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FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF CIVIL AND WATER ENGINEERING

FINAL YEAR PROJECT (MAY 2011)

**PROJECT TITLE: *RESEARCH AND DESIGN ON SUSTAINABLE
RURAL WATER SUPPLY CASE STUDY (CHITEKETE).***

STUDENT: TSIKISAYI PARDON (N006 681F)

SUPERVISOR: MS E. MANGORE

May 2011

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Abstract

During the Colonial regime blacks were moved from their ancestral land to be resettled in inhospitable areas like Chitekete which is Tsetse fly infested. The area is also haunted by perennial water shortages, despite efforts by past planners to try to alleviate the community from their plight, little has been achieved as some people walk 10km to get to the nearest water source

The aim of the project is to design an appropriate and economical water system, which utilizes locally available materials to cut the project cost, for Chitekete rural community, with the involvement of the community from planning, design, operation and maintenance of the project. And the following specific objectives 1) Physical quantity assessment and economical feasibility of all potential water sources which are capable of meeting the community's demand. 2) Carry out water quality test, yield estimation and demand estimate in line with population growth projections. 3) To consult the community on their expectation from the water supply system and how much effort they are prepared to help in setting up the water supply system. 4) Determining the reduced levels pumping, gravity and distribution main in order to design all the distribution mains and gravity mains.

A baseline survey was carried out with questioners and meetings with the community in Chitekete. The community consists of 15 villages with an average of 40 households each, 3 primary and 2 secondary schools. There are also 90 shops along the way from Sasame River to Chitekete, which are all in dire need of a piped water supply as the water shortage is currently hampering their operation. The community leadership expressed their will to have a water supply system serving the entire community. They proposed having communal stand pipes being shared by approximately 12 households supplying all the villages along the way and stand alone pipes for the shops and business premises.

Sand Abstraction Schemes (*SAS*) are most sustainable means of water supply with water being abstracted from Sasame River through a series of artificial boreholes. From there it will undergo a full treatment process this is line with Zimbabwe National Water Authority (*ZINWA*) standards

of quality assurance. SAS have been used as a means of water supply mainly in Matabeleland with a considerable rate of success despite water shortage during the critical period.

Design calculations and drawings were produced for the area under study then a Bill of Quantities for the entire requirement to set up the water supply. The project determined the following components for the Water Supply System:

- i. Well point
- ii. Treatment plant
- iii. Pumping main
- iv. Gravity reservoir
- v. Gravity main
- vi. Booster station

Keywords:

Water Supply, Sand Abstraction Scheme (SAS), Treatment plant, Booster station, Stand Pipes