



**FACULTY OF ENGINEERING**  
**DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING**  
**FINAL YEAR PROJECT REPORT**  
**DESIGN OF A SLUDGE MANAGEMENT SYSTEM FOR**  
**BUGOLOBI SEWAGE TREATMENT PLANT.**

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**MAY, 2015**

### DECLARATION

I hereby declare that all information and illustrations that have been put down are a reflection of my efforts placed in the project according to the best of my study, training and research and not from any external transfer, copy or illegal methods.

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**APPROVAL.**

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## DEDICATION

I dedicate this report to my siblings; **Allan Kizza, Catherine Nakamya Ssebwufu, Brian kityo, Grace Kyaterekera, Moses Ssozi Hussein and Maria Zahiya**. I love you from the bottom of my heart.

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May the Almighty God bless the works of your hands.

**LIST OF ABBREVIATIONS**

BSTW – Bugolobi Sewerage Treatment Works

STW – Sewage Treatment Works

DWF – Dry Weather Flow

BOD – Biological Oxygen Demand

TSS – Total Suspended Solids

DS – Dry Solids

VS – Volatile Solids

VOC – Volatile Organic Compounds

COD – Chemical Oxygen Demand

pH- Potential Hydrogen ions

i.e- that's to say

HRT – Hydraulic Retention Time

SRT – Solids Retention Time

**LIST OF FIGURES**

- Figure 1..... Wastewater treatment plant with mechanical and biological treatment.
- Figure 3.1.....BOD<sub>5</sub> under analysis
- Figure 3.2..... A multi-meter on a magnetic hot plate for determining the TSS
- Figure 3.3.....The pH meter for determining the pH
- Figure 3.4..... Anaerobic digester
- Figure 3.5..... Standard Rate Anaerobic Digester
- Figure 3.6..... High Rate Anaerobic Digester
- Figure 3.7..... Aerobic Digester
- Figure 3.8.....A modern Sanitary landfill

**TABLES**

Table 1..... Concentrations of phosphorus, nitrogen, metals and organic indicator substances in sludge from municipal wastewater treatment plants in Sweden year 2002

Table 2..... Composition of primary and secondary sludge

Table 4..... Typical concentrations of some micro-organisms in untreated sludge per g wet weight

Table 4.1..... The physiochemical characteristics experimental results



### ABSTRACT

Sludge is water that contains suspended solids from the source water and the reaction products of chemicals added in the treatment process. The treatment and disposal of sewage sludge is an expensive and environmentally sensitive problem. It is also a growing problem world-wide since sludge production will continue to increase as new sewage treatment works are built and environmental quality standards become more stringent. With some traditional disposal routes coming under pressure, and others such as sea disposal having been phased out, the challenge facing sludge managers is to find cost-effective and innovative solutions whilst responding to environmental, regulatory and public pressures. Recycling and use of wastes are the preferred options for sustainable development, rather than incineration or landfilling, but with sewage sludge this is not straight forward because of perceptions over contaminants, pathogens and its faecal origin, particularly by the food retailers. If future quality standards for sludge and the receiving environment are made too stringent, the agricultural outlet may become untenable for the water utilities resulting in sludge being disposed of by other means that offer the utilities greater operational and financial security, but which may be less acceptable in the long-term

Table of Contents	
<b>DECLARATION</b> .....	ii
<b>APPROVAL</b> .....	iii
<b>DEDICATION</b> .....	iv
<b>ACKNOWLEDGMENTS</b> .....	v
<b>LIST OF ABBREVIATIONS</b> .....	vi
<b>LIST OF FIGURES</b> .....	vii
<b>TABLES</b> .....	viii
<b>ABSTRACT</b> .....	ix
<b>CHAPTER ONE</b> .....	1
<b>1.0 Background</b> .....	1
<b>1.1 Statement of the problem</b> .....	1
<b>1.2 Justification</b> .....	1
<b>1.3 Scope</b> .....	1
<b>1.4 Objectives</b> .....	2
<b>1.4.1 Main objective</b> .....	2
<b>1.4.2 Specific objectives</b> .....	2
<b>1.5 Significance of the study</b> .....	2
<b>CHAPTER TWO</b> .....	3
<b>2.0 Literature review</b> .....	3
<b>2.1 Sewage sludge</b> .....	3
<b>2.1.1 Origin of the sludge</b> .....	3
<b>2.1.2 Sludge composition</b> .....	4
<b>2.1.3 Water content</b> .....	6
<b>2.1.4 Sludge Management in Kampala</b> .....	6
<b>2.2 Contaminants of concern in sludge treatment</b> .....	7
1. Biochemical Oxygen Demand (B.O.D).....	7
2. Chemical Oxygen Demand (COD).....	8
3. pH.....	8
4. Temperature.....	9
5. Biological community.....	9
6. Phosphates.....	10
7. Total suspended solids(TSS).....	10
<b>2.3 Treatment and disposal methods</b> .....	11

2.3.1 Treatment methods.....	11
2.3.1.1 Conditioning.....	11
2.3.1.2 Sludge thickening.....	11
2.3.1.3 Dewatering.....	12
2.3.1.4 Stabilization.....	12
2.3.1.5 Disinfection.....	13
2.3.1.6 Volume Reduction.....	13
2.3.2 Disposal methods.....	13
2.3.2.1 Deposition/ Land fill application.....	14
2.3.2.2 Incineration.....	15
2.3.2.3 Use of sludge in agriculture and other land use.....	15
<b>CHAPTER THREE.....</b>	<b>17</b>
<b>3. METHODOLOGY.....</b>	<b>17</b>
3.1 Location of the project.....	17
3.2 The characterization of the composition of sludge at BSTW.....	17
I. Biological Oxygen Demand (BOD <sub>5</sub> ).....	17
II. Chemical Oxygen Demand (COD).....	18
III. Determination of total suspended solids by dr/2010.....	18
IV. pH (potential hydrogen ions).....	19
3.2.2 Characterization of the Sludge Quantities.....	20
3.3 To identify feasible sludge management technologies.....	20
3.3.1 Anaerobic Digestion:.....	21
3.3.2 Aerobic Digestion:.....	24
3.4 To select and design the individual components of the appropriate system.....	25
The design of individual components of anaerobic digester.....	25
3.3.1 Materials and equipment.....	25
3.3.2 Method of data collection.....	25
3.3.3 Design parameters for the anaerobic digester.....	26
3.5 To identify feasible disposal options.....	27
<b>CHAPTER FOUR.....</b>	<b>30</b>
<b>4.0 RESULTS AND DISCUSSION.....</b>	<b>30</b>
4.1 Results from the sewage sludge composition tests.....	30
4.2 Discussion.....	30
For the second specific objective;.....	31

## CHAPTER ONE

### 1.0 Background

Bugolobi Sewerage Treatment Works (BSTW) was constructed prior to 1940 and subsequently extended during the periods of 1956/1958 and 1968/1978. It is located on plot 10/13 spring road/old port-bell road. It covers an area of approximately 27 hectares. Domestic sewage is predominantly treated using a conventional system designed to handle a hydraulic flow capacity of 33,000 m<sup>3</sup>/day with a dry weather flow (DWF) of 16,000 m<sup>3</sup>/day. However on average, the STW receives 15,000 m<sup>3</sup>/day of very strong raw sewage with BOD range of 230 – 550 mg/l and TSS of 200 – 800 mg/l.

### 1.1 Statement of the problem

In Kampala, due to a problem of rapid population growth associated with urbanization and industrialization, Sewage treatment plants are faced with the problem of receiving very strong raw sewage which has to be treated to meet acceptable effluent standards. This produces vast amounts of sludge which poses a very strong public health hazard to the community around if not treated to acceptable standards. All the while sludge disposal options are continually being dwarfed by the increasingly stringent environmental regulations leading to acute shortages of disposal options for sewage treatment plants case in point Bugolobi sewage treatment plant. Thus the need for an appropriate management system to address the growing concerns.

### 1.2 Justification

Sludge management is an important part of any municipal waste water treatment plant because it finds means of reducing the likely hazards of sludge if not treated properly prior to discharge to the environment. The purpose of this research is to design appropriate systems that will be able to handle increasing amounts of sludge handled at Bugolobi STP while disposing it of in ways that conserve the environment and do not threaten human health especially to downstream users

### 1.3 Scope

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