

Exploring the potential of OSM Data in the Identification of Buildings Illegally Developed on the Riparian Zone of Ngong River-Kenya

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Study Area:

Background

One of the main cause of urban floods in Kenya, which has been identified by many researchers is illegal settlement and development of structures along the riparian zones of rivers that pass through or near urban centers. Such structures usually interfere with the smooth flow of water and hence increasing the chances of flooding.

In this research, we sought to find out if OSM data can help in identifying the illegal structures which were interfering with the smooth flow of water in Ngong River in Nairobi-Kenya.

Objective:

To explore the potential of OSM in mapping the illegal physical developments on riparian zone that interfere with water flow and hence causing floods

Data and Methods

A 30m river buffer was generated to identify the extent of the riparian zone along Ngong River in the Southern parts of Nairobi City.

The OSM data were then downloaded and overlaid with the river buffer in order to identify the structures which were erected on the waterways

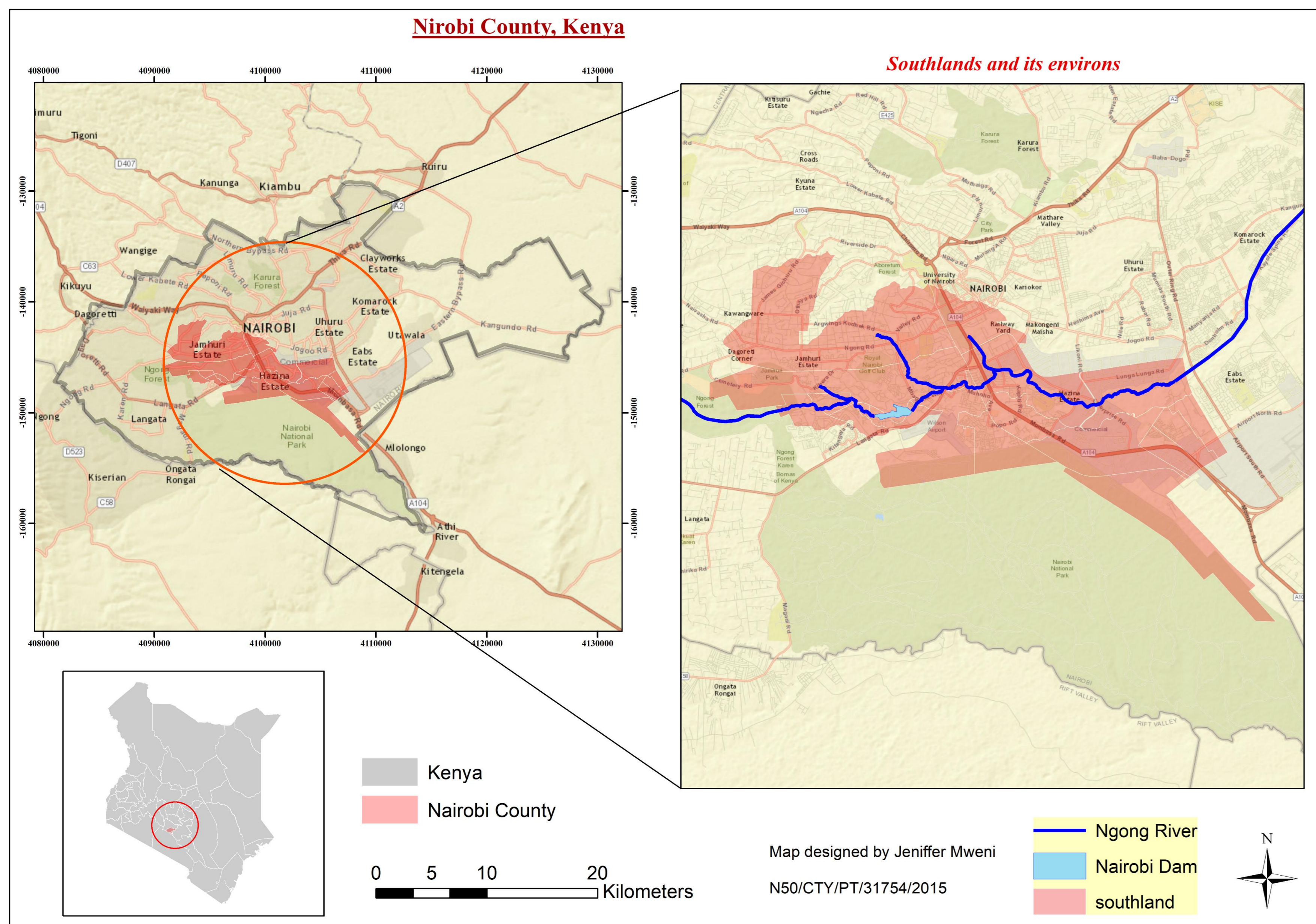


Figure 1: Map of Southern parts of Nairobi City, Kenya

Results

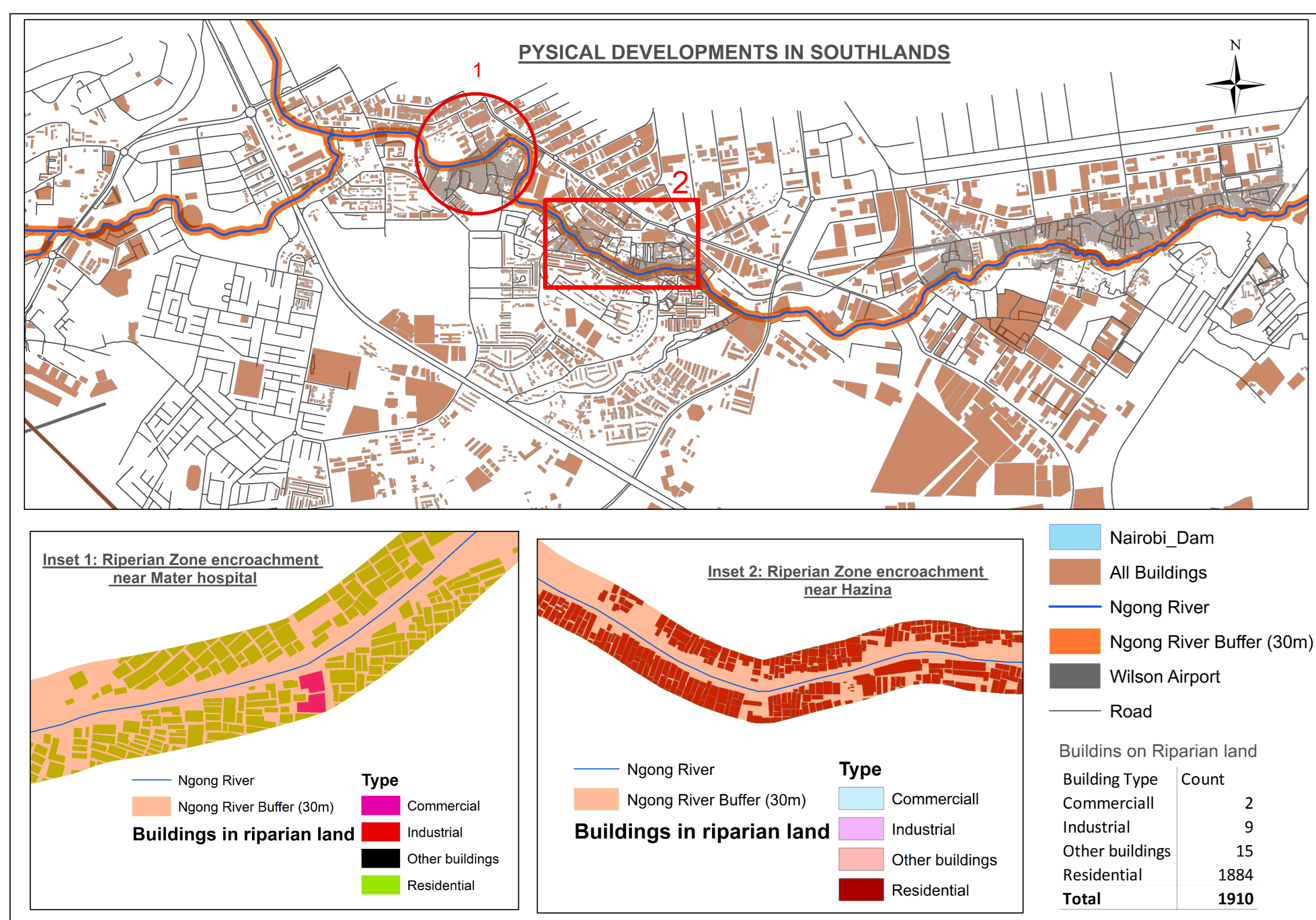


Figure 2: Map showing Buildings on the riparian zone of Ngong River

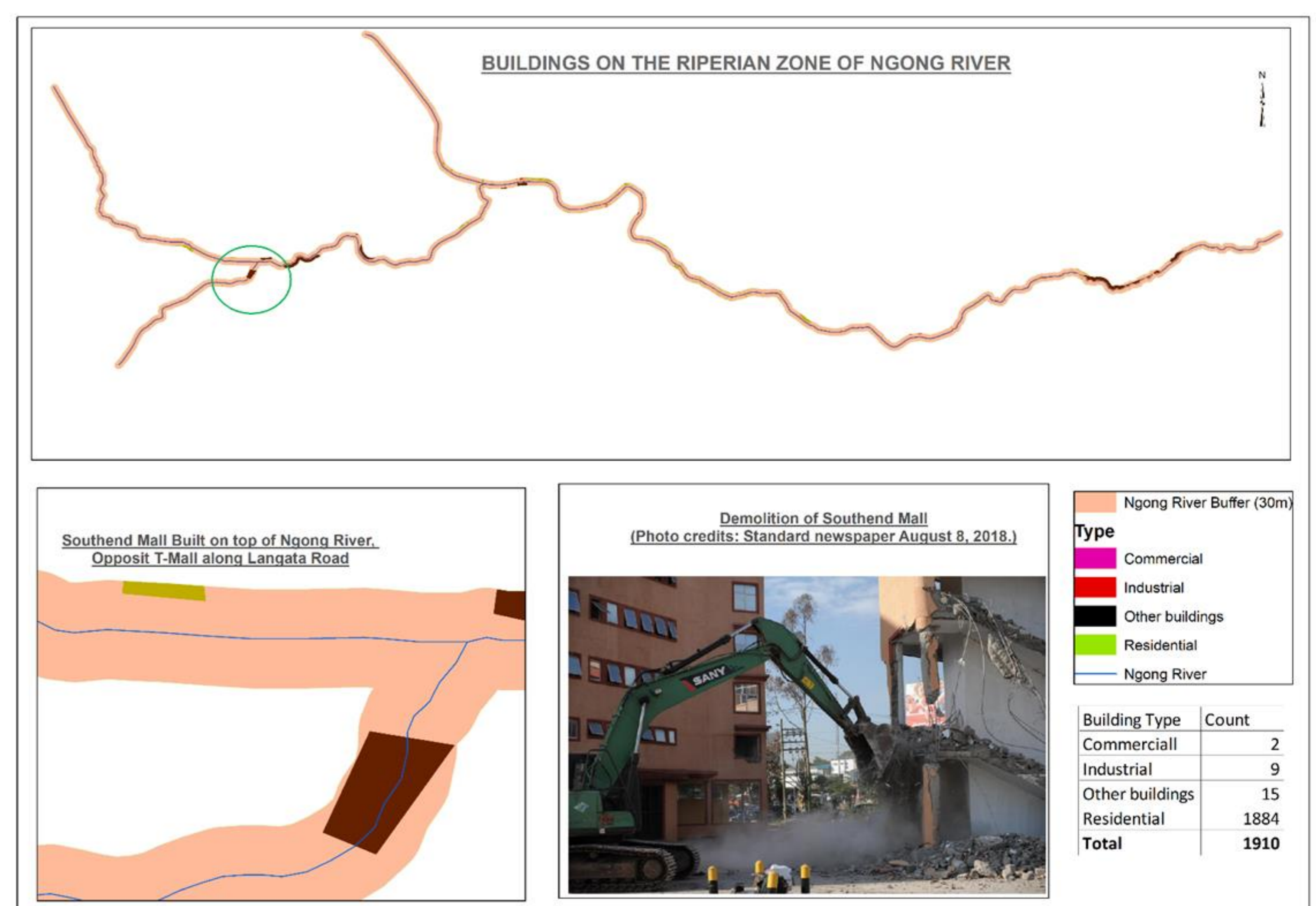


Figure 3: One of the identified buildings on waterway being demolished

Through Open Street Map data we were able to identify 1910 buildings that were on the riparian zone with some being built on top of the waterways. Some of the buildings that were identified to be on the riparian zone have already been demolished as shown in Fig 3.

Discussion and Conclusion

The analysis of the historical Open Street Map data showed an upward trend in the encroachment of the riparian zones of Ngong river. This was done by generating a buffer of 30m from the river and counting the number of buildings within the generated buffer ring. The 30m buffer is defined by the law as a region and/or distance that should not be developed so as to allow conservation of natural river ecosystem to thrive. The structures on the riparian zones of Ngong river interferes with the smooth flow of water by creating a narrow water passage and/or blocking it completely hence making the place vulnerable to flooding even when the rainfall received is not too much.

The analysis of Open Street Map data indicated a strong correlation between the level of encroachment of riparian zone and flooding in southern parts of because the places along Ngong river which had dense structures on riparian zone also had more frequent and severe incidences of floods than other places. OSM data from the user community and volunteers plays a very important role in creating a spatial information to address environmental problems in our society and will be even better when authoritative data is updated more often.

References

- Panyako et al. (2015). *Environmental attitude and effect of flooding on households in Mavoko peri-urban settlements of Nairobi Metropolis, Kenya*, 3(4), 1–21.
- Murgor, L. (2016). *Planning Implications of Informal Economic Activities in Nairobi South B Residential Area*. Nairobi: Department of Urban and Regional Planning, The University of Nairobi.