SUM4Re

Creating materials banks
from digital urban mining

D16.4 Progress Report 1

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EXECUTIVE SUMMARY

This Progress Report presents an overview of the activities, progress and achievements of the SUM4Re project during the first reporting period (M01–M18). The document begins with a summary of the project's overall purpose, structure, specific objectives, and main activities, providing context for the assessment of progress against the planned scope and schedule (Section 1). Key performance indicators and their status are reported in detail (Section 1.3), along with the milestones and deliverables achieved to date (Section 2).

Subsequent sections offer a comprehensive account of technical and scientific progress (Section 3) across all work packages and tasks, including updates on pilot implementation, management and governance procedures, and risk management strategies (Section 4). The report also reviews all communication, dissemination, open science and exploitation activities (Section 5), with dedicated tables summarising actions carried out and results achieved during the period. A specific section is devoted to ethics (Section 6), describing the project's engagement with the independent ethics mentor and compliance with ethical requirements for activities involving human participation.

The information included in this report forms the basis for the evaluation of project outcomes and supports the upcoming Periodic Technical Report, to be submitted after M18.

GLOSSARY

Terms, Abbreviations, and Acronyms

AB	Advisory Board
AHS	Active hyperspectral sensor
AI	Artificial Intelligence
AR	Augmented Reality
BIM	Building Information Modelling
C-BIM	Circular-BIM
CDW	Construction and demolition waste
DEC	Dissemination, Exploitation and Communication
DECP	Dissemination, Exploitation and Communication Plan
DMP	Data Management Plan
DMP	Digital Material Passport
DoA	Description of the Action
EC	European Commission
ECT	Eddy Current Technology
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FOS	Fibre optic sensor
GDPR	General Data Protection Regulation
GPR	Ground Penetrating Radar
IFC	Industry Foundation Classes
iMMS	Indoor Mobile Mapping System
IPR	Intellectual Property Rights
KER	Key Exploitable Result
KPI	Key Performance Indicator
MFT	Muon Flux Technology
RGB	Red Green Blue
SSH	Social sciences and humanities
STC	Scientific Technical Committee
SWOT	Strengths, Weaknesses, Opportunities, and Threats
WP	Work Package
XRF	X-ray Fluorescence

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. Project Overview

This section summarises the overall purpose and structure of the SUM4Re project, outlines its main objectives and key activities during the reporting period, and provides a concise view of scope and schedule status. It establishes the context for the progress assessment presented in the following sections, in line with the requirements of Deliverable D16.4 under Task 16.1 on project coordination and management.

1.1. Mission and objectives

The overall mission of SUM4Re is to enable sustainable urban mining and circular renovation through a data-driven and human-centred approach. The project develops and validates a comprehensive framework to identify, analyse and valorise materials and components from existing buildings and infrastructures, promoting Europe's transition towards circular construction and resource efficiency.

The specific objectives of SUM4Re are as follows:

- O1: To develop a traceability system for tracking throughout their entire lifecycle building materials and asset's components considering interoperability within and beyond SUM4Re.
- O2: To develop a holistic methodological framework to 1) assess the actual potential to make circular use of construction products 2) to identify solutions that overcome the barriers for their circularity.
- O3: To develop on-site and off-site smart digital solutions to rapidly identify construction entities (including complex or concealed elements) with the additional ability to analyse their properties and characteristics.
- O4: To develop a cost-effective methodology for data acquisition and sharing aligned with open standards and technical frameworks for smart data in circular construction.
- O5: To facilitate the circular use of construction components by preserving the maximum value of the built environment considering relevant agents and processes in the value chain.
- O6: To work out a strategy for skill development using user-friendly tools&SSH and business model aspects.
- O7: To demonstrate SUM4Re in a real construction case that focuses on the structural potential for reuse of asphalt, reinforced concrete (steel & concrete) and automated CDW characterization schemes.
- O8: To demonstrate SUM4Re solutions in the transformation of an industrial district into a sustainable mixed-used district opting for refunctioning or transformation of industrial buildings.
- O9: To demonstrate the application of SUM4Re in a circular construction project that involves the disassembly, relocation and expansion of several timber buildings anchored in unstable permafrost.

Progress against the Key Performance Indicators (KPIs) linked to each objective is reported in Section 1.3.

1.2. Scope and schedule at a glance

The overall scope of SUM4Re during the first reporting period (M1–M18) covered project setup, technical specification, and pilot preparation across the three demonstration sites. Activities focused on establishing the methodological framework, defining requirements for the digital tools and traceability system, and coordinating ethical and management procedures.

The implementation schedule remained fully aligned with the Description of the Action. All **deliverables** planned for this period were submitted on time to the Funding & Tenders Portal

and all **milestones** were achieved, as detailed in Table 2 and Table 3. No significant delays or deviations from the baseline schedule were reported.

The Spanish pilot was updated to two complementary sites in Donostia-San Sebastián: Anoeta Metro Station (demolition phase) and Jolastokieta Urbanisation (reuse and material recovery). This change on pilot sites did not affect any partner roles, budget allocation, or expected results. The Dutch and Norwegian pilots proceeded according to plan, completing their activities as scheduled.

Project coordination under Task 16.1 ensured continuous monitoring of progress, quality, and ethics, supported by regular meetings, reporting tools, and effective communication channels across partners.

1.3. Objectives and KPIs

The SUM4Re project pursues nine specific objectives as defined in Section 1.1 of the Description of the Action and in this present document (Section 1.1). Table 1 below lists each objective together with its associated Key Performance Indicators (KPIs) and a summary of progress achieved during the first reporting period (M01–M18). This information has been extracted from the first Periodic Technical Report.

Table 1. SUM4Re: Objectives and achievement

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
O1. To develop a traceability system for tracking throughout their entire lifecycle building materials and asset's components considering interoperability within and beyond SUM4Re.	**KPI1:** SUM4Re will integrate in 1 interface following an open C-BIM standard (central point for managing, tracking, processing & handling) at least 5 different materials (asphalt, structural steel, reinforced concrete, timber, and concrete), aligned with EEA's benchmark of current standards, maximizing traceability in the lifecycle and interoperability to make the process for secondary material uses more efficient, transparent, and accessible, as several authors[1] consider that the BIM standard (even those not dedicated to circularity) will contribute to waste management.	• The C-BIM interface design has been completed (D6.1), integrating the data requirements for Asphalt, Structural Steel, Reinforced Concrete, Timber, and Concrete. The system uses a federated architecture where a central UUID links IFC objects to external material databases (CIRDAX, CONCULAR), ensuring traceability without overloading the BIM model.	*Completed (Design Phase)* *Ongoing (Implementation)*
	KPI2: SUM4Re will address the most relevant construction entities, at least 3 different typologies of buildings (residential, tertiary & industrial) and 1 typology of infrastructure assets (asphalts).	• KPI2 supports O1 by ensuring that the SUM4Re traceability system is tested across at least three representative building typologies: residential, tertiary, and industrial. Each case study reflects one of these categories, enabling validation of the framework under diverse construction contexts. • After the amendment redefining the Spanish pilot assets, the three typologies remain covered, and data collection has been completed in all sites, confirming KPI2 as achieved.	*Completed*
O2. To develop a holistic methodological framework to 1) assess the actual potential to make circular use of construction products and 2) identify solutions that overcome the barriers for their circularity.	**KPI3:** SUM4Re will deeply analyse uses for deconstructed materials/products from different perspectives: technological, economic, legal/regulatory, information matching the Waste Framework Directive and the Construction Products Regulation.	• Legal/regulatory perspective: the requirements of the legal framework for secondary materials, components and products to retain or to obtain the product status have been analysed. • Standardization & data interoperability: Analysis of circularity and product standards, data structure and interoperability.	*Completed (Addressed by deliverables from WP1)*

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[1] Schamne, A. N., Nagalli, A., Soeiro, A. A. V., & Martins, J. P. D. S. P. (2024). BIM in construction waste management: A conceptual model based on the industry foundation classes standard. Automation in Construction, 159, 105283.

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
		· Market strategies & economic assessment: Analysis of circular demolition handbook, transaction costs and value creation DPP & DBL. · Interfaces between DMP and existing databases: Analysis of existing data platforms in SUM4Re, Proof-of-concept of interoperability solutions. · Connectivity with auxiliary data: Analysis of existing data & legacy systems, calculation tool integration, legal & economic aspects.	
	KPI4: The requirements for the extension of at least 2 existing digital materials databases (CIRDAX and CONCULAR) will be set.	· Requirements for extending the databases were defined in D6.1 and D7.1 preparations. · For CONCULAR, the focus is on integrating the Circularity Performance Index (CPX) and Circular LCA modules via API. · For CIRDAX, the data structure for the Material Recovery Potential Index has been aligned with the C-BIM schema to allow seamless data exchange.	*Completed*

	KPI5: SUM4Re will be demonstrated through 3 case studies addressing 5Re of circularity: O7 (Reuse & Recycle), O8 (Reduce & Renovate) and O9 (Reuse & Repair), including service life extension and material banks creation[2,3].	· The5R will be applied in each material depending on the possibility of application in each case study. The initial idea is applied:
		  · Reuse and recycle asphalt, concrete and steel in Spain y Netherlands
		  · Reduce and renovate Concrete and Timber in Netherlands
		  · Reuse and Repair Timber in Norway
			Pending

	KPI6: The analysis focuses on reviewing the EU legal framework on waste/products legislations that determine how secondary materials must be categorised and treated with a consensus on the waste/non-waste categorisation of the existing	· Work under T1.2 (WP1) delivered a comprehensive analysis of the EU and national regulatory frameworks governing secondary materials, including the legal conditions for waste and non-waste status and the barriers affecting circular use.	*Completed*

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[2] Peck, D. (2024). Buildings. In Handbook of Recycling (pp. 235-247). Elsevier

[3] Jain, N. (2022). Cities as material banks for the future: closing the material resource loop.

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
	materials in 3 countries, and legal status information in material databases.	The study combined literature reviews, stakeholder interviews and a survey to map key policies, identify legislative bottlenecks and document local best practices in Norway, the Netherlands and Spain. · The task also assessed how legal requirements are reflected in material databases such as CIRDAX and CONCULAR and developed policy recommendations to address identified gaps. · These activities fulfil the requirements of KPI6 for this reporting period and provide the methodological basis for the circularity framework defined in Objective 2.	
O3. To develop on-site and off-site smart digital solutions to rapidly identify construction entities (including complex or concealed elements) with the ability to analyse their properties and characteristics.	**KPI7:** SUM4Re will combine various techniques for characterization before physical intervention: visible (AR-iMMS-RGB) with time reduction of 50% for 3D models generation and materials identification compared to traditional Terrestrial Laser Scanner scanning techniques considering the time spent on acquisition and registration of each scan position; hidden components and geometric modelling (MFT), harmful materials and chemical-mineral composition (XRF), reinforced concrete structural-mechanical identification (GPR & ECT), and timber pathologies detection (AHS) with an increase of productivity of 90% (real time vs. sample collection and laboratory analysis).	· AR-iMMS, AHS, XRF, MFT, GPR-ECT, were tested in data collection (WP2) but not processing (WP3) · Times or productivity for whole process were not estimated yet. Out of scope M18.	*Ongoing*
	KPI8: The reuse of large structural components will be assessed through the structural condition index (FOS in combination with transfer learning) to detect structural alterations, reducing time for assessing mechanical behaviour by over 60%, when involving repetitive structural patterns.	· FOS sensors were applied to beams for static and dynamic testing. Combined with FEM calibration and transfer learning, a preliminary indication shows that a reduction of the time required for condition assessment by more than 60% can be demonstrated in SUM4Re use cases. This statement will be proven in the next related tasks T11.1 – T12.1, demonstrating efficiency gains in evaluating large structural elements.	*Ongoing*

SUM4Re

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
	KPI9: One plugin to extend GENIA platform for data acquisition & integration of all the techniques included and for the assessment of structural components in accordance with their recyclability potential.	• Out of scope M18. • GENIA plugin will contribute to centralized access to the information extracted from the assessment of structural components and it will add extra information about the recyclability potential in each element.	*Pending*
	KPI10: For heterogeneous CDW composed by multiple mineral fractions, all-in-one TRACLINE will characterize material composition and mineral stream. It is composed by LIBS, Raman, RGB-D, NIR, UV. AI will be used to process (identify, quantify and classify) construction materials and assets for a C-BIM. CDW quality control process and/recycled materials with capacity to process 1-3 t/h (according to belt feed rate and sensor data capture time specifications) will be developed and tested in a real case study.	• A reproducible method of sample preparation was established, guaranteeing homogeneity and representativeness in all particle size fractions under dry and wet conditions. • An integrated multi-sensory platform (Raman, LIBS, NIR, UV-Vis, HSI, RGB) capable of acquiring multimodal data in a consistent and comparable manner was calibrated and validated. • Sensor-specific processing pipelines were developed, transforming raw signals into clean, structured data ready for advanced analysis. • Strong preliminary results were obtained, showing the complementarity between sensors and the great potential of HSI to sort materials, laying the foundation for predictive models in real-time smart recycling. • New processing pipes are being developed for tasks 5.2. (Computer based solutions for waste reduction.	*Ongoing*
O4. To develop a cost-effective methodology for data acquisition and sharing aligned with open standards and technical frameworks for smart data in circular construction.	**KPI11:** Integration of 3 national construction material databases (NCMD) on 2 existing data platforms aligned to EU frameworks for data sharing. The data will be prepared for further analysis on the 'Material Recovery Potential Index' and the EU R-ladder for circular economy.	• Interoperability pilots have been conceptually designed (D6.1). The architecture connects GENIA (acquisition data), CIRDAX (inventory/materials), and CONCULAR (circularity assessment/market). Mapping of national databases (e.g., NMD in Netherlands, Madaster) was analysed in T1.5 to ensure the data structure is compatible with EU frameworks like the Digital Building Logbook.	*Ongoing*
O5. To facilitate the circular use of construction components by preserving the maximum value of the built	**KPI12:** Implementation LCA and quality improvements of secondary materials considering economic, environmental, and social viability. Increase of 3% in the use of	• Achievements M01-M18: Initial Circular LCA calculations were performed for the pilot sites (D4.1). Priority components identified for quality improvement and reuse include Sanitary fixtures, Doors, Windows, and Technical Equipment (PV	*Ongoing*

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
environment considering relevant agents and processes in the value chain.	secondary materials to be reused at a high quality[4], at least 5% in pilot demonstrators.	panels). For mineral streams (concrete), the focus is on high-quality recycling to reduce embodied carbon.	
	KPI13: To follow different go-to-the-market strategies to optimize the added value of secondary materials. It will increase the supply of 10% the circular material flows, at least 25% in pilot demonstrators; reducing CDW of 10%, at least 25% in pilot demonstrators[5].	· The go-to-market strategies are defined in the economic assessment in T6.2 and is based on an added value approach, including enhanced labour productivity analysis. According to this approach everything is circular which prevents the production of new materials. In such cases the added value of secondary materials is equal to the value that is saved by not producing new materials. · The exact impact in % is still pending, because these results come forward from all the pilots.	*Ongoing*
O6. To work out a strategy for skill development using user-friendly tools, SSH and business model aspects.	**KPI14:** To carry out min. 2 rounds of interviews (at least 10 contacts per participant country/round) focused on, i) social acceptance of SUM4Re approach; ii) current know-how in sustainable reuses & CDW management.	· Across WP8 and WP1, a wide range of stakeholders were already engaged through surveys and interviews, covering sector practices, technology acceptance, social perceptions, and local circularity policies. In total, more than 350–400 contacts were reached through two major surveys (WP8), complemented by 16 qualitative interviews and an 30 respondents via targeted surveys under Task 1.2. These activities directly support KPI14 by gathering evidence on social acceptance, current know-how, and barriers to circularity. · Additional rounds of interviews may be conducted in the next reporting period.	*Ongoing*
	KPI15: To transfer the outcomes to representatives of the Commission. At least 10 member states policy actors will be personally contacted for dissemination and feedback.	· NEXT STEPS: Invitations to the Brussels workshop (Dec 2025); Targeted invitations to the final project event; Involvement of local and regional authorities (e.g. municipalities, regional administrations); Producing a policy dissemination brief	*Ongoing*

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[4] https://www.rivm.nl/bibliotheek/rapporten/2016-0024.pdf

[5] https://vb.nweurope.eu/projects/project-search/digital-deconstruction/

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
	KPI16: At least, 2 face-to-face & virtual training sessions (sector companies) organized in each participant country (targeted, 50 persons/country).	· Initial progress towards KPI16 has been made under Task 9.1, with two in person training sessions already delivered: The Hague (69 participants) and Oslo (61 participants). These sessions introduced SUM4Re technologies and supported early skills development in circular construction. · Additional training sessions and online workshops are planned for the next reporting period to meet the KPI target in all participating countries.	*Ongoing*
	KPI17: To produce training materials or programmes on 2 different axes (construction materials used in EU regions; smart digital solutions & platforms-construction databases) based on AR/VR for human interaction training and skills development in the construction sector.	· KPI17 contributes to O6 by supporting skill development through practical and accessible training resources. Two recorded demonstration sessions are planned, one on material tagging using the remote assistance app and another on AR and VR digital solutions. · Their production and dissemination are scheduled for the next period.	*Pending*
O7. To demonstrate SUM4Re in a real construction case that focuses on the structural potential for reuse of asphalt, reinforced concrete (steel & concrete) and automated CDW characterisation schemes. **O8. To demonstrate SUM4Re solutions in the transformation of an industrial district into a sustainable mixed-use district opting for refunctioning or transformation of industrial buildings.** **O9. To demonstrate the application of SUM4Re in a circular construction project that involves the disassembly, relocation**	**KPI18:** Reduction of 10% of time needed for circular assessment of the construction project (SUM4Re's solutions vs manual approach)[6].	**Case Study 1 (San Sebastián, Spain):** · Data collection and baseline assessment were completed at both pilot sites using AR iMMS RGB, XRF, GPR ECT, FOS and TRACLINE, enriching the information obtained through manual inspections and supporting the circular assessment process. · The combined datasets provide more detailed and reliable geometric, material and structural information, adding clear value to the pre demolition and reuse analysis. · Although KPI18 cannot yet be quantified, the work completed in M01 to M18 establishes the technical basis for measuring time reduction against manual approaches once the next steps of the use case are carried out.	*Ongoing*

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[6] https://urbact.eu/

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
and expansion of several timber buildings anchored in unstable permafrost.		**Case Study 2 (The Hague, the Netherlands):** · A full baseline assessment was performed for the donor and target buildings in the Binckhorst district, covering definition of the pilot context, strategic planning and execution of scanning activities: AR iMMS RGB, AHS and MFT were deployed to capture geometric, material and hidden component information, complemented by an initial materials inventory and registration in CIRDAX and CONCULAR. · This preparatory work supports the demonstration of SUM4Re solutions for industrial district transformation as foreseen in O8. · While preliminary indications suggest potential improvements in labour productivity, detailed analysis and time based benchmarking required for KPI18 will be carried out in the next phase.	*Ongoing*
		Case Study 3 (Longyearbyen - Svalbard, Norway): · A strategic baseline assessment was completed for the Svalbard building, including AR iMMS RGB, AHS and GPR scanning campaigns, supplemented by a manual materials inventory and a contextual review of legal, functional and environmental conditions relevant for material reuse. · The combined dataset provides detailed information on timber condition, structural layers and subsurface conditions, supporting the objectives of O9 linked to reuse in Arctic permafrost environments. · Although labour input has been recorded to enable later benchmarking, KPI18 cannot yet be evaluated, as time reduction will only be measurable once SUM4Re workflows are applied in WP11 and WP12.	*Ongoing*

Objective (from DoA)	KPI(s)	Achievements M01–M18	Progress status
	KPI19: Increased supply of secondary materials in pilots in 25% and reduction in construction CDW in 25% (SUM4Re's solutions vs manual)[7].	• Out of scope M18.	*Pending*

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[7] https://urbact.eu/sites/default/files/2023-04/the_hague_iap_final.pdf

2. Milestones and deliverables

During the first reporting period (M01–M18), SUM4Re progressed in line with the DoA. The consortium ensured timely submission of the deliverables foreseen in this period and reached the planned milestones.

Table 2 below provides an overview of the deliverables scheduled in M01–M18, indicating their status and compliance with planned deadlines.

Table 2. Completed deliverables

Deliverable data					SyGMA	
ID	**Name**	**Type**	**Dissem. level**	**Leader**	**Due date**	**Status**
D1.1	Guidelines for materials	Report	PU	SINTEF	M11 30/04/2025	*Submitted*
D1.2	Report on regulatory framework	Report	PU	VTT	M11 30/04/2025	*Submitted*
D1.3	Workshop Agreement on standardisation and interoperability	Report	PU	VTT	M12 31/05/2025	*Submitted*
D1.4	Materials reuse strategy	Report	PU	BLOCKM	M15 31/08/2025	*Submitted*
D1.5	Schematic architecture of data workflows	OTHER	PU	THUAS	M16 30/09/2025	*Submitted*
D1.6	Integration scheme	OTHER	PU	THUAS	M17 31/10/2025	*Submitted*
D2.1	iMMS and RGB data acquisition AR system	Report	PU	UVIGO	M17 31/10/2025	*Submitted*
D2.2	AHS methodological framework acquisition	Report	PU	VTT	M17 31/10/2025	*Submitted*
D2.3	XRF methodological framework acquisition	Report	PU	OLAR	M17 31/10/2025	*Submitted*
D2.4	MFT methodological framework acquisition	Report	PU	GSCAN	M17 31/10/2025	*Submitted*
D2.5	Framework GPR-ECT methodological acquisition	Report	PU	EAGLE	M17 31/10/2025	*Submitted*
D2.6	FOS methodological framework acquisition	Report	PU	TECN	M17 31/10/2025	*Submitted*
D4.1	Urban mining concept	Report	PU	CONC	M16 30/09/2025	*Submitted*
D4.2	Report on multisensory functional algorithms	Report	SEN	TECN	M16 30/09/2025	*Submitted*
D6.1	C-BIM design	OTHER	PU	CONC	M17 31/10/2025	*Submitted*
D6.2	Economic analysis	Report	PU	BLOCKM	M17 31/10/2025	*Submitted*

D6.3	Social-Environmental analysis	Report	PU	BLOCKM	M17 31/10/2025	*Submitted*
D8.1	Report of scientific challenges	Report	PU	SINTEF	M12 31/05/2025	*Submitted*
D8.2	Market analysis report	Report	PU	RAFER	M16 30/09/2025	*Submitted*
D8.3	Report with policy recommendations	Report	PU	RAFER	M17 31/10/2025	*Submitted*
D10.1	Strategic planning and data collection report part 1	Report	PU	TECN	M17 31/10/2025	*Submitted*
D10.2	Strategic planning and data collection report part 2	Report	PU	THUAS	M17 31/10/2025	*Submitted*
D10.3	Strategic planning and data collection report part 3	Report	PU	SINTEF	M17 31/10/2025	*Submitted*
D13.1	Dissemination, Exploitation and Communication Plan (DECP)	Report	PU	R2M	M6 30/11/2024	*Submitted*
D13.2	Report 1 on achieved DEC activities and performance	Report	PU	R2M	M18 30/11/2025	*Submitted*
D13.3	Exploitation Plan (version 1)	Report	SEN	R2M	M18 30/11/2025	*Submitted*
D13.4	Web site & social media accounts	DEC	PU	R2M	M3 31/08/2024	*Submitted*
D16.1	Project Management Plan	Report	SEN	UVIGO	M3 31/08/2024	*Submitted*
D16.2	Data Management Plan (version 1)	DMP	PU	UVIGO	M6 30/11/2024	*Submitted*
D16.3	Quality Assurance Plan	Report	SEN	UVIGO	M3 31/08/2024	*Submitted*
D16.4	Progress Report 1	Report	PU	UVIGO	M18 30/11/2025	*Submitted*

Table 3 summarises the milestones foreseen in the same period, together with their achievement status and alignment with the overall project timeline.

Table 3. Overview of project milestones and their status

| Milestone data | | | | | SyGMA | |
ID	Name	WP	Leader	Means	Due date	Status
1	Identification of requisites for target materials- existing regulation	WP1	THUAS	Existing regulations applicable to the materials under study (D1.1-D1.2) completed	M11 30/04/2025	*Completed*
2	AI models for material detection in the field	WP2	UVIGO	Algorithms and laboratory results (D2.1-D2.6) completed	M17 31/10/2025	*Completed*
3	Demonstrator materials processed	WP3	TECN	Materials identified with AI in demonstrators (D3.1-D3.6) completed	M32 31/01/2027	*Pending*

4	Urban mining concept developed for TRACLINE	WP4	TECN	Urban mining concept (D4.1) and TRACLINE installation (D4.2) completed	M17 31/10/2025	*Completed*
5	Digital Material Passports defined for demonstrators	WP5	VTT	Specifications on DMP will be completed in D5.1	M34 31/03/2027	*Pending*
6	C-BIM designed and implemented	WP6	BLOCKM	C-BIM specifications completed (D6.1)	M17 31/10/2025	*Completed*
7	C-BIM connected to databases	WP7	CONC	Connection diagram to CIRDAX, GENIA & Concular Platform completed (D7.1)	M32 31/01/2027	*Pending*
8	Barriers identified in sustainable material supply & CDW recycling	WP8	SINTEF	State of the art in sustainable material supply & CDW recycling (D8.1)	M12 31/05/2025	*Pending*
9	Worker training conducted	WP9	RAFER	Trainings and workshops completed (D9.1-D 9.2)	M35 30/04/2027	*Pending*
10	Data collected before demolition	WP10	BLOCKM	Acquisition planning and data collection of iMMS, AHS, XRF, MFT, GPR-ECT, FOS (D10.1, D10.2 & D10.3) submitted	M17 31/10/2025	*Completed*
11	Demolition in progress with collected data processed, integrated and/or evaluated	WP11	BLOCKM	Acquisition planning and data collection of iMMS, AHS, XRF, MFT, GPR-ECT, FOS (D10.1-D10.3) submitted, D11.1-D11.3 completed	M35 30/04/2027	*Pending*
12	Evaluation of demonstrator results	WP12	BLOCKM	D12.1 to D12.3 completed	M41 31/10/2027	*Pending*
13	Web, logos, templates, and social media	WP13	R2M	D13.4 provided by R2M	M3 31/08/2024	*Completed*
14	Description of tasks, dependencies, and responsibilities	WP16	UVIGO	Gantt chart and additional information (D16.2)	M6 30/11/2024	*Completed*
15	Final reporting and evaluation of the project and its impacts	WP18	UVIGO	Finalisation of the demonstration, training, and evaluation activities	M42 30/11/2027	*Pending*

The project remains on track towards its objectives, with no major deviations activated during the reporting period apart from the aforementioned amendment.

3. Overview of the progress and activities

This section summarises the progress made in the project from M01 up to M18. Table 4 presents the main achievements for each task, providing a clear overview of what has been accomplished during this reporting period.

Project activities are progressing as planned and there are no major issues that would put the implementation at risk.

Table 4. Main achievements per task (M01–M18)

WA1 - Pre-requisites for smart data acquisition and interoperability in circular construction				
WP1 – Prerequisites for smart data acquisition and interoperability				
Task	**Title**	**Leader**	**Duration**	**Achievements (M01-M18)**
T1.1	Identification of material-products & sustainability	SINTEF	M01-M11 (Finished)	The task established a classification system for reusable components, completed a literature review on circularity and material reuse, and defined key attributes for Digital Material Passport, Product Passport and Building Logbook. These results provide a foundation for subsequent work on data capture and C-BIM developments.
T1.2	Regulatory framework	VTT	M01-M11 (Finished)	The task identified regulatory requirements, best practices and legislative pathways for the uptake of recovered and reusable construction materials, with a focus on lessons learned from national and local cases. Surveys and interviews in the Netherlands, Spain and Norway mapped local policies and stakeholder perspectives, supporting the formulation of policy recommendations for use in later project activities.
T1.3	Standardization & data interoperability	VTT	M02-M12 (Finished)	The task mapped relevant standards and data models for circular products and open BIM, developing working definitions for Digital Material Passport, Product Passport, and Building Logbook. An ecosystem of standards and information flows was established, and alignment with related tasks ensured consistent interoperability requirements for data exchange and classification.
T1.4	Market strategies & economic assessment	BLOCKM	M04-M15 (Finished)	The task developed and analysed market strategies and economic aspects of circular construction, focusing on value creation, cost-benefit, and labour productivity related to digital tools. Key outputs include the internal C-BIM questionnaire, ongoing C-BIM workshops, and successive versions of the Circular Deconstruction Handbook, with results synthesised in a dedicated findings document.

T1.5	Interfaces between Digital Material Passports and existing databases	THUAS	M05-M16 (Finished)	The task designed a preliminary integration framework to ensure interoperability between Digital Material Passports and SUM4Re's core data platforms (GENIA, CIRDAX, and CONCULAR). Workshops, platform analyses, and a proof of concept for cross-platform data exchange were completed, with user testing underway and ongoing alignment with consortium partners for long-term federated data sharing.
T1.6	Connectivity with auxiliary data	THUAS	M06-M17 (Finished)	The task completed the integration of auxiliary data into SUM4Re's platforms, improving connectivity with legacy systems and external tools. Auxiliary data for the Dutch and Norwegian pilots were incorporated in CIRDAX, and an inventory was completed for each pilot to address specific information needs, with partner collaboration guiding the final integration approach.

WA2 - Techniques & technologies for identification, analysis, digitalization

WP2 – Pre-demolition data collection analysis and constraining requirements

Task	Title	Leader	Duration	Achievements (M01-M18)
T2.1	Rapid 3D data collection for materials and construction products with RGB-iMMS & AR	UVIGO	M03-M17 (Finished)	The task tested and enhanced the use of Microsoft HoloLens 2 for rapid 3D data collection in diverse pilot settings. Scans were completed in all case studies, with upgrades to marker tagging, point cloud export, and colourization. Initial AI algorithms for point cloud segmentation and material classification were trialled, though device limitations led to exploring a client-server approach for real-time processing (WP3).
T2.2	Data collection for identification of materials & construction products with AHS	VTT	M03-M17 (Finished)	The task established a database of hyperspectral images of materials relevant to the pilot tests, focusing on wood samples from Svalbard and painted samples from Finland. Improvements to the sensor increased measurement quality, and analysis of the collected data enabled identification of material types and moisture effects. Pilot tests in Svalbard and The Hague confirmed the approach's potential for material classification and monitoring under different conditions.
T2.3	Data collection for identification of materials & construction products with XRF	OLAR	M03-M17 (Finished)	The task established a library of construction material samples (mainly concrete and asphalt) from project pilot sites, with elemental composition analysed both on site and in the laboratory. The team compared different analytical techniques and sample preparation methods, enabling a detailed characterisation of key materials and supporting further evaluation of material quality and potential

Task	Title	Leader	Duration	Achievements
				environmental impacts across the pilots.
T2.4	Data collection for complex or concealed elements with MFT	GSCAN	M03-M17 (Finished)	The task demonstrated the use of muon flux technology for data collection in hard-to-access or concealed elements, including its application in the pilot at The Hague. The team completed measurement campaigns and simulation studies on various materials, improved hardware and object detection algorithms, and validated results through real and simulated tests.
T2.5	Data collection for complex or concealed elements with GPR-ECT	EAGLE	M03-M17 (Finished)	The task used high-resolution GPR and ECT technologies to characterise materials and detect concealed elements in both Nordic and Spanish pilot sites. Scans enabled identification of internal structures, moisture, reinforcement, and hidden defects in walls and floors, supporting a detailed understanding of material composition and building condition across varying scenarios.
T2.6	Structural health monitoring system with FOS	TECN	M03-M17 (Finished)	The task established and implemented a fibre optic sensor system for structural health monitoring on steel beams in the Jolastokieta pilot. Activities included sensor installation, risk-based assessment, and calibration of a finite element model using experimental data. An AI-based approach for damage detection was initiated, using both simulated and real sensor data to identify anomalies and improve structural safety monitoring (WP3).

WP3 – AI algorithm development for C-BIM automation

Task	Title	Leader	Duration	Achievements (M01-M18)
T3.1	Automated AI geometric modelling from 3D data	UVIGO	M15-M32	Random Forest implemented to process 3D data capture in real time from HoLoLens 2 and Spatial LM implemented to process high quality data from HMLS reference.
T3.2	Material properties prediction with AHS	VTT	M15-M32	Laboratory models are being adapted to AHS data from the Svalbard pilot. Initial results show the approach can identify moisture levels and relevant wood properties on site.
T3.3	Material properties prediction with XRF	OLAR	M15-M32	The algorithm of the is in the early steps of development. The complete achievement is expected at the end of the M32.
T3.4	Complex or concealed elements identification with MFT	GSCAN	M15-M32	No specific SUM4Re activities were carried out in this period. GScan focused on internal development of advanced reconstruction and object detection methods that will later support SUM4Re data processing.
T3.5	Complex or concealed elements identification with GPR-ECT	EAGLE	M15-M32	For this task, the software development for the GPR+ECT device along with the AI-based

Task	Title	Leader	Duration	Achievements (M01-M18)
				interpretation tools are in progress and will be completed at the end of M32.
T3.6	FOS-Based Long-Term Monitoring for Structural Retrofitting	TECN	M15-M32	The transfer learning algorithm is in the first steps of development. The process up to M18 is the launch of a pool of FEM simulations using the inverse calibrated model in T2.6, in order to train the proposed transfer learning model.
T3.7	Data upload to GENIA for C-BIM structural model generation	TECN	M23-M34	Not started yet.

WA3 - Reduction in construction and demolition waste

WP4 – Sustainable Demolition, Renovation, and Waste Management

Task	Title	Leader	Duration	Achievements (M01-M18)
T4.1	Pre-Demolition audit & renovation plans	CONC	M05-M16 (Finished)	The task advanced through the collection and exchange of general information and material inventories for each case study, initial estimation of circularity potential, and alignment of data formats with partners. Ongoing efforts focused on verifying data compatibility and identifying gaps, setting the stage for developing urban mining concepts and refining the assessment of reusability and deconstruction possibilities.
T4.2	Quality control of on-site CDWs using a multisensory system	TECN	M05-M16 (Finished)	The task developed and calibrated a multisensor system for on-site quality control of construction and demolition waste, preparing and analysing a wide range of controlled and real material samples. The work included optimisation of sensor setup, detailed sample classification, and creation of a comprehensive dataset for material characterisation, laying the groundwork for automated sorting models in smart recycling applications.

WP5 – Digital Solutions for Sustainable Waste Reduction

Task	Title	Leader	Duration	Achievements (M01-M18)
T5.1	Comprehensive Digital Material Passports (DMP) Development	VTT	M15-M34	The task started by reviewing data from WP4 and data frameworks from WP1 and WP6. An initial Digital Material Passport data structure was developed using IFC 4X3 ADD2 and pilot data provided by Concular from Norway and the Netherlands.
T5.2	Computer based solutions for waste reduction	TECN	M15-M34	All the algorithms developed in section 4.2 are being adapted to work live with the new material samples to be received from MOYUA. The measurements made with the multi-sensor system serve as a reference for training predictive models with the new measurements.

WA4 - Increased supply of secondary materials & improved facility to reuse/repair construction products

WP6 – Evaluation and Integration of Circular Economy Principles in C-BIM Strategy

Task	Title	Leader	Duration	Achievements (M01-M18)

Task	Title	Leader	Duration	Achievements (M01-M18)
T6.1	C-BIM design and implementation of DMP	CONC	M06-M17 (Finished)	The task completed the design of the C-BIM environment and Digital Material Passports, based on a state-of-the-art review, partner questionnaires, and technical harmonisation. Prototypes and a central integration system were developed to ensure interoperability between platforms, establishing the data structure for future implementation.
T6.2	Economic Analysis of Elements of Circular Economy and assessment of Secondary Materials	BLOCKM	M08-M17 (Finished)	The task completed an economic analysis of circular construction elements and secondary materials, drawing on cost-benefit research, labour productivity studies, and partner input through targeted questionnaires. Findings were synthesised into an updated Handbook for Circular Deconstruction, supporting project-wide assessment of productive use of technologies and methods.
T6.3	Sustainability Analysis of Elements of Circular Economy	BLOCKM	M08-M17 (Finished)	The task completed a sustainability analysis of circular economy elements, focusing on expanding CIRDAX with data access, CO_2 calculation tools, and project management features. Insights were incorporated into the updated Handbook for Circular Deconstruction and into the KPI analysis included within D6.3.

WP7 – Integrated Digital Solutions for C-BIM Connectivity and Database Management				
Task	**Title**	**Leader**	**Duration**	**Achievements (M01-M18)**
T7.1	Technological solutions for connections with C-BIM	CONC	M17-M32	Building on the C-BIM architecture from D6.1, work has focused on mapping DMP attributes to IFC standards with WP5 and drafting the API structure to connect BIM models with external databases.
T7.2	Improvement of the Digital Materials Database CIRDAX	BLOCKM	M19-M35	Not started yet.
T7.3	Improvement of GENIA Platform to register-assess additional information	TECN	M19-M35	Not started yet.
T7.4	Improvement of CONCULAR Platform	CONC	M19-M35	Not started yet.

WA5 - Improvements to labour productivity				

WP8 – Strategies for a sustainable material supply & CDW Management with Stakeholder Engagement				
Task	**Title**	**Leader**	**Duration**	**Achievements (M01-M18)**
T8.1	Insights for Enhancing Labour Productivity in the increased supply/use of secondary materials and upcycling of CDW	SINTEF	M01-M12 (Finished)	The task completed a systematic literature review, research projects analysis, and stakeholder interviews across the three pilot sites to identify barriers, enablers, and business models for increasing labour productivity and CDW upcycling. Results informed practical recommendations at policy, project, and operational levels.

Task	Title	Leader	Duration	Achievements (M01-M18)
T8.2	Technology Acceptance Study for Circular Economy Project	RAFER	M02-M16 (Finished)	The task completed a technology acceptance study through surveys, market analysis, and a SWOT analysis, engaging stakeholders from several countries. Results provided insights on adoption drivers and barriers for SUM4Re technologies, informing strategies to increase uptake of secondary materials and CDW upcycling.
T8.3	Sustainable material supply & CDW management Perception and Policy Assessment	REFER	M03-M17 (Finished)	The task completed a social perception study and policy assessment through surveys and stakeholder engagement, identifying attitudes, misconceptions, and concerns around sustainable material supply and CDW management. Insights were used to draft targeted policy recommendations and guidelines to enhance the social and economic impact of circularity in construction.

WP9 – Sustainable material supply & CDW Upcycling Initiative with Best Practices, Training, Collaboration, and Social Awareness

Task	Title	Leader	Duration	Achievements (M01-M18)
T9.1	Training and Collaboration activities	RAFER	M16-M34	The task delivered two successful training sessions, one in The Hague and one in Oslo, where project technologies were demonstrated to stakeholders through interactive seminars and live demos. Preparations are underway for a workshop in Brussels in December to promote collaboration with other EU projects and advance circularity in construction. Recordings and materials were prepared for wider dissemination.
T9.2	Promoting Social Awareness of sustainable material supply & CDW Upcycling	RAFER	M17-M35	The task aim is to highlight the significance and positive environmental impact of the supply/use of secondary materials and CDW upcycling through a social awareness campaign divided in 3 different phases: awareness, education and engagement. Consortium members were contacted to help with the awareness phase.
T9.3	Lessons Learned Synthesis and Impact Analysis	SINTEF	M25-M41	Not started yet.

WA6 - Demonstrators in existing built works

WP10 – Baseline Assessment and Strategic Planning for Pilot Implementation and Testing

Task	Title	Leader	Duration	Achievements (M01-M18)
T10.1	Case study 1	TECN	M03-M17 (Finished)	The task adapted to a change in pilot site by shifting activities to Anoeta Metro Station and Jolastokieta urbanisation. All planned fieldwork was completed, including high-resolution laser scanning, FOS-based structural testing, non-destructive surveys with GPR-ECT, and material sampling for laboratory analysis. These efforts provided the

				technical foundation for integration and demonstration in the Basque Country pilot.
T10.2	Case study 2	THUAS	M03-M17 (Finished)	The task completed the Dutch pilot in The Hague, where two buildings were assessed using a combination of manual inventories and advanced scanning technologies, including iMMS RGB, AHS, and MFT. Material locations and conditions were documented, data were integrated into CIRDAX, and the process was coordinated with local stakeholders, laying the groundwork for further analysis and comparison with traditional assessment methods.
T10.3	Case study 3	SINTEF	M03-M17 (Finished)	The task completed the Nordic pilot in Longyearbyen, Svalbard, where all planned inventories and scans were carried out despite logistical challenges. Manual inventories and sample collection were followed by hyperspectral, AR, and GPR-ECT scans, producing comprehensive datasets for analysis of material condition and building structure.

WP11 – Testing, Analysis, and Evaluation of Selected Techniques and Technologies at Pilot Sites				
Task	**Title**	**Leader**	**Duration**	**Achievements (M01-M18)**
T11.1	Case study 1	TECN	M15-M35	During the first three months of T11.1, the team consolidated and analysed the WP10 datasets, completing the ingestion, cleaning, and structuring of the data to establish a reliable baseline. In parallel, the first AI algorithms for each scanning technology were drafted and tested on preliminary data segments, setting the foundation for more advanced analysis in the next phase.
T11.2	Case study 2	THUAS	M15-M35	Preliminary reviews of acquired data of the pilot buildings. Technical meetings are currently organised between local experts, digital data acquisition experts and material and renovation passport providers to discuss the prerequisites and actions to link the acquired data to the existing 3DBIM/GIS and Digital Twin models developed by CTH.
T11.3	Case study 3	SINTEF	M15-M35	Datasets from AR iMMS-RGB scanning, AHS, and GPR-ECT were consolidated and cleaned. Workshops were held with local partners to define circularity value and identify parameters for AI evaluation. Material samples were collected for AHS calibration, and a wall mock-up was constructed for GPR data calibration.

WP12 – Development of Building Renovation and Reuse Plan with CDW Reduction and Labor Productivity Enhancement at Pilot Sites				
Not started yet.				

	WA7 - Communication & Dissemination & Exploitation			
	WP13 – Communication & Dissemination & Exploitation Plan 1 (CDEP 1)			
Task	**Title**	**Leader**	**Duration**	**Achievements (M01-M18)**
T13.1	CDEP coordination and monitoring	R2M	M01-M18 (Finished)	The task coordinated and monitored all communication, dissemination, exploitation and protection activities across the consortium. Regular KPI tracking and updates were provided at each Consortium Meeting to ensure alignment with project objectives and effective progress monitoring.
T13.2	Communication & Dissemination activities	R2M	M01-M18 (Finished)	Communication and dissemination activities included launching and managing the project website, social media, newsletters and press releases, as well as participation in conferences, workshops and collaboration with sister projects. The Advisory Board (AB) was established to incorporate external expertise, with regular updates and meetings scheduled. All activities supported achievement of DEC KPIs.
T13.3	Exploitation: monitor KERs and innovative business models development	R2M	M07-M18 (Finished)	This task focused on mapping, tracking and supporting Key Exploitable Results and the development of innovative business models. Market analysis, partner input collection, and preparation of the Exploitation Plan were carried out to support future exploitation and alignment with long-term project objectives.
	WP14 – Communication & Dissemination & Exploitation Plan 2 (CDEP 2)			
	Not started yet.			
	WP15 – Communication & Dissemination & Exploitation Plan 3 (CDEP 3)			
	Not started yet.			
	WA8 – Management			
	WP16 – Management 1			
Task	**Title**	**Leader**	**Duration**	**Achievements (M01-M18)**
T16.1	Project coordination and management	UVIGO	M01-M18 (Finished)	The task ensured effective project coordination and management through regular communication with the Project Officer, timely amendment of the Spanish pilot, and support for all reporting and administrative duties. General Assemblies, monthly meetings and partner follow-up were maintained, with all deliverables submitted on schedule and no major internal issues reported.
T16.2	Scientific-technical supervision	UVIGO	M01-M18 (Finished)	The task ensured active scientific and technical supervision through regular meetings of the Scientific-Technical Committee, chaired by BLOCKM, where key decisions such as adopting IFC4.3 ADD2 for data modelling were agreed. Ethical compliance was maintained in line

					with the Grant Agreement. KPI monitoring was conducted to track technical progress and ensure targets are met. No major risks or IPR issues were reported.
WP17 – Management 2					
Not started yet.					
WP18 – Management 3					
Not started yet.					

3.1. Implementation timetable

Project implementation has followed the established timeline described in the Description of Action. All work packages and tasks scheduled for M01–M18 were launched and completed as planned. Progress has been monitored through regular updates of the project Gantt chart and tracking tools, enabling timely delivery of milestones and deliverables. No significant delays or re-planning have been required, and the project remains on track for upcoming activities.

The current implementation timetable is summarised in the updated project Gantt chart (APPENDIX A).

3.2. Management of the action

Project management is coordinated by UVIGO and follows the governance structure defined in the Grant Agreement (Figure 1).
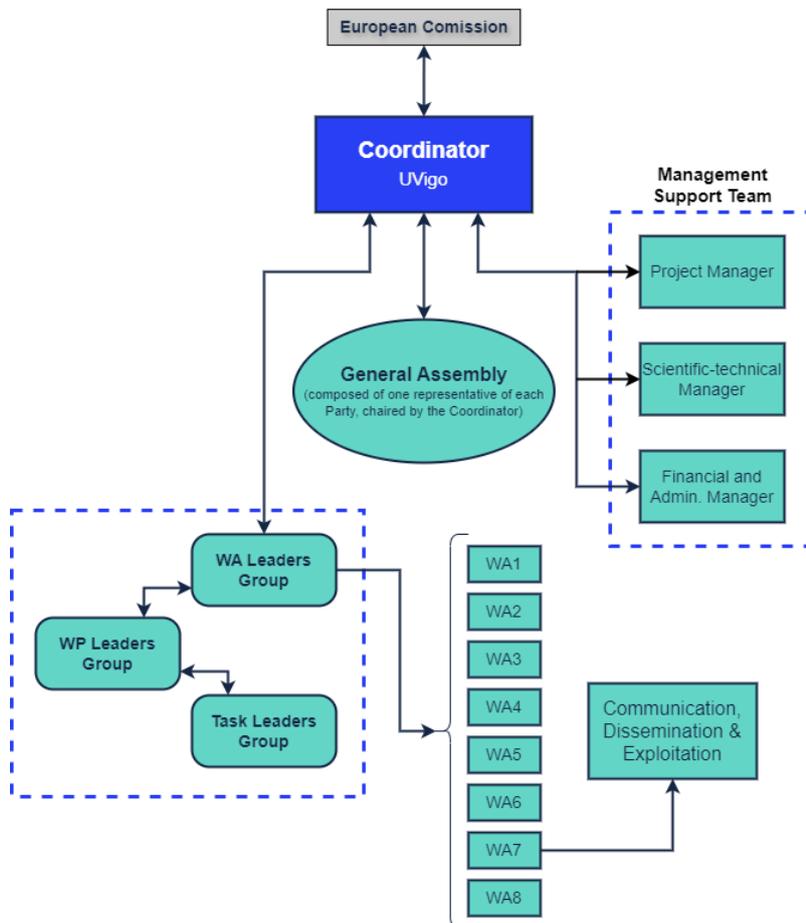
Figure 1. SUM4Re organisational structure

The consortium is organised through regular General Assemblies, monthly progress meetings, and dedicated work area coordination sessions.

Transparent communication and shared documentation have been ensured via a central project repository and agreed channels, and decision-making and internal reporting have been conducted as planned, with all partners engaged and responsibilities clearly distributed.

No management or governance issues have been identified during the period.

4. Risk Management

This section is updated with each Progress Report to reflect the status of identified risks, the implementation of mitigation strategies, and the overall risk outlook of the project during the current reporting period.

4.1. Identified Risks

Table 5 lists the foreseen risks identified at project start, together with their potential impact and planned mitigation measures. This is updated as needed to reflect the current situation.

Table 5. List of critical risks (foreseen)

ID	Description	WP	Proposed Mitigation Measures
1	Insufficient best practices and R&D projects to analyse. Likelihood: Low. Severity: Low.	WP1	Practices and projects have been investigated directly by SUM4Re consortium and stakeholders. All data is available. Other cases collected as desk research.
2	Different testing materials are not available for verification due to logistics. Likelihood: Med. Severity: Med.	WP2 WP3	Investigated materials will be decided before testing and distributed to all participants in due time.
3	The contamination of the samples for analysis might affect to the accuracy and reliability of the data. Likelihood: Low. Severity: High.	WP2 WP3	Implementation of tailored protocol for the sample handling, preparation, and analysis. Regular cleaning and maintenance of the XRF equipment.
4	The processing of huge amounts of raw data (e.g., AHS, XRF) can lead to incorrect conclusions. Likelihood: Low. Severity: High.	WP2 WP3	Develop and implement an automated data pre-processing by skilled data scientists with experience in handling large datasets.
5	Technical limitations or malfunctions in the equipment (i.e., AHS, XRF) could lead to incomplete or erroneous data collection. Likelihood: Low. Severity: High.	WP2 WP3	Regularly maintenance and calibration of the equipment to ensure optimal performance and accuracy. Additionally, a backup of the equipment available in case of any technical
6	Insufficient dataset to train the AI models. Likelihood: Med. Severity: Med.	WP2 WP3	Synthetic data together with data augmentation techniques will be adopted. Open datasets can be used for the preliminary models.
7	There are many obstacles still ahead transforming a linear building economy into and circular one. Probably not everything can be solved within the time and budget frame of the project Likelihood: Med. Severity: Low.	WP4	Choices will be made, which (group of) obstacles SUM4Re really wants to solve. The circular economic model will be one of the first deliverables of the project, so the broad methodology for the cases and other stakeholders can be used from almost the beginning of the project.
8	Access to the pilot site for data acquisition with TRACLINE developments is not available in the early stage of the project. Likelihood: Med. Severity: Low.	WP5	In addition to a construction company involved in several projects, MOYUA owns a demolition and waste recovery company. Access to materials to be recovered by applying the different technologies of the project is possible.
9	Confusion about definitions, meaning of words, applying general economic theory in the construction industry, lack of understanding within the consortium. Likelihood: Med. Severity: Low.	WP6	BLOCKM will provide basic lectures and educational materials on the economic toolbox of information asymmetry, property rights, transaction costs, etc, that is central to circular (building) economics for all partners in the project.
10	Unauthorized access to the collected and storage data of the different materials by unaccredited people. Likelihood: Low. Severity: High.	WP6 WP7	It is necessary the implementation of a robust data encryption and access control to the database system supported by current cybersecurity practices of commercial partners (CONC, BLOCKM).
11	Difficulty of acceptance of SUM4Re's upskill training programme. Likelihood: Low. Severity: Med.	WP8 WP9	Identify from initial phase of the project the needs and expectations of the users. Importance of conducting and analysing surveys. Identification of the SWOT of the project. Need for diffusion through target-oriented marketing strategies.

12	State restrictions on portable radiation equipment may lead to delays/inability to collect data. Likelihood: Med. Severity: Med.	WP11 WP12 WP10	Adequate planning of activities related to the demonstrators. Monitoring of national requisites (e.g., certification, training, procedures)
13	Technical conditions (placement, positioning, power supply) on-site are not suitable for MFT measurement. Likelihood: Med. Severity: Med.	WP11 WP12 WP10	Clearly specified needs for placement-positioning are described. Different power supply options (battery, etc.) will be investigated relative the measurement times
14	Adverse events that might lead to possible delays of demonstrators' results (permitting phase, data acquisition, resources allocation, material availability). Likelihood: Med. Severity: Med.	WP11 WP12 WP10	Adequate planning of activities related to the demonstrators. Extensive alignment between partners and parties involved before execution. Planning created by adopting contingencies and early start of activities.
15	Estimated resources are not sufficient or not balanced (potential over- or under-estimation of budget). Likelihood: Low. Severity: Med.	WP13 WP14	Constant monitoring of the work by R2M as coordinator, supported by UVIGO. If necessary, reallocation of resources between WPs and/or cost items and/or partners will be requested to the EC.
16	Lack of stakeholder involvement in dissemination activities Likelihood: Low. Severity: Med.	WP13 WP14 WP15	Exchanges with dissemination multipliers and AB members will be intensified. New communication and dissemination measures will be designed if those initially foreseen prove to be insufficient (update of the C&D plan)
17	Local/Regional ecosystems of industry shows low interest in circular practices uptake. Likelihood: Med. Severity: Med.	WP13 WP14 WP15	Leverage on partners extended network (i.e., NEBULA & Metabuilding project) & EU Digital Innovation Hubs (via ECTP) to find new ecosystems to involve
18	Failure in respecting planning and/or unexpected delays in achieving milestones/deliverables. Likelihood: Low. Severity: High.	WP16 WP17 WP18	Close monitoring of activities with strict control on deliveries that will allow to anticipate problems and/or provide additional resources/re-plan activities
19	Lack of appropriate communication flows among the partners. Likelihood: Low. Severity: Med.	WP16 WP17 WP18	Appropriate flows will be established (e.g., technical monthly meetings, biannual ordinary meetings for governing committees)
20	Loss of a consortium partner. Likelihood: Low. Severity: Med.	WP16 WP17 WP18	All partners are committed to the project. Should a partner leave, key tasks will be reassigned other partners, or appropriately qualified partner will be involved

During the current reporting period (M01–M18), no new risks have been formally identified. The project continues to monitor its progress closely through regular communication between Work Area leaders and the coordination team.

One previously anticipated risk (regarding the availability of the Spanish pilot site) was successfully mitigated through the amendment process submitted and approved by the European Commission.

4.2. Mitigation Strategies

The consortium responded to the pilot availability issue by promptly identifying alternative buildings that could fulfil the technical requirements of the original Spanish case study. This solution was discussed with the Project Officer and officially included via **amendment**.

No further contingency measures have been required so far.

4.3. Risk Outlook

The overall risk level for the project remains low at this stage. Project progress is stable and aligned with the Description of Action. However, the consortium will continue to monitor potential risks, especially those linked to pilot site dependencies and the availability of material samples for testing. Regular coordination and Scientific Technical Committee (STC) meetings will help ensure early detection and resolution of any emerging issues.

5. Communication, Dissemination, Open Science and Exploitation

This chapter provides a summary of all communication, dissemination, open science and exploitation activities carried out during the reporting period (M01-M18). For more detailed information, please refer to the relevant deliverables of WP13, including D13.1 (DECP), D13.2 (Report on achieved DEC activities and performance), D13.3 (Exploitation Plan), and the M18 Periodic Report, where each activity is described in depth.

5.1. Communication

This section summarises the project's main communication channels and outputs, including visual identity, website, and social media. Activities follow the strategy set out in the Dissemination, Exploitation and Communication Plan (D13.1) and are monitored as detailed in D13.2. For more information on specific actions, audiences and results, please consult deliverables D13.1 and D13.2.

5.1.1. Visual identity

The visual identity of SUM4Re was established at the start of the project and includes a logo, infographic, poster, roll-up, A5 leaflet, templates for deliverables and presentations, and the project brandbook. All materials are available to consortium members, and the general project infographic, roll-up, poster, and brandbook are also published on the project website.

5.1.2. Website

The SUM4Re website (www.sum4re.eu), hosted and managed by R2M, has been launched in M3 (August 2024). It has been updated with information about the project, news, and various resources (press release, scientific articles, brand identity).

Table 6: Number of visitors on the SUM4Re website in a year.

	KPI (Visitors/year)	M1 (Jun24) – M12 (Jun25)	M12 (Jun25) - M15 (Aug25)
Number of Visitors	2 000	1 100	473
Total (M3 – M15)		1 573	

Table 6 records the number of visitors to the SUM4Re website from June 2024 (project start) to August 2025. The count restarts each year, as the KPIs refer to the number of annual visitors

5.1.3. Social media

The social media channels (*LinkedIn* and *X*) have been created for the kick-off meeting and remain active as of today, with a minimum frequency of one post every two weeks.

Table 7: Number of subscribers on the SUM4Re social media.

	KPI (through the project)	Number of subscribers by M16
LinkedIn	400	341
X	200	12

A YouTube channel was established by M16 to host video content related to the SUM4Re project. This initiative was both requested by consortium members and foreseen in the Grant Agreement, which requires a dedicated platform for audiovisual dissemination, although no specific KPI regarding subscriber numbers is defined. As the channel is newly created and has not yet been publicly announced, it currently has no followers. At present, the only

published video is the introductory project video, which will be promoted through the project's social media channels and website in the coming period.

5.2. Dissemination

This section describes the dissemination activities aimed at sharing project results and knowledge with external audiences, covering press releases, bi-annual newsletters, project video, event participation, clustering events, scientific publications and multipliers. Activities are tracked and reviewed as outlined in the Dissemination, Exploitation and Communication Plan (D13.1) and the DEC performance report (D13.2). For further details on each activity and their impact, please refer to these deliverables.

5.2.1. Press release

Only **one press release** has been published in July 2024, and has been widely spread by consortium members to support the beginning of SUM4Re. It announced the launch of the SUM4Re project and highlighted the project's aim to promote circular construction through early-stage material reduction, recycling, and recovery of by-products prior to demolition or dismantling.

5.2.2. Bi-annual newsletters

To date, **two newsletters** have been published: the first in November 2024 and the second in June 2025. Each newsletter provides an overview of the activities undertaken within the framework of the SUM4Re project. Beyond reporting progress, the newsletters function as key dissemination tools, ensuring that stakeholders and the wider public remain informed and engaged with the project's objectives and outcomes.

By M16, the SUM4Re newsletter had reached 152 subscribers, representing approximately 30% of the KPI target of 500. On this basis, it is anticipated that the KPI will be achieved within the project timeframe.

5.2.3. Project video

In accordance with the Grant Agreement, a **project video** is planned for the last months of the project by M42. However, work had already started on this task by February 2025, and a final version of the storyboard was approved in June 2025. The development of the video was finalized in M16 and was released in September 2025. It is now publicly available on YouTube.

5.2.4. Events

SUM4Re partners are expected to participate in a minimum of 20 events, including roundtable discussions with the Community of Interest and the Advisory Board. As of today, half of the KPI target has been achieved, with participation in **11 events** (Table 8) which proves that the project is on track to achieve this dissemination objective fully.

Table 8: List of attended events from M4 to M14

Project Month	Date	Location	Title of the event	Partner
M14	2 July 2025	Thessaloniki, Greece	International Workshop on Advanced Ground Penetrating Radar conference	EAGLE
M13	11 June 2025	Vigo, Spain	EGRWSE 2025	UVIGO
M13	10 June 2025	Oslo, Norway + Online	Training Session	SUM4Re
M12	21 May 2025	Pontevedra, Spain	SUM4Re at Pontenciencia 2025	SUM4Re
M11	9 April 2025	Groningen, The Netherlands	Presentation at 4TU-14UAS Research Day "Digitalisation of the Built Environment"	THUAS
M10	28 March 2025	Switzerland	ECCREDI meeting	EBC

M7	5 December 2024	The Hague, The Netherlands + Online	"Circular construction unabled by photonic technologies"	RAFER
M6	15 November 2024	The Hague, Netherlands	METREX Symposium	VTT
M4	24 September 2024	Sustainable Places - Luxembourg	Data management for Enhanced Built Environment Circularity	R2M
M4	17 September 2024	Cape Town, South Africa	ISWA Conference 2024	THUAS
M4	10 September 2024	Vienna, Austria	EuroCarto 2024	UVIGO

5.2.5. Clustering events

SUM4Re is expected to participate in a total of three clustering events, with a "liaison with Sustainable Places Conferences, among other significant events" as defined by its KPI in the Grant Agreement. The project is on track to fully achieve this target, having already taken an active role in the following events:

▪ **Sustainable Places 2024:** Workshop 'Data Management for Enhanced Built Environment Circularity' (with REGEN EU, Drastic, LIAISON EU, CircularB, and Reincarnate)
▪ **Sustainable Places 2025:** Workshop 'Re-valuing resources: Cross-sectoral circular solutions for a sustainable future' (with ReBoat, THESEUS, DeremCo, Wood2Wood, YouRban, ICONIC, and STORCITO)
▪ **'Towards More Circularity in Construction: A Collaborative Approach from EU-Funded Projects'**, Brussels, December 2025 (with BIO4EEB and DISCOVER)

5.2.6. Released papers

As of M18, SUM4Re partners have produced 5 **journal publications** (Table 9) out of a KPI of 12, and 3 **conference papers** (Table 10) out of a KPI of 10. This corresponds to 42% of the Open Access KPI and 30% of the conference paper KPI achieved. Given that publication activity typically intensifies in the latter stages of a project, once technological developments and pilot results are consolidated, this progress demonstrates that SUM4Re is on track to meet its scientific dissemination objectives.

Table 9. Journal publications

ID	Title	Lead partner	Date of publication	Link
1	*HoloLens 2 Performance Analysis for Indoor/Outdoor 3D Mapping*	UVIGO	May 2025	Link ID1
2	*Toward a Collaborative Circular Ecosystem within the Built Environment*	SINTEF	October 2024	Link ID2
3	*A Systematic Literature Review of Low-Cost 3D Mapping Solutions*	UVIGO	September 2024	Link ID3
4	*Scanning Indoor Environments with Microsoft HoloLens 2 for Interactive Generation of Floor Plans*	UVIGO	September 2024	Link ID4
5	*Mixed Reality Head-Mounted Displays for Enhanced Indoor Point Cloud Segmentation with Virtual Seeds*	UVIGO	September 2024	Link ID5

Table 10. Conference papers

ID	Event	Title	Authors/Partner	Date of publication
1	*EGRWSE 2025 Conference* Vigo, Spain – June 2025	*The Role of Augmented Reality and Governance in Improving Labour Productivity for Building Inventories: Insights from the Binckhorst Area*	UVIGO THUAS BLOCKM	PENDING, not published yet

2	*13th International Workshop on Advanced Ground Penetrating Radar (IWAGPR2025)* Thessaloniki, Greece – June 2025	*GPR Performance for Material Characterization of Existing End-of-Life Buildings*	Ourania Patsia Alexandre Novo Samuel Lehner Miguel Clavijo (EAGLE)	14/08/2025
3	*4TU–14UAS Research Day "Digitalisation of the Built Environment"* Groningen, The Netherlands – April 2025	*Research on the Interoperability of Circular Construction Material Data* Link (page 100)	Daniëlle Strydom Rizal Sebastian (THUAS)	09/04/2025

5.2.7. Multipliers

To date, 2 out of 10 **multipliers** have been engaged within the SUM4Re project (Table 11). Multipliers play a key role in extending the project's reach beyond the consortium by sharing results, tools, and best practices with wider professional and stakeholder networks. Their engagement supports the dissemination and exploitation strategy by amplifying project visibility and impact. While the current number reflects the early stage of outreach activities, it demonstrates progress toward the KPI, with additional collaborations expected as project results mature and communication materials are further developed.

Table 11. Multipliers

Date of Contact	Impact Multiplier	Contact of the multiplier (email, Linkedin,...)	Scale	Partners involved
March 2025	**DG ENV, DG GROW, DG ENER**	Josefina Lindblom - Senior Policy Advisor at DG ENV *Josefina.LINDBLOM@ec.europa.eu*	EU	THUAS
March 2025	**ECCREDI European Council for Construction R&D&I**	-	EU	EBC

5.3. Open Science

Open science is implemented according to the commitments outlined in the Grant Agreement and the Data Management Plan (DMP, deliverable D16.2). All peer-reviewed publications are made openly accessible via appropriate repositories, when possible. Project data is managed and shared in line with FAIR principles, with repositories and access details specified in the DMP.

The DMP is reviewed regularly and remains up to date. No issues or deviations from the planned approach have been identified during this reporting period.

5.4. Exploitation

Table 12 presents the current list of Key Exploitable Results (KERs) and main exploitation activities. This information is based on the updated Exploitation Plan (D13.3, M18) and will continue to be reviewed throughout the project to reflect progress and priorities.

Table 12. List of key exploitable results

ID	Name	Manager	IPR	Strategy
ER1a	**iMMS & RGB image AR software prototype for faster 3D geometric data collection**	UVIGO	open source	Dissemination of new knowledge through publications and open access repositories. Software registry.
ER1b	**Scan-to-BIM software prototype for massive 3D geometric modelling**	UVIGO	open source	Dissemination of new knowledge through publications and open

				access repositories. Software registry.
ER2	AHS and software prototype for real-time timber construction characterisation	VTT	patent/license	Dissemination of new knowledge. Commercialisation in product- service.
ER3	XRF and software prototype for real-time identification of concrete and asphalts materials	OLAR	patent/license	Commercialisation in product/service.
ER4	MFT and software prototype for hidden materials-components detection and geometric modelling	GSCAN	patent/license	Dissemination of new knowledge. Commercialisation in product/service.
ER5	GPR & ECT integration and software prototype for detection and characterization of reinforced concrete structures, wood condition and hidden facilities in buildings	EAGLE	patent/license	Commercialisation in product/service.
ER6	Prototype of a software tool for structural condition assessment with FOS that enables simplified monitoring of structural elements through real-time vibration-based analysis	TECN	license	Commercialisation in service
ER7	TRACLINE multi-sensing prototype for the identification & classification in real time of CDW mineral fractions (onsite and in-line)	TECN	patent/license	Dissemination of new knowledge. Commercialisation in product/service.
ER8	Open C-BIM prototype for information organisation, classification and exchange (CIRDAX and CONCULAR) and the generation of digital passports (materials and products) and building logbooks	SUM4Re (Expected joint exploitation).	open	Dissemination of new knowledge.
ER9a	Software prototype based on plugins to connect GENIA, CIRDAX and CONCULAR software platforms	CONC, TECN, BLOCKM (Expected joint exploitation).	TBD	TBD
ER9b	New CIRDAX functionality based on AI and other techniques to quantify and classify materials in buildings	BLOCKM	license / transaction fee	a) transaction fee on sold materials (through connected marketplaces of CIRDAX); b) freemium fee on access and help for material owners; c) freemium fee for stakeholders on demand site for secondary materials. Commercialisations of products and services connected to materials. Background IP of CIRDAX if owned by a combination of 3 companies: Block Materials, ReUseMaterials and Dynabloqs, all-in Netherland.
ER9c	New GENIA functionality for survey and diagnosis of building components for material	TECN	patent/license	Commercialisation in product/service.

	characterization, assessment of structural behaviour, pathologies, creation of inputs to C-BIM			
ER9d	New CONCULAR functionality for circularity assessments	CONC	license	Commercialisation in product/service.
ER10	Guidelines for product/waste management of deconstructed materials/products based on EU Directives	VTT, BLOCKM (Expected joint exploitation)	open	Dissemination of new knowledge.
ER11	Guidelines to improve the high-quality reuse of secondary materials based on life cycle assessment (LCA).	BLOCKM	open	Dissemination of new knowledge.
ER12	Guidelines for go-to-market strategies aimed at adding value to secondary construction materials, improving circular material flows, and reducing construction and demolition waste.	BLOCKM	open	Dissemination of new knowledge.
ER13	Guidelines on EU legal framework on waste-products-material information.	VTT, SINTEF, THUAS (Expected joint exploitation)	open	Dissemination of new knowledge.
ER14	Policy paper (outcomes).	VTT, all	open	Dissemination of new knowledge.
ER15a	Guidelines for a co-creation strategy for skills development in the construction sector.	RAFER	open	Dissemination of new knowledge.
ER15b	MOOCs tailored for different profiles, including for Bachelor students in applied sciences and Lifelong Learning professional training programme.	RAFER, THUAS (Expected joint exploitation)	open	Training & education.
ER15c	Training material.	RAFER	copyright	Commercialisation in product/service.

6. Ethics

Ethics oversight in SUM4Re is ensured by an independent **ethics mentor** contracted via the coordinator (UVIGO). The mentor maintains regular contact with the project management team (Table 13) and is available for on-demand consultation on issues such as General Data Protection Regulation (GDPR) compliance and any ethical challenges that may arise, particularly regarding data storage, processing, use of Artificial Intelligence, or human participation in project activities.

Table 13. Meetings held to follow up ethics requirements

Meeting #	Date	Summary

#1	16/05/2024	1. To familiarise with the SUM4Re project and its ethics requirements.
		2. Ethics Advisor work - tasks, deliverables, and timeline.
		3. Ethics Reports' structure and content topics.
		4. Documents to be evaluated: Grant Agreement, and other if available.
		5. Tools to be applied:
		  - 'Questionnaire for ethical requirements'
		  - 'SUM4Re Ethics Legal Standards Update Excel Table'

#2	12/06/2024	Kick-off Meeting, June'24 - Ethics Advisor support: Introduction and summary plan.
		What is an Ethics Advisor?
		  1. What is the role of the Ethics Advisor?
		  2. Project Objectives
		  3. SUM4Re Ethics Requirements
		  4. Ethics Reports
		  5. Methodology
		  6. Example of Tools
		  7. Ethics Work Plan
		  8. Ethics Advisor CV.

#3	02/08/2024	1. Documentation reviewed: first ethics deliverable draft. 2. 'Questionnaire for ethical requirements' template. 3. *SUM4Re Ethics Legal Standards Update Excel Table'* template and initial assessment.
#4	14/11/2024	Preparation of Ethics Requirements Report No. 1 (M18). Email contact to share with partners the 'Questionnaire for ethical requirements' and the 'SUM4Re Ethics, Legal Standards Update – Excel Table'. These documents were distributed for review and input to ensure all relevant ethical actions and standards were addressed across the consortium.
#5	30/10/2025	Preliminary analysis of the Ethics Report draft (M18)

At project launch, the ethics mentor reviewed the planned work and produced a **first ethics report**, which is available in the internal consortium repository. Periodic engagement has continued throughout the project, with the mentor consulted as needed to ensure compliance with relevant standards and regulations.

A **second ethics report** is currently being drafted and will accompany the M18 Periodic Report when submitted to the EC platform. Both reports document the main recommendations and actions taken, serving as evidence of ongoing compliance.

Key points from the ongoing ethics supervision and the second Ethics Report:

- **Human Participation:** The project is focused on technical developments and does not involve direct participation of human subjects. However, gender balance, diversity and equal opportunities are tracked among project personnel, and all partners are required to avoid bias in AI development and data management. Special care is taken to integrate gender and diversity perspectives in training materials and co-creation activities. Survey data on staff show a gender split of approximately 65% men and 35% women (with 32% women in research roles), and around 35% of leadership positions held by women. Equal opportunities and anti-discrimination measures are in place across most partners, though

follow-up is ongoing to ensure that all subcontractors and future external staff are also covered by these principles.

- **Personal Data Protection (GDPR/POPD):** Most data generated in SUM4Re is technical and does not include sensitive personal information. Informed consent is always requested for surveys, interviews, and registration activities. Data is processed according to the Data Management Plan (D16.2, M6). Any incidental collection of personal data (e.g., through images) is minimised and handled through anonymisation or deletion. Further improvements and clarifications from partners are being followed up, and compliance is closely monitored.
- **Artificial Intelligence (AI):** SUM4Re develops AI-based tools for materials identification and analysis. Ethical safeguards are in place to avoid algorithmic bias and protect fundamental rights and freedoms. Systems are transparent, do not make autonomous decisions affecting people, and are designed to support—not replace—human judgement. The ethics mentor has issued recommendations to ensure continued monitoring of data sources, diversity of user needs, and explainability of AI results.
- **Non-EU Countries:** Activities in Norway and Switzerland are reviewed for legal and ethical compliance, in line with EU and national regulations. Partners from non-EU countries complete the same ethics questionnaires and participate in legal standards monitoring as EU partners.
- **Continuous improvement:** Ethics recommendations are regularly updated based on partner questionnaires and new developments, with actions defined for any detected deviation. The mentor maintains close communication with the management team and all partners are reminded of their obligations regarding equal treatment, data protection and responsible innovation.

No major ethical issues or conflicts have arisen in the reporting period. All work with human participation, data management, and sensitive information continues to follow the procedures agreed with the ethics mentor. Evidence of ethics mentor engagement and compliance reports is stored in the internal project repository and can be provided upon request.

7. Conclusion

The reporting period M01–M18 marks a successful start for the SUM4Re project. During this period, the consortium has demonstrated robust coordination and effective collaboration, ensuring that all technical, administrative and ethical activities have advanced according to plan.

Regular communication within the consortium, alongside transparent decision-making and proactive engagement with the Project Officer, have helped maintain a high standard of performance. All milestones and deliverables scheduled for this period were completed and submitted as planned, confirming the reliability of the project's implementation timetable.

Technically, substantial progress has been made across all work areas and pilots. The consortium's cross-disciplinary expertise has facilitated progress in both the scientific and practical dimensions of circular construction, supporting the achievement of all technical objectives and associated KPIs.

Management and governance structures remain stable, with UVIGO coordinating administrative and reporting activities and all partners contributing actively to project meetings, reporting, and quality assurance. Risk management procedures have proven effective, with the consortium able to promptly identify, assess and mitigate emerging challenges. The overall risk level remains low, with no unresolved issues or significant threats identified at this stage.

Communication, dissemination, and exploitation activities have also been a strong focus, with a comprehensive strategy implemented to ensure that SUM4Re's results and activities reach relevant stakeholders and target audiences. Open science and data management practices are being implemented in line with the Grant Agreement and DMP, ensuring compliance with Horizon Europe requirements.

Ethical oversight has been ensured through regular engagement with the independent ethics mentor and the ongoing review of procedures concerning GDPR, data management, and human participation in project activities. Compliance with all relevant ethical standards has been maintained, and internal ethics reports are available for audit and review as required.

Looking ahead, the project is well positioned to advance towards its next objectives and deliverables. The progress achieved in this first period provides a solid basis for maximising the project's scientific, technical, and societal impact.

APPENDICES

LIST OF APPENDICES

APPENDIX A Updated project Gantt (M01-M18)

WA	No	Leader	Milestones / Deliverables (month)
WA1	WP1	THUAS	M1 (m11)
	T1.1	SINTEF	D1.1 (m11)
	T1.2	VTT	D1.2 (m11)
	T1.3	VTT	D1.3 (m13)
	T1.4	BLOCKM	D1.4 (m16)
	T1.5	THUAS	D1.5 (m17)
	T1.6	THUAS	D1.6 (m18)
WA2	WP2	UVIGO	M2 (m17)
	T2.1	UVIGO	D2.1 (m17)
	T2.2	VTT	D2.2 (m17)
	T2.3	OLAR	D2.3 (m17)
	T2.4	GSCAN	D2.4 (m17)
	T2.5	EAGLE	D2.5 (m17)
	T2.6	TECN	D2.6 (m17)
	WP3	TECN	M3 (m33)
	T3.1	UVIGO	D3.1 (m33)
	T3.2	VTT	D3.2 (m33)
	T3.3	OLAR	D3.3 (m33)
	T3.4	GSCAN	D3.4 (m33)
	T3.5	EAGLE	D3.5 (m33)
	T3.6	TECN	D3.6 (m34)
	T3.7	UVIGO	D3.7 (m35)
WA3	WP4	TECN	M4 (m17)
	T4.1	CONC	D4.1 (m17)
	T4.2	TECN	D4.2 (m17)
	WP5	VTT	M5 (m35)
	T5.1	VTT	D5.1 (m35)
	T5.2	TECN	D5.2 (m35)
WA4	WP6	BLOCKM	M6 (m17)
	T6.1	CONC	D6.1 (m17)
	T6.2	BLOCKM	D6.2 (m17)
	T6.3	BLOCKM	D6.3 (m17)
	WP7	CONC	M7 (m33)
	T7.1	CONC	D7.1 (m33)
	T7.2	BLOCKM	D7.2 (m34)
	T7.3	TECN	D7.3 (m34)
	T7.4	CONC	D7.4 (m34)
WA5	WP8	SINTEF	M8 (m12)
	T8.1	SINTEF	D8.1 (m12)
	T8.2	RAFER	D8.2 (m16)
	T8.3	RAFER	D8.3 (m17)
	WP9	RAFER	M9 (m34)
	T9.1	RAFER	D9.1 (m34)
	T9.2	RAFER	D9.2 (m35)
	T9.3	SINTEF	D9.3 (m42)
WA6	WP10	BLOCKM	M10 (m17)
	T10.1	TECN	D10.1 (m17)
	T10.2	THUAS	D10.2 (m17)
	T10.3	SINTEF	D10.3 (m17)
	WP11	BLOCKM	M11 (m33)
	T11.1	TECN	D11.1 (m33)
	T11.2	THUAS	D11.2 (m34)
	T11.3	SINTEF	D11.3 (m34)
	WP12	BLOCKM	M12 (m42)
	T12.1	MOYUA	D12.1 (m42)
	T12.2	CTH	D12.2 (m42)
	T12.3	AFDECOM	D12.3 (m42)
WA7	WP13	R2M	M13 (m3)
	T13.1	R2M	D13.1 (m6)
	T13.2	R2M	D13.4 (m3), D13.2 (m17)
	T13.3	R2M	D13.3 (m17)
	WP14	R2M	
	T14.1	R2M	
	T14.2	R2M	D14.1 (m35)
	T14.3	R2M	D14.2 (m35)
	WP15	R2M	
	T15.1	R2M	
	T15.2	R2M	D15.1 & D15.3 (m41)
	T15.3	R2M	D15.2 (m42)
WA8	WP16	UVIGO	
	T16.1	UVIGO	D16.1 & D16.3 (m3), D16.4 (m17)
	T16.2	UVIGO	D16.2 (m5)
	WP17	UVIGO	
	T17.1	UVIGO	D17.1 (m35)
	T17.2	UVIGO	
	WP18	UVIGO	M14 (m42)
	T18.1	UVIGO	D18.1 (m42)
	T18.2	UVIGO	D18.2 (m42)

Timeline header: 2024 (Jun–Dec = months 1–7), 2025 (Jan–Dec = months 8–19), 2026 (Jan–Dec = months 20–31), 2027 (Jan–Nov = months 32–42).

SUM4Re

Creating materials banks
from digital urban mining

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& TECHNOLOGY ALLIANCE

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