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AGREEMENT

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Visionary nature-based actions for health, wellbeing & resilience in cities

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Contents

Page

Foreword

This CEN Workshop Agreement (CWA 18237:2025) has been developed in accordance with the CEN-CENELEC Guide 29 “CEN/CENELEC Workshop Agreements – A rapid way to standardization” and with the relevant provisions of CEN/CENELEC Internal Regulations - Part 2. It was approved by the Workshop CEN/WS “VARCITIES”, the secretariat of which is held by “UNI” consisting of representatives of interested parties on 2025-05-14, the constitution of which was supported by CEN following the public call for participation made on 2025-01-06. However, this CEN Workshop Agreement does not necessarily include all relevant stakeholders.

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Introduction

In an increasingly urbanized world, local governments and international institutions strive to enhance the productivity and efficiency of cities - recognized as economic growth hubs - while ensuring better quality of life and better living conditions for citizens. To meet these challenges, VARCITIES puts the citizen and the "human community" in the eye of the future cities' vision. The aim of the VARCITIES project is to translate visionary ideas into real solutions by reshaping shared public spaces and making cities liveable and welcoming.

Seven municipalities that are exposed to diverse climatic conditions and challenges around Europe have been identified as case studies. Each pilot city has been recognized as a large-scale site for co-designing and implementing local actions and has adopted an innovative cross-sectoral approach by combining urban digital transformation with nature-based actions. This innovative solution's implementation is consistent with the increase in citizens' awareness, respect for public spaces, and the integration of green spaces into everyday life. Developing a healthy green mind set for citizens and improving economic opportunities through green-digital strategies, drives the implementation of additional actions towards becoming a more sustainable and equitable city. The development process of these visionary ideas into feasible actions is approached by following a bottom-up planning and co-design participatory process involving local stakeholders, assuming a "multiple benefits" perspective, and addressing social issues and cultural diversion (Figure 1).

Figure 1 — Cities involved in VARCITIES

Figure 2 — Key topics addressed within VARCITIES project

1 Scope

This CEN Workshop Agreement (CWA) defines requirements to describe a health relevant approach for developing nature-based, socio cultural and digital VSs in cities and an assessment of good practices.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

prEN 18140, *Sustainable and smart cities and communities — Nature-based solutions (NBSs) — Vocabulary and principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 18140 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp/

— IEC Electropedia: available at http://www.electropedia.org/

3.1
Visionary Solution (VS)
innovative approach that integrates nature-based solutions with digital, social, and cultural elements to enhance the health and well-being of citizens in urban areas

Note 1 to entry: These solutions are designed to be sustainable and adaptable, addressing diverse climatic conditions and urban challenges across Europe with the aim to create public spaces that are people-centered, promoting creativity, inclusivity, health, and happiness.

3.2
Nature based Solutions (NbS)
actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits based on surveys addressed to stakeholders for the adoption of a correct approach to the relationship, needs, and process

[SOURCE: UNEP/EA.5/Res.5 United Nations Environment Assembly of the United Nations Environment Program Fifth, 2022]

3.3
Human health
health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity

Note 1 to entry: The health of a whole community or population is reflected in measurements of disease incidence and prevalence, age-specific death rates, and life expectancy. Constituents of well-being: The experiential aspects of well-being, such as health, happiness, and freedom to be and do, and, more broadly, basic liberties. Determinants of well-being: Inputs into the production of wellbeing, such as food, clothing, potable water, and access to knowledge and information.

Note 2 to entry: The terms “Human health” and “Human wellbeing” in this document are considered altogether as Health and Wellbeing (H&WB).

[SOURCE: prEN 18140:2024, 3.2.33, modified – Note 2 to entry added]

3.4
Human Wellbeing
prosperity or quality of life

Note 1 to entry: Human wellbeing is assumed to have multiple constituents, including the basic material for a good life, such as secure and adequate livelihoods, enough food at all times, shelter, clothing, and access to goods; health, including feeling well and having a healthy physical environment, such as clean air and access to clean water; good social relations, including social cohesion, mutual respect, and the ability to help others and provide for children; security, including secure access to natural and other resources, personal safety, and security from natural and human-made disasters; and freedom of choice and action, including the opportunity to achieve what an individual values doing and being.

Note 2 to entry: NbS provide human well-being.

Note 3 to entry: The terms “Human health” and “Human wellbeing” in this document are considered altogether as Health and Wellbeing (H&WB).

[SOURCE: prEN 18140:2024, 3.2.34, modified – Note 3 to entry added]

3.5
good practice
procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption

[SOURCE: NIST- National Institute of Standards and Technology]

3.6
stakeholder
person or group who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, positively or negatively

Note 1 to entry: Stakeholders can include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society, organizations and groups with special interests, the academic community, or other businesses. The “stake” that each of these different individuals or groups has in a project or investment will vary.

3.7
key performance indicators (KPI)
parameter, or a value derived from parameters, which provides information about performance

[SOURCE: ISO 24523:2017, 3.13]

3.8
PESTLE
analysis which studies the key external factors (political, economic, sociological, technological, legal and environmental) that influence an organization

[SOURCE: ISO 20121:2024, 3.44]

3.9
SWOT
strategic planning tool used to assess the strengths, weaknesses, opportunities and threats of an organization or a project

[SOURCE: ISO 20121:2024, 3.43]

3.10
co-creation
active involvement of stakeholders in service design, delivery and innovation

[SOURCE:ISO 23592:2021, 3.3]

3.11
workplan
collection of Working steps with an execution sequence

Note 1 to entry: It contains a list of Executables.

[SOURCE: ISO 14649-1:2003, 3.6.3]

3.12
procurement management plan
component of the project or program management plan that describes how a project team acquire goods and services from outside the performing organization

[SOURCE: A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Fifth Edition]

3.13
cost management plan
component of a project or program management plan that describes how costs will be planned, structured, and controlled

[SOURCE: A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Fifth Edition]

3.14
risk management plan
process of defining how to conduct risk management activities for a project

[SOURCE: A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Fifth Edition]

3.15
social return on investment
method for measuring extra-financial value (i.e. environmental and social value not currently reflected in conventional financial accounts)

[SOURCE: ISO 16439:2014, 3.65]

4 Towards Standardized VSs

There is growing recognition of the critical role nature plays in addressing societal challenges, driving many nations to incorporate NbS and digital innovations into their national climate strategies to support EU climate neutrality. Despite this progress, the systemic integration of nature-based, social, cultural, and digital innovations remains limited. Moreover, many initiatives lack a consistent framework, often omitting the critical details necessary for effective implementation, replication, or adaptation.

VSs aims to address this gap by delivering integrated approaches that combine these innovations to enhance citizens' H&WB. Establishing clear guidelines for designing and implementing VSs ensures that knowledge from successful projects is accessible, adaptable, and reusable, promoting sustainable urban transformation.

Drawing on the experiences of cities that have faced diverse challenges, the proposed framework facilitates systematic learning and enhances the application and impact of VSs. By offering practical tools and methodologies, it builds confidence among decision-makers, enabling them to adopt, scale, and sustain these solutions effectively.

Compared to existing approaches, the VS framework integrates digital components and feedback loops from the initial design stage of the project. It provides a more systemic and future-oriented perspective, encouraging collaboration across disciplines and sectors, and promoting long-term wellbeing. However, implementing VSs may involve trade-offs such as increased complexity in governance, higher initial investment costs, and the need for strong multidisciplinary collaboration, requiring both in-house capacities and external service providers with expertise across urban planning, technology, health, and social innovation, as well as navigating complex procedures that can delay implementation. Additionally, the integration of diverse components requires careful coordination to avoid siloed efforts and to balance technological, environmental, and cultural priorities.

The proposed guidelines for VSs aim to provide a comprehensive framework to standardize the design, implementation, and evaluation of VSs. Key objectives include:

1. **Defining VSs**: Establish clear criteria for what constitutes a VS, ensuring consistency and clarity in their conceptualization, design, and implementation. The guidelines also outline methods for verifying that solutions meet the requirements of the VS Standard.

2. **Supporting Systemic Change**: Refine the documentation of the VS practices to promote sustainable transformation by aligning them with social, cultural, and environmental goals.

The framework equips STKs with a structured methodology (Figure 3) which enables them to create visionary, sustainable, and impactful solutions that address complex urban challenges and to guide all phases of the VS lifecycle:

- identify: document the context, goals, and processes to create a solid foundation for new initiatives;
- design and implement: develop tailored, innovative solutions specific to the context and ensure their effective execution;
- evaluate: assess outputs and outcomes to determine the effectiveness of the solutions, identify areas for improvement, and explore opportunities for scaling;
- co-create: engage stakeholders in participatory processes to ensure inclusivity, relevance, and community ownership;
- sustain: integrate long-term financial and operational planning to ensure the longevity and adaptability of the solutions.

This document is intended for use by a broad range of stakeholders involved in the verification, design, and scaling of VSs. Potential users include project managers in the public and private sectors, landscape planners, development practitioners, conservationists, government representatives, and financial stakeholders such as donors and investors. It is also relevant for policymakers and urban planners.

This CWA is versatile and can be applied across various environments, including urban areas, green spaces and protected regions throughout Europe. Furthermore, it supports both small- and large-scale interventions and is accessible to diverse users, including non-profit organizations, corporations, funding bodies, and municipal or local governments.

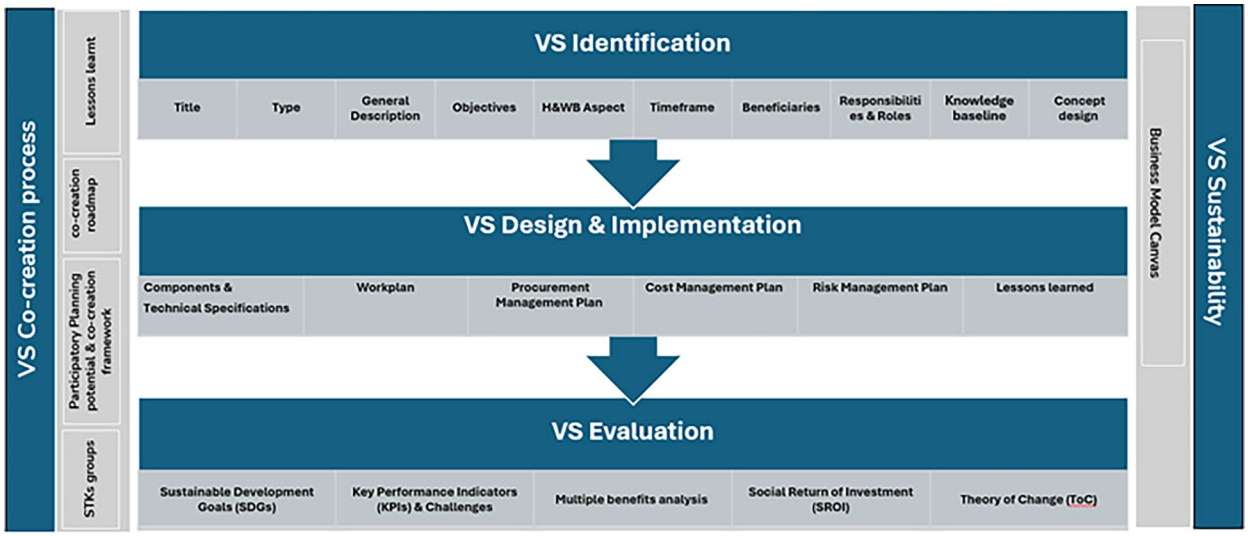

Figure 3 — VS flowchart

5 Establishing Criteria for a VS good practice

5.1 General

This clause outlines how the concept of good practice fosters a shared understanding of VSs that enhance H&WB while contributing to a just and sustainable future. Through a carefully curated set of criteria, this assessment ensures that VS designed with the H&WB dimension at their core.

Inspired by the IUCN Global Standard for NbS, the framework described here aims to provide credibility and inspire widespread adoption. It serves as a comprehensive guide for the description, design, implementation, and evaluation of VS good practices. By defining good practices as solutions that generate meaningful and measurable positive impacts, this framework bridges the gap left by the absence of a standardized assessment method, offering clarity and consistency in evaluating VSs.

5.2 Criterion 1 - VSs effectively address societal challenges

VSs shall tackle pressing societal challenges, with Human H&WB as the central focus. Any additional challenges, such as climate change mitigation and adaptation, disaster risk reduction, economic and social development, food and water security shall be integrally linked to their impact on H&WB.

VSs achieve this by combining NbS with sociocultural and digital innovations to enhance the socio-cultural dimension in alignment with H&WB objectives. Examples include infrastructure like sensory gardens, health trails, and learning pods; innovative platforms like Mobile Urban Living Rooms; and technology-driven tools such as Mixed Reality Applications, mobile apps with heat maps, health tips, and optimized routing. These integrated solutions address societal challenges holistically while improving citizens' H&WB.

5.3 Criterion 2 - VSs effectively address environmental challenges

All VSs shall ensure a positive direct or indirect impact on biodiversity or green space management, regardless of the primary societal challenge they aim to address.

VSs may either take the form of NbSs or focus on augmenting and optimizing existing NbSs by gathering critical data. This process demands a detailed understanding of the ecosystems involved, which can be achieved through comprehensive baseline assessments. These assessments should integrate scientific data with local knowledge to evaluate ecological conditions, identify degradation drivers, and develop actionable strategies for improvement.

By fostering innovation in NbS design and management, VSs advance biodiversity conservation while improving human H&WB. For example, a Mobile Urban Living Room can traverse green spaces, collecting environmental data to inform green space redesign. Similarly, sensor kits installed on public bikes can gather critical data to strategically position new NbSs, aligning them with both ecological priorities and community needs.

Such initiatives not only enhance ecological integrity but also strengthen the link between environmental health and societal well-being, showcasing the multifaceted benefits of addressing environmental challenges within VSs.

5.4 Criterion 3 - VSs effectively address digital transition

VSs shall seamlessly integrate digital solutions to support governance frameworks, promote compatibility across systems, and ensure interoperability among services, goods, and procedures.

Key digital components include ICT prototypes and platforms that monitor and evaluate the sustainability and impact of interventions using advanced KPIs for H&WB. The Internet of Things (IoT) creates a smart environment by connecting citizens with intelligent services, enhancing their quality of life.

A network of sensors feeds data into a cloud-based ICT H&WB platform, which visualizes insights through a local data management framework. Additionally, mixed reality (MR) applications engage citizens, particularly in educational contexts, to promote environmental awareness and interaction with VSs.

Simulation tools such as GIS based tools, thermal model and digital twins play a crucial role in modelling environmental performance, microclimate conditions, ecosystem services, and spatial dynamics, thereby informing data-driven planning and decision-making within VSs.

By leveraging these digital tools, VSs not only address the digital transition but also enhance the interconnectedness of technology, environment, and societal well-being [1], [3].

5.5 Criterion 4 - VSs are designed and implemented in a consistent manner

Throughout the development and implementation of VSs, it is crucial to ensure alignment with final objectives, set clear milestones, and proactively address potential risks through a comprehensive Implementation Framework. Given the diversity of VS types being deployed across cities, it is challenging to prescribe a uniform process that accommodates all needs and requirements.

However, regardless of the intervention type, the approach shall prioritize defining core tasks and preparatory activities prior to entering the implementation phase (see clause 6.2). These tasks are detailed and visualized in the Implementation Framework (see subclause 6.3.1 to 6.3.6). This structured methodology ensures that the execution of VSs remains focused, adaptable, and capable of achieving their intended outcomes.

5.6 Criterion 5 - VSs are managed adaptively, based on evidence

VSs should be managed with an adaptive approach that is grounded in evidence, ensuring continuous improvement and responsiveness to evolving urban challenges as described in current EU publications

[4]. This approach involves utilizing KPIs to monitor the effectiveness and impact of the solutions (see subclause 6.4.2), aligning them with the Sustainable Development Goals (SDGs) to drive progress toward global sustainability targets (see subclause 6.4.1). VSs are implemented and delivered on schedule, supported by a monitoring and evaluation (M&E) framework that involves stakeholders in the verification of outcomes, results and learnings, and helps manage both positive and negative long-term impacts.

A critical component of adaptive management is the use of multiple benefits analysis, which assesses the diverse environmental, sociocultural and digital outcomes of VSs, helping to identify and maximize their value across various sectors (see subclause 6.4.3). Achieving these benefits requires balancing trade-offs equitably, transparently, and inclusively, while considering spatial and temporal dimensions.

The management process should also incorporate the social return on investment (SROI) framework, evaluating the broader societal benefits of VSs to ensure that the investments lead to positive, measurable changes in communities (see subclause 6.4.4).

To guide adaptive decision-making, VSs should be rooted in a Theory of Change (ToC) that outlines the cause-and-effect pathways through which the interventions are expected to achieve their desired outcomes (see subclause 6.4.5). This evidence-based approach enables flexible, data-driven management, ensuring that VSs evolve to meet the changing needs of urban populations and effectively address emerging challenges.

5.7 Criterion 6 - VSs are based on inclusive, transparent, and empowering governance processes

Effective governance is essential to ensure VSs benefit both people and the environment. Governance processes shall allow for inclusive participation, transparency in decision-making, and empowerment of stakeholders through co-creation strategies. This ensures that VSs are tailored to the needs of end-users and local stakeholders, addressing the challenges of sustainable urban development (see subclause 6.5.2).

The co-creation process unfolds in four stages (see subclause 6.5.3):

1. co-identification stage: challenges and stakeholder needs are identified, creating a knowledge base through tools like PESTLE analysis. Inputs from multi-stakeholder workshops help refine the initial VS concepts;

2. co-design stage: solutions are tailored and validated through iterative feedback from stakeholders. Draft designs are disseminated for public comment and finalized with adjustments based on stakeholder input;

3. co-implementation stage: solutions are collaboratively executed, ensuring sustainability through real-time feedback mechanisms such as town hall meetings, surveys, and issue-specific working groups;

4. co-evaluation stage: the solutions, their impacts, and the co-creation process are assessed using quantitative and qualitative tools like surveys and focus groups, ensuring they address stakeholders' evolving needs.

The methodology emphasizes inclusion, equity, and diversity, integrating varied demographics and perspectives into the co-creation process. Local users, such as residents, schools, and public bodies, are actively engaged at every stage to ensure the solutions align with community priorities.

It is crucial to ensure not only the full acceptance of the VS but also its survival over time that the local community recognizes it as part of its urban and social heritage. In this sense, it is necessary to develop a feeling of ownership, which can ensure long-term interest and care, even beyond the conclusion of the initial enthusiasm and help keep it in use and properly maintained, avoiding vandalization or

inappropriate use. Finally, this governance model highlights lessons learned for cities adopting future VSs, advocating stakeholder involvement beyond traditional methods to address local needs comprehensively (see subclause 6.5.4).

5.8 Criterion 7 - VSs are sustainable and economically viable

The VS interventions shall be designed and executed with a focus on long-term sustainability and economic viability (see subclause 6.6). This involves aligning them with national, sectoral, and other relevant policy frameworks to ensure coherence and integration.

Key considerations include:

1. Sustainability planning: solutions should be designed for enduring impact, taking into account maintenance costs, potential funding options, and scalability. The development of a business model canvas can help outline the economic framework and lifetime funding strategies. Sustainability is also closely linked to the replicability and innovation potential of the solutions, with opportunities for scaling up or replication in similar urban contexts;

2. Avoiding common pitfalls: many VS interventions fail due to insufficient long-term resource and financial planning. Overemphasis on initial investments without considering ongoing financial requirements often leads to challenges in maintaining viability;

3. Strategic financial planning: a comprehensive financial strategy should align public and private funding sources with project needs. This includes:

    - identifying local public funding to cover CAPEX (capital expenditures, see subclause 6.3.4);
    - exploring grants and interest-free financing options for additional support;
    - evaluating financing through impact investments to generate measurable social and environmental benefits alongside financial returns;
    - considering maintenance and operational cost (OPEX) allocating reasonable resources. (see subclauses 6.3.1 and 6.3.4).

4. Impact investment approach: impact investments combine financial returns with social and environmental outcomes. These investments are tailored to diverse challenges, often varying by their degree of focus on impact versus financial returns. Social finance tools can be categorized to illustrate these variations and guide decision-making for sustainable funding approaches.

6 Documenting a VS good practice

6.1 General

This clause offers a structured methodology for capturing and documenting VSs best practices, focusing on their identification, design, implementation, evaluation, co-creation, and sustainability. It provides clear guidance to ensure that every phase of the VS lifecycle is thoroughly addressed, facilitating effective replication and long-term impact.

6.2 VS Identification

6.2.1 Title

A clear and concise title that identifies the VS shall be provided.

6.2.2 Type

The VS type shall be clearly defined. It should fall into at least one of the following categories: NbS, socio-cultural innovations, or digital solutions. Furthermore, the solution shall have a health-oriented focus.

6.2.3 General description

The VS description shall provide a detailed account of the envisioned project, including the planned technical or social measures. It should include an overview of the underlying technical or social analyses that support the project, such as audit results, assessments of technology options, or findings from questionnaires and surveys conducted prior to the intervention. Additionally, the description shall outline details of the targeted areas, addressing aspects such as:

- Public/private buildings: number and type of buildings, managed surface areas, current energy consumption, and proposed technology options;
- Public/private areas: managed surface areas and land use characteristics;
- Infrastructure: expected energy efficiency improvements and ownership details of installations;
- Nature-based Solutions (NbS): species involved, functionalities, and specific features;
- Services: number of users and other relevant metrics.

This comprehensive description ensures a clear understanding of the scope, context, and planned outcomes of the VS.

6.2.4 Objectives

The VS objectives should be clearly and precisely defined. They shall be specific, realistic, achievable and measurable by the end of the project.

6.2.5 H&WB aspect

The H&WB aspect shall be briefly explained, emphasizing how the VS contributes to enhancing the H&WB of citizens, encompassing physical health, mental health, well-being, and physical activity. This includes individuals of all ages, such as women, children, young people, middle-aged adults, and the elderly, particularly those exposed to diverse climatic conditions and challenges in urban and surrounding areas across Europe.

6.2.6 Timeframe

The timeline for the VS should be defined and should align with the overall implementation schedule and duration of the project.

6.2.7 Beneficiaries

The beneficiaries shall be clearly defined. The description should specify which targeted group is expected to benefit the most from the VS.

6.2.8 Responsibilities & roles

The responsibilities and roles shall be clarified from the outset to prevent confusion or drift in the discussion:

- Who is the leader of the VS? This refers to the institution or legal entity responsible for the implementation of the VS;

- Who are the decision-makers? These are the individuals or entities with legal authority and rights to be considered in the decision-making process;
- Who are the other involved partners, and what are their roles? It is important to specify the other stakeholders involved and outline their respective contributions to the VS.

An organizational chart should be established, detailing the specific roles, responsibilities, and tasks assigned to team members according to the needs and processes defined within each VS (Figure 4).

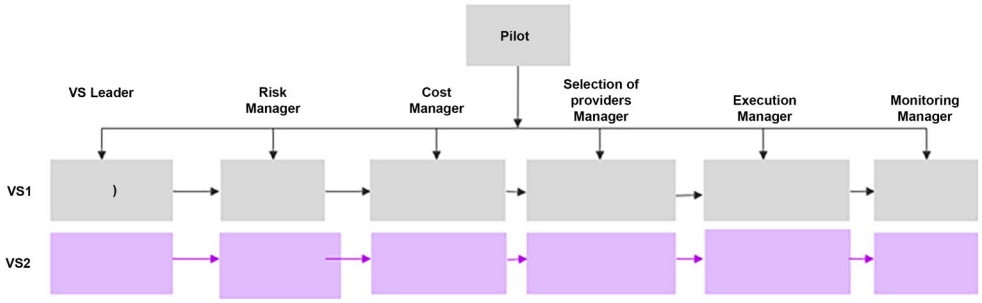

Figure 4 — Example of the organization chart

6.2.9 Knowledge baseline

A knowledge framework shall be provided to support the design and implementation of integrated VSs that aim to significantly improve H&WB in pilot cities. This clause focuses on establishing the knowledge baseline necessary to:

- characterize the current status of the pilot cities;
- identify and understand the challenges, needs, barriers, and drivers that could influence the design and implementation of the VSs through the PESTLE and SWOT analysis.

The PESTLE analysis offers a structured approach to assess the external factors impacting the organization. It prompts an examination of the key external forces and their potential implications on the VS design and overall success.

SWOT analysis is described as a tool to identify and analyse the internal strengths, weaknesses, external opportunities and threats that are affecting the planned VS, and shape current and future operations to help develop strategic goals. An effective way of conducting a SWOT analysis is with the participation of stakeholders, to capture additional feedback to devise future plans.

6.2.10 Concept design

A concept design shall be presented in a clear and concise manner, ensuring it is easily understandable even by non-experts. It is essential to define the problem and objectives of the VS in a way that resonates with and appears relevant to non-experts and stakeholders, highlighting its significance and impact.

6.3 VS Design & implementation

6.3.1 Components & technical specifications

The components of the VS (including supplies, works, services, etc.) shall be clearly defined to ensure a comprehensive understanding of all elements involved in its implementation (Table 1).

Table 1 — Template for the VS Components

No.	VS component	Component category	Brief description of the component	Regular/ Preventive Maintenance frequency	Possible Pro-active care/ Remedial actions

The sensors and devices used in each VS shall be clearly defined, including their technical specifications, functions, and roles within the solution (Table 2).

Table 2 — Template for the specification of sensors

No.	Sensors	Measuring	Quantity	Protocol	Link as reference

6.3.2 Workplan

The VS workplan shall be developed to encompass all design and implementation activities, not only from a financial perspective but also with clear timelines. The key elements to be addressed in the workplan include:

- Main investment steps: what are the primary steps (e.g., feasibility study, town planning authorization/conformity assessment, preliminary and definitive design, procurement phase, construction/installation, verification, testing, and roll-out), and when should each begin?
- Milestones: what are the key milestones, and when should they be reached?
- Responsibilities: who is responsible for each task?

Regardless of the intervention type, the goal of this analytic workplan is to outline the core tasks to be completed before the implementation phase begins, ensuring a structured approach to the project's execution.

6.3.3 Procurement management plan

A procurement management plan (Figure 5) is crucial for the successful implementation of a VS, irrespective of the procurement strategy chosen. Procurement encompasses the acquisition of goods or services under specified conditions to fulfil project requirements. Common procurement approaches include Public Procurement, Public-Private Partnerships (PPPs), and Direct Delivery.

The plan serves to ensure that all necessary components are procured, delivered, and implemented efficiently and effectively. It aims to maximize value and cost-efficiency while supporting the achievement of the VS objectives and maintaining alignment with project goals.

		Component	Description	Procurement procedure	Provider	Milestone	Start (mm/yy)	Finish (mm/yy)	Duration	Task Owner	Status	Contract value
VS	VS1											
	VS1 SUM											

Figure 5 — Template for the procurement management plan

6.3.4 Cost management plan

A cost management (Figure 6) plan should provide a structured approach to managing project costs, ensuring alignment with the project's scope, schedule, and budget. While high-quality execution is essential, adherence to the financial plan is equally critical to avoid the significant challenges posed by budget overruns.

The plan should evolve continuously throughout the VS lifecycle, from initial planning to implementation and final handover. It shall become progressively more detailed and accurate as new information emerges about the design, component specifications, and cost estimates provided by specialists, contractors, and suppliers. A well-developed Cost Management Plan should account for two major types of expenditures: Capital Expenditures (CAPEX) and Operational Expenditures (OPEX). CAPEX includes one-time costs such as planning processes, design, equipment procurement, and installation. OPEX, on the other hand, represents recurring expenses, including maintenance and operational staffing costs. By enabling effective estimation, budgeting, and monitoring, the Cost Management Plan ensures comprehensive expenditure control and supports the successful realization of the VS objectives.

		Component	Unit of measure	Unit Cost	Number of	Baseline cost	Current cost	Accruel	Best estimate	Invoiced amount	Budget variance	Savings/ Contingency	Maintenance cost			Requested EU funding	Own funding	Other sources
													Maintenance cost per year (C)	Lifeline (years)	Present value of lifeline maintenen			
VS 1	VS1						A	B	C	D	-A-B-C-D							
	VS1 SUM																	

Figure 6 — Template for the cost management plan

6.3.5 Risk management plan

A risk management plan (Table 3) should outline a comprehensive approach to identifying, assessing, and mitigating potential risks throughout the VS implementation process. This includes a detailed account of the risks encountered, their nature, and their potential or actual impact on the project. It

should specify the measures taken to address these risks and include contingency planning to ensure that unforeseen challenges are managed effectively.

By documenting and analysing realized risks, this plan serves as a valuable resource for improving risk management strategies and ensuring the successful execution of the VS.

Table 3 — Template for the risks that may affect the implementation process

Risk Category	Risk Type	Risk Description	Stage	Risk significance	Risk Impact	Mitigation Action
Scheduling	**Delay**		**Preparation**	**Major**		
Political	**Delay**		**Procurement**	**Major**		

6.3.6 Lessons learned

The lessons learned during the design and implementation processes should be thoroughly documented and described. These insights (e.g. level of required expertise) are invaluable for identifying successes, challenges, and areas for improvement, ensuring that future projects can benefit from enhanced practices and strategies. By capturing this knowledge, the likelihood of achieving greater success in subsequent initiatives is significantly increased.

6.4 VS Evaluation

6.4.1 Sustainable Development Goals (SDGs)

The VS should explicitly reference and align with the United Nations (UN) Sustainable Development Goals (SDGs). This alignment ensures that the project contributes to global priorities for sustainable development, such as H&WB, environmental sustainability, social equity, and economic growth. Clear connections to specific SDGs highlight the positive impact of the VS and demonstrate its commitment to advancing these shared global objectives.

6.4.2 KPIs & challenges

KPIs serve as a crucial tool for monitoring and evaluating the implementation and impact of innovative projects, including VS. By framing the outcomes according to their specific aims and scope, KPIs provide a holistic perspective on effectiveness, sustainability, and areas for improvement.

They are instrumental in:

- Measuring impact: determining which aspects of the VS interventions have been most effective;
- Enhancing sustainability: assessing the long-term viability of interventions;
- Engaging stakeholders: involving a wide range of participants with diverse expertise, including local and international contributors, in the monitoring and evaluation process.

A set of KPIs, categorized into various challenge areas, shall be selected to systematically collect and evaluate data from diverse H&WB perspectives. These challenges represent critical dimensions of sustainable urban development and the successful implementation of VSs. The identified challenge areas should be in alignment with TFII Handbook [4] and include:

1. Climate Resilience – Addressing climate adaptation and mitigation strategies.
2. Water Management – Optimizing water resources and enhancing water quality.
3. Natural and Climate Hazards – Reducing vulnerability to natural disasters and extreme weather.

4. Green Space Management – Enhancing the planning, accessibility, and maintenance of urban green areas.

5. Biodiversity Enhancement – Promoting ecosystems and preserving natural habitats.

6. Air/Ambient Quality – Improving air quality and reducing pollution levels.

7. Place Regeneration – Revitalizing urban spaces for functionality, attractiveness, and livability.

8. Knowledge and Social Capacity Building for Sustainable Urban Transformation – Empowering communities with education and skills for sustainability.

9. Participatory Planning and Governance – Fostering inclusive decision-making and stakeholder engagement.

10. Social Justice and Social Cohesion – Ensuring equity and strengthening community bonds.

11. Health and Well-Being – Enhancing physical and mental health and overall well-being.

12. New Economic Opportunities and Green Jobs – Creating innovative, sustainable economic pathways and employment opportunities.

These challenges provide a structured framework for assessing the VS's impact, guiding its design, and addressing key urban sustainability priorities. The management of a VS project requires the implementation of a robust Monitoring and Evaluation (M&E) framework, designed to track data across various stages of the project. This framework ensures that data is consistently collected during both pre- and post-implementation phases, providing insights into the effectiveness of the interventions over time. By using a Monitoring Protocol, the management team can track the progress of the project, identify areas for improvement, and ensure the sustainable management of the VS in the long term. Furthermore, it includes the engagement of stakeholders through co-evaluation, fostering an inclusive, transparent process for assessing the impact and refining the project based on real-time data and outcomes.

6.4.3 Multiple benefits analysis

The multiple benefits analysis involves evaluating the diverse, interconnected positive impacts generated by integrated solutions that combine NbS, Digital Solutions, and Socio-Cultural Actions. This analysis focuses on assessing the synergies across various dimensions, environmental, social, and economic, to address a range of societal challenges. Ultimately, Multiple Benefits Analysis helps stakeholders understand and optimize the value created by innovative urban interventions, setting clear goals and ensuring that they contribute to sustainable development and improved quality of life for citizens.

By following three key steps, cities can understand and optimize the wide-ranging effects of VSs on urban areas:

1. Learning from Existing Projects: Begin by analyzing EU-funded initiatives on Nature-Based Solutions (NbS) and Smart Cities to identify shared challenges and benefits that align with VSs (green or technological solutions). This exercise provides insights into challenges and multiple benefits suitable for integration into the taxonomy of VSs.

2. Aligning with Global Frameworks: Assess the impact of VSs by correlating identified challenges and benefits with the objectives of the United Nations' 2030 Agenda for Sustainable Development and the OECD Well-Being Framework. This alignment ensures that VSs support global sustainability and well-being goals.

Co-creation for Identifying Benefits: During co-creation workshops and activities, participants reflect on the potential multiple benefits VSs can provide. These discussions should also explore the timing of benefits (immediate vs. delayed) and their long-term implications. Co-creation activities lead to a structured validation process where the multiple benefits of VSs are identified, analyzed, and quantified.

6.4.4 Social Return of Investment (SROI)

The SROI framework should be developed to guide the design and evaluation of VS that aim to drive social change, with active engagement from local stakeholders. This framework evaluates both the outputs, the tangible, measurable results anticipated from the intervention, i.e., the VSs, and the outcomes, the long-term changes experienced by the beneficiaries. The SROI framework's primary objective is to calculate the social value generated by the intervention, offering a comprehensive view of its impact. The major difference between this framework and other economic analyses, such as the cost benefit analysis or the cost efficiency analysis is that SROI relies on active stakeholder engagement, acknowledging that the process's credibility and effectiveness derives from collecting real data directly from the beneficiaries of these VS interventions, and not from expert assumptions only.

The SROI calculation moves from the ToC to translate the long-term changes into a monetary value by applying financial proxies, or approximations, and monetization techniques of assets that do not have a market value but have a social value instead. The analysis compares costs with expected returns claimed by the community, thus offering a unique and local perspective through a cost to benefit ratio that expresses how many euros of social value are generate by each euro invested in the VARCITIES VSs.

6.4.5 H&WB Aspect

A ToC framework should be developed to explain how the project's planned interventions will lead to the desired outcomes and long-term impacts. It aims to illustrate the cause-and-effect pathways, supported by evidence and stakeholder involvement, ensuring that every stage aligns with the overarching goals.

- Problem statement & objectives: this clause establishes the foundational rationale for the project by identifying the core challenges and defining specific objectives to address them; the objectives shall directly or indirectly linked to improving citizens' health and well-being (H&WB);

- Inputs: inputs refer to the resources, knowledge, and preliminary research necessary to implement project activities effectively. Examples could include Expertise from multidisciplinary teams, funding and resources, data and findings from existing case studies, community engagement and participatory planning mechanisms;

- Activities: activities outline the specific actions and processes undertaken to address the identified problems and achieve project objectives. Examples could include conducting comprehensive assessments of urban spaces to evaluate their current state through infrastructural changes, implementation of digital systems in urban environments, workshops, focus groups, cultural activities and public consultations, to collect and analyze environmental, social, and health-related data;

- Outputs: outputs represent the tangible and measurable results that directly emerge from the project’s activities. Examples could include improved accessibility and qualities of urban green spaces, policy recommendations for urban planning and sustainable development, increased community awareness and engagement with green space initiatives;

- Outcomes: outcomes capture the intermediate benefits and changes expected to occur because of the outputs and their uptake by stakeholders. Examples could include enhanced physical and mental well-being of citizens through increased use of green spaces, strengthened connections between urban planning and public health sectors, and development of scalable and replicable models for urban green space management;

- Long-term impact: long-term impacts highlight the broader, enduring effects of the project, aiming for systemic change and a lasting contribution to urban and environmental well-being. Examples could include sustainable urban development that prioritizes health, well-being, and environmental resilience, reduced healthcare costs through preventive health measures linked to green space utilization, a legacy of citizen-centric urban spaces fostering inclusivity, equity, and ecological balance.

6.5 VS co-creation process

6.5.1 General

Co-creation can be defined as a collaborative process involving diverse actors to drive sustainable urban development and foster innovative solutions. It is characterized by a 'dialogic engagement' process, defined as a "two-way, relational, give-and-take interaction between organizations and stakeholders/publics with the goal of making decisions that benefit all parties involved."

Key elements of Co-creation include:

- Inclusive stakeholder selection: The selection of stakeholders shall be deliberate and unbiased to ensure the inclusion of all relevant participants, particularly end-users of innovative solutions, alongside expert stakeholders. This approach prevents selection bias and fosters a holistic engagement process (see subclause 6.5.2);

- Effective process design: the co-creation process shall enable meaningful participation, maximizing knowledge exchange among stakeholders. The design and conduct of the engagement should empower participants to contribute fully to the development of innovative solutions. (see subclause 6.5.3);

- Analyzing and reflecting on the experiences with a view to improving on-going and future co-creation processes (see subclause 6.5.4).

6.5.2 Inclusive Stakeholder selection

Stakeholders include individuals and groups impacted by or influencing VSs, such as citizens in pilot areas. A stakeholder mapping exercise is essential to identify and clarify the stakeholder landscape as a foundation for engagement.

To ensure a balanced group of stakeholders, criteria should be developed in different dimensions based on the nature of the VSs and local specifics and needs:

- Topical criteria: for example, health and well-being initiatives should consider actors from mental and physical healthcare, health insurers, patient associations, sports organizations, etc.;

- Demographic criteria: gender, age, and geographical representation should be considered;

- Impact and influence: engage stakeholders who are highly impacted by the solutions but may have limited influence, alongside those with high influence but lower personal impact;

- Disposition: blend critical voices with neutral or positive perspectives to promote inclusivity and address potential conflicts early.

The stakeholder mapping process aims to assemble a diverse group that represents varied backgrounds and identities, considering factors like gender, age, disabilities, socio-economic status, race, ethnicity, immigration status, religion, and sexual orientation.

6.5.3 Design of the co-creation process

The co-creation process follows four stages, from co-identifying needs and challenges to co-evaluating outcomes (see subclause 6.6). Stakeholders identified in subclause 6.5.2 are invited to participate in all stages of the process. Participation can be organized through various pathways, for instance through a mix of workshops, town halls, focus groups and surveys. The process and activities should be meticulously designed, incorporating the expertise of professional facilitators where necessary to ensure effective implementation and outcomes.

Initiatives can be implemented to engage and inform a wider audience, aiming to showcase, demonstrate, and communicate the benefits of VSs. These efforts may include organizing social and cultural events, distributing newsletters, or presenting the VSs at public gatherings and forums.

At the project's outset, a detailed co-creation roadmap should be prepared. This roadmap can be refined and adapted throughout the project to reflect ongoing insights and emerging needs.

6.5.4 Lesson learned

Lessons learned at the conclusion of each co-creation stage provide critical feedback for continuous improvement. These insights refine processes, address challenges, and enhance the overall effectiveness of the co-creation approach, ensuring its long-term success and adaptability.

6.6 VS Sustainability - Business model canvas

A Business Model Canvas (Figure 7) should be developed to outline and refine a potentially viable business model for the proposed deployment. The involved partners collaboratively and iteratively enhance this model throughout the process. This dynamic visual tool captures all critical business components of the project, such as Key Partners, Key Activities, Key Resources, Value Proposition, Customer Relationships, Channels, and Customer Segments, among others.

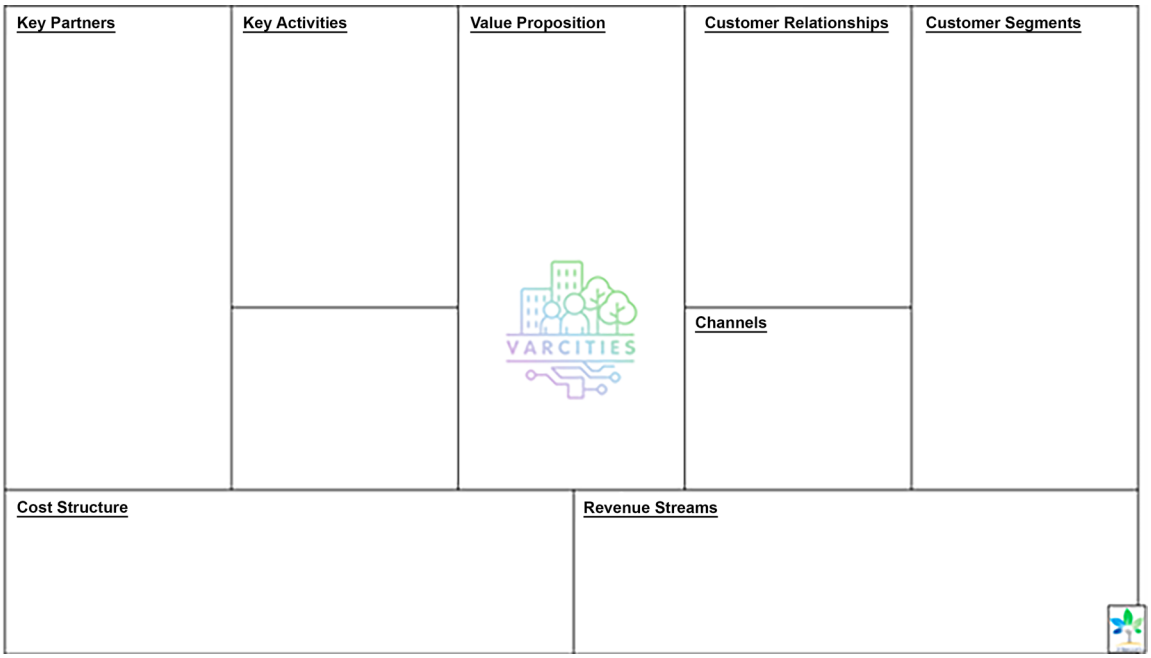

Figure 7 — Example of the business canvas proposition

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