

## Stormwater tanks option in remediation of Candiano head channel area at Ravenna: functions, design, environmental impact.

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### Summary

The environmental reclamation of the terminal tract of Ravenna Candiano channel requires high improvement in quality characteristics of water, greatly polluted by harbour activity residues, by many outlets of urban drainage system, and by short replacement capacity supplied by tides in head channel at 12 Km from Adriatic sea. As firstly required the project provides to intercept sewers drainage systems, now carrying inside the "lake", and to convey these to discharge in Candiano, down a new embankment. In a second time Port Authority imposed as necessary the maintenance of port activity in head channel and a second option has been proposed, based on two stormwater tanks. The project is described in term of civil and electromechanics works and it is discussed such in treatment efficiency as in environmental impact. The present paper give a description of provided works and presents results in modelling forecasted effects on ecosystem level.

**Keywords:** stormwater tanks; abandoned area; combined drainage system; urban wastewater; harbour area, sludge; Candiano channel; modelling, organic loadings; trophic level.

### 1. Introduction

Environmental reclamation of terminal tract of Ravenna Candiano channel, named "Darsena città", take rise from decision to modify use destination of surrounding zone from disused and degraded harbour area to valuable residential area. This remediation activity appears preliminary to any other economic activities. So it's necessary to improve present bad quality characteristics of water caused by a greatly polluted bottom produced by harbour activity residues, by organic loadings from urban drainage system, and by a short replacement capacity. Aim of the project is to realize, in a middle long period, water quality standards useful to permit recreational and residential activities. Channel port head is about 12 km from the sea, so there isn't possibility of water exchange because head-waters moved by tides cover only some kilometres and then they return to previous position. Actual hydraulic-sanitary state of water and bottom appear deeply compromised for heavy metal due to port activity, for long anoxic conditions in summer related to high eutrophication level due to organic loadings, coming from Ravenna, and discharged with rain by urban drainage pipes. Actually two big main sewers discharge just in head-channel and, in dry weather conditions, most part of domestic



Fig. 1: View of the head Candiano channel