

**Republic of Iraq
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Closed Pipe Irrigation Systems -Karbala province as a Case Study

**A THESIS
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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF
MASTER OF SCIENCE IN WATER RESOURCES ENGINEERING**

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Abstract

Upon the worldwide scarcity of fresh water due to increasing demand together with the changes in natural conditions and global warming, it becomes necessary to develop new approaches for water rationalization, especially in arid regions such as the middle east countries. Water demand for irrigation may consist of more than (75%) of the total amount of water required in these countries. Canal networks to convey, distribute and apply water to agricultural land have been the most popular method in use for many years. However, this type of open surface irrigation is no longer going well with the current worsen situation of water shortage. This may be due to the remarkable waste in water through evaporation, seepage and leakage losses. Therefore, applying closed pipe systems for water conveying, distributing and irrigating may be an important implementation or at least water waste mitigation. Closed irrigation is not a new technique in the international measure, but it is still unused yet in Iraq. In this pioneer research a case study has been selected for applying the closed irrigation concept in Iraq. Karbala province, within the middle Euphrates region /Iraq, has been chosen for this path finding scheme. This thesis presents design proposal for closed irrigation system .The irrigation water requirement was computed by CROP WAT program. Design of the main pipeline that flowing under gravity irrigation (part full pipe) will be achieved by using pipe flow advisor program. Pump stations are installed on the outlets of the main pipeline to deliver irrigation water to the fields.

Keywords: irrigation . pipelines . water saving .

Cost analysis have been taken in to consideration and the results showed that Conserving water through replacing open canals with pipelines is economically feasible for canals specified in this thesis.



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الجامعة التكنولوجية
قسم هندسة البناء والانشاءات

منظومات الري المغلق - دراسته ميدانيه في محافظه
كربلاء

رسالة تقدمت بها الطالبه زينب صباح مهدي

(بكلوريوس علوم في هندسة البناء والانشاءات/2009)

إلى قسم هندسة البناء والإنشاءات في الجامعة التكنولوجية
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بأشراف

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