ABSTRACT

The rapid expansion of urban space has caused many problems all around the world. This is especially true in China, where we need to face challenges such as limited spaces, wastewater treatment, decreasing water resources, ecological preservation, and so on. In the management of urban water, an economic, environmental, and social balance needs to be. The aim of this study was to develop a freeway strategy of Integrated Constructed Wetlands to achieve this balance. This strategy combined several disciplines of civil engineering, ecology, landscape design, and agricultural irrigation, and this conceptual idea will be demonstrated through a design for Huai’an city in Jiangsu province, which sits on the East-route Water Transfer Project of China. The project consists of surface flow wetlands, ecotype corridors, retention facilities, and stabilization ponds. Importantly, it is designed beside the Ning-Lian freeway that goes around the city. The whole system could treat effluents from city and wastewater plants. In rainy seasons, it could store and treat extra sewer discharges and freeway surface runoff. During farming seasons, it could potentially treat the effluents from irrigation fields and it was also designed that the outflow of this whole system would be reused for irrigation. The environment surrounding the freeway could derive multiple benefits from the proposed strategy and could provide recreation, habitat creation, and education possibilities for the city and local community.

Keywords: Urban water management; Integrated highway wetlands; Wastewater treatment; Ecological design; Low carbon; Sustainability