Execution process							
C1	Time-location chart for implementation process	When will the municipal construction team be available? What flexibility is needed?	SKELLEFTEA Stefanos Neopoulos	Construction completed	14M	Mar-22	Apr-23	Closed





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

C2	Health and Safety plan	Assess all risks for workers and public during the construction phase of this specific project. Make further investigations of the site, suggested materials and such if needed. Make a Health and Safety plan according to the municipal standards. All consultants in framework agreement are obligated to have their own risk management plan.	SKELLEFTEA Elsa Karlberg	Health and Safety plan ready	3M	Apr-22	Jun-22	Closed
C3	Construction	Electricity, lighting and foundations are constructed 2022. Sensors are installed 2023.	SKELLEFTEA Stefanos Neopoulos / Kent Johansson	ICT system installed	17M	Apr-22	Aug-23	Closed
C4	Risk management plan	All consultants in framework agreement are obligated to have their own risk management plan	SKELLEFTEA	Construction completed	2M	Nov-22	Dec-22	Closed
C5	Record keeping	Take photos before, during and after. Also make as-built documents.	SKELLEFTEA Stefanos Neopoulos / Kent Johansson		17M	Apr-22	Aug-23	Closed
D1- D3 Handover								
D1	Commissioning	As-built document handed over. Document that shows the result from the measurements to the H&W-platform	SKELLEFTEA Elsa Karlberg	Contracts concluded	7M	Oct-23	Apr-24	Closed
D2	Operation and Maintenance concept	Department of green space management, department of lighting and department of IT.	SKELLEFTEA Elsa Karlberg	VS successful operation, monitoring & maintenance	2M	Apr-24	May-24	Closed
D3	Handover solutions	Handover of solutions to department of green space and department of lighting	SKELLEFTEA Elsa Karlberg	Handover of the VS	2M	May-24	Jun-24	Closed
E1- E5 Operation / Social & Cultural Solutions								
E1	Time-location chart (Gantt)	Social & cultural events based on the game to be Planned.	SKELLEFTEA Berith Juvonen	VS successful operation, monitoring & maintenance	21M	Feb-23	Oct-24 May -25	Open
E2	Record keeping	Documentation of all events must be made.	SKELLEFTEA Berith Juvonen		15M	Aug-23	Oct-24 May -25	Open
E3	Appoint facilities management	Agreement with department of green space management	SKELLEFTEA Elsa Karlberg	Agreement with department for lighting	4M	Feb-25	May-25	Planned
E4	Monitor & evaluate	How are the values evaluated, what is a good result?	SKELLEFTEA Elsa Karlberg	VS successful operation, monitoring & maintenance	13M	May-23	May-24	Closed
E5	Apply maintenance plan	What is going to be maintained and what is ending with VARCITIES? After that: make maintenance plan.	SKELLEFTEA Elsa Karlberg		4M	Feb-25	May-25	Planned

7.1.5. Detailed workplan for VS4

Table 117: Skellefteå (SE) - Work Plan VS4





Tasks	Description		Task Owner	Milestone	Duration	Start	Finish	Status
A1-A5 Preparation stage								
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA,...)	Permits for signboards is needed	SKELLEFTEA Berith Juvonen	Permits obtained	5M	Aug-22	Dec-22	Closed
A2	Clarify requirements regarding procurement, accounting rules	Which companies can be contracted according to the municipality's framework agreement? Contact several or ask one company from that agreement.	SKELLEFTEA Berith Juvonen	VS4 fully designed	5M	Aug-22	Dec-22	Closed
A3	Supporting actions	Corporative signboard of the Vitberget area and surroundings	SKELLEFTEA Berith Juvonen		2M	Aug-22	Sep-22	Closed
A4	Designs	The municipality standard for signs to be used. How will the QR-code work after the end of VARCITIES. Is the game working after the end of VARCITIES?	SKELLEFTEA Berith Juvonen		11M	Aug-22	Jun-23	Closed
A5	Preliminary budget	How big is the budget for the VS? Crosscheck the cost estimate based on the blue prints with the budget of the VS.	SKELLEFTEA Berith Juvonen		11M	Aug-22	Jun-23	Closed
B1- B3 Selection of Service providers								
B1	Time-location chart listing stages for Selection of service providers	Contract for manufacturing the sign boards. Installation by internal unit?	SKELLEFTEA Berith Juvonen	Evaluation & Award of tenders	6M	Jan-23	Jun-23	Closed
B2	Preparation and planning	Together with the municipalities communication unit	SKELLEFTEA Berith Juvonen	Contract implemented	6M	Jan-23	Jun-23	Closed
B3	Contract implementation	Signing of contract, manufacturing of signs, construction on site.	SKELLEFTEA Berith Juvonen		6M	Jan-23	Jun-23	Closed
C1- C3 Execution process								
C1	Apply for permit for signs	Permits for sign obtained	SKELLEFTEA Berith Juvonen	Permits obtained	7M	Sep-22	Apr-23	Closed
C2	ICT installed	VARCITIES game, check the time chart for that.	SKELLEFTEA Berith Juvonen	ICT system installed	15M	Aug-22	Oct-23	Closed
C3	Construction	Foundations for the signs. Order? Install by internal unit or contracted entrepreneur.	SKELLEFTEA Stefanos Neopoulos	Construction completed	4M	Apr-23	Jul-23	Closed
D1- D3 Handover								





Tasks		Description	Task Owner	Milestone	Duration	Start	Finish	Status
D1	Commissioning	As-built document: specifications and locations.	SKELLEFTEA Berith Juvonen	Contracts concluded	5M	Jun-23	Oct-23	Closed
D2	Handover solutions	Can the ICT, see C1, be used after the end of VARCITIES?	SKELLEFTEA Berith Juvonen	Handover of the VS	5M	Jun-23	Oct-23	Closed
D3	Operation and Maintenance concept	Maintenance plan is created and handed over at commissioning to the department of green spaces.	SKELLEFTEA Berith Juvonen		5M	Oct-23	Feb-24	Closed
E1- E4	Operation / Social & Cultural Solutions							
E1	Time-location chart (Gantt)	Social & cultural events based on the game to be Planned.	SKELLEFTEA Berith Juvonen	VS successful operation, monitoring & maintenance	21M	Apr-23	May - 25	Open
E2	Record keeping	Documentation of all events must be made.	SKELLEFTEA Berith Juvonen		17M	Aug-23	May - 25	Open
E3	Apply maintenance plan	What is going to be maintained and what is ending with VARCITIES. After that: make maintenance plan.	SKELLEFTEA Berith Juvonen	VS successful operation, monitoring & maintenance	4M	Feb-25	May- 25	Planned
E4	Appoint facilities management	Municipality department of green space management	SKELLEFTEA Berith Juvonen	Agreement with department of green space management	4M	Feb-25	May- 25	Planned

7.1.6. Detailed workplan for VS5

Table 118: Skellefteå (SE) - Work Plan VS5





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

A1-A6	Preparation stage							
A1	Clarify legal requirements concerning permits and accompanying reports (planning, EIA,...)	Is building permit for changing ground level needed? If so, plan for resources and help from consultant.	SKELLEFTEA Elsa Karlberg	VS5 fully designed	8M	Apr-22	Nov-22	Closed
A2	Clarify requirements regarding procurement, accounting rules	Which companies can be contracted according to the municipality's framework agreement? Contact several or ask one company from that agreement?	SKELLEFTEA Elsa Karlberg		5M	Jan-22	Jun-22	Closed
A3	Supporting actions	Any further stakeholders who should be consulted about the design before selection of providers? Schools, pre-schools, Exploratoriet.	SKELLEFTEA Berith Juvonen		4M	Apr-22	Jul-22	Closed
A4	Designs	What qualities for outdoor learning where specified in the workshops? Which of these qualities can be met in this VS? How are they met in the best way on this specific site? Where on the site should they be located for best user value.	SKELLEFTEA Elsa Karlberg		3M	Dec-21	Feb-22	Closed
A5	Preliminary budget	How big is the budget for the VS? Crosscheck the cost estimate based on the blue prints with the budget of the VS.	SKELLEFTEA Elsa Karlberg		5M	Jan-22	Jun-22	Closed
A6	Record keeping	How was the procurement made?	SKELLEFTEA Elsa Karlberg		12M	May-22	Apr-23	Closed
B1- B4	Selection of Service providers							
B1	Time-location chart listing stages for Selection of service providers	Contract for architectural sketch, ground works, building the classroom.	SKELLEFTEA Elsa Karlberg	Evaluation & Award of tenders	6M	Jan-22	Jul-22	Closed
B2	Preparation and planning	Describe the assignment. What resources and materials does the service providers need to complete the tasks?	SKELLEFTEA Elsa Karlberg	Contract implemented	6M	Jan-22	Jul-22	Closed
B3	Contract implementation	In progress	SKELLEFTEA Elsa Karlberg		6M	Jan-22	Jul-22	Closed
B4	Record keeping	How was the procurement made?	SKELLEFTEA Elsa Karlberg		6M	Jan-22	Jul-22	Closed
C1- C7	Execution process							
C1	Apply for building permit	Building permit obtained	SKELLEFTEA Elsa Karlberg	Permit obtained	13M	Apr-22	Apr-23	Closed





Tasks

Description

Task Owner

Milestone

Duration

Start

Finish

Status

C2	Health and Safety plan	Assess all risks for workers and public during the construction phase. Make further investigations of the site, materials and such if needed. Make a Health and Safety plan according to the municipal standards. All consultants in framework agreement are obligated to have their own risk management plan.	SKELLEFTEA Elsa Karlberg	Contract implemented	3M	Apr-22	Jul-22	Closed
C3	Preparation works on site?	Ground works completed?	SKELLEFTEA Elsa Karlberg	Construction completed	4M	Aug-22	Nov-22	Closed
C4	Site management plan	Need of transportation of excess soil from the area?	SKELLEFTEA Elsa Karlberg		4M	Aug-22	Nov-22	Closed
C5	Construction	Ground works done autumn -22 by internal unit, classroom-built spring -23 by entrepreneur.	SKELLEFTEA Stefanos Neopoulos		16M	Apr-22	Jul-23	Closed
C6	Risk management plan	Contractors in framework agreement are obligated to have their own risk management plan	SKELLEFTEA Stefanos Neopoulos	Contract implemented	6M	Jan-22	Jul-22	Closed
C7	Record keeping	How was the procurement made?	SKELLEFTEA Elsa Karlberg	Construction completed	12M	May-22	Apr-23	Closed
D1- D3	Handover							
D1	Commissioning	As-built document. Send to compliment the building permit (revderad ritning + kontrollplan)	SKELLEFTEA Stefanos Neopoulos	Contracts concluded	5M	Jun-23	Oct-23	Closed
D2	Handover solutions	Handover of solutions to department of green space.	SKELLEFTEA Elsa Karlberg	Handover of the VS	6M	May-23	Oct-23	Closed
D3	Operation and Maintenance concept	Maintenance plan is created and handed over at commissioning to the department of green spaces.	SKELLEFTEA Elsa Karlberg		6M	May-23	Oct-23	Closed
E1- E4	Operation / Social & Cultural Solutions							
E1	Time-location chart (Gantt)	Social & cultural even based on the game to be Planned.	SKELLEFTEA Berith Juvonen	VS successful operation, monitoring & maintenance	21M	Feb-23	May - 25	Open
E2	Record keeping	Documentation of all events must be made.	SKELLEFTEA Berith Juvonen		21M	Feb-23	May - 25	Open
E3	Apply maintenance plan	What is going to be maintained and what is ending with VARCITIES? After that: make maintenance plan.	SKELLEFTEA Elsa Karlberg		6M	May-23	May - 25	Open
E4	Appoint facilities management	Municipality department of green space management	SKELLEFTEA Elsa Karlberg	Agreement with department of green space management	6M	May-23	Oct-23	Closed

7.2. Skellefteå (SE) - Procurement Management Plan

General notes: Procurement has been contracted in accordance with the municipal's framework agreements for procurement. This ranks companies, if the estimated sum of the procurement is over a specific number they should be contacted in the order of the rank. If the estimated sum is lower than the specific number companies can be contacted freely. Choices are made based on companies' expertise, availability and price.

Table 119: Skellefteå (SE) - Procurement Management Plan

		Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration in days	Status
VS1	VS1	Build natural infrastructure to create urban resilience										
	VS1.1	Digging in ditches and ponds	Work hours	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS1.11	Adjustment of outflow in lower pond	Material costs	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS1.12	Digging in ditches and ponds	Rental, Excavator	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS1.13	Digging in ditches and ponds	Rental, Loader	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS1.2	Water sampling	Consultant cost including analyses	Specialist supplier from suitable framework	Services	No	No	WSP	Jan-22	Feb-22	60	Closed
	VS1.3	Flow measurement	Consultant cost including rental cost for flow metres	Specialist supplier from suitable framework	Services	No	No	Sweco	Mar-22	Apr-22	60	Closed
VS2	VS2	Build natural infrastructure to create urban resilience										
	VS2.1	Creation of a wetland bed	Working hours	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS2.11	Creation of a wetland bed	Rental, Loader/excavator	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS2.12	Stone flour including transport, 50 mm	Material	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS2.13	Base course gravel including transport, 0-30, 100 mm	Material	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS2.14	Reinforcement layer including transport, 0-80, 300 mm	Material	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS2.15	Establishment	Material	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS2.16	Geo textile	Material	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Apr-22	30	Closed
	VS2.2	Inventory of species	Working hours	Internal assignment	Services	No	No	Skellefteå kommun	Mar-22	Mar-22	30	Closed
	VS2.21	Inventory of species (Removal of invasive species)	Working hours	Internal assignment	Services	No	No	Skellefteå kommun	Aug-23	Sep-23	60	Closed
	VS2.22	Inventory of species (Removal of species)	Transport	Internal assignment	Services	No	No	Skellefteå kommun	Aug-23	Sep-23	60	Closed

	Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration in days	Status
VS2.23	Deposit of invasive species	Landfill fee (Degermyran)	Internal assignment	Services	No	No	Skellefteå kommun	Aug-23	Sep-23	60	Closed

VS3	VS3	Installation of smart lightning to contribute to an inviting environment and encourage activities in the park: Innovative lighting installations										
	VS3.1	Light design	Consultant cost	Specialist supplier from suitable framework	Services	No	No	Tyréns	Feb-22	Mar-22	60	Closed
	VS3.111	Material (Spotlights including shipping)	Procurement of Bellalite Derksen PHOS 85 Outdoor GOBO-strålkastare	Specialist supplier from suitable framework	Supply	Yes	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.112	Material (GOBO-plåt including shipping)	Procurement of GOBO-plåt Rosco 77808 Dot Breakup (Large)	Specialist supplier from suitable framework	Supply	Yes	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.113	Material (Filter and cap including shipping)	Procurement of Fergin Meyer Nightspot B, ncl colour filter and cap	Specialist supplier from suitable framework	Supply	Yes	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.114	Material (Lighting pole including shipping)	Procurement of ASEC power Abaacus, Heave Duty collapsible pole 12 m*	Specialist supplier from suitable framework	Supply	Yes	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.115	Material (Tool for light pole including shipping)	Procurement of Tool for collapsible light pole	Specialist supplier from suitable framework	Supply	Yes	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.116	Material (Custom pole including shipping)	Procurement of Moramast square custom pole 3 m, 100x100 mm, RAL8002	Specialist supplier from suitable framework	Supply	Yes	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.117	Material (Procurement of Fergin Meyer)	Nano Cube incl. Honeycomb raster, RAL8002	Specialist supplier from suitable framework	Supply	Yes	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.118	Material (Lifting poles)	Crane work	Negotiated procedure without prior publication	Services	No	No	Elektroskanda	Apr-22	Apr-22	60	Closed
	VS3.119	Material (Concrete foundations)	Procurement of materials and work hours	Internal assignment	Supply	Yes	No	Skellefteå kommun	Apr-22	Apr-22	60	Closed
	VS3.12	Installation of smart light poles (Installation incl. adjustments)	Work hours	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jun-22	30	Closed

		Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration in days	Status
	VS3.13	Installation of smart light poles (Establishing machines)	Rental fee for establishment	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jun-22	360	Open
	VS3.14	Installation of smart light poles (Digging for foundations, excavator)	Rental, Excavator	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jun-22	30	Open
	VS3.15	Installation of smart light poles (crane)		Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jun-22	30	Open
	VS3.16	Installation of smart light poles (Cable laying)	Work hours	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jun-22	30	Open
	VS3.17	Installation of smart light poles (Cable)	Material and transport	Specialist supplier from suitable framework	Works	Yes	No	TBD	Apr-22	Jun-22	30	Closed
	VS3.18	Installation of smart light poles (Cable cabinet)	Material and transport	Specialist supplier from suitable framework	Works	Yes	No	TBD	Apr-22	Jun-22	30	Closed
	VS3.21	Interactive solutions for the lighting (consultant)	Consultant cost	Negotiated procedure without prior publication	Services	Yes	No	Tyréns	Mar-22	Apr-22	60	Closed
	VS3.22	Interactive solutions for the lighting (Sensors)	Material and shipping	Innovation partnership	Supply	Yes	No	Skellefteå Kraft	Mar-22	Apr-22	60	Closed
	VS3.23	Interactive solutions for the lighting (Installation)	Work hours	Negotiated procedure without prior publication	Works	No	No	Eltech	Mar-22	Apr-22	60	Closed

VS4	VS4	Educating & engaging citizens to level up their awareness of climate change and the importance of biodiversity										
	VS4.1	Information materials (Signs 20)	Material	Competitive procedure with negotiation	Works	Yes	No	TBD	Apr-23	Jul-23	120	Closed
	VS4.11	Information materials (Base for signs 30)	Material	Competitive procedure with negotiation	Works	Yes	No	TBD	Apr-23	Jul-23	120	Closed
	VS4.12	Information materials (Assembly)	Work hours	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-23	Jul-23	120	Closed
	VS4.13	Information materials (Digging for bases)	Excavator	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-23	Jul-23	120	Closed
	VS4.14	Information materials (Layout signs, consultant)	Consultant cost	Negotiated procedure without prior publication	Services	No	No	Henson	Aug-22	Sep-22	60	Closed
	VS4.2	Educational material (designer)	Consultant cost incl. material		Services	no	No	Exploratoriet	Dec-22	May-23	180	Closed
	VS4.21	Educational material (material)			Supply	No	No		Dec-22	May-23	180	Closed
	VS4.3	Digital twin	The digital twin/dashboard that is being developed in WP5 will be linked to the site and promoted on site		Services	No	No	IES	Apr-23	May-25	390	Planned
	VS4.4	Campaigns	Campaigns will complement the static material to raise more interest	Internal assignment	Services	No	No	Skellefteå Kommun, Nature Association, Allotment	Apr-23	May-25	390	Planned

		Component	Description	Procurement Procedure	Procurement category	Quality or LCA evaluation criteria?	Maintenance part of contract	Provider	Start (mm/yy)	Finish (mm/yy)	Duration in days	Status
VS5	VS5	Creation of space in the park with bee hotels/insect habitats, permanent school-material (school in nature, bee hotels)										
	VS5.1	Shelter for Open air classroom (Outdoor classroom incl. furniture)	Material and assembly	Competitive procedure with negotiation	Works	Yes	No	Martinssons + Contractor	Apr-22	Jul-23	420	Closed
	VS5.11	Shelter for Open air classroom (Building permit)	Fee for building permit	Competitive procedure with negotiation	Services	No	No	Skellefteå kommun	Apr-22	Nov-22	210	Closed
	VS5.12	Shelter for Open air classroom (Establishing machines)	Rental fee for establishment	Internal assignment	Works	No	No	Contractor	Apr-22	Jul-23	420	Open
	VS5.13	Shelter for Open air classroom (Casting/anchorage)	Material	Competitive procedure with negotiation	Works	Yes	No	Contractor	Apr-22	Jul-23	420	Closed
	VS5.14	Shelter for Open air classroom (Assembly)		Competitive procedure with negotiation	Works	Yes	No	Contractor	Apr-22	Jul-23	420	Closed
	VS5.15	Shelter for Open air classroom (Design and construction)	Consultant cost	Competitive procedure with negotiation	Services	No	No	MAF Architects, WSP	Dec-22	Jun-22	270	Closed
	VS5.16	Shelter for Open air classroom (Loader)	Surveying engineer	Internal assignment	Works	No	No	Skellefteå kommun	Apr-23	Apr-23	30	Open
	VS5.17	Shelter for Open air classroom (Furniture and blackboard)	Material	Internal assignment	Supply	Yes	No	Skellefteå kommun	Apr-22	Jul-23	420	Closed
	VS5.181	Shelter for Open air classroom (Ground work)	Rental, Loader	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jul-23	420	Open
	VS5.182	Shelter for Open air classroom (Stone flour 50mm (400m2))	Material	Internal assignment	Supply	No	No	Skellefteå kommun	Apr-22	Jul-23	420	cancelled
	VS5.183	Shelter for Open air classroom (Gravel 0-30 100mm (400m2))	Material	Internal assignment	Supply	No	No	Skellefteå kommun	Apr-22	Jul-23	420	cancelled
	VS5.184	Shelter for Open air classroom (Gravel 0-80 300mm (400m2))	Material	Internal assignment	Supply	No	No	Skellefteå kommun	Apr-22	Jul-23	420	cancelled
	VS5.185	Shelter for Open air classroom (Work hours, ground work)	Consultant cost	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jul-23	420	Closed
	VS5.19	Shelter for Open air classroom (Retaining wall)		Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Jul-23	420	cancelled
	VS5.2	Bee hotels/insect habitats (design)		Innovation partnership	Services	No	No	White architects	Dec-21	Feb-22	90	Closed
	VS5.21	Bee hotels/insect habitats (material)	Material and shipping	Negotiated procedure without prior publication	Supply	No	No	TBD	Apr-22	Jul-23	420	Closed
	VS5.22	Bee hotels/insect habitats (Assembly bee hotels/insects’ habitats)	Work hours	Internal assignment	Works	No	No	Skellefteå kommun	Apr-22	Sep-22	180	Closed
	VS5.23	Bee hotels/insect habitats (Base/foundation bee hotels/insects’ habitats)	Material	Internal assignment	Works	Yes	No	Skellefteå kommun	Apr-22	Sep-22	180	Closed
	VS5.3	Fire place	Material incl. transport	Competitive procedure with negotiation	Supply	Yes	No	Dahlgrens cementgjuteri	Apr-23	Aug-23	150	Closed



7.1. Skellefteå (SE) – Realised risks and identified opportunities

Following is a list of the realised risks that Skelleftea pilot faced, along with a brief description of how these risks impacted the Visionary Solutions and the mitigation actions that were put in place.

Table 120: Skelleftea (SE)- Realised risks

ID	Risk Category	Risk Type	Risk Description	VS	Stage	Risk significance	Risk Impact	Mitigation Action
RR002	Financial	Price	Equipment, installation and labour costs are too high because of inflation	All	Preparation	Moderate	More time spent to reduce costs. Reduced number of light points from 8 Planned to 7 implemented (but still meeting the lighting demands).	Conduct effective sourcing and monitor any potential cost increase on materials
RR013	Legal	Damage	The sensor data about visitors in the park might raise issues with privacy (GDPR).	All	Preparation	Major	More time spent to try meeting demands. GDPR has had an impact on what the sensors could be used for .	Review sensor data to ensure it complies with GDPR
RR016	Financial	Price	There is a risk that the cost for the outdoor classroom is too high because of offer from supplier.	All	Preparation	Low	Some extra work to re-allocate the work to internal work force.	The project rejects the offer and is doing the work by Municipality's own personnel.
RR009	Strategic	Delay	Return of Covid restrictions	All	Preparation	Low	No real significant impact in implementation phase.	Follow public health advice
RR015	Technical	Delay	There is a risk that the construction of the outdoor classroom is delayed until after the summer because of lack of resources.	All	Preparation	Low	No delay realised.	The project rejects the construction company's proposal to delay.

Table 121: Skelleftea (SE)- Identified opportunities

Summary of opportunities		Most of the opportunities are gathered from stakeholder dialogues and in general only need small changes to Planned solutions or components in order to meet the needs of the opportunities expressed.				
ID	Opportunity Description	VS	Stage	Opportunity Category	Opportunity capture strategy	Status
OR06	VS5 Learning outdoors is important for today's children who spend a lot of time behind a computer / Outdoors is the best classroom (already covered by solutions)	5	Preparation	Social	Already being covered by the solutions	Closed
OR01	VS1 Luleå University of Technology is interested in cooperating about sensors and sensor networks	1	Preparation	Technological	Continued cooperation	Open
OR02	VS2 Make the park more accessible and connected with other green spaces in the city	2	Preparation	Environmental	Internal cooperation	Closed
OR05	VS 4 It would be good to cater for all people not just schools and kindergartens	4	Preparation	Social	Find other not for profit organisations that may like to use the space	Closed



7.2. Skellefteå (SE)- Received feedback with respect to the implementation process

Table 122: Skelleftea (SE)- Changes in the concept design

Skellefteå	VS1	VS2	VS3	VS4	VS5
1. Did any changes occur in the concept design since the initial sketching of your VS?	☐ Yes ☒ No	☐ Yes ☒ No	☒ Yes ☐ No	☒ Yes ☒ No	☒ Yes ☐ No
2. At which stage did the change occur? <i>(multiple choice possible)</i>	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☐ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☒ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☒ Concept design ☐ Preparation stage ☐ Selection of services providers ☐ Execution stage	☐ Concept design ☒ Preparation stage ☒ Selection of services providers ☐ Execution stage
3. What kind of change occurred? <i>(multiple choice possible)</i>	☐ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☐ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☐ Design ☒ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other	☐ Scope ☐ Location ☒ Design ☐ Scale/Downsize ☐ Other
4. Which is the main reason for any changes to occur? <i>(multiple choice possible)</i>	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☒ Financial issues ☐ Other	☒ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☐ Financial issues ☐ Other	☐ STK input ☐ Political decision ☐ Legal issues ☐ Technical issues ☒ Financial issues ☐ Other
5. How did the changes affect the progress of work? <i>(multiple choice possible)</i>	☐ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☐ Timeframe ☐ Budget ☐ Procurement procedure ☐ Other	☐ Timeframe ☐ Budget ☐ Procurement procedure ☒ Other: Nothing of the above. Only fewer poles installed	☐ Timeframe ☒ Budget ☐ Procurement procedure ☐ Other	☐ Timeframe ☒ Budget ☒ Procurement procedure ☐ Other

Table 123: Skellefteå (SE)- Required expertise

Skellefteå	VS1	VS2	VS3	VS4	VS5
1. Which experts (in-house & service providers) were involved in the design / implementation of your VS? (multiple choice possible)	☒ Architect/ Engineer ☐ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☒ Biologist/ Agronomist ☐ Communication expert ☐ Municipal project officer ☐ Other:	☒ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☐ Other:	☐ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☒ Biologist/ Agronomist ☒ Communication expert ☐ Municipal project officer ☒ Other: Illustrator/artist	☒ Architect/ Engineer ☒ Landscape designer ☐ Urban planner ☐ NbS expert ☐ Researcher ☐ IT expert ☐ Surveyor ☐ SSH disciplines (psychologist, sociologist, archaeologist, artist, lawyer, educator, economist ...) ☐ Biologist/ Agronomist ☐ Communication expert ☒ Municipal project officer ☐ Other:
2. Which was the highest level of expertise required for in-house experts?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐
3. Which was the highest level of expertise required for service providers?	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☒ 4. Advanced ☐ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐	1. Basic knowledge ☐ 2. Limited experience ☐ 3. Intermediate ☐ 4. Advanced ☒ 5. Expert ☐



Table 124: Skellefteå (SE)- Experience from the procurement processes

Skellefteå	VS1	VS2	VS3	VS4	VS5
1. Did you experience any difficulties with the procurement process?	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☒ Yes ☐ No
2. In case of any difficulties, please describe the reason. <i>(multiple choice possible)</i>	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☐ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☐ Other	☐ Tendering process specifications ☒ Bureaucracy ☐ Regulations ☐ Eligibility of offers ☐ Market analysis ☐ Level of expertise required ☒ Other: <i>Both in the design but also in procurement, we got too high offers.</i>
	<i>In case of "other" please explain:</i>	<i>In case of "other" please explain:</i>	<i>In case of "other" please explain:</i>	<i>In case of "other" please explain:</i>	<i>In case of "other" please explain: Problems with the build log to get it through. We couldn't have the classroom be bookable in a park</i>
3. For VS3, VS4 and VS5 you indicated that you used Quality or LCA evaluation criteria. Please outline the criteria used.			<i>LCC, Embodied CO2, Sustainability criteria, safety criteria, security criteria</i>		



Table 125: Skellefteå (SE)- Budget variance

Skellefteå	VS1	VS2	VS3	VS4	VS5
1. Were there any significant variances to the budget needed for your VS? ($\pm 25\%$)	☐ Yes ☒ No Additional budget received from Bergen was used	☐ Yes ☒ No	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No
2. Which was the reason for any significant budget variance? (multiple choice possible)	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☐ Change in the concept design ☐ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other	☒ Change in the concept design ☒ External factors (e.g market conditions, inflation) ☐ Inaccurate forecasting ☐ Unforeseen costs ☐ Other

Table 126: Skellefteå (SE)- Experienced delays

Skellefteå	VS1	VS2	VS3	VS4	VS5
1. Were there any delays in your workplan	☐ Yes ☒ No	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No	☒ Yes ☐ No
2. Which was the reason for the delay? (multiple choice possible)	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☒ Other: <i>The soil managed to run away from the meadow into the ponds. The</i>	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☐ Change in the concept design ☐ Budget issues ☐ Approvals ☐ Project complexity ☐ Procurement issues ☐ Labor challenges ☒ Unavailable resources (amount of signs/content/artist) ☐ Equipment failure ☐ Weather ☐ Other	☐ Inaccurate forecasting ☒ Change in the concept design ☒ Budget issues ☒ Approvals ☐ Project complexity ☒ Procurement issues ☐ Labor challenges ☐ Unavailable resources ☐ Equipment failure ☐ Weather ☐ Other

Skellefteå	VS1	VS2	VS3	VS4	VS5
		<i>plants had not had time to take root. Retake.</i>			

Table 127: Skellefteå (SE)- Key take-aways from the implementation process

Skellefteå	VS1	VS2	VS3	VS4	VS5
1.Looking back, what aspects of any implementation stage would you approach differently?	☒ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☒ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☐ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring	☐ Preparation ☒ Procurement ☐ Execution ☐ Handover ☐ Operation & Monitoring
2.What were the most valuable lessons learned during the development of the concept design and the setting up of the implementation process?	At an earlier stage bring in a consultant for where the flow measurement was best placed. Check existing drums and other better.	Time the layout. If you had sown in the spring, you might have had the plants take root better. Was an autumn planting instead of a spring planting.	Sensors, various laws within the EU regarding GDPR		Be clearer to consultants about what applies. Clearer ordering. Have a better plan for how the facility will be used. And budget. We rely too much on the consultants and contractors.
3.Which preventive measures would you recommend for future replication of your VS?		Spring planting	Sensors: start with a starting point. We know more now than we did when we started around sensors.		
4.If you could start over, what would you change about the preparation stage?	Better planning	Time planning	Sensors: start with a starting point. We know more now than we did when we started around sensors.		Design.



Skellefteå	VS1	VS2	VS3	VS4	VS5
5. If you could start over, what would you change about the procurement stage?	None	None			Clarity.
6. If you could start over, what would you change about the budget planning?			Count up the plant, so that you had received the number of poles that you needed/wanted		Calculate the cost of the facility.



7.3. Skellefteå (SE)- Operation and Maintenance

As-built documents need to be established, and assessment of the project results needs to be done (e.g., whether the invasive species returning and so on). An operation and maintenance plan will be created together with the municipal department that will facilitate the area (D1- D in detailed workplan). An official handover to the facilitating department will be done after an agreement between the parties in the project and the department.

Regarding the green areas, an operation and maintenance guide will be created in collaboration with the municipal management team for parks. The maintenance guide is based on the municipal strategy for green space management. This will be handed over after the project is completed. Regarding the sensors an operation and maintenance guide will be created in accordance with an upcoming municipal strategy for IoT.

7.3.1. O&M of Nature-based Solutions

Table 128: Skellefteå (SE)- O&M of Nbs

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Adjusting water flow/ water flow measurements	Regular/ Preventive Maintenance	Type of action(s)	Check inlets and outlets of dams	500	30
		Frequency	Bimonthly		
		Procedure	Visual inspection		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
	Pro-active care/ Remedial actions	Type of action(s)	Remove sediments and objects from dams	250	30
		Procedure	Manual labour		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
Ditches and ponds	Regular/ Preventive Maintenance	Type of action(s)	1.Regular inspections 2.Cut grass and vegetation on dams 3.Erosion prevention 4.Water quality testing 5.Sediment management 6.Invasive species prevention	3700	30
		Frequency	Yearly		
		Procedure	Apart from the visual inspections, special machine will be used (contracted service)		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
	Pro-active care/	Type of action(s)	1. Erosion control 2. Sediment removal 3. Bank stabilization		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Remedial actions	Procedure	TBD		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
Ditches and ponds	Regular/ Preventive Maintenance	Type of action(s)	Clearing of forest edge	4600	30
		Frequency	Every second year		
		Procedure	Special machine		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
	Pro-active care/ Remedial actions	Type of action(s)	Vegetation management		
		Procedure	Special machine and manual labour		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
Wetland bed	Regular/ Preventive Maintenance	Type of action(s)	Wetland bed maintenance, mowing vegetation	950	25
		Frequency	Yearly		
		Procedure	Special machine and manual labour		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
	Pro-active care/ Remedial actions	Type of action(s)	Sediment removal		
		Procedure	TBD		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		



7.3.2. O&M of Socio/ Cultural Solutions

Table 129: Skellefteå (SE)- O&M of Socio/ Cultural Solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Outdoor classroom and complementing infrastructure	Regular/ Preventive Maintenance	Type of action(s)	1. Regular visual inspection of structure and equipment for damages and for wood-damaging pests. 2. Cleaning of surfaces, fire pits, waste bins. 3. Checking gutters, downspouts and drainage systems for any obstructions 4. Checking foundation for settling, shifting or erosion. 5. Winter preparation. 6. Checking information material.	6800	40
		Frequency	Weekly		
		Procedure	Manual labour		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
	Pro-active care/ Remedial actions	Type of action(s)	1. Sealing and staining of the wooden surfaces. 2. Remove any blockages of drainage, repair leaks. 3. Apply insecticides or borate treatments in case of wood-damaging pests. 4. Reinforce or replace any weakened or deteriorated wood. 5. Removal of graffiti, vandalism	500	40
		Procedure	Manual labour, cleaning, painting, replacement of equipment, sections		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		
Large Bee hotel	Regular/ Preventive Maintenance	Type of action(s)	Cleaning of large insect hotel, checking information material	100	40
		Frequency	Weekly		
		Procedure	Manual labour		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Pro-active care/ Remedial actions	Type of action(s)	Removal of graffiti, vandalism	100	40
		Procedure	Manual labour, cleaning, painting, replacement of equipment, sections		
		Responsibility	Unit manager, park section		
		Solution specific issues	TBD		

7.3.3. O&M of Digital Solutions

Sensors used in Skellefteå VSs are stated in Table 130: sensor ID number, commercial name, measuring unit, quantity used together with the sensor's communication protocol, and the reference link.

Table 130: Skellefteå (SE)- Sensors and devices used

No.	Sensors	Measuring	Quant.	Protocol	Link as reference
1	Sensedge Senstick	T, RH, air pressure	5	LoraWAN	https://senstick.co/
2	Elsys ELT-2	T, RH		LoraWAN	https://www.elsys.se/
3	Decentlab DL-ATM22	T, RH, wind speed, wind direction	1	LoraWAN	https://cdn.decentlab.com/download/datasheets/Decentlab-DL-ATM22-datasheet.pdf
4	Milesight-iotEM500-UDL or Elsys ELT Ultrasonic	distance	2	LoraWAN	https://www.elsys.se/
5	Milesight 5G AIOT Pro	counting people	2	LoraWAN	https://www.milesight.com/product/5g-aiot-pro-bullet-plus

The local governance for IoT maintenance strategy follows a fixed schedule. Local Pilot Expert / VS manager can manage planned downtime, rather than emergency downtime. Skellefteå pilot's central and periodic evaluations of the IoT are also used to manage the coherent progress of VSs performance.

- Set maintenance dates are as much as possible in-line with the typical battery lifespan used in the sensors, which are part of the local IoT network (VS1 and VS3).

Sensedge's Sensor Management Platform receives the additional local sensor data and evaluates them: battery level, signal-to-noise ratio, signal strength indicator of the channel, to enable local users with alerts on possible unforeseen degradations and miscalibration of IoT devices used in VSs.

Table 131 and Table 132 provide a short description of the local governance strategy and persons or organisations responsible for performing monitoring and maintenance tasks.



Table 131: Skellefteå (SE)- Local IT infrastructure/ Management

Local governance (Months / Weeks)	Once per month
Short description	The overall strategy for the governance of all sensors within the city is undergoing a review and development phase to organise an overarching strategy for the entire city, covering VARCITIES sensors.

Table 132: Skellefteå (SE)- Local IT infrastructure/ Maintenance responsibility

Monitoring Manager / Organisations responsible for maintenance	
Person/Organisation responsible for sensor performance / Data backup verifications	Skellefteå Kraft AB
Person/Organisation responsible for on-site scheduled maintenance	Skellefteå Kraft AB
Person/Organisation responsible for unscheduled maintenance	Skellefteå Kraft AB

Table 133: Skellefteå (SE)- O&M of Digital Solutions

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Sensedge Stick	Regular/ Preventive Maintenance	Type of action(s)	Checking signal strength, battery life	180	10+
		Frequency	Bimonthly		
		Procedure	Via platform checking sensor health – LoRaWAN signal rate, battery life. With stronger signal the battery will last longer.		
		Responsibility	TBD		
	Pro-active care/ Remedial actions	Solution specific issues	Maintenance might be done on field if LoRaWAN gateway needs fixing.		
		Type of action(s)	Battery change on average span of 5-7 years		
		Procedure	Opening the sensor and changing the two AAA alkaline batteries with new ones. (industrial grade recommended) Tutorial on battery change can be seen HERE .		
		Responsibility	TBD		
Wind Speed Sensors	Regular/ Preventive Maintenance	Type of action(s)	The proper handling and care of the device are imperative.	100	
			1. Regular calibration 2. Visual inspection 3. Cleaning 4. Alignment check 5. Lubrication of moving parts 6. Environmental protection (from moisture, humidity, harsh weather conditions)		

Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
			7. Checking of electrical connections 8. Verification of correct data streaming, battery and signal strength 9. Software updates 10. Documentation/ record keeping	TBD	
		Frequency	Quarterly		
		Procedure	By implementing these preventive maintenance measures accuracy, reliability and longevity of a wind speed sensor is ensured.		
		Responsibility	TBD		
		Solution specific issues	If data is not streamed or not correct the sensor will be assessed internally and if needed specified technical assistance will be requested. The frequency of preventive maintenance tasks should be adapted on the specific conditions.		
	Pro-active care/ Remedial actions	Type of action(s)	Verify wear or damage		
		Procedure	On-site visual check		
		Responsibility	TBD		
		Solution specific issues	Substitute cables or other components		
Water flow sensor	Regular/ Preventive Maintenance	Type of action(s)	1. Cleaning from debris, sediment and mineral buildup 2. Inspect seals, gaskets and fittings. 3. Check for signs of wear, damage, leakage. 4. Verify that the flow path of water is clear and unobstructed to maintain accurate measurements. 5. Monitor battery levels	TBD	5-20 years depending on maintenance
		Frequency	Bimonthly		
		Procedure	Regular monitoring and adherence to manufacturer guidelines needed.		
		Responsibility	TBD		



Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
	Pro-active care/ Remedial actions	Solution specific issues	TBD		
		Type of action(s)	1. Calibration of the sensor 2. Replace worn or damaged seals and fittings 3. Battery replacement 4. Removal of obstructions or blockages that may impede water flow through the meters.		
		Procedure	Regular monitoring and adherence to manufacturer guidelines needed.		
		Responsibility	TBD		
		Solution specific issues	TBD		
People counter	Regular/ Preventive Maintenance	Type of action(s)	1. Cleaning lens and enclosure. 2. Check power supply. 3. Check mounting position and angle. 4. Ensure strong Wi-fi connection	120	10+
		Frequency	Quarterly		
		Procedure	Training needs to be provided to personnel responsible for operating and maintaining the sensor.		
		Responsibility	TBD		
		Solution specific issues	The proper handling and care of the device are imperative.		
	Pro-active care/ Remedial actions	Type of action(s)	1. Address any power supply issues. 2. Install latest updates provided by the manufacturer. 3. Periodically calibrate the sensor.		
		Procedure	Checking signal of Wi-Fi Strength. Can be done via phone.		
		Responsibility	TBD		
		Solution specific issues	Needs visits on-site to check signal strength		



Operation & Maintenance	Activity	Information required	Description	Estimated Cost per year (€)	Lifetime (years)
Smart light poles	Regular/ Preventive Maintenance	Type of action(s)	1. Regular inspection of pole structure, lighting fixtures, electrical components and communication devices to identify signs of damage, wear or malfunction. 2. Cleaning from dirt/ dust/ debris. 3. Electrical system inspection. 4. Testing of communication system/ connectivity. 5. Record keeping	TBD	TBD
		Frequency	Quarterly		
		Procedure	Training needs to be provided to personnel responsible for operating and maintaining the sensor.		
		Responsibility	TBD		
		Solution specific issues	The proper handling and care of the device are imperative.		
	Pro-active care/ Remedial actions	Type of action(s)	1. Address any power supply issues. 2. Repair or replace any faulty electrical components. 3. Replacement of damaged or burnt-out bulbs. 4. Install latest updates provided by the manufacturer. 5. Periodically calibrate the sensor.	TBD	TBD
		Procedure	Adherence to manufacturer guidelines is essential.		
		Responsibility	TBD		
		Solution specific issues	TBD		



8 Conclusions

Deliverable D6.4 marks the completion of the implementation phase for the VARCITIES pilots. Together with D6.3 Cost management program for pilots' implementation and solutions maintenance (TUC) and D6.5: Finalised VS for all pilots (E2ARC) the implementation process is summarised. The Pilot Leaders have been the main responsible partners for implementing the Visionary Solutions, with the support of the relevant Pilot Experts and under the general supervision of WP6 leader (E2ARC) and the VARCITIES coordination team (TUC).

In this deliverable the overview of the VS and their associated implementation aspects (Workplan, Procurement plan, Realised Risks, Identified Opportunities, Operation and Maintenance considerations) are presented.

Out of the 29 Visionary Solutions implemented by the seven VARCITIES pilots, 26 are fully operational. Certain components of one VS are at the handover stage (Gzira, VS3). Two VS (Castelfranco VS1 and Leuven VS4) are in the final stages of execution phase. A clear overview of the implementation timeline and of the status of the various VS components is presented in Annex II and Annex III.

Encountered issues and realised risks have been managed efficiently (Annex I: Overview of the realised risks across the 7 pilots), while an effort has been made to collect the experiences from the Pilot Leaders from the implementation process, through the distribution of questionnaires that addressed 1. Changes made in the concept design, 2. The level of required expertise (in-house and from external providers) 3. Any significant budget variances. 4. Experienced delays. 5. Key take-aways from the implementation process.

The lessons learned from the above will be drawn as part of Task 6.3 activities in order to ensure the successful uptake and replication of the implemented Visionary Solutions.

9 References

- [1] Van Rompaey et al, "VARCITIES Project- D3.6: Reports of the sketched solutions", 2022.
- [2] Goni et al. "VARCITIES project" D6.2 "Implementation and Execution plan for all pilots", 2023.

10 Annexes

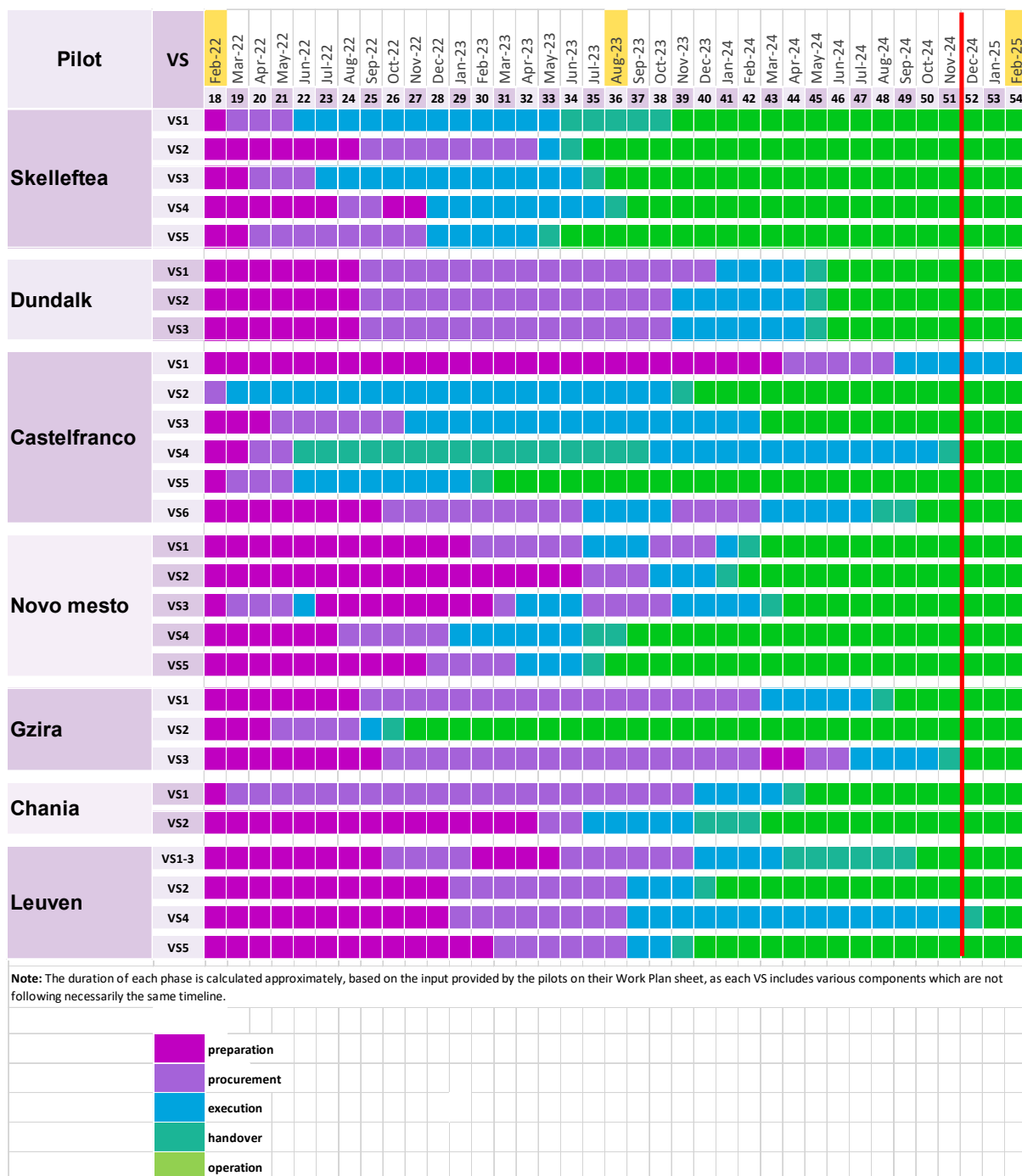
Annex I: Overview of the realised risks across the 7 pilots

Table 134: Overview of the major realised risks across the 7 pilots

Risk category	Risk description	Risk type	Risk significance	Affected pilot(s)	Response
Financial	Equipment, installation & labour costs increased due to inflation (energy crisis)	Price	Major	All	Reduce/ Contingency
Resources	High demand/ Low availability of resources & man power in the local market	Delay	Major	IE	Accept/ Contingency
Legal/ Political	Complex permit procedures/ rejections of planning applications	Delay	Major	IT, BE, MT, SE	Accept/ Contingency
Technical	Underground infrastructure on excavation site	Delay/ Damage/ Price	Major	MT	Share/ Contingency
Technical/ Project Management	No prior experience with innovating ideas & technology in municipality's department	General	Moderate	BE, GR, IE, SI	Reduce
Resources/ Technical	Difficulties in finding the adequate sensors & providers (specialized market, new technologies) / specialized contractors	Delay	Moderate	GR, IE, SI	Accept/ Contingency
Technical	Malfunctioning sensors	Delay	Moderate	IT	Contingency

Annex II: Implementation status of the VS

Table 135: Implementation status of all VS



Annex III: Implementation status of the VS components

Table 136: Nbs/ Socio-cultural/ Digital components' status overview

	NBS					SOCIO CULTURAL						DIGITAL								
Pilot	Planting	Landscaping	Biodiversity		Water management	Construction / infrastructure	Educational & information material	Social & educational events / campaigns	Accessibility	Toolbox	Surveys & questionnaires	Microclimate sensors	Air Quality sensors	Wind sensors	Noise sensors	Water sensors	Visitors tracking	Wearables	Energy	IoT
Skelleftea		wetland bed / digging	inventory of species/ bee hotels		quality & flow	Open-air classroom / bee hotels	signboards		BBQ & Open-air classroom			sensedge pen	health in beehives	weather station		quality & flow (by lab)	(privacy issues)		light poles with sensors	
Dundalk	enhance existing garden & new sensory garden				rainwater harvesting		learning pod	gates & fencing		science week in Dundalk Library						rain harvesting		bike mounted		touchscreen
Castelfranco							new garden access road	internal paths renovation	engaging materials as totem content		internal paths renovation									totem
Novo mesto	native trees & bushes	preparation of lands					forest trails													
Gzira	seeds distributed	micro greening / school garden	green playscape in schoolyard		habitat creation through micro-greening		school garden & playscape	play & artistic structures	micro-greening / council of EU event / Citizen science / Pop-											
Chania	MULaR micro-greening		inventory of species				mobile urban living room					stationary & bike mounted	stationary & bike mounted		bike mounted			bike mounted HR		screens
Leuven					river branch uncovered		riverside urban living room / art installation								light poles with sensors		traffic			hosting of API & data platform

preparation

procurement

implementation

operation

