A LETTER OF RECOMMENDATION FOR EXEMPTION FOR THE MDLETSHE (PHASE 2) RURAL HOUSING DEVELOPMENT: HLABISA LOCAL MUNICIPALITY

FOR K2M ENVIRONMENTAL

DATE: 27 MARCH 2017

By Gavin Anderson

Umlando: Archaeological Surveys and Heritage Management

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Abbreviations

HP	Historical Period
IIA	Indeterminate Iron Age
LIA	Late Iron Age
EIA	Early Iron Age
ISA	Indeterminate Stone Age
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
HIA	Heritage Impact Assessment
PIA	Palaeontological Impact Assessment

INTRODUCTION

The Department of Economic Development, Tourism and Environmental Affairs was approached with regards to whether state funded rural housing projects on Ingonyama Trust Land such as that of the proposed development requires an Environmental Authorization. DEDTEA, after having considered the nature of this development determined that no environmental authorization for the proposed development will be required from the Department, as there are no listed activities which are triggered under the Environmental Impact Assessment Regulations (the EIA Regulations, 2014).

The project area falls within Wards 5, 6, and 7 and a portion of Wards 4 and 8 of the Hlabisa Local Municipality. The total extent of the project area is approximately 37 377.70ha. The total population of the Hlabisa Local Municipality, as recorded in the Census 2011 is estimated at 71 925 persons while the overall population of the Mdletshe (Phase 2) Rural Housing project area is approximately 37 038 persons.

The proposed housing development will consist of the construction of approximately 2 500 new top structures within the project area, and will therefore service approximately 2 500 beneficiaries and their associated families.

This letter does not cover the bulk services.

Umlando was appointed by K2 Environmental to assess the need for an HIA for the proposed Fig's 1 – 3 show the location of the proposed development.

FIG. 1 GENERAL LOCATION OF THE STUDY AREA

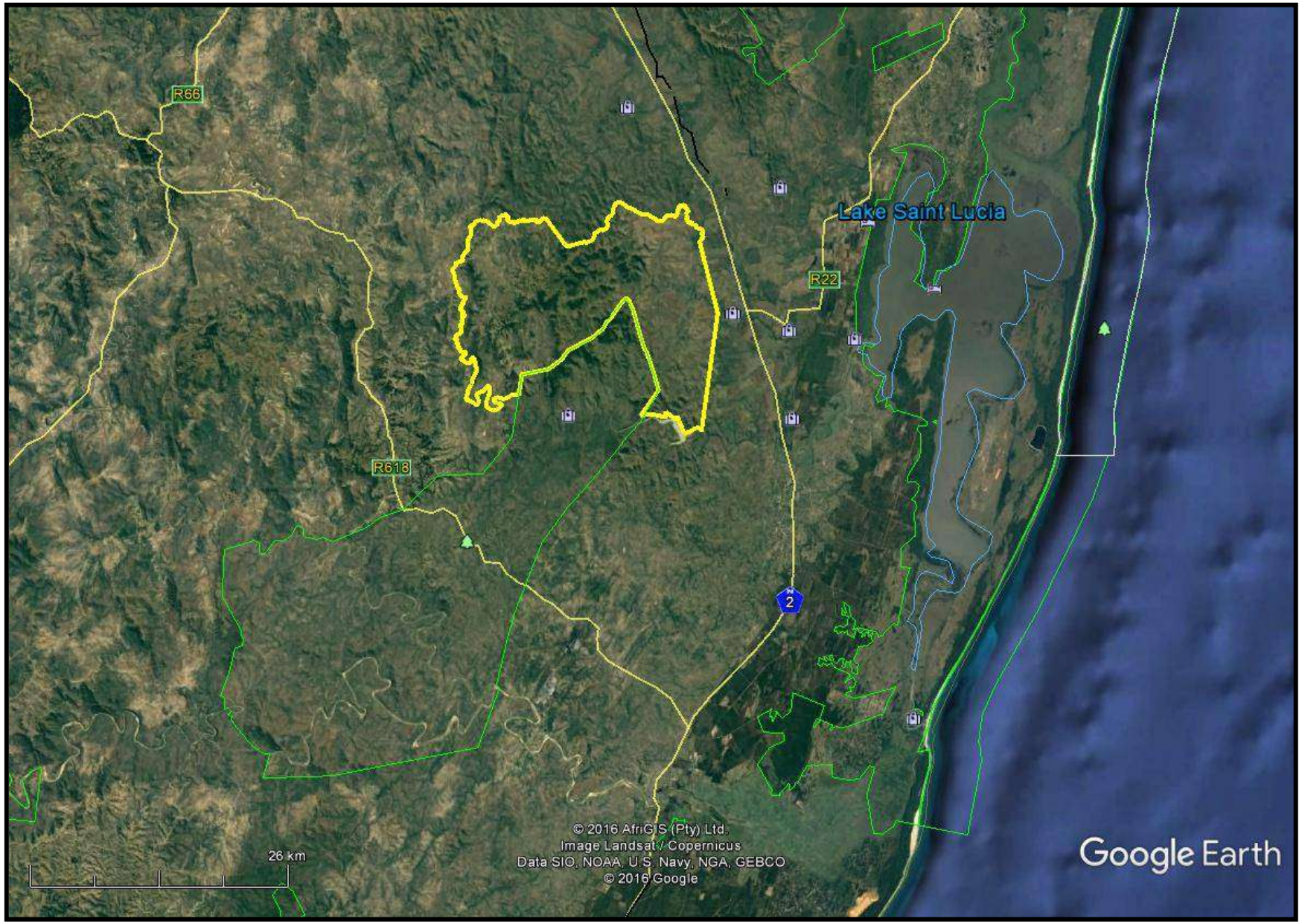


FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA

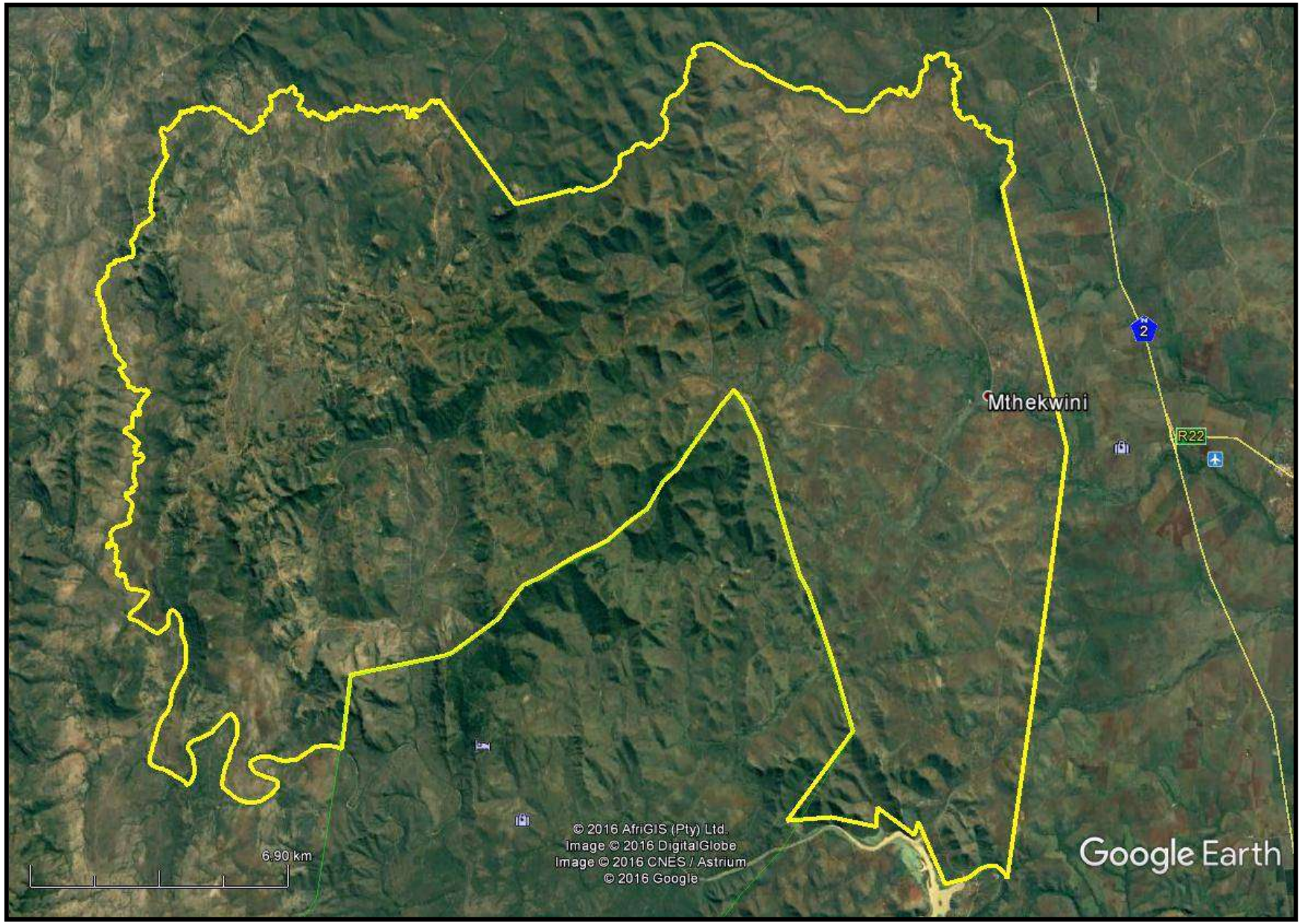


FIG. 3A: TOPOGRAPHICAL OVERVIEW OF THE NORTHWESTERN STUDY AREA

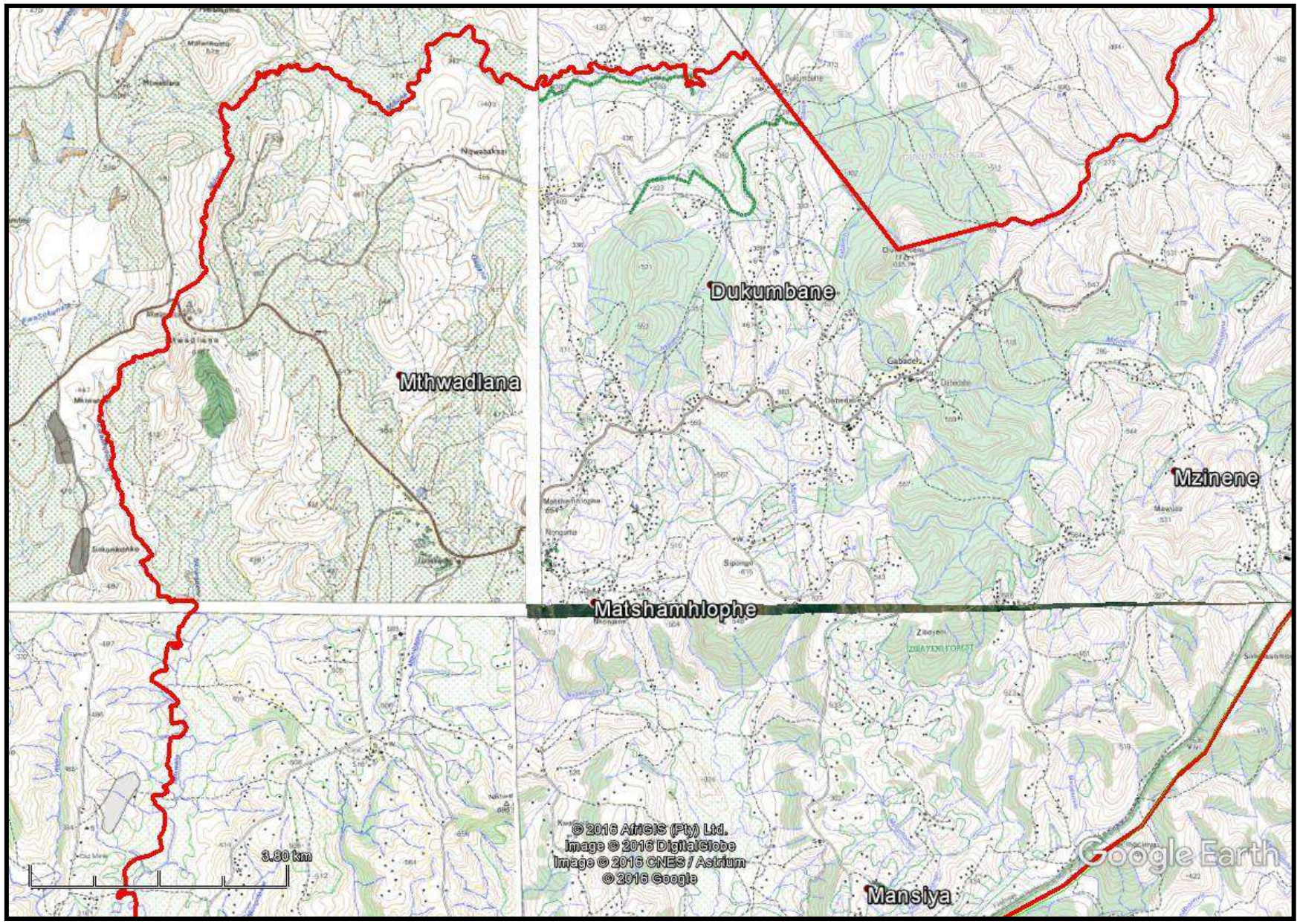


FIG. 3B: TOPOGRAPHICAL OVERVIEW OF THE NORTHEASTERN STUDY AREA

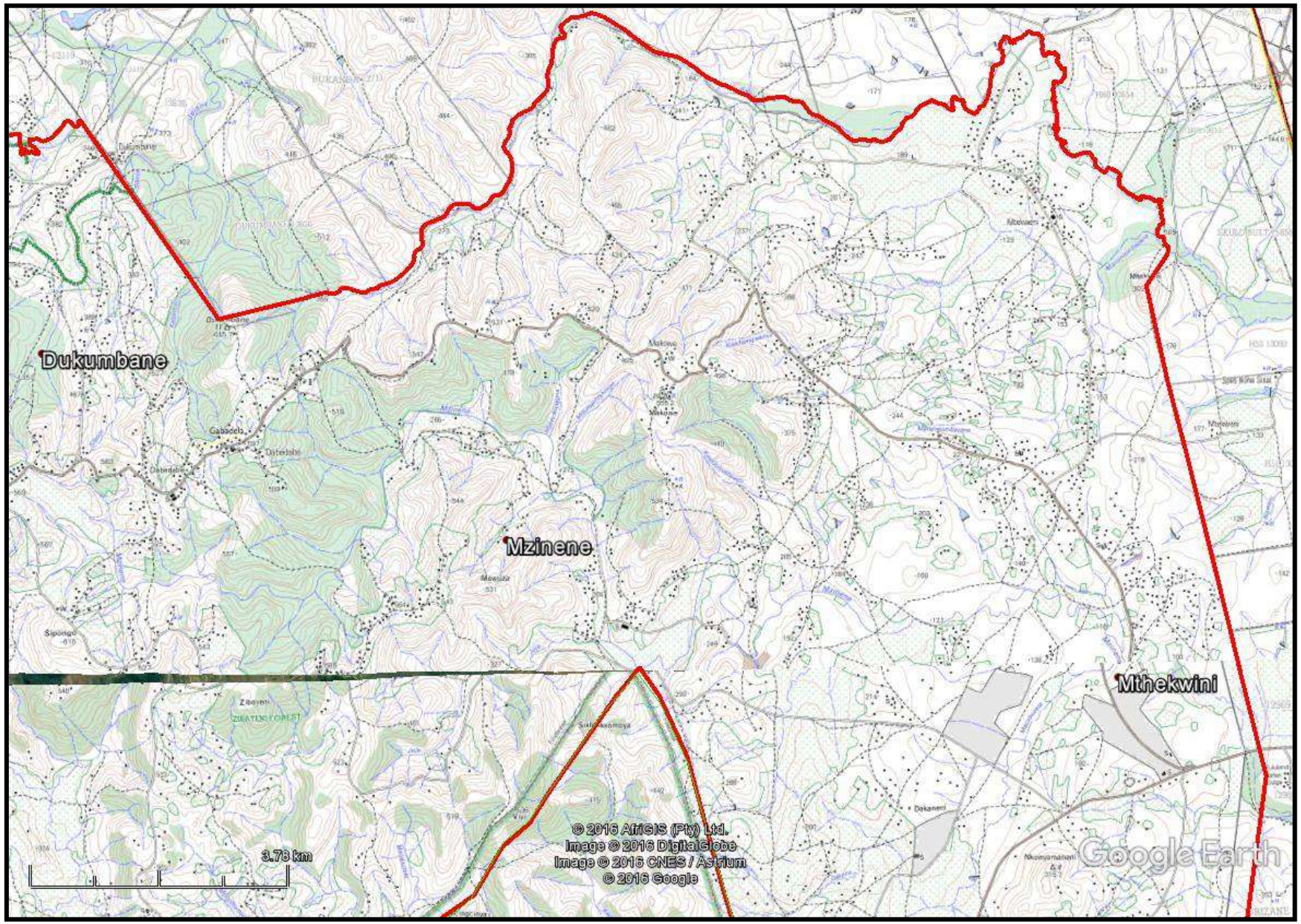


FIG. 3C: TOPOGRAPHICAL OVERVIEW OF THE SOUTHEASTERN STUDY AREA

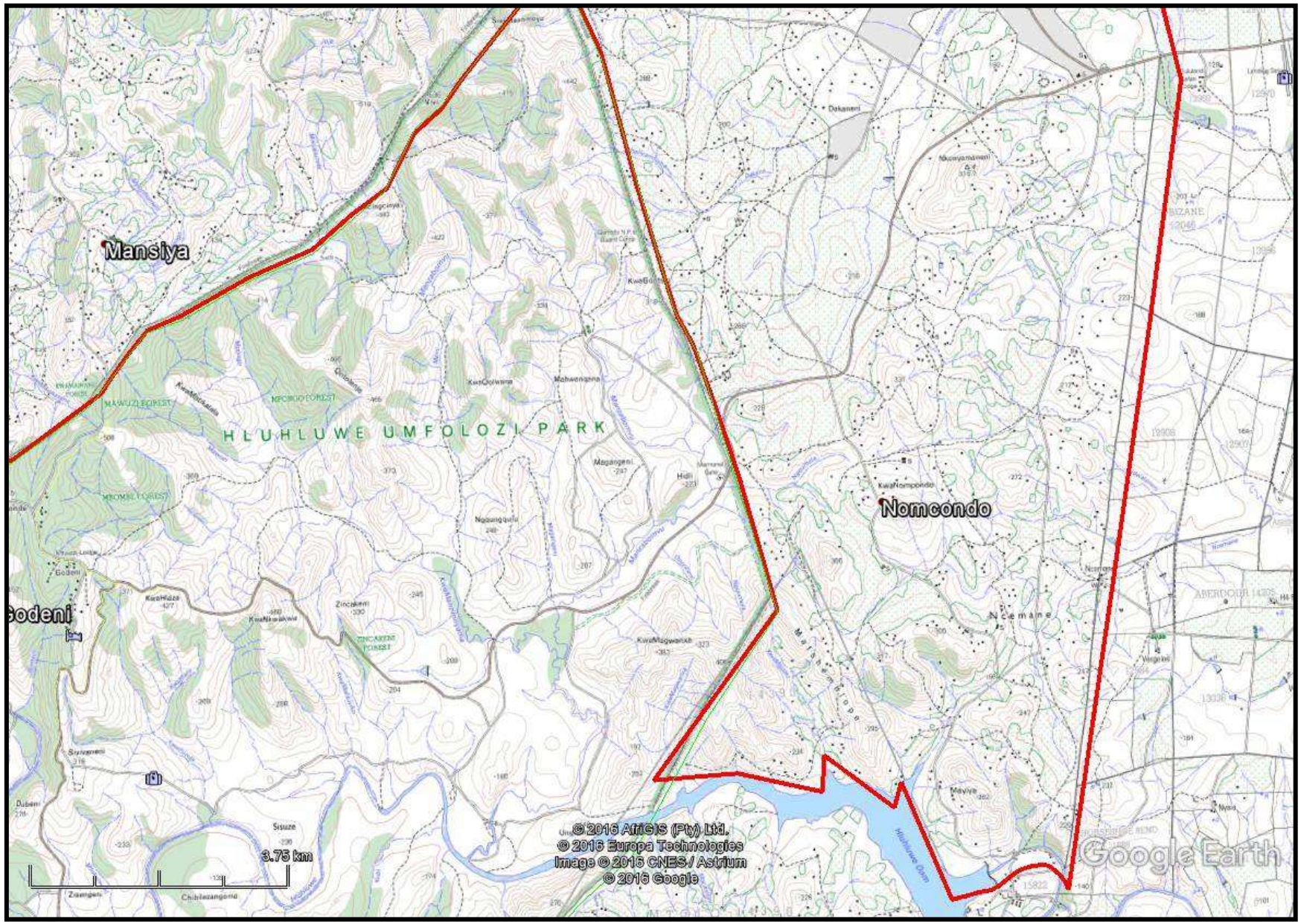


FIG. 3D: TOPOGRAPHICAL OVERVIEW OF THE SOUTHWETERN STUDY AREA

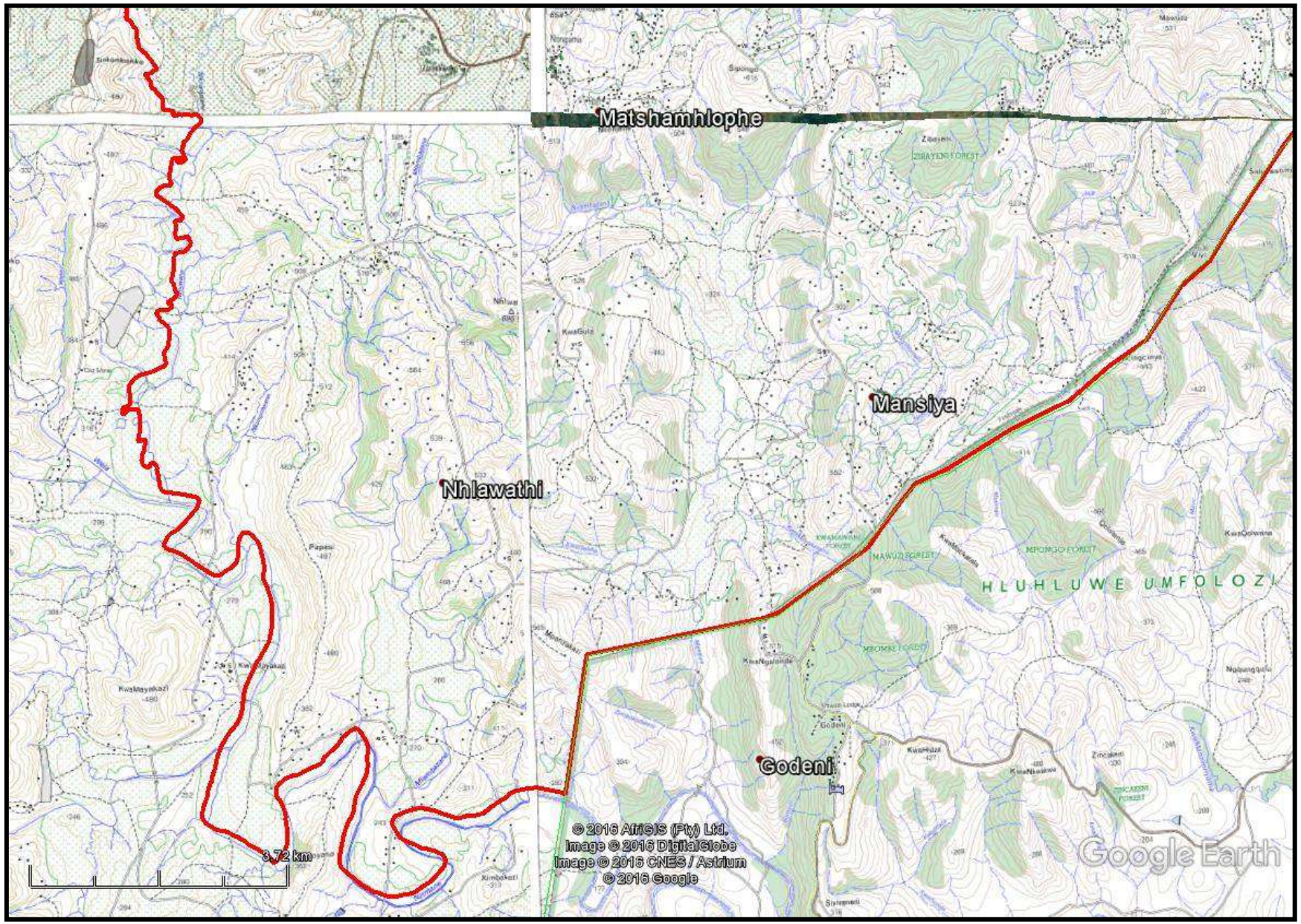


FIG. 4: SCENIC VIEWS OF THE STUDY AREA

DESKTOP STUDY

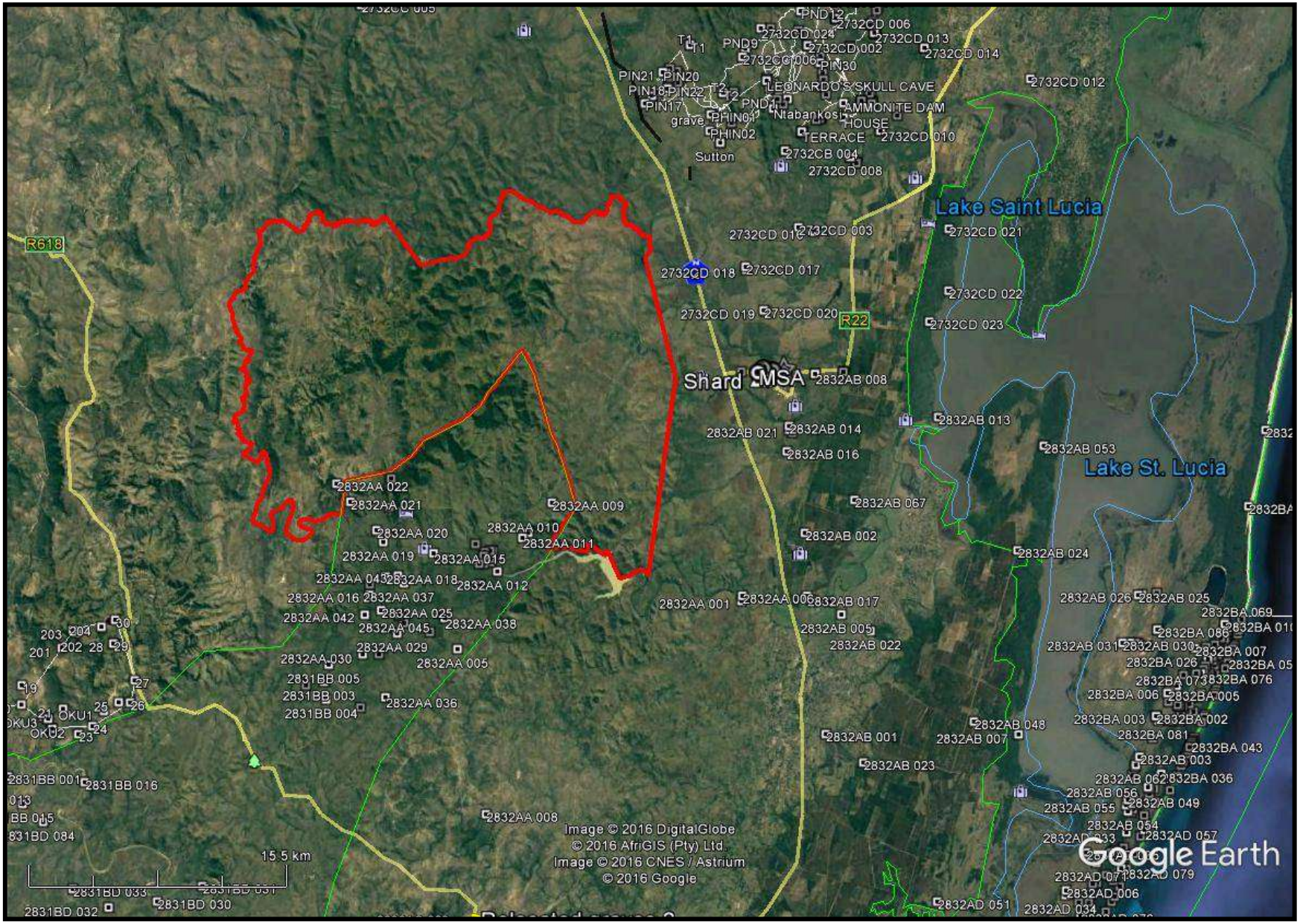
The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. The archaeological database indicates that there are archaeological sites in the general area (fig. 4). These sites include all types of Stone Age and Iron Age sites and ar the result of systematic archaeological surveys. One archaeological site occurs in the study area:

1. 2832AA 022
    a. Mpanzakazi shelter: Large shelter in Table Mountain Sandstone facing northwest. A good sandy deposit covers shelter floor at dripline and forms a thin talus slope outside. Wall covered with a red mineral deposit.
    b. Archaeological content: LSA: Smithfield "N" flakes and blades of quartzite, quart and chert, occurring at 1per sq m on surface; small quartzite core. No paintings.

This suggests that there are open scatters of stone tools in the area and ploughed fields, but these are in a secondary context. More importantly, there are overhangs and shelters with deposit and rock art images along the various sandstone bands. These will not be affected by the proposed housing.

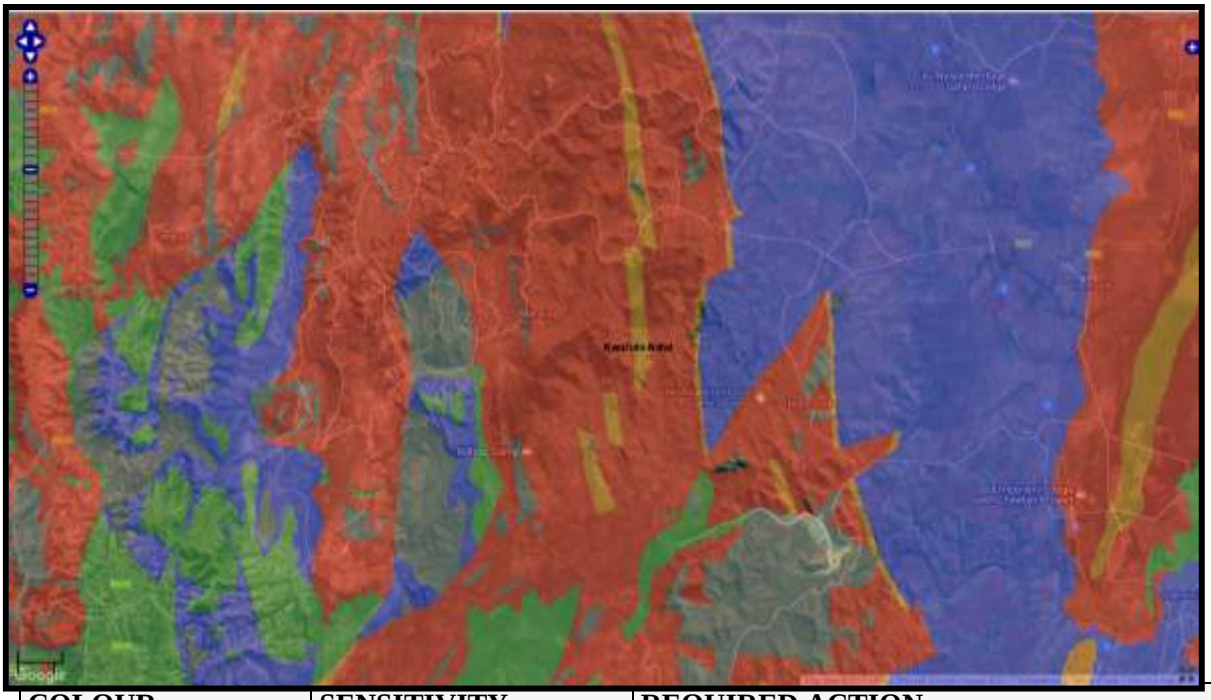
No national monuments, battlefields, or historical cemeteries are known to occur in the study area.

FIG. 5: LOCATION OF KNOWN HERITAGE SITES NEAR THE STUDY AREA



The palaeontology for this area is mostly orange red on the SAHRIS map, i.e. of high to very high sensitivity (fig. 6). However, the housing development is unlikely to affect any sensitive layers. The housing will occur in already disturbed areas and trenching for houses should not be too deep to disturb *in situ* finds. A letter of exemption for the PIA occurs in Appendix A.

FIG. 6: PALAEONTOLOGICAL SENSITITIVY



COLOUR	SENSITIVITY	REQUIRED ACTION
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

CONCLUSION

A brief desktop heritage survey was undertaken for the proposed Qhudeni Rural Subsidised Housing Project. The proposed development will occur in existing housing footprints and thus the area to be disturbed has been disturbed already. Any graves that exist in the individual households will be managed by the family.

A brief desktop analyses indicates that the footprint areas are unlikely to yield *in situ* archaeological and palaeontological finds.

I recommend that the Mdletshe housing project be exempt from further HIA mitigation.

This exemption is only for the building of existing houses and their footprints, and not other infrastructures such as pipelines and roads.

REFERENCES

2731DD_1986_ED2_GEO Ngxongwane

2732CC_2002_ED4_GEO Mhlosinga

2831BB_1999_ED3_GEO Hlabisa

2832AA_1999_ED4_GEO Ntondweni

EXPERIENCE OF THE HERITAGE CONSULTANT

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the Association of Professional Archaeologists of Southern Africa in 1998 when it was formed. Gavin is rated as a Principle Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

DECLARATION OF INDEPENDENCE

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

Gavin Anderson
Archaeologist/Heritage Impact Assessor

APPENDIX A

PIA DESKTOP ASSESSMENT

APPLICATION FOR EXEMPTION FROM THE PALAEONTOLOGICAL ASSESSMENT PROCESS FOR THE PROPOSED UPGRADING OF RURAL HOUSING SCHEMES AT MDLETSHE, LOCATED WITHIN THE HLABISA LOCAL MUNICIPALITY, UMKHANYAKUDE DISTRICT MUNICIPALITY, KWAZULU-NATAL PROVINCE.

FOR

Umlando

DATE: 25 March 2017

By

Gideon Groenewald

Cell: 078 713 6377

EXECUTIVE SUMMARY

Gideon Groenewald was appointed by Umlando to undertake a Desktop Survey, assessing the potential Palaeontological Impact related to an application for exemption from the PIA process during the construction of the proposed upgrading of rural housing schemes at Mdletshe, located within the Hlabisa Local Municipality, Umkhanyakude District Municipality, KwaZulu-Natal Province.

This report provide reasons why the developer requests exemption from the PIA process and the man reason is that the entire development node is an existing rural housing area, where the chances of finding unbroken fossils is very low indeed. The development does not include any trenching for infrastructure and the foundations are virtually in the soil layers on site.

Legal Requirements

This Palaeontological Assessment forms part of the Heritage Impact Assessment (HIA) and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999 as well as the KwaZulu-Natal Heritage Act No 4 of 2008. In accordance with Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), a HIA is required to assess any potential impacts to Palaeontological Heritage within the development footprint.

The development site applicable to the application for exemption from the PIA process during the construction of the proposed upgrading of rural housing schemes at Mdletshe area located within the Hlabisa Local Municipality, Umkhanyakude District Municipality, KwaZulu-Natal Province, is underlain by fossiliferous rocks of the Ecca Group and Emakwezini, Ntabene Nyoka and Clarens Formations of the Karoo Superfgroup.

No significant fossils are expected before deep excavation (>1.5m) are done, and for this reason the author of this Application for Exemption from the PIA process, is confident that very few if any fossils will be disturbed during the construction phase. If fossils are, however recorded during excavations, it will contribute significantly to our knowledge of the Palaeontological Heritage of the KwaZulu-Natal Province.

It is recommended that:

The EAP and ECO must be informed of the fact that the the study area in general has a very rugged topography, with very steep valley sides and

most of the rocks in the western and central part of the area have a Very High Palaeontological Sensitivity, but no deep excavations are foreseen. The eastern part of the study area is allocated a Low Palaeontological Sensitivity.

It is recommended that AMAFA issue the developer with an “Exemption from the PIA Process” with the proviso that if any fossils are observed, that the HIA specialist will be informed immediately for appropriate actions according to the Law.

These recommendations must be included in the EMPr of this project.

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INTRODUCTION

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Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; and
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

Aims and Methodology

A Desktop investigation by the writer of this report indicated that any excavation into the geological formations on site will most probably lead to the discovery of fossils, but due to the very shallow excavations planned, the chance find of significant fossils is not high enough to warrant expensive Palaeontological Investigations. The aim of this report is to satisfy the

requirements of AMAFA and SAHRA and although it is the only opportunity to record the fossil heritage within the development footprint, the request is for AMAFA to provide a "Letter of Exemption from the PIA Process". The rest of this report contains information that will provide AMAFA with reasons for the request of exemption.

Following the "*SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports*" the aims of the palaeontological impact assessment are:

- to identifying exposed and subsurface rock formations that are considered to be palaeontologically significant;
- to assessing the level of palaeontological significance of these formations;
- to comment on the impact of the development on these exposed and/or potential fossil resources and
- to make recommendations as to how the developer should conserve or mitigate damage to these resources.

A preliminary assessment (desktop study) of the topography and geology of the study area was made using appropriate 1:250 000 geological maps (2730 Vryheid; 2732 St Lucia; 2830 Dundee;) in conjunction with Google Earth. Potential fossiliferous rock units (groups, formations etc) have been identified within the study area and the known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region and the author's field experience.

Priority palaeontological areas are identified within the development footprint to focus the field investigator's time and resources. The aim of the desktop survey is to document any exposed fossil material and to assess the palaeontological potential of the region in terms of the type and extent of rock outcrop in the area.

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the minimal extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained in Table 1 below.

Table 1 Palaeontological sensitivity analysis outcome classification

PALAEONTOLOGICAL SIGNIFICANCE/VULNERABILITY OF ROCK UNITS	
The following colour scheme is proposed for the indication of palaeontological sensitivity classes. This classification of sensitivity is adapted from that of Almond et al (2008) and Groenewald et al., (2014)	
RED	Very High Palaeontological sensitivity/vulnerability. Development will most likely have a very significant impact on the Palaeontological Heritage of the region. Very high possibility that significant fossil assemblages will be present in all outcrops of the unit. Appointment of professional palaeontologist, desktop survey, phase I Palaeontological Impact Assessment (PIA) (field survey and recording of fossils) and phase II PIA (rescue of fossils during construction) as well as application for collection and destruction permit compulsory.
ORANGE	High Palaeontological sensitivity/vulnerability. High possibility that significant fossil assemblages will be present in most of the outcrop areas of the unit. Fossils most likely to occur in associated sediments or underlying units, for example in the areas underlain by Transvaal Supergroup dolomite where Cenozoic cave deposits are likely to occur. Appointment of professional palaeontologist, desktop survey and phase I Palaeontological Impact Assessment (field survey and collection of fossils) compulsory. Early application for collection permit recommended. Highly likely that a Phase II PIA will be applicable during the construction phase of projects.
GREEN	Moderate Palaeontological sensitivity/vulnerability. High possibility that fossils will be present in the outcrop areas of the unit or in associated sediments that underlie the unit. For example areas underlain by the Gordonia Formation or undifferentiated soils and alluvium. Fossils described in the literature are visible with the naked eye and development can have a significant impact on the Palaeontological Heritage of the area. Recording of fossils will contribute significantly to the present knowledge of the development of life in the geological record of the region. Appointment of a

	professional palaeontologist, desktop survey and phase I PIA (ground proofing of desktop survey) compulsory.
BLUE	Low Palaeontological sensitivity/vulnerability. Low possibility that fossils that are described in the literature will be visible to the naked eye or be recognized as fossils by untrained persons. Fossils of for example small domal Stromatolites as well as micro-bacteria are associated with these rock units. Fossils of micro-bacteria are extremely important for our understanding of the development of Life, but are only visible under large magnification. Recording of the fossils will contribute significantly to the present knowledge and understanding of the development of Life in the region. Where geological units are allocated a blue colour of significance, and the geological unit is surrounded by highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a blue colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in dolerite sill outcrops. Collection of a representative sample of potential fossiliferous material recommended. At least a Desktop Survey and "Chance Find Protocol" is compulsory. The Chance Find Protocol must be included in the EMPr for the project.

GREY	Very Low Palaeontological sensitivity/vulnerability. Very low possibility that significant fossils will be present in the bedrock of these geological units. The rock units are associated with intrusive igneous activities and no life would have been possible during implacement of the rocks. It is however essential to note that the geological units mapped out on the geological maps are invariably overlain by Cenozoic aged sediments that might contain significant fossil assemblages and archaeological material. Examples of significant finds occur in areas underlain by granite, just to the west of Hoedspruit in the Limpopo Province, where significant assemblages of fossils and clay-pot fragments are associated with large termite mounds. Where geological units are allocated a grey colour of significance, and the geological unit is surrounded by very high and highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a grey colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in dolerite sill outcrops. It is important that the report should also refer to archaeological reports and possible descriptions of palaeontological finds in Cenozoic aged surface deposits. At least a Desktop Survey and "Chance Find Protocol" document is compulsory. The Chance Find Protocol must be included in the EMPr of the project.

Despite the fact that nearly half of the area outlined in this application falls on geology with a Very High Sensitivity for Palaeontology, the actual housing development will be limited to existing disturbed areas where houses have been built over many years already.

Scope and Limitations of the Desktop Study

The study will include: i) an analysis of the area's stratigraphy, age and depositional setting of fossil-bearing units; ii) a review of all relevant palaeontological and geological literature, including geological maps, and previous palaeontological impact reports; iii) data on the proposed

development provided by the developer (e.g. location of footprint, depth and volume of bedrock excavation envisaged) and iv) where feasible, location and examination of any fossil collections from the study area (e.g. museums).

The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologists carrying out fieldwork in RSA and the Kingdom of Lesotho. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering, or are buried beneath a thick mantle of unfossiliferous “drift” (soil, alluvium etc.).

Locality and Proposed Development

The study area comprises the built-up areas in the Mdletshe area located within the Hlabisa Local Municipality, Umkhanyakude District Municipality, KwaZulu-Natal Province and no significant fossil finds are expected during the development.

GEOLOGY

The site of the development falls mainly on Permian to Jurassic aged mudstone and sandstone (with coal beds) of the Vryheid and Volksrust Formations, Ecca Group, mudstone and sandstone (with coal beds) of the Emakwezini Formation, Beaufort Group, Ntabene, Nyoka and Clarens Formations as well as the Jurassic aged basaltic and rhyolitic lavas of the Letaba Formation, Lebombo Group, as well as small dolerite intrusions (Figure 1).

Figure 1 Geology underlying the Mdletshe development node

PALAEONTOLOGY

The entire western area of the proposed development area is underlain by Very Highly Sensitive rocks of the Permian to Triassic aged Ecca Group, known for the abundance of *Glossopteris* and other fossil flora (Groenewald, 2012). The overlying Emakwezini Formation of the Beaufort Group is well-known for rich deposits of *Glossopteris* flora (Groenewald, 2012) and might contain *Daptocephalus* and *Lystrosaurus* Assemblage Zone vertebrate fossils, whilst the Triassic aged Ntabene Formation contains plant fossils of the Dicroiidium Assemblage. The overlying Nyoka and Clarens Formations contain significant remains of dinosaurs (Groenewald 2012). If the developer record any finds of fossils these must be reported to AMAFA.

Dolerite, Basalt and Rhyolite of the Lebombo Group will not contain any significant fossils.

The author of this “Application for Exemption from the PIA process” is convinced that, the areas where the development of housing is planned have been trampled and the chance find of significant Palaeontological Heritage is too small to warrant a full PIA process. It is however important that AMAFA includes a recommendation that, should any fossils be recognised during the development, a suitably qualified Palaeontologist must assess the presence of the fossils and act accordingly.

PALAEONTOLOGICAL IMPACT AND MITIGATION

The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews as well as information gathered during the desktop investigation. The desktop investigation confirms that the study area is underlain by relatively deep (>2m) sandy soil associated with the Permian to Jurassic aged sediments and volcanic rocks of the Ecca Group, Emakwezini, Ntabene, Nyoka, Clarens and Letaba Formations.

The sedimentary rocks in the study area are known to be very rich in Palaeontological Heritage objects and if these are recorded during the development the HIA specialist as well as the Palaeontologist must be informed for immediate and appropriate action.

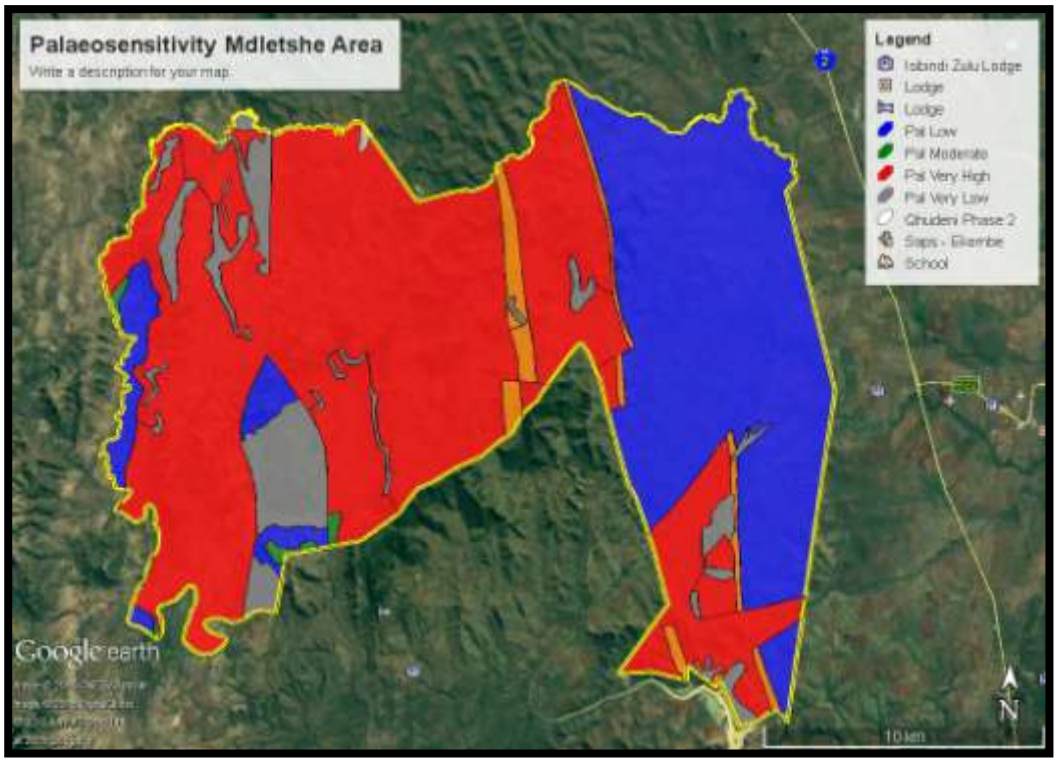

Figure 2 Palaeontological sensitivity of the study area. For explanation of colour coding see Table 1.

Dolerite will not contain fossils.

The excavations for the construction of the infrastructure for this development will most probably not expose any important fossiliferous rock units. Due to the igneous nature of the dolerite and volcanic rocks, it will not contain fossils.

This application is for an exemption from the PIA process normally required for these areas and although highly unlikely, any recording of fossils will contribute significantly to our understanding of previous eco-systems. Sighting of fossil material must be reported to the HIA specialist.

CONCLUSION

The development site applicable to the application for exemption from the PIA process during the construction of the proposed upgrading of rural housing schemes at Mdletshe area located within the Hlabisa Local Municipality, Umkhanyakude District Municipality, KwaZulu-Natal Province, is underlain by fossiliferous rocks of the Ecca Group and Emakwezini, Ntabene Nyoka and Clarens Formations of the Karoo Superfgroup.

No significant fossils are expected before deep excavation (>1.5m) are done, and for this reason the author of this Application for Exemption from the PIA process, is confident that very few if any fossils will be disturbed during the construction phase. If fossils are, however recorded during excavations, it will contribute significantly to our knowledge of the Palaeontological Heritage of the KwaZulu-Natal Province.

It is recommended that:

The EAP and ECO must be informed of the fact that the the study area in general has a very rugged topography, with very steep valley sides and most of the rocks in the western and central part of the area have a Very High Palaeontological Sensitivity, but no deep excavations are foreseen. The eastern part of the study area is allocated a Low Palaeontological Sensitivity.

It is recommended that AMAFA issue the developer with an “Exemption from the PIA Process” with the proviso that if any fossils are observed, that the HIA specialist will be informed immediately for appropriate actions according to the Law.

These recommendations must be included in the EMPr of this project.

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QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Gideon Groenewald has a PhD in Geology from the University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeo-ecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

DECLARATION OF INDEPENDENCE

I, Gideon Groenewald, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

Dr Gideon Groenewald
Geologist