REWETLAND

Widespread introduction of constructed wetlands for a wastewater treatment of Agro Pontino

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MUNICIPALITY OF LATINA

ACTION 5.2

FEASIBILITY STUDY FOR THE PILOT PLAN 2

SUB-SUPERFICIAL AND FREE WATER CONSTRUCTED WETLAND FOR DRAINAGE AND IRRIGATION WATER TREATMENT IN THE WATERFRONT LATINA AREA

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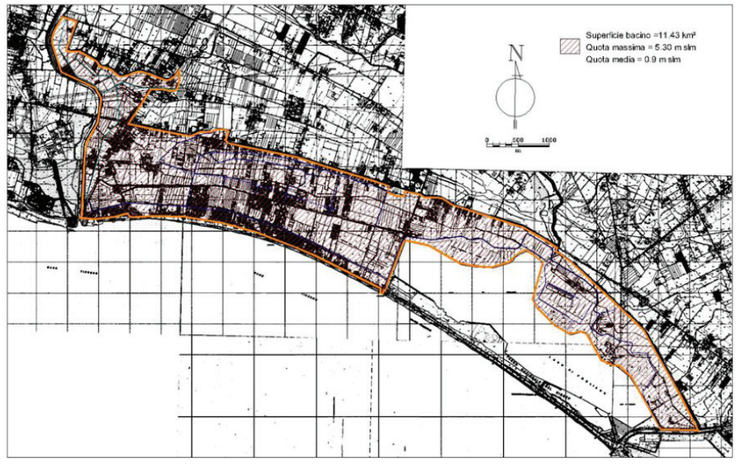

Figure 1 Hydrographic basin of the considered area

[1]This report gives a general overview of the examination of the hydraulic network connecting channels and ditches for drainage and irrigation and the proposed intervention for the creation of a constructed wetland in the Marina di Latina area.

General objective of the study is to contribute to the safe and environmental friendly use of the territory and to improve bathing in the Marina di Latina area by improving channel, rivers and sea water quality in the same area.

Specific objectives are:

a1. Improving water quality of Moscarello river;
a2. Improving water quality of Astura river;
a3. Improving water quality of Mastro Pietro channel;
a4. Improving water quality of Colmata channel;
a5. Prevent pollution with mitigation of the impact of run-off water.

Tributary basin with nearly rectangular shape, has altitude varying between 5 m and -1 m s.l.m. (corresponding to the closing section - draining

1 This document is a summary of the italian version.

Figure 2 Hydraulic connection between Moscarello Channel and Colmata river

pump of Capo Portiere). Surface of the basin is approx. 11.43 km2 and length is 6.7 km (Figure 1).

The feasibility study in question still has to be viewed in the context of a general optimization of the hydrographic network in the light of the new realizations at the Municipality of Latina downstream with the ultimate aim of improving the quality of fresh waters and marine areas for irrigation, recreational use, nature and coastal bathing facing channels subject to intervention.

The hydraulic study (Sammarco, 2011) illustrates the drainage and irrigation systems in this area that is quite complex depending on many factors. Among these are overwhelming: the rise of water level in the drainage canals during the rainy tidal action and the taking of water for irrigation and supply of fresh water of Lake Fogliano and whether or not the operation of the dewatering of Capo Portiere.

Various hypothesis have been considered and they are reported as follows: the hypothesis a) involves the construction of a plant wetland that is fed by water flowing in the channel Mastro Pietro, in turn resulting from the waters from the River Astura with the creation of riparian habitat in correspondence of the bank's upstream of the Colmata channel.

The hypothesis b) provides for the planting of macrophytes inside the Colmata channel. This option would involve the planting within macrophytes of the riverbed of selected species of Phragmites and Typha to allow the water drained into a progressive treatment. This option has not been considered because of the increase of hydraulic risk for flooding the closest area.

The hypothesis c) provides for the placement of the constructed wetland in a direction parallel to the Colmata channel and so parallel to the coastline with supply of water from the channel Colmata through the side weir located immediately below the lowest estimated level of the free surface in the same channel. This hypothesis has not been considered because of the pumping energy that is necessary for the operation.

The assumption d) provides the realization of constructed wetlands btween the channel Mastro Pietro and Colmata in an area closer to the pumping station of Capo Portiere. This hypothesis has been excluded because of the high distance between the two channels in this area.

The more appropriate solution is the creation of a system of wetlands fed by the waters flowing in the Channel Mastro Pietro, which discharges water into the canal filled. This assumption, shared by technicians and managers of the City of Latina is at present supported by the following considerations:

- The system thus established would be able to be fed by gravity because of the difference in elevation between the two channels.
- It is possible to obtain a noteworthy increase of the quality waters of the River Astura which is particularly polluted.

This solution seems to be particularly favourable also in view of the fact that the treatment plant at Latina Lido will be moved and relocated, according to estimates of the Municipality, to the north in the vicinity of the nuclear plant Sogin.

This implies that water can be conveyed, in whole or in part in proportion to the flow treated by the plant itself directly in the channel Mastro Pietro, or first in the Moscarello Channel and then Mastro Pietro. This communication is possible as shown in Figure 2 from the existing connection.

The area in question is subject to many constraints as required by the Regional Landscape Territorial Plan (RLTP) the Plan of Hydrogeological and Hydraulics (PHH) in addition to geological constraints and the National Park of Circeo.

The system will consist of subsurface flow to an area fed by the intake channel directly from Mastro Pietro and then flow from one area in which surface water will be completed in the finishing treatment. Figure 3 represents a draft scheme of the longitudinal section of a sub-superficial constructed wetland. Cw has a 0.6 – 1 % slope bottom to facilitate the outflow of the waters for gravity. The stability of the banks is ensured by a 45° inclination. A perforated tube Ø 200 mm

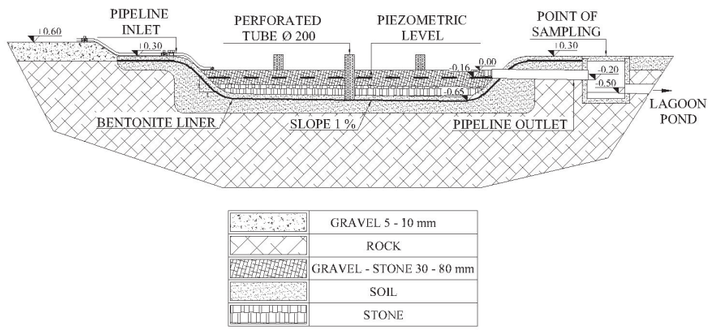

Figure 3 Scheme of the longitudinal section of the subsuperficial constructed wetland area

internal diameter should be positioned within the field to the aim of measuring and controlling the flow water level. Bottom is waterproofed with a bentonitic liner that is permeable to plants roots, but impermeable to the water in treatment. Water is fed in at the inlet and passes slowly through the filtration medium under the surface of the bed in a more or less horizontal path until it reached the outlet zone where it is collected before discharge via level control arrangement at the outlet. The medium is so stratified: 0,1 m of soil 0,1 m of stones; 0,30 ÷ 0,35 m gravel. Each layer should have less depth as a consequence of the geognostic surveys.

On either side of the section of constructed wetlands is for the installation of 2 runs for the accessibility to the canal and jogging as well as installation of equipment for urban design.

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