

## **ABSTRACT**

The subgrade used on the paved roads within Syokimau, composed of black cotton soil, is challenging to work with. This makes the roads to be in such a bad state as heaving and cracks develop on minor roads hence making the need to remove a layer of the soil replacing it with a better material. This study analyzed processes involved in the stabilization of black cotton soil with waste rPET. The main objective was to establish the feasibility of using waste plastic in stabilizing black cotton soils for subgrade on paved roads in the ongoing JKIA-Syokimau, Nairobi Expressway in Nairobi and Machakos counties. Other objectives were; to determine the physical and mechanical properties of black cotton soil if used on the paved road in the said expressway, to determine the optimum performance of black cotton soil stabilized with waste rPET for paved road sand to highlight the potential economic benefits over other stabilizers such as cement and techniques such as soil replacement. Waste rPET was used in this study because of its overwhelming abundance in the waste sites as well as the close proximity of the recycling plant (Mr. Green Africa), located in Sameer Business Park, to the site of works. However, this does not come close to the environmental benefits of using rPETs. It was evident that 2% waste rPET by weight of dry soil was the optimum for effective stabilization of lateritic soil. The study established that neat black cotton specimens gave lower California Bearing Ratio values than one mixed with waste PET. The increase in California Bearing Ratio values for black cotton soil mixed with PET higher than those of neat soil was an indication that PET caused the strength of the soil to increase and therefore it stabilized laterite soil. Waste rPET improved the engineering qualities of the soil i.e. California