I4: WELLS FOR DISTINGUISHING BETWEEN DIFFUSE AND SITE-SPECIFIC CONTAMINATION IN MILAN FUA (IT)

Investment report 10.2019

Project index number and acronym	CE32 - AMIIGA
Responsible partner (PP name and number)	Lombardy Region (PP6)
Linked to pilot action (number and title)	O.T2.3 – Separation of hot spot & multiple point diffuse contamination in Milan FUA (IT)
Project website	http://www.interreg-central.eu/Content.Node/AMIIGA.html
Delivery date	9.2019

Description of the investment (including technical characteristics) explaining its embedding into the linked pilot action

In 2017, Lombardy Region delimited the first area affected by diffuse pollution and approved reclamation measures and the discipline for remediation procedures. The area, which is North - East of Milan (including the City of Milan), is interested by diffuse contamination of Chlorinated Hydrocarbons (CHC).
During the development of the reclamation measures, emerged that several plumes that originate North-Western of Milan have a significant effect on the deterioration of the groundwater quality in the City of Milan and affect some water supply stations in the upper part of Milan city. Moreover, in the same area there is background level of low concentrations of chlorinated hydrocarbons not immediately linked to a point source. For these reasons, the area has been selected in AMIIGA Project as pilot action (PA) area (157 km^2 and 12 Municipalities involved).
The aim of the activities carried out within the PA was to investigate the characteristics of the groundwater pollution, distinguishing between contamination from point sources (hot spots and plumes) and diffuse contamination, also developing new scientific procedures (tools) and models more suitable to represent and separate the two sorts of contamination.
The investment task included the realization of 5 new piezometers, of the 6 drilled during the activities, and the sampling costs related to three monitoring campaigns provided to integrate the available data set on the PA.
Infrastrutture Lombarde s.p.a. (ILSPA), in house RL company, supported RL in the procedure, launching the public tender for the drilling of the piezometers.
The realization of 5 new piezometers allowed improving the monitoring network close to main plumes of chlorinated hydrocarbons to better outlie the extension of the plumes and to distinguish the contribution of plumes and diffuse pollution to the contamination found at the pumping stations. The position of the new

piezometers have been defined in cooperation with Politecnico di Milano (PP7) and the technical members of the local Regional Implementation Group (RIG) after an accurate analysis of the position of the already existing monitoring points in the area and their effectiveness in the spatial definition of the phenomena.
Due to the presence of numerous infrastructural networks in the subsoil in most of the public areas, the definition of the final position of the new piezometers took a lot of time and many efforts. Moreover, the procedure was slowed due to time consuming of the complex administrative procedure to obtain the drilling permits from the Municipality of Milan.

In the following, the 5 piezometers technical characteristics:

- 2 shallow piezometers (PzEU1PS and PzEU2PS) drilled in the area of Pero municipality;
- 1 shallow piezometers (PzEU3PS) and 2 deep piezometers (PzEU1PP and PzEU2PP) were realized in Milan.

The depth of the shallow piezometers is 20 m from ground level for PZEU1PS, PZEU2PS and PZEU3PS. They have a diameter of 4", they were realized using the continuous core boring and are screened from -2 m ground level to the bottom hole. The depth of the deep piezometers (PzEU1PP and PzEU2PP) is of 70 m from ground level. They have a diameter of 3"; they were drilled using core destruction/continuous core technique and are screened from 60 to 70 m from ground level. Moreover, a nested multilevel system to characterize vertically the contamination was installed.
The total length of perforation is of 235 m, then greater than the 200 m originally forecasted in AMIIGA application form.
Three monitoring campaigns were carried out with the scope to integrate the available data set on the PA:

- First campaign: December 2017,
- Second campaign: Maj-June 2018
- Third campaign: November 2018 and Maj 2019.

Investment location		
NUTS 3	**Address (Street, house number, postal code, city, country)**	**GPS coordinates (Gauss-Boaga)**
ITC4C - Milano	PzEU1PP: via Castellanza, Milano PzEU2PP: via Bacchelli, Milano PzEU1PS: via Don Gnocchi, Pero PzEU2PS: via V. Monti, Pero PzEU3PS: via Daimler, Milano	PzEU1PP: 1508850; 5038578 PzEU2PP: 1508778; 5038279 PzEU1PS: 1507231; 5039888 PzEU2PS: 1507523; 5039750 PzEU3PS: 1507864; 5039418

Duration and process of investment implementation	
Start date	**End date**
4-2017	5-2019
Major milestones of investment implementation	

- Several decisional meeting between Lombardy Region, Polimi and ILSPA (in house RL company)
- Several walkthrough the pre-selected area
- final version of tender documentation: April 2017
- tender publication: May 19 – June 05, 2017
- definition of the final position of the new piezometers: August 2017
- tender final assignment: August 23, 2017
- authorizations for the drilling of each piezometer: October 23, 2017 - authorization for PzEU1PS and PzEU2PS in Pero; November 16, 2017 - authorization for PzEU1PP and PzEU2PP in Milan, April 16, 2018 - authorization for PzEU3PS
- date for works beginning: 13/12/2017
- end of the works: 29/05/2019 (last monitoring campaign)

Investment costs (Total costs and ERDF in EUR) including a break-down of main cost items

€ 34.846,34

Ownership and durability of the investment (e.g. maintenance, financing)

Thanks to AMIIGA funds, Lombardy Region owns the 5 new piezometers, which were drilled in public areas and is in charge for their maintenance. In the next years the piezometers ownership will be transferred to the Regional Environmental Agency that will take care of the long-term maintenance and durability of the investment. In any case, the piezometers are simple structures that do not need specific maintenance to conserve their efficiency in time, they just need to be purged before proceeding to their sampling.

Transnational effect and added value of the investment to the partnership

The investment by itself has not a transnational effect and added value for the partnership. The added value for the partnership rather depends on the enhancement of the modelling and of the procedures to separate plumes from diffuse contamination. These results, held with the pilot action, could not have been reached without the measure of the contamination concentrations in the new piezometers of the investment, which have been indeed conveniently positioned to the purpose.

Expected impact and benefits of the investment for the concerened territory and target groups and leverage of additional funds (if applicable)

Positive impacts of investment are that through the data collected, and that will be collected in the future, the contamination in the area can be monitored and the trends assessed.
Moreover, through the data monitored in the new piezometers:

- Municipalities will be able to monitor the quality of groundwater and to highlight quickly the presence of any risk for human health
- Owners of polluted sites will be able to monitor the contamination evolution and the effectiveness of the remediation measures enacted
- Regional Environmental Agency will be able to better modelling and monitoring data to define a the extension of the plumes, and monitor their evolution
- Provinces will be able to proceed to the identification of the contamination sources to activate administrative procedure for remediation.

Additional funds have been leveraged for:

- Cooperation Agreement with Politecnico of Milan for the implementation of research activities to study the contamination of groundwater in Milan area (SIAM C.A.) (139.000 €),
- tender for the experimental application of innovative reclamation technologies for a contaminated site suspected of being one of the sources of plumes identified for the north-west Milan area (39.500 €).

If applicable, compliance with relevant regulatory requirements (e.g. environmental, building regulations, authorisations)

Before proceeding to the works realization, all the authorizations have been collected (permit to the use of public soil).
Moreover, during the realization of the investment, all the legislations in force have been fulfilled, in particular those on the safety for the workers.

Contribution to sustainable development - potential effects of the investment on the environment and climate. In case of negative effects, mitigation measures conducted

The investment is neutral with respect to the impacts on the environment and climate. However, it indirectly contributes to measure the effect of climate change on groundwater matrix from both chemical and quantitative point of view: new points to measure trends in contamination and water levels.

Consideration of other horizontal principles such as equal opportunities and non-descrimination (e.g. barrier-free accessibility)

The question has not particular relevance with this kind of investment. The only aspect that can be marginally considered is that women mainly compose RL team.

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

D.C.5.2 Final Brochure

D.T2.3.1 Hydrogeological and groundwater monitoring data collection

D.T2.3.2 Database realization and publication through WEB-GIS Tool

D.T2.3.3 Chlorinated hydrocarbons transport model: report including the implemented results

D.T2.3.4 Report on “pilot area” selection for the application of methodologies and tools developed in WP1

D.T2.3.5 Monitoring network improvement: design and documentation preparation

D.T2.3.6 Monitoring network improvements

D.T2.3.8 Report on statistical analysis and inverse iterative simulations application

D.T2.3.9 Summary report on GW pollution assessment including diffuse/site specific contamination separation