UNIVERSITY OF NAIROBI
DEPARTMENT OF GEOLOGY

UNDERGROUND USE BY TUNNELING IN NAIROBI

SGL 413: PROJECT IN GEOLOGY

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REG NO: I13/3159/2008

SUBMITTED TO COURSE CO-ORDINATORS
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6/1/2012

A PROJECT SUBMITTED TO THE DEPARTMENT OF GEOLOGY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR OF SCIENCE IN GEOLOGY AT THE UNIVERSITY OF NAIROBI.

ABSTRACT

This tunneling project has been necessitated by the congestion of roads by motor vehicles that have outnumbered the capacity of roads to accommodate them. This phenomenon is progressively becoming a nightmare in the City center of Nairobi. If necessary measures aren't taken in stride, even the authorities wouldn't be able to handle the anarchy witnessed on the roads. It is in this respect that this project is relevant to the quick industrialization of the country towards achieving economic stability embedded in the Vision 2030, in terms of efficiency in goods and service delivery to ensure that no losses are incurred in transactions involving transports along Nairobi's roads.

The use of Google earth and Geographical Information System has been useful in delineating the geological boundary through which the routes will pass through and the geologic formations in Nairobi area are, undifferentiated Ngong volcanic material, Basanites and Tephrites, Kandizi phonolites, Nairobi Trachytes, which covers most of the Karen area; middle and upper Kerichwa valley tuffs which cover Wilson Airport area, Nairobi phonolites – of lower Trachyte Division, which cover most of the Eastern parts of Nairobi, including Jommo Kenyatta International Airport (JKIA). The CBD and the rest of the city is covered in various form of Trachytes.

The tunneling methods selected are in accordance with the different sub-surface conditions that exist within Nairobi and its outskirts that direct traffic in and out of the city. Some of the methods are Shallow Tunneling methods, Shield tunnels, New Austrian tunneling methods and Tunnel Boring machines. It is in the profiling of sub-surface conditions that geology comes into play in recognizing the properties of different formations and their relevance towards handling them in initiating this project.

The hazards towards tunneling both natural like faults and artificial hazards like overbreaks have been exposed and dealt with by geological solutions.