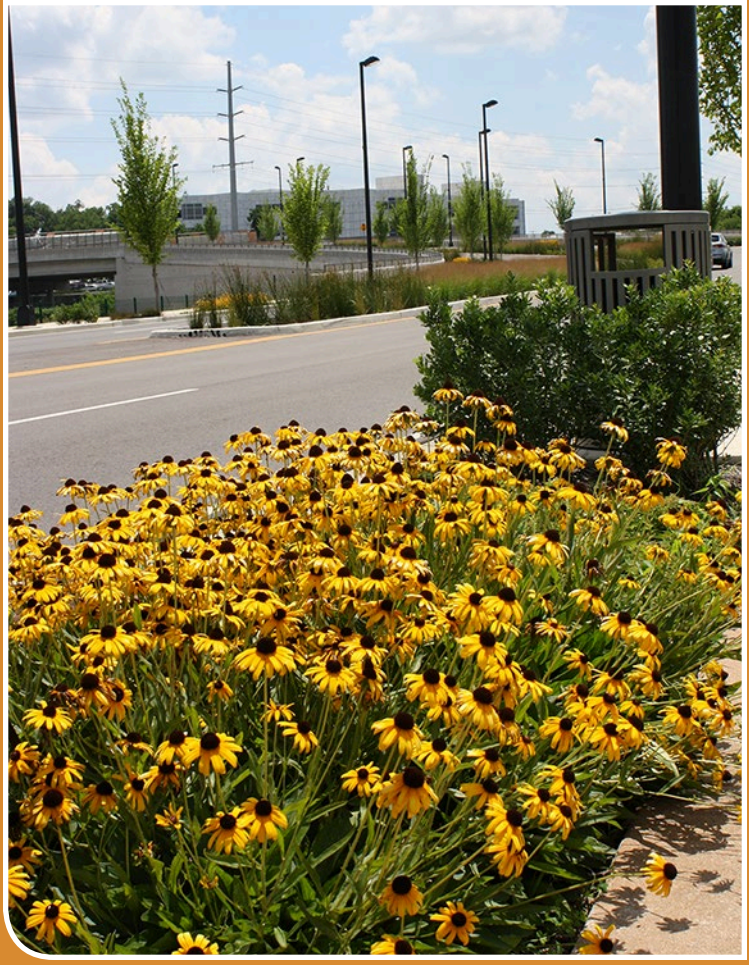
International Low Impact Development Conference 2018

Getting In Tune with Green Infrastructure



Proceedings of the International Low Impact Development Conference 2018

Nashville, Tennessee | August 12–15, 2018

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INTERNATIONAL LOW IMPACT DEVELOPMENT CONFERENCE 2018

GETTING IN TUNE WITH GREEN INFRASTRUCTURE

PROCEEDINGS OF THE INTERNATIONAL LOW IMPACT DEVELOPMENT CONFERENCE 2018

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Preface

The International Low Impact Development Conference was held in Nashville, Tennessee, in August of 2018. The Proceedings presented here represent a portion of the timely, innovative, and diverse content that was presented at the conference. The theme for this event was "Getting in Tune with Green Infrastructure," so in addition to sessions focused on research, case studies, and municipal challenges, we highlighted the social aspects of stormwater management. Sessions associated with this topic included ways to educate, engage, and incorporate the public in our design and management programs. The 2018 LID Conference also included a number of "special sessions" proposed by the community to allow participant input into the conference program on topics that might be overlooked by the planning committee. We are excited at the continued interest and growth in Low Impact Development globally, we hope that these proceedings provide the in-depth information that you are looking for and look forward to seeing you at the next LID conference in 2019!

Acknowledgments

Preparation and planning are the key to a successfully executed conference, so we would like to recognize the hard work of the Conference Steering Committee and also others that are not mentioned here.

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Finally, we acknowledge and thank the staff of the EWRI of ASCE, who, in the end, make it all happen.

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Contents

Using a Compact Ceramic System to Filter Raw Water in Iraq: Challenges and Opportunities

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ABSTRACT

Filtering of raw water for drinking purposes is limited in rural areas in Iraq. The limitation is mainly due to technical and logistical difficulties of the traditional method, as well as high initial and operation costs. Therefore, a less complicated system is needed to overcome this problem. As a result, a laboratory size compact ceramic system has been designed, constructed, and extensively tested. The system mainly consists of a reservoir and two modules of rotating ceramic discs. The discs have been made from red clay, sawdust, and water. The laboratory results suggest the proposed system could be used in water filtration. This system can be continuously operated with a constant flow rate and does not need the primary sedimentation water tanks that are typically used in the traditional method. The proposed system can be manufactured with different filtration capacities to satisfy the needs of the served areas; however, a large filtration capacity system has not been tested previously. A large capacity filtration system could help humanitarian aid organizations and military units since it is easy to transport and install. The study discusses the design and cost of manufacturing large capacity systems, and compares the finding with traditional filtration systems. This study also reviews the potential advantages of using the proposed system in rural areas in Iraq, as well as the challenges.

INTRODUCTION

Most rural regions in the world suffer from deficient water. The availability of potable water is a challenge in most rural and remote regions due to the fact that there are no existing traditional water treatment systems (TWTS) in these areas. Traditional water treatment systems that use surface water are usually fixed and expensive to build and maintain. These plants consist of the following components: surface water steel intake structure, sedimentation tank, filtration tank, alum mixer and tank (i.e., flocculating tank), and chlorination system, see Picture 1. Several studies have been carried out to improve current filtration systems, as well as propose new systems. Al-Kathily (2014), for example, conducted an empirical study aimed to eliminate sedimentation phase from TWTS. Al-Kathily built a laboratory direct filtration unit that includes four main units: an axial flocculating unit, a filtration unit, injection unit for pumping coagulants and clay materials, and a backwashing unit. In another study, Mahanna et al. (2015) constructed an experimental pilot plant to improve turbidity removal and developed a simple regression model between turbidity and the sand filter's depth. The results of the proposed model showed a good correlation ($r^2 = 0.88$) within the observed data, indicating that the most significant parameters that affect turbidity are sand media depth and filtration rate.