OUTPUT FACT SHEET

Pilot actions (including investment, if applicable)

Version 3

Project index number and acronym	CE1578 CityWaterCircles
Output number and title	O.T2.2. Pilot actions testing and demonstrating combined urban rainwater and grey/wastewater utilization
Investment number and title (if applicable)	I3 - Use of Rainwater and Purified Wastewater for producing recycled construction material in Maribor
Responsible partner (PP name and number)	PP5 – Maribor Water Supply Company (MBVOD)
Project website	https://www.interreg-central.eu/Content.Node/CWC.html
Delivery date	Jan 2020 – March 2022

Summary description of the pilot action (including investment, if applicable) explaining its experimental nature, demonstration character and transnational added value

Use of Rainwater and Purified Wastewater for producing recycled construction material in Maribor

Wastewater overload and water over-abstraction are one the main problems EU is facing in the future and is already being faced with today in some regions. Industry sector are one of the main users of the drinking water. The pilot action addresses this topic with an integrated circular economic approach, showing that reused water can be used in construction industry and can be used along with other recycled materials, circularly closing the material loop.

The implementation of the pilot action has demonstrated the usability of rainwater and purified wastewater for production of secondary raw material based (SRM) construction production and has therefore achieved the goals set at the start of the project.

Rainwater is harvested and stored in a reservoir and used in the production process, whereas purified wastewater is transported from the nearby wastewater treatment plant, for which two underground storage tanks have been installed. A hydro-booster station has been installed in a shaft to pump the water from the tanks directly to the production process. The catchment shaft for the collection of rainwater mixed with discharged industrial wastewater from construction was built next to concrete plateau along with drainage around the plateau to collect the excess water used in the production process, along with rainwater – water that would otherwise sink into the ground. A pipeline was built from the catchment area to the storage tanks, where it is being stored for re-use in the production process. In between three sedimentation shafts were built to eliminate small and large particles and other foreign matter. A filter was also installed to eliminate fine particles. In that way the water is being re-used multiple times.

NUTS region(s) concerned by the pilot action (relevant NUTS level)

Country (NUTS 0): SI

Country (NUTS 1): SI0, Slovenija

Region (NUTS 2): SI01, Vzhodna Slovenija

Sub-region (NUTS 3): SI012, Podravska

Investment costs (EUR), if applicable

Description of cost	Real amount (based on contract) (EUR)
Pumps	3.176,00
2 underground storage tanks (16 m^3) and filters	5.272,00
Transport of purified wastewater	3.609,60
Land work (preparation work, landwork, concrete laying & unexpected costs)	9.269,02
Shaft	3.850,00
Land works and installation works for rainwater harvesting	3.973,05
Total	**29.149,67**

Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (if applicable)

FUA Maribor with Municipality of Maribor and surrounding municipalities has gained the experience and know-how in water reuse within the construction industry. Pilot action was presented in various local, national and international events and has therefore reached the dissemination objectives, communicating the results to stakeholders, local authorities and construction industry sector. As the project is transferable, we hope that similar projects can be implemented in the future, especially if EU, national and local measures could make similar projects economically more viable. Similarily, utilities sector could use the purified wastewater and rainwater for road maintanance works.

As part of city's "Strategy for the transition of the city of Maribor to circular economy", Municipality of Maribor, together with Mariborski vodovod and the Wcycle Institute, focus their funds in order to explore the possibilities of implementing the distribution system for the recycled water in the city with a goal to later implementation. As systemic implementation is currently not economically feasible due to the abundance of fresh water, projects like CWC can serve as springboard for above mentioned organizations to cooperate with local, national and international and European institutions in the preparation of the necessary documents, which would allow for appropriate incentive measures on the demand side. Moreover, energy demand implications for abstraction and distribution of potable water should also be considered.

The designed distribution system of recycled urban water is based on the idea of maximum reuse (of over 7.0 million m3) of purified and discarded water at the Central Wastewater Treatment Plant in at least 6 existing urban industrial zones, 4 central planned urban depots (urban gardens, urban greenhouses, energy planting zones, snowmaking) and an unspecified number of other potential hauliers (Magna, ERM Airport, …).

Sustainability of the pilot action results and transferability to other territories and stakeholders

The implementation of the two demonstration pilots, CWC and Cinderela, is a perfect example of how material flows can be closed into loops. The synergies were evident early on in the preparation phase of the two projects. While Cinderela is using recycled materials as raw material for construction products and water being critical to production, CWC I3 pilot provides the whole process with recycled water. Therefore we have a whole cycle of material reuse. Produced concrete blocks have been tested for hardness with results showing the same or similar characteristics as non-recycled construction materials.

A pilot demonstration facility is currently being built with the produced recycled materials made from the recycled water from CWC I3 pilot as part of the Cinderela project at the CWC/Cinderela pilot site. The facility along with the whole pilot site can be used in the future as a circular economy hub, showcasing the results and synergies of CWC and other connected and similar projects to local, national and international organizations, general public, potential public and private investors. This could provide a springboard for initiatives for similar projects for years to come.

The pilot is not transportable but all of the elements of the pilot are transferable and can be easily implemented in other locations/regions with minor technical adaptations, based on location and output specifications.

If applicable, contribution to/ compliance with:

- **relevant regulatory requirements**
- **sustainable development - environmental effects. In case of risk of negative effects, mitigation measures introduced**
- **horizontal principles such as equal opportunities and non-descrimination**

We did not have any legal/regulatory difficulties during the preparation and implementation of the pilot action. Building and other permits have been granted and were obtained by the publicly owned company Nigrad, d.o.o., (stakeholders in this project), who are responsible for on-site planning and construction and are day-to-day operators of the production plant (Cinderela project). We have obtained the Permission to carry out the pilot from the land owner.

The pilot action has provided numerous climate change impacts on FUA, such as promotion of water efficiency measures and reuse of non-conventional local water resources, enhancement of water conservation and alleviating pressure on over-exploited freshwater resources as well as on urban drainage systems. During the implementation process, the pilot action also proved to have environmental benefits, such as drinking water and energy savings, social benefits, such as revitalization of a degraded area and economic benefits, such as reduction of freshwater consumption. The Pilot also did not have any negative impact on the environment.

References to relevant deliverables (e.g. pilot action report, studies), investment factsheet and web-links
If applicable, additional documentation, pictures or images to be provided as annex

DELIVERABLES:

D.T2.4.2. – FUA-level pilot concept (Maribor)

D.T2.4.4. – Investment preparation package for pilot action in Maribor

D.T2.6.3. – Intermediate self-evaluation report on the implementation of the pilot action in Maribor

D.T2.7.1. – Final self-evaluation report on pilot implementation in Maribor with upscaling plans

D.T2.4.3. – Report on the mentoring visit to upgrade and fine-tune the pilot concept in Maribor

D.T2.5.3. – Report on the peer-review visit in Maribor

LINKS:

Video about CWC I3 Pilot Action in Maribor:

https://www.youtube.com/watch?v=Yv9qDQLBEn0

Video about CWC I3 Pilot Action in Maribor in cooperation with Cinderela Pilot Action:
https://www.youtube.com/watch?v=k9d9rB0XuTo

CWC I3 Pilot Action in Maribor website:
https://www.interreg-central.eu/Content.Node/Secondary-raw-material-from-wastewater-in-Maribor.html

PHOTOS:

Figure 1: Underground storage tanks and equipment shaft during construction

Figure 2: Hydro-booster station with two pumps inside the shaft

Figure 3: Concrete blocks made from SRM (secondary raw materials) including recycled water provided through pilot investment