



**FACULTY OF ENGINEERING**

**DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING.**

**FINAL YEAR PROJECT REPORT**

**DESIGN AND CONSTRUCTION OF A PORTABLE UNPLANTED DRYING BED FOR  
FAECAL SLUDGE TREATMENT**

**(case study: Kyaka II refugee settlement)**

**BY**

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## ABSTRACT

The most common on-site sanitation systems (OSS) used in Kyaka II refugee settlement are pit latrines including individual and public ones. Currently, there is no disposal facility for treating emptied faecal sludge (FS) from the OSS which poses severe risks to both human health and environment at large.

This research therefore, aimed at designing and constructing an experimental physical model for testing the performance of unplanted drying beds system for treating FS from OSS by characterizing it in order to know its physio-chemical properties and quantifying the FS purposely to know the quantities to be treated overtime for the ultimate design year of 2046. The results from the laboratory analysis of the sludge indicated that the high strength nature of the FS with an average Total Solids concentration of 33.44g/l. This and other field data obtained during the research were used to come up with the design of the beds for treating the settlement's FS in order to reduce its level pollutant concentration before discharge into environment and/or disposal or re-use of the by-product.

The physical experimental model was set up in the field to test the performance of the system upon treatment of the FS generated within the settlement. The environmental impact Analysis (EIA) upon discharge of the leachate was also carried out. In the physical model, the FS was screened with a bar screen structure and allowed sludge to be loaded in batches and the structure monitored for 19 days to collect the leachate for analysis and from the EIA basing on percentage removals, the structure was recommended for the treatment of sludge from the settlement.

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## DEDICATION

I dedicate this report to all my family members for the love, care and tireless efforts they render to me more so my father **Mr. MUGERWA EDWARD** and my beloved **late mum Madam NANYOMBI MARGRET**, my beloved sister **NAKANJAKO ANNEMARY** and all my other relatives. May the Almighty God bless you abundantly.

**DECLARATION**

I **KIKABI AGGREY EDWARD**, declare to the best of my knowledge that this final year project report is as a result of my research and efforts.

Student's signature.....

Date.....

**APPROVAL**

This report has been submitted to the department of Mining and Water Resources Engineering of Busitema University with approval of the following University supervisors.

**SUPERVISOR: Mr. IGGA HUZAIRU**

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Date.....

**CO-SUPERVISOR: Mr. BADAZA MOHAMMED**

Signature.....

Date.....

## LIST OF ACRONYMS AND ABBREVIATIONS

**WHO**-World health Organization

**UNICEF**-United Nations International Children's  
Emergency Fund.

**MGDs**- Millennium Development Goals

**SDGs** -Sustainable Development Goals

**MSW**-Municipal Solid Waste.

**SDC**-Swiss Agency for Development and Cooperation.

**UPDB**-Unplanted Drying Bed.

**FSTP**-Faecal Sludge Treatment Plant.

**UNHRC**-United Nations Human Rights Council.

**BOD**-Biochemical Oxygen Demand.

**UNEP**-United Nations Environmental Program

**USEPA**-United States Environmental protection Agency.

**NWSC**- National water and sewerage corporation.

**PH**-Potential Hydrogen.

**TSS**-Total Suspended Solids.

**TVS**-Total Volatile Solids.

**SLR**-Sludge Loading Rate.

**SSW**-Septic Solid waste.

**UN**-United Nations.

**FS**-Faecal Sludge.

**PDB**-Planted Drying Bed.

**OSSFs** -Onsite Sanitation Facilities.

**COD**-Chemical Oxygen Demand.

**FMS**-Faecal Sludge Management.

**TS**-Total Solids.

**MoH**-Ministry of Health

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