BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES AND MINING ENGINEERING

FINAL YEAR PROJECT REPORT

DESIGN OF FLOOD ATTENUATION DRAINAGE SYSTEM

CASE STUDY: MAZIMASA SUB COUNTY, BUTALEJA DISTRICT

BY

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BU/UG/2013/1594

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A Project Report Summited in Partial Fulfillment of the Requirement for the Award of the Degree of Bachelor of Science in Water Resources Engineering at the Faculty of Engineering of Busitema University

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ABSTRACT

Throughout the human history floods have been an integral part of the civilization. Still men have not quite coped well to live with floods. Flooding is the most frequent global natural disaster; rural areas are becoming more vulnerable to flooding due to effect of climate change. Flash flood is one of the most prominent phenomena caused by heavy rains. In developing countries drainage channels is the most common strategy employed for flood control. The failure of preventive measures has led to most authors and researchers to advocate a shift in thinking from preventive measures to flood risk and structural management measures. Recently, the advancement in computer-aided technology has been extensively used in formulating models used for flood calculation and hazard analysis. This study focuses on using a hydraulic model HEC-HMS and HEC-RAS in a GIS environment for the affected areas of Butaleja, generates the inundation area and the return period for the specified flood events. The research involved studying various literature and collecting ancillary data in form of journals and reports. This helped to formulate the methodology for the whole project.

It was followed by the modelling stage. This started with data collection from various sources i.e. from offices. Data collected included: - DEM, discharge flow data, land use/land cover data, rainfall data and soil data. These datasets were conditioned and processed in the GIS environment using the ArcGIS software. Land use and soil data was used to generate Curve number grid and later geo.hms was used to set up a project which involved basin characteristics and processing and exported into HMS to generate hydrograph (peak discharges) to be used in the HECRAS. The IDF curves were generated for a return period of 50 years that gave peak intensity of 804.6mm/hr. and therefore aided in calculating the design flood. The GeoRAS file was exported to the HEC-RAS program to compute for a steady flow simulation. The RAS mapper export from HEC-RAS program was then imported in to ArcMap to delineate a flood plain map which was overlaid to a Google image to determine flood prone areas. The villages included among others like Doho, Kangalaba and wangale.

Finally after the hydrological and hydraulic modelling, the drainage system was then designed with the design parameters already generated

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DECLARATION

By submitting this project report, I **WOKOTO STEVEN** declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Busitema University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: 30/05/2017

Signature: .....

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APPROVAL

This project report has been submitted with the approval of the following supervisors

Mr. Okirya Martin

MAIN SUPERVISOR

Date.....

Ms. Nakabuye Hope Njuki

CO-SUPERVISOR

Date.....

DEDICATION

I would like to dedicate this report to my beloved family especially my mom and dad with their confidence in me to overcome the entire obstacle in my journey to success. After all, we all have dreams, but in order to make dreams come into reality, it takes an awful lot of determination, dedication, self-discipline and effort.

AKNOWLEDGEMENT

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations (DRWM). I would like to extend sincere thanks to all of them.

I am highly indebted to Mr. Okirya Martin and Ms. Nakabuye Hope Njuki for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project.

I would like to express the gratitude towards my parents for their kind co-operation and encouragement which helped me in completion of this project.

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I would like to give a warm and well-deserved thank you to Maximo MWE-Mbale, Faima and Charles DWRM-Entebbe for their hard work, dedication, and soggy feet are greatly appreciated. Without these wonderful, inspiring, and charismatic people, I would not be who I am today, nor would I have accomplished as much as I have through the years. Their unwavering support, encouragement, zest for life, and humor are greatly appreciated.

LIST OF ACRONYOMS

GIS	Geographical Information System
HEC-RAS	Hydrological Engineering Centre-River Analysis System
HMS	Hydrological Modelling System
DWRM	Directorate of Water Resources Management
MWE	Ministry of Water and Environment
DEM	Digital Elevation Model
UNMA	Uganda National Meteorological Authority
USGS	US Geological Survey
TIN	Triangular Irregular Network

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1.0 CHAPTER ONE

1.1 INTRODUCTION

This chapter briefly gives the general information relevant to the research topic whilst clearly showing the problem of interest that forced the researcher to undertake the project. It as well shows how this study provides solution to the identified problems, the objectives and scope of study.

1.2 Background of the study

Human anxiousness as well as quest improve survival chances and gain better control over their environment has indeed succeeded through man's constant exploration, exploitation and alteration of the natural environment. This has enabled man to achieve urbanization, industrialization and development in general. These developments have not come without a very high price due to the vindictive nature of the environment. The result or implication of human developments is the evolution of serious environmental problems such as deforestation, erosion, global warming, flooding, pollution and recently climate change etc. (Nwoko, 2013)

Surface water drainage has always been a very important aspect on the global scale and has presented a number of implications onto the inhabitants of urban areas. The rapid urbanization

in developing countries and world over has led to the massive increase in human settlement which is growing faster than the rate at which the drainage network is being enhanced causing a mismatch between service and urbanization. This leads to health, social and economic problems which affect the urban settlers especially the poor. Because of these enormous mismatch related problems such as drainage. In many settlements of the developing countries of the world studies have indicated that drainage systems have been a big deterrent in the development of low cost settlements. It has led to serious and hazardous flooding and submergence of structures constructed on unsuitable land like low lying areas or reclaimed land for residential, industrial and, at times, commercial development. (Paul, 2011)

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