

**HERITAGE SURVEY OF THE PROPOSED N3 KEY
RIDGE UPGRADE AND VIADUCT, KWA-ZULU
NATAL**

FOR JEFFARES AND GREEN

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INTRODUCTION

Umlando was contracted by Jeffares and Green to undertake a HIA of the proposed Key Ridge N3 upgrade and viaduct option. The upgrade begins at the N3-M13 interchange, goes west through Peacevale and Drummond, to the MR385-N3 intersection. A proposed new viaduct may occur in the Peacevale-Drummond area. The location of the proposed road upgrade and viaduct are shown in Figures 1 – 4.

The proposed upgrade includes:

- Widening of the existing N3
- A new viaduct through the Peacevale-Drummond area
 - Occurs along farmed land
 - Affects existing buildings

The N3 has an existing servitude and thus the road widening would not affect new areas. If the viaduct is chosen, then it would be going through ploughed and farmed land that occurs on steep slopes.

The project was initiated in 2013, and revived several times. The road alignment has not changed significantly.

The survey did not locate any new heritage sites. Some buildings occur in the way of the viaduct and were assessed by Lindsay Napier in 2023.

.FIG. 1 GENERAL LOCATION OF THE PROPOSED ROUTE

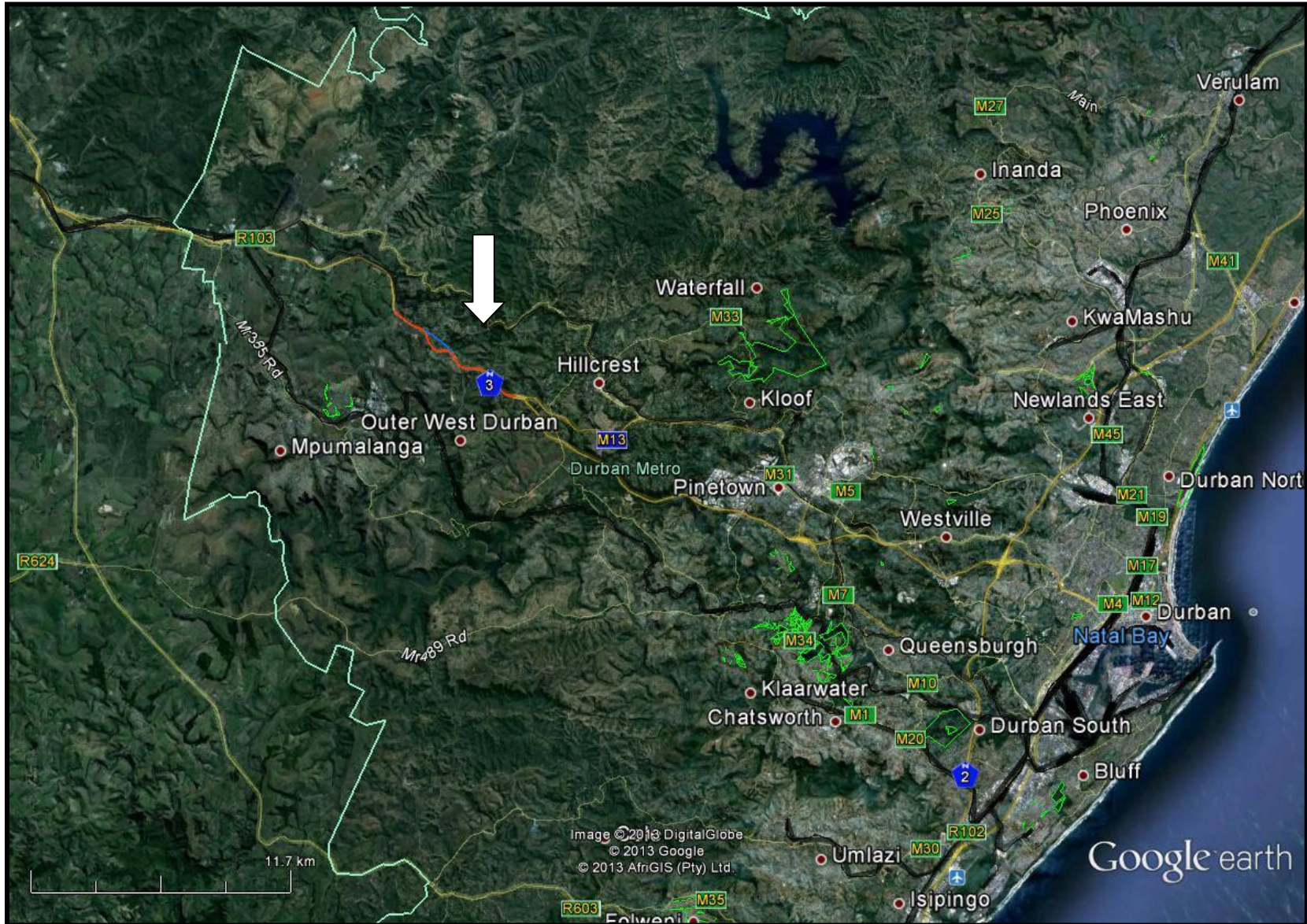
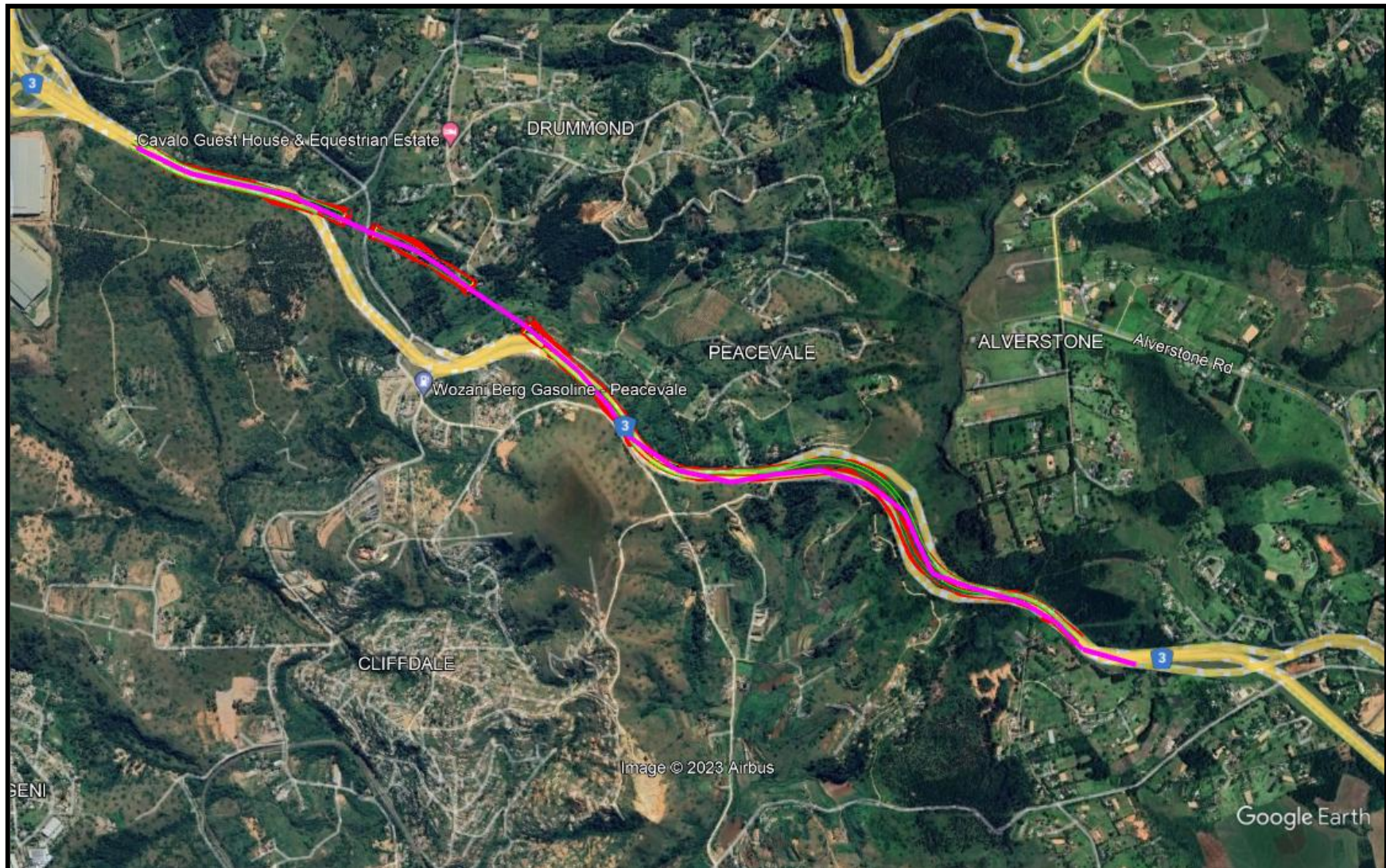


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED ROUTE¹



¹ Pink line = original alignment

FIG. 3: AERIAL MAP OF THE PROPOSED ROUTE

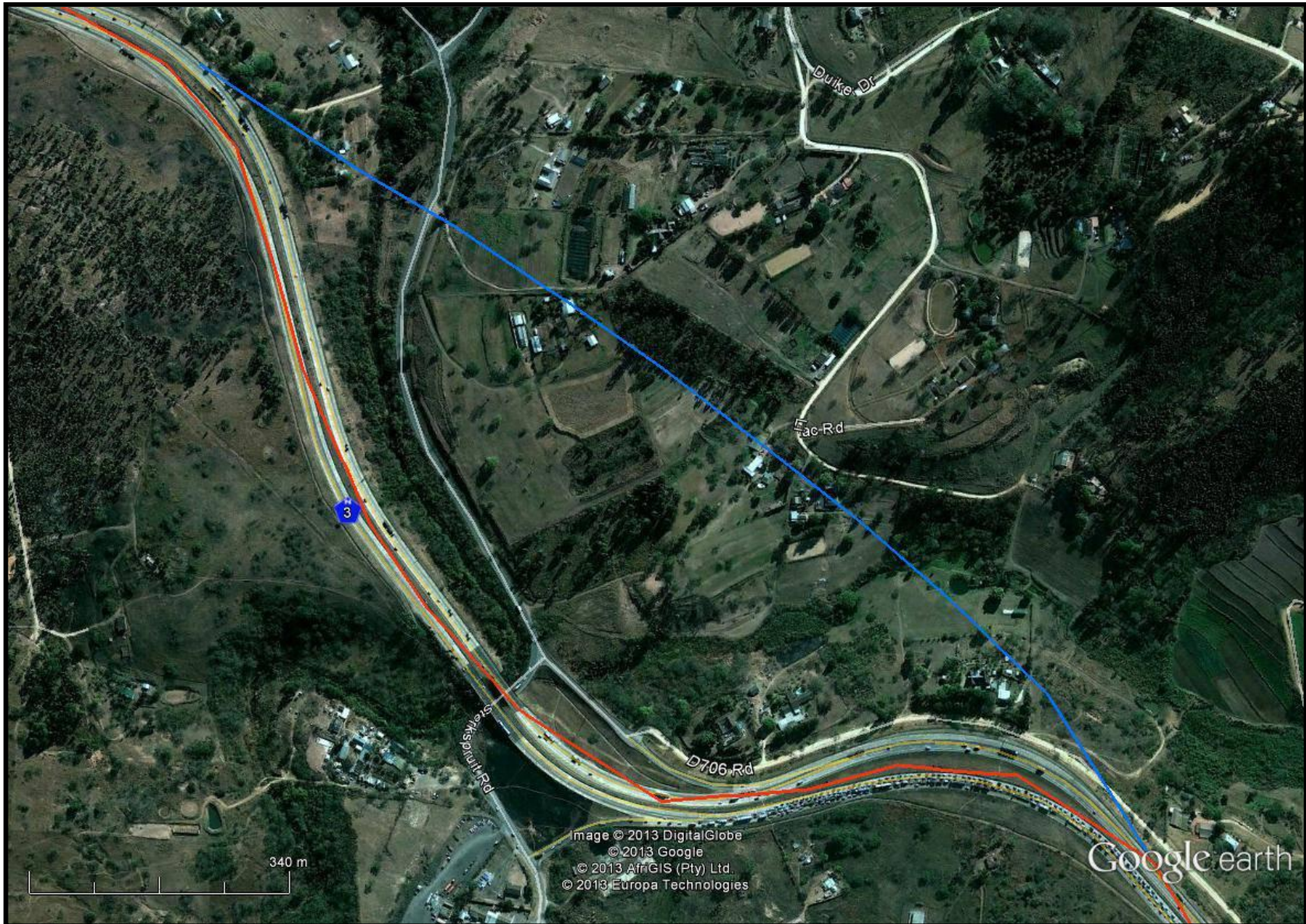
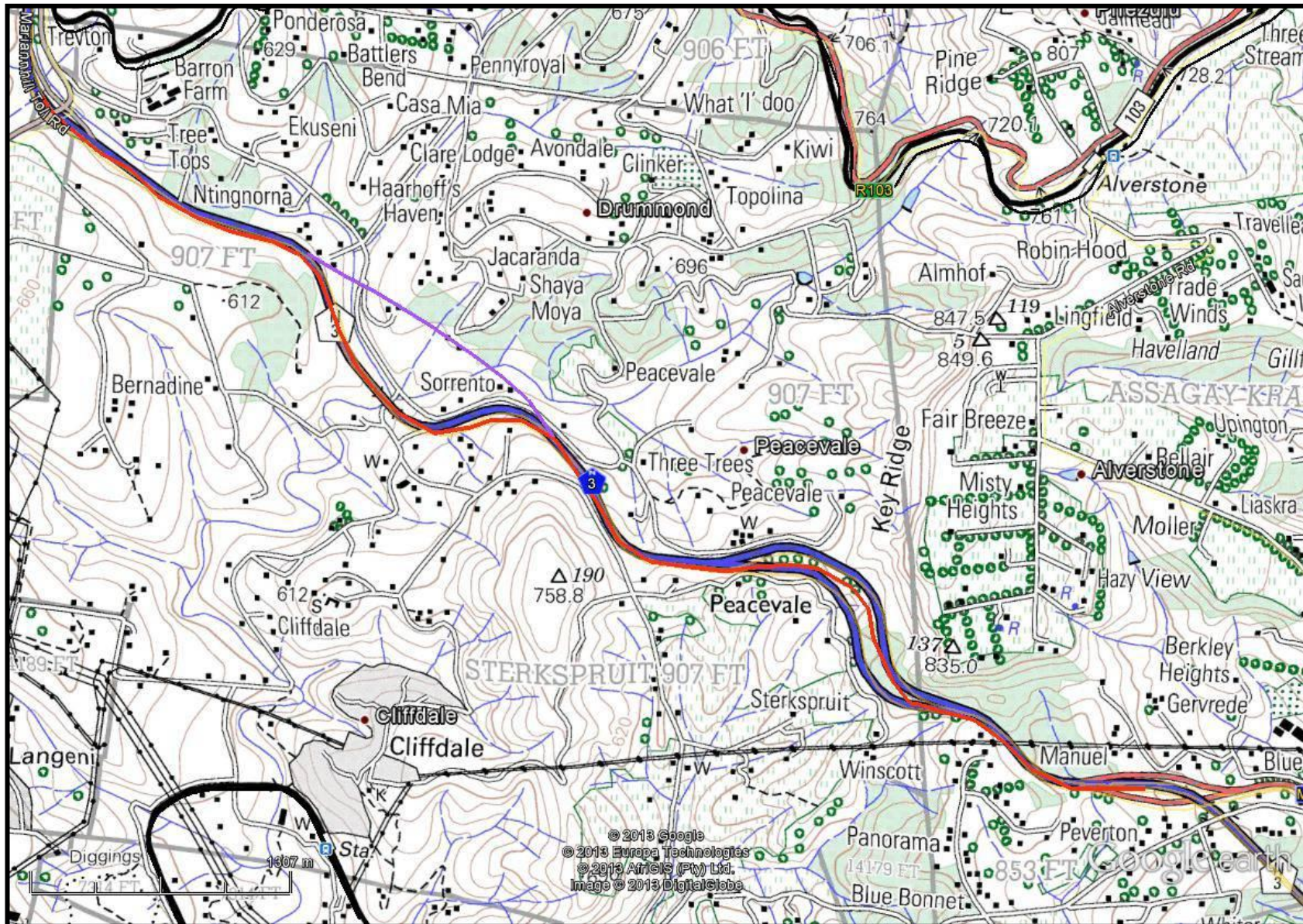


FIG. 4: 1:50 000 TOPOGRAPHICAL MAP OF THE PROPOSED ROUTE



KWAZULU-NATAL HERITAGE ACT NO. 4 OF 2008

1. “ General protection: Structures.—
 - a. No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Council having been obtained on written application to the Council.
 - b. Where the Council does not grant approval, the Council must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
2. The Council may, by notice in the *Gazette*, exempt—
 - a. a defined geographical area; or
 - b. defined categories of sites within a defined geographical area, from the provisions of subsection where the Council is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
 - c. A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.
3. General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—
 - a. the grave of a victim of conflict;
 - b. a cemetery made up of such graves; or
 - c. any part of a cemetery containing such graves, without the prior written approval of the Council having been obtained on written application to the Council.
4. General protection: Traditional burial places.—
 - a. No grave—
 - b. not otherwise protected by this Act; and
 - c. not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original position, or otherwise disturbed without the prior written

approval of the Council having been obtained on written application to the Council.

5. The Council may only issue written approval once the Council is satisfied that—
 - a. the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
 - b. the applicant and the relevant communities or individuals have reached agreement regarding the grave.
 - c. 36. General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—
6. No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
7. Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Council without delay.
8. The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.
9. No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.

10. No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Council having been obtained on written application to the Council.
11. The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.” (KZN Heritage Act of 2008)

METHOD

The method for Heritage assessment consists of several steps.

The first step forms part of the desktop assessment. Here we would consult the database that has been collated by Umlando. This databases contains archaeological site locations and basic information from several provinces (information from Umlando surveys and some colleagues), most of the national and provincial monuments and battlefields in Southern Africa (<http://www.vuvuzela.com/googleearth/monuments.html>) and cemeteries in southern Africa (information supplied by the Genealogical Society of Southern Africa). We use 1st and 2nd edition 1:50 000 topographical and 1937 aerial photographs where available, to assist in general location and dating of buildings and/or settlements with graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required we would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at

times. We also consult with an historical architect, palaeontologist, and an historian where necessary.

The use of historical maps allows us to note the locations of potential heritage sites in areas where the vegetation is too dense, or where there is no physical evidence of a settlement. That is, some areas have a high rate of deterioration of archaeological/organic remains, and human graves are generally ephemerally marked or demarcated with organic remains. By using the maps, we can indicate sensitive areas and suggest appropriate management plans.

The survey results will define the significance of each recorded site, as well as a management plan.

All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

Defining significance

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

1. State of preservation of:

- 1.1. Organic remains:
 - 1.1.1. Faunal
 - 1.1.2. Botanical
- 1.2. Rock art
- 1.3. Walling
- 1.4. Presence of a cultural deposit
- 1.5. Features:
 - 1.5.1. Ash Features
 - 1.5.2. Graves
 - 1.5.3. Middens
 - 1.5.4. Cattle byres
 - 1.5.5. Bedding and ash complexes

2. Spatial arrangements:

- 2.1. Internal housing arrangements
- 2.2. Intra-site settlement patterns
- 2.3. Inter-site settlement patterns

3. Features of the site:

- 3.1. Are there any unusual, unique or rare artefacts or images at the site?
- 3.2. Is it a type site?
- 3.3. Does the site have a very good example of a specific time period, feature, or artefact?

4. Research:

- 4.1. Providing information on current research projects
- 4.2. Salvaging information for potential future research projects

5. Inter- and intra-site variability

- 5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?

5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

6. Archaeological Experience:

6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

7. Educational:

7.1. Does the site have the potential to be used as an educational instrument?

7.2. Does the site have the potential to become a tourist attraction?

7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

8. Other Heritage Significance:

8.1. Palaeontological sites

8.2. Historical buildings

8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites

8.4. Graves and/or community cemeteries

8.5. Living Heritage Sites

8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts.

RESULTS

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 Natal Museum database indicates that several archaeological sites have been recorded in the general area. These sites tend to be open Stone Age and Late Iron Age scatters located mostly on the top of the hills. Anderson (2009) recorded an Early Iron Age site near the Peacevale turnoff. Fig. 5 shows the locations of these sites. The previous archaeological work from the area suggests that archaeological sites would be found at the top of hills, or on flat spurs above a watercourse.

There are no known monuments and graves within the study area. The nearest monument would be “The Cycads” near Inchanga. The original Drummond Village will not be affected.

Drummond dates back to the mid-late 19th century/early 20th century. One of the larger farms were owned by the Kinghams from 1903, and their holdings included wattle plantations, an hotel, butchery and a farm building. The farm land stretched from Drummond to the N3 and falls within the study area of the viaduct..

The 1937 aerial photograph (fig. 6) indicates that the study area was mostly afforested plantation (see above). All buildings that occur in the area are to the north of the viaduct. There are two settlements to the south of the N3, and these are probably labourers’ houses.

By 1968, there are several buildings and labourers’ houses in the study area (fig. 7). By 2010 there are many more houses, but the labourer’s houses do not

exist, and this reflects the area becoming more peri-urban. It appears that only AB2, or B5 still exist (fig. 8).

The proposed viaduct will go through two buildings and one labourer's house from the 1968 map, one possible building from the 1937 map. The locations of these features are not precise and occur within 50m – 100m of their mark. E.g. B1 and B2 are probably the buildings to the west in fig. 8.

Table 1 gives the co-ordinates and description of these features.

TABLE 1: LOCATION AND DESCRIPTION OF FEATURES

NAME	LATITUDE	LONGITUDE	DESCRIPTION	MAP DATE
B1	29°45'59.14"S	30°41'08.96"E	Building	1968
B2	29°45'59.78"S	30°41'09.97"E	Building	1968
B3	29°46'03.55"S	30°41'32.13"E	Building	1968
B4	29°45'50.26"S	30°41'07.32"E	Building	1968
B5	29°45'47.47"	30°41'25.54"	Building	1968
H1	29°46'4.83"S	30°41'01.95"E	Labourer's house	1968
H2	29°46'08.68"S	30°41'12.83"E	Labourer's house	1968
H3	29°46'13.05"S	30°41'31.19"E	Labourer's house	1968
H4	29°45'47.92"S	30°40'49.26"E	Labourer's house	1968
AH1	29°46'04.71"S	30°40'45.56"E	Labourer's house	1937
AH2	29°46'23.47"S	30°41'29.81"E	Labourer's house	1937
AB1	29°45'54.32"S	30°41'25.02"E	Building	1937
AB2	29°45'47.30"S	30°41'24.51"E	Building	1937
AB3	29°45'56.68"S	30°41'22.38"E	Building?	1937
AB4	29°46'01.97"S	30°41'12.66"E	Building?	1937

FIG. 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA

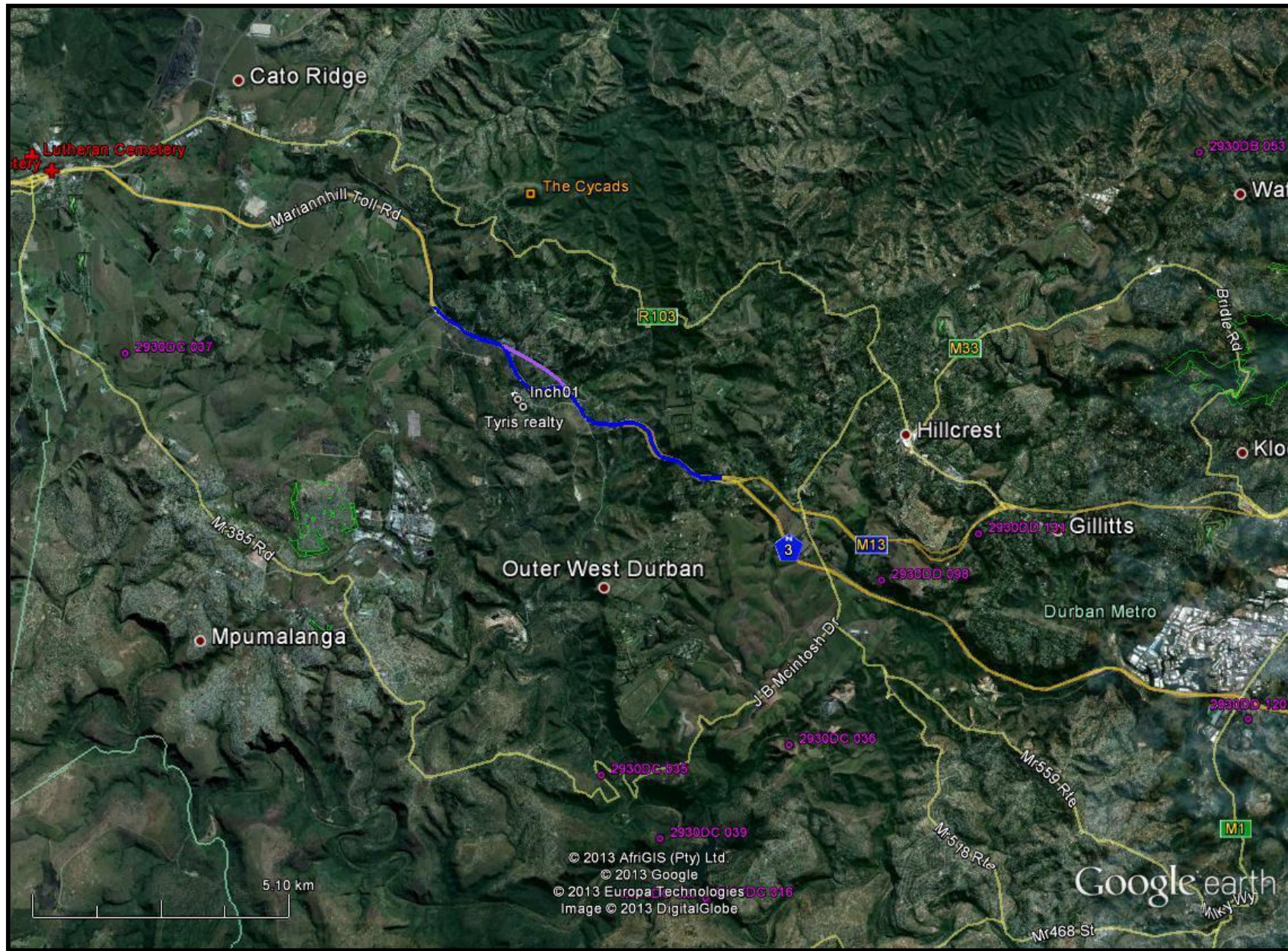


FIG. 6: LOCATION OF SETTLEMENTS ALONG THE PROPOSED ROUTE IN 1937

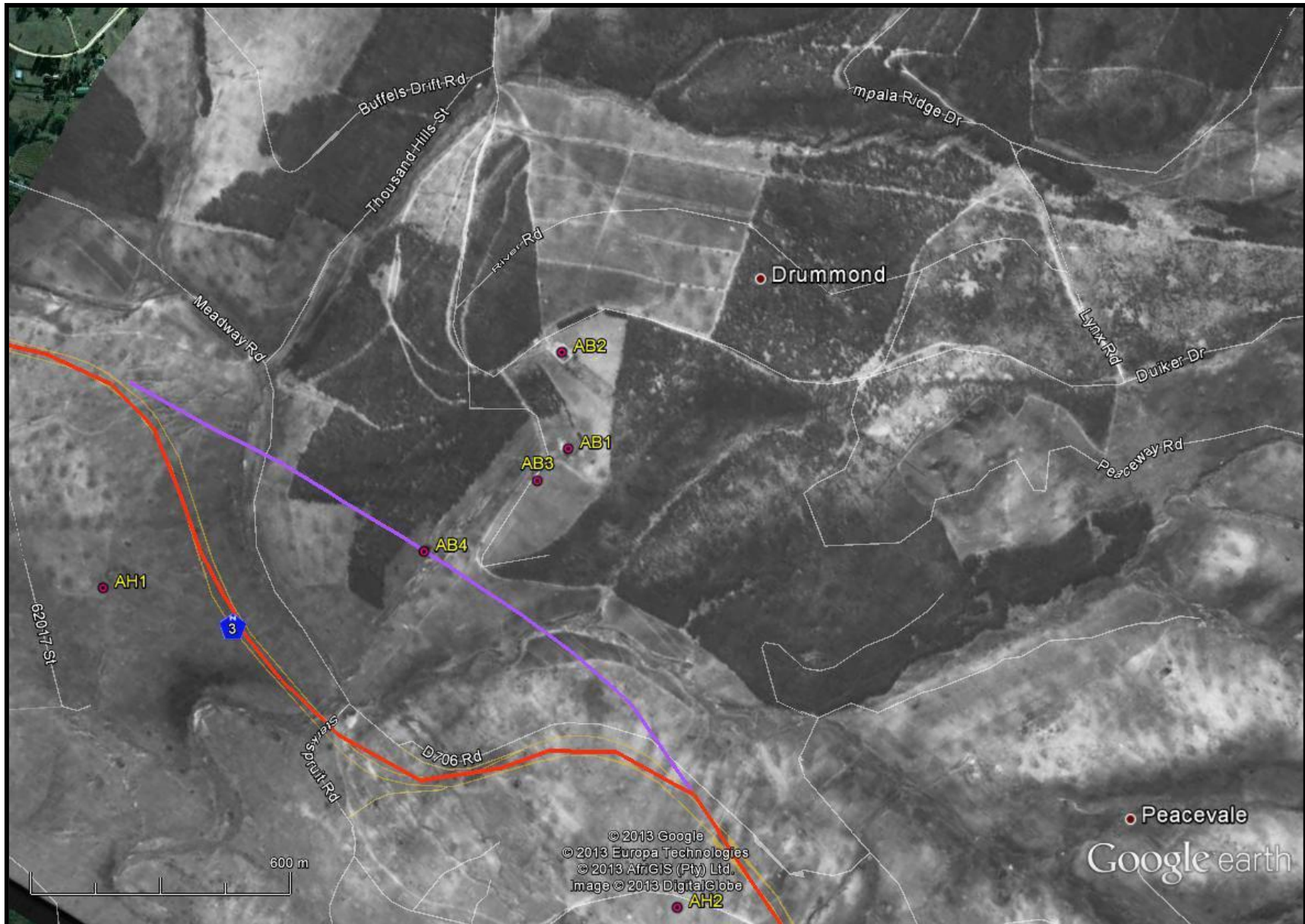


FIG. 7: LOCATION OF SETTLEMENTS ALONG THE PROPOSED ROUTE IN 1968

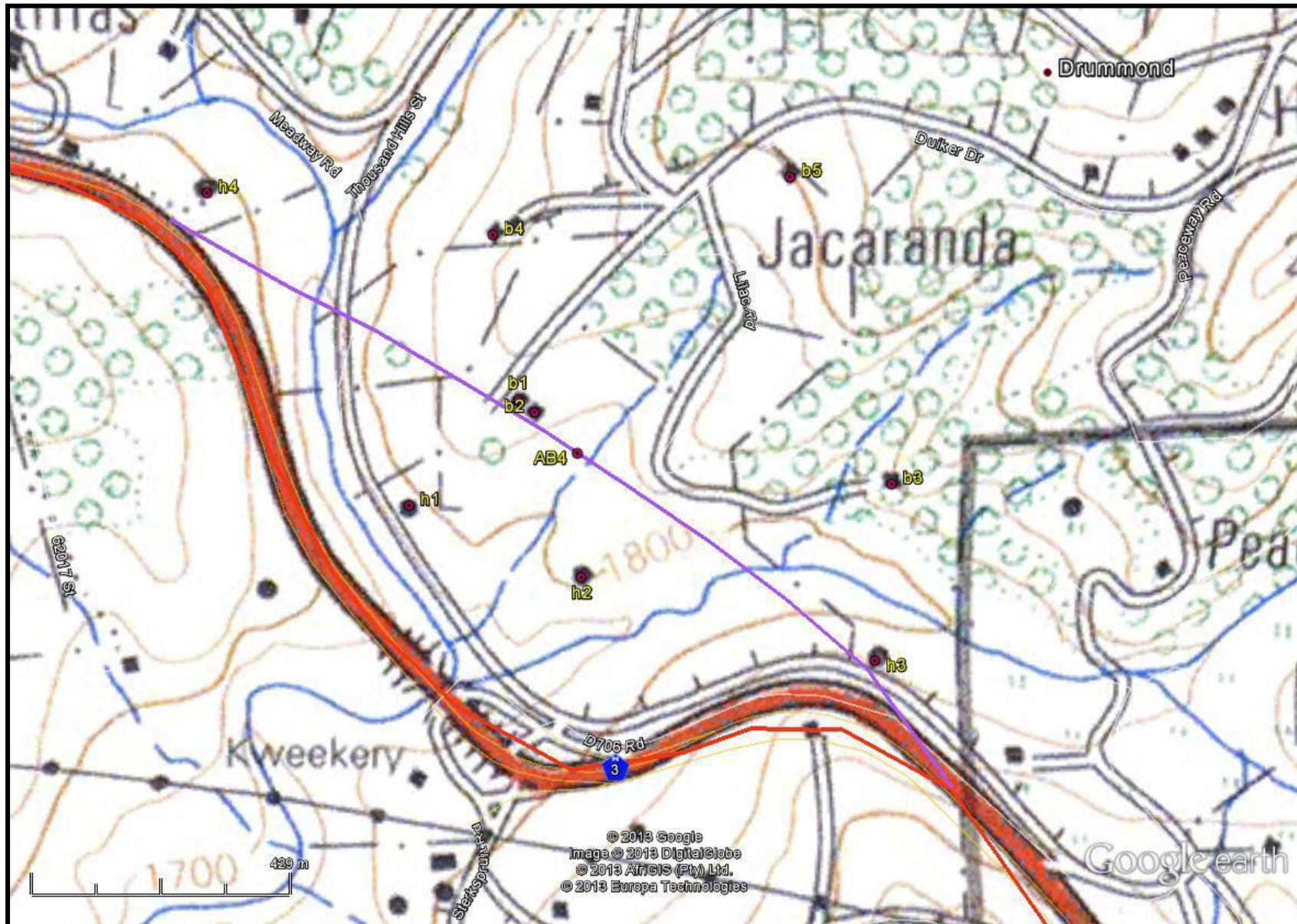
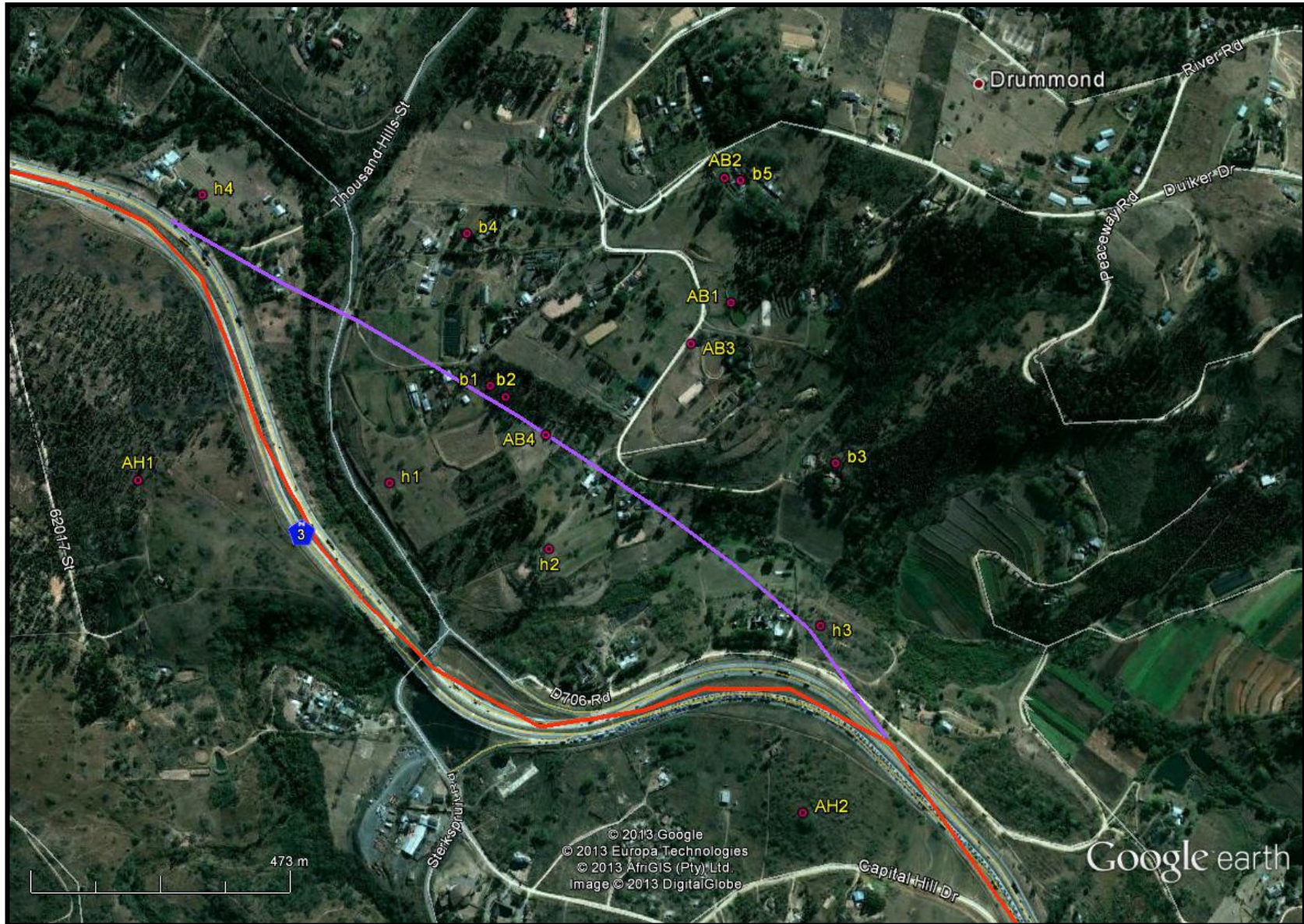


FIG. 8: LOCATION OF OLDER SETTLEMENTS ON MODERN AERIAL IMAGERY



FIELD SURVEY

The field survey was undertaken in March 2013. No heritage sites were noted during the survey. This is partially due to the steep slopes along the viaduct that do not favour human occupation. The area has been severely disturbed by farming and building activity, and thus the labourer's houses noted on the older maps, do not occur in the present. Figure 9 shows the general view of the viaduct route.

The older houses that will be affected by the viaduct were assessed by Lindsay Napier. The locations of the buildings are given in fig. 10 and Table 2.

FIG. 9: SCENIC VIEWS ALONG THE PORPOSED VIADUCT



FIG. 10: LOCATION OF BUILT FEATURES

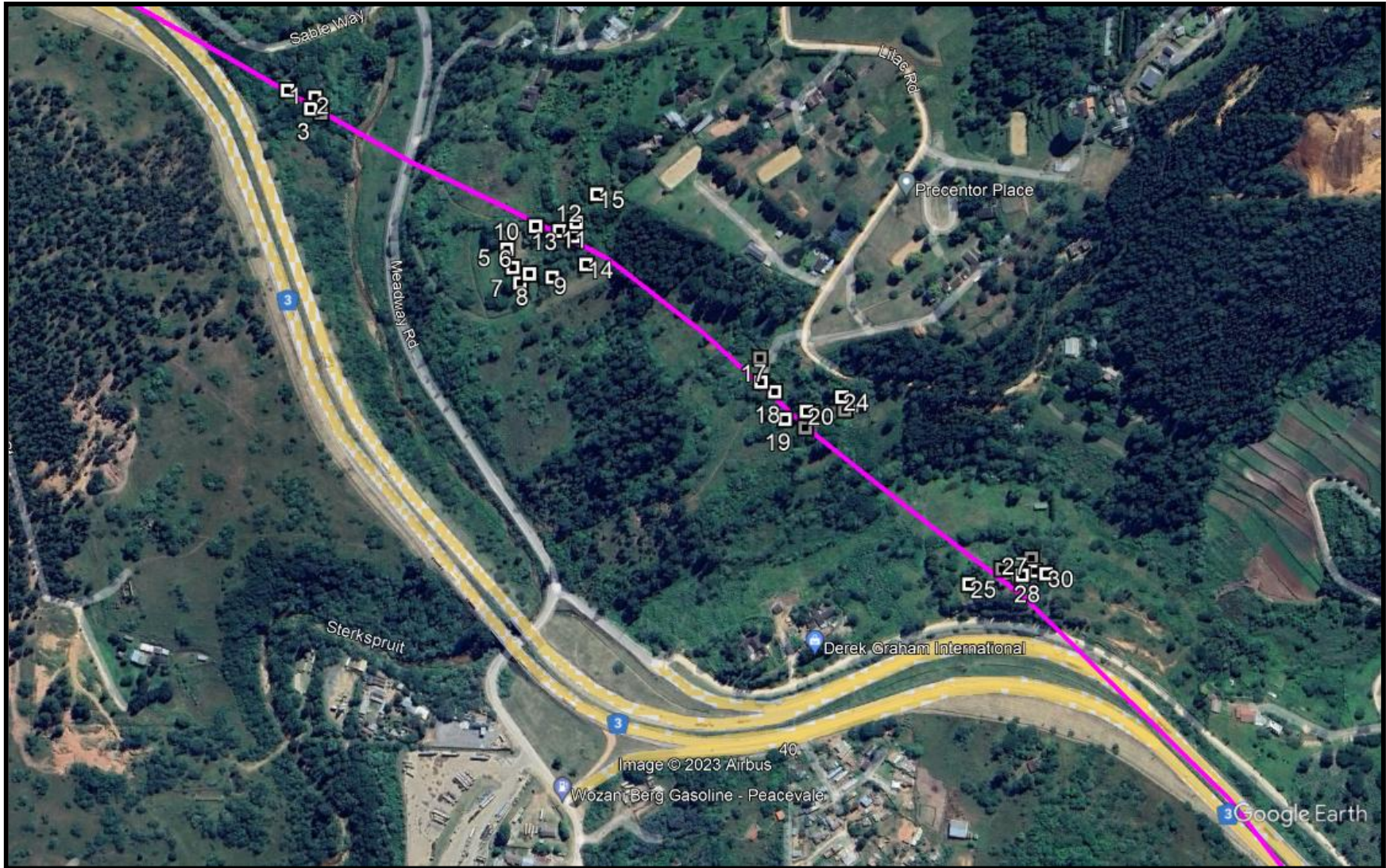


TABLE 2: LOCATION OF RECORDED FEATURES

Erf	Name	Description	Coordinates	Significance	Mitigation
127	1	Facebrick house and yard	s29.764624, e30.681372	Nil Younger than 60 years	No permit required for demolition
	2	Outbuilding – plastered concrete block construction	s29.764686, e30.681717	Nil Younger than 60 years	No permit required
	3	Outbuilding – plastered concrete block construction	s29.764825, e30.681668	Nil Younger than 60 years	No permit required
	4	Outbuilding – plastered concrete block construction	s29.764865, e30.681793	Nil Younger than 60 years	No permit required
200	5	Animal shelter (kennels)	s29.766466, e30.684299	Nil Younger than 60 years	No permit required
	6	Animal shelter	s29.766675, e30.684377	Nil Younger than 60 years	No permit required
	7	Animal shelter	s29.766851, e30.684470	Nil Younger than 60 years	No permit required
	8	Animal shelter	s29.766750, e30.684599	Nil Younger than 60 years	No permit required
	9	Animal shelter	s29.766792, e30.684902	Nil Younger than 60 years	No permit required
	10	Animal shelter	s29.766214, e30.684685	Nil Younger than 60 years	No permit required
	11	Ex. Residential/ admin building (Peacevale Kennels)	s29.766273, e30.685001	Appears on 1968 aerial photograph. Date of construction is unconfirmed.	Amafa to confirm if a permit is required for demolition
	12	Animal shelter	s29.766181, e30.685220	Nil Younger than 60 years	No permit required

	13	Animal shelter	s29.766337, e30.685189	Nil Younger than 60 years	No permit required
	14	Animal shelter	s29.766653, e30.685348	Nil Younger than 60 years	No permit required
133	15	2 roomed dwelling – concrete block structure	s29.765869, e30.685493	Nil Younger than 60 years	No permit required
132	?			Nil Younger than 60 years	No permit required
145	16	Residential building	s29.767706, e30.687623	Nil Younger than 60 years	No permit required
	17	Residential building	s29.767978, e30.687636	Nil Younger than 60 years	No permit required
	18	Agricultural building	s29.768089, e30.687817	Nil Younger than 60 years	No permit required
	19	Agricultural building	s29.768402, e30.687954	Nil Younger than 60 years	No permit required
144	20	Wooden cabin	s29.768312, e30.688236	Nil Younger than 60 years	No permit required
	21	carport	s29.768328, e30.688e309	Nil Younger than 60 years	No permit required
	22	Stables	s29.768500, e30.688223	Nil Younger than 60 years	No permit required
	23	Residential building	s29.768297, e30.688743	Nil Younger than 60 years	No permit required
	24	garage	s29.768149, e30.688701	Nil Younger than 60 years	No permit required

139	25	Residential building	s29.770283, e30.690370	Nil Younger than 60 years	No permit required
	26	House and farm workshops	s29.770111, e30.690809	Nil Younger than 60 years	No permit required
	27	Outbuilding	s29.770179, e30.691067	Nil Younger than 60 years	No permit required
	28	Outbuilding	s29.770135, e30.691235	Nil Younger than 60 years	No permit required
	29	Outbuilding	s29.769992, e30.691205	Nil Younger than 60 years	No permit required
	30	Outbuilding	s29.770165, e30.691385	Nil Younger than 60 years	No permit required

PALAEONTOLOGICAL IMPACT ASSESSMENT

Dr. G Groenewald undertook a desktop Palaeontological Impact Assessment for the project. The desktop is used as a primary means of identifying if an area has the correct geology for palaeontological remains. The PIA report occurs in Appendix A.

Dr Groenewald states:

“The proposed deviation of the N3 Highway near Key Ridge is located on quartzitic sedimentary rocks of the Natal Group and igneous Buhleni Gneiss of the Natal Structural and Metamorphic Province. No fossils have been described from the quartzitic sedimentary rocks of the Natal Group. The Buhleni Gneiss outcrops have no significance for palaeontological finds.

No mitigation measures will be needed to preserve or rescue palaeontological data.”

MANAGEMENT PLAN

No management plan is currently required as no heritage sites were identified. These houses are of low significance and only one will be affected. KZNARI will confirm if a permit is required for its demolition.

CONCLUSION

A heritage survey was undertaken for the proposed N3 widening and possible viaduct near Key Ridge, KZN. No heritage sites were observed during the survey, however some older houses may be affected by the viaduct. These houses are of low significance and only one will be affected. A permit for the demolition of one house may be required.

APPENDIX A
PALAEONTOLOGICAL DESKTOP IMPACT ASSESSMENT

**DESKTOP PALAEOANTHROLOGICAL
ASSESSMENT OF**

**Proposed deviation of the N3 Highway near
Key Ridge**

**FOR
Umlando**

DATE: 08 April 2013

By

Gideon Groenewald

Cell: 082 829 4978

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EXECUTIVE SUMMARY

Gideon Groenewald was appointed to undertake a desktop survey, assessing the potential palaeontological impact of the proposed deviation of the N3 Highway near Key Ridge, KwaZulu Natal

The potential palaeontology of a rock unit relates directly to the geology of the area. The desktop survey includes the comparison of relevant referenced geological maps and locality maps and/or waypoints provided for the development project. The potential impact and significance of the palaeontology for a specific rock unit is determined through comparison of existing geological and palaeontology database information.

The proposed deviation of the N3 Highway near Key Ridge is located on quartzitic sedimentary rocks of the Natal Group and igneous Buhleni Gneiss of the Natal Structural and Metamorphic Province. No fossils have been described from the quartzitic sedimentary rocks of the Natal Group. The Buhleni Gneiss outcrops have no significance for palaeontological finds.

No mitigation measures will be needed to preserve or rescue palaeontological data.

INTRODUCTION

Gideon Groenewald was appointed to undertake a desktop survey, assessing the potential palaeontological impact of the proposed deviation of the N3 Highway near Key Ridge, KwaZulu Natal.

SAHRA ACT OR KWAZULU-NATAL HERITAGE ACT NO. 4 OF 2008

The National Heritage Resources Act of 1999 (pp 12-14) and the KwaZulu heritage Act of 2008 protects a variety of heritage resources. These resources are defined as follows:

1. “For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.
2. Without limiting the generality of subsection (1), the national estate may include -
 - 2.1. Places, buildings, structures and equipment of cultural significance;
 - 2.2. Places to which oral traditions are attached or which are associated with living heritage;
 - 2.3. Historical settlements and townscapes;
 - 2.4. Landscapes and natural features of cultural significance;
 - 2.5. Geological sites of scientific or cultural importance;
 - 2.6. Archaeological and palaeontological sites;
 - 2.7. Graves and burial grounds, including—
 - 2.8. Ancestral graves;
 - 2.9. Royal graves and graves of traditional leaders;
 - 2.10. Graves of victims of conflict;
 - 2.11. Graves of individuals designated by the Minister by notice in the Gazette;
 - 2.12. Historical graves and cemeteries; and

- 2.13. Other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
3. Sites of significance relating to the history of slavery in South Africa;
- 3.1. Movable objects, -
4. Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
- 4.1. Objects to which oral traditions are attached or which are associated with living heritage;
- 4.2. Ethnographic art and objects;
- 4.3. Military objects;
- 4.4. objects of decorative or fine art;
- 4.5. Objects of scientific or technological interest; and
- 4.6. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).
5. Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—
- 5.1. Its importance in the community, or pattern of South Africa's history;
- 5.2. Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- 5.3. Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- 5.4. Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- 5.5. Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- 5.6. Its importance in demonstrating a high degree of creative or technical achievement at a particular period;

- 5.7. Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- 5.8. Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- 5.9. sites of significance relating to the history of slavery in South Africa”

METHODOLOGY

The potential palaeontology of a rock unit relates directly to the geology of the area. The desktop survey includes the comparison of relevant referenced geological maps and locality maps and/or waypoints provided for the development project. The potential impact and significance of the palaeontology for a specific rock unit is determined through comparison of existing geological and palaeontology database information.

The only limitation of this methodology is the scale of mapping, which restricts comparison of the geology to a scale of 1:250 000. This restriction only applies in areas where major changes in the geological character of the area occur over very short distances.

RESULTS

The proposed deviation of the N3 Highway near Key Ridge, KwaZulu Natal is geologically underlain by quartzitic sedimentary deposits of the Natal Group with a small section of the deviation being underlain by Buhleni Gneiss (Figure 1).

GEOLOGY

The planned deviation is mainly underlain by Ordovician-Silurian aged quartzitic sedimentary rocks of the Natal Group (O-Sn). A small section of the

deviation is underlain by Namibian aged Buhleni Gneiss (Nb), an intrusive component of the Natal Structural and Metamorphic Province.

Natal Group

The Natal Group can be described as a red-brown coarse-grained arkosic to subarkosic sandstone, quartz arenite, micaceous sandstone, small pebble conglomerate, subordinate siltstone and mudstone (map description of sheet 2930 Durban, Geological Survey (1988)).

Buhleni Gneiss

Intrusive suite of banded granitic gneiss, fine-grained in some places (map description of sheet 2930 Durban, Geological Survey (1988)).

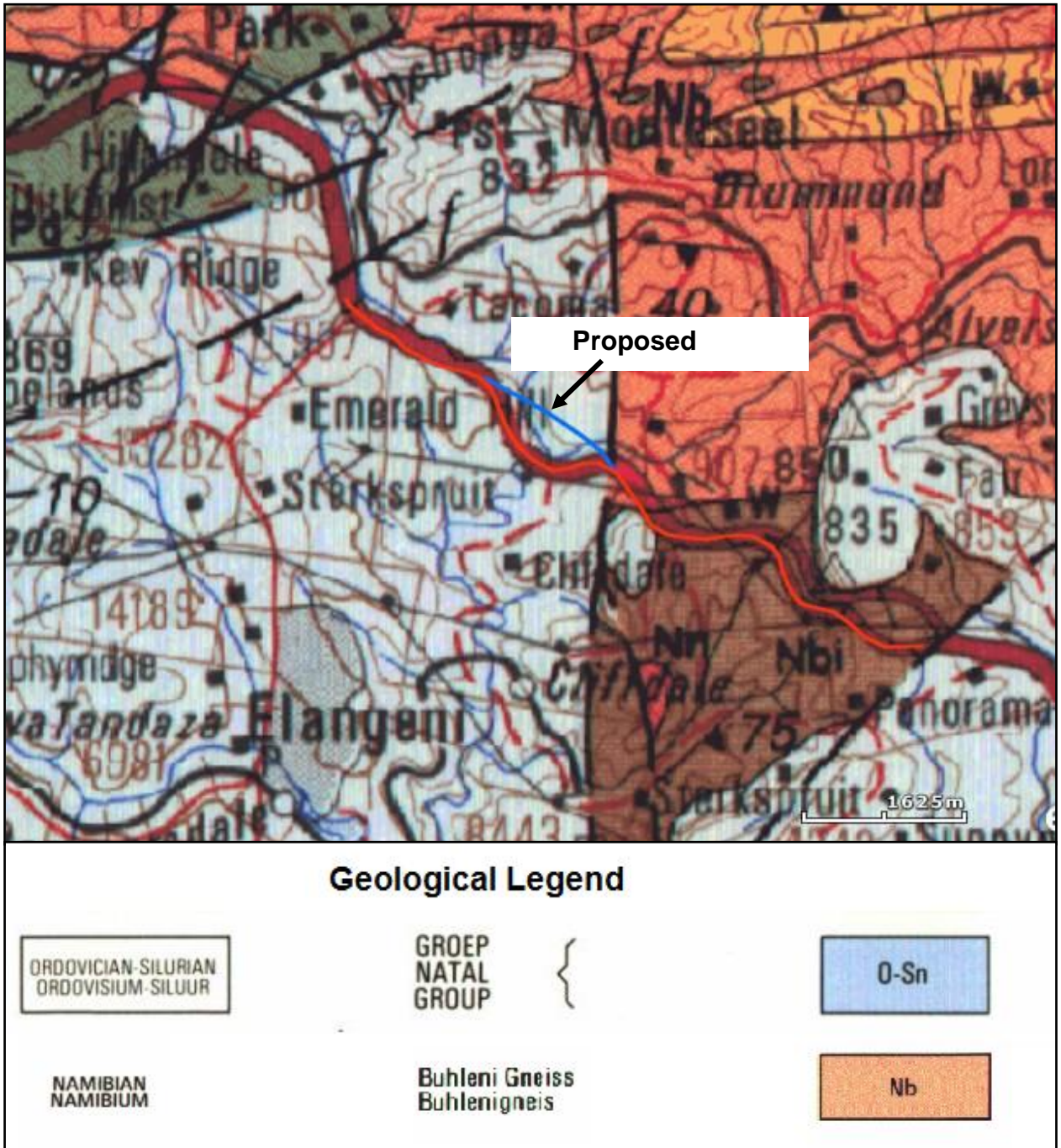


Figure 1 Geological map showing the proposed deviation near Key Ridge

PALAEONTOLOGY

The potential palaeontology of a rock unit relates directly to the geology of the area. The desktop survey includes the comparison of relevant referenced geological maps and locality maps and/or waypoints provided for the development project.

Natal Group

The Natal Group is generally unproductive as far as fossils are concerned. No fossils have been described from this unit in the study area. (Johnson et al 2006, Groenewald 2012).

Buhleni Gneiss

Due to the igneous nature of this unit, it will not contain any fossils.

DISCUSSION

The potential impact and significance of the palaeontology for a specific rock unit is determined through comparison of existing geological and palaeontology database information. The desktop survey indicates that the proposed deviation of the N3 Highway near Key Ridge is underlain by quartzitic sedimentary rocks of the Natal Group and igneous rocks (Buhleni Gneiss) of the Natal Structural and Metamorphic Province.

There have been no fossils described from the Natal Group and it is unlikely that significant fossils will be associated with this unit in the study area.

The Buhleni Gneiss will not contain any fossil material.

MANAGEMENT PLAN

The desktop survey indicates that the proposed deviation is underlain by sedimentary rocks of the Natal Group and igneous Buhleni Gneiss of the Natal Structural and Metamorphic Province.

For management purposes a colour scheme is proposed with the following interpretations (Table 1). The deviation has a low palaeontological significance as shown in figure 2.

Table 1 Palaeontological sensitivity classification

Sensitivity	Description
Low Sensitivity	Areas where there is likely to be a negligible impact on the fossil heritage. This category is reserved largely for areas underlain by igneous rocks. However, development in fossil bearing strata with shallow excavations or with deep soils or weathered bedrock can also form part of this category.
Moderate Sensitivity	Areas where fossil bearing rock units are present but fossil finds are localised or within thin or scattered sub-units. Pending the nature and scale of the proposed development the chances of finding fossils are moderate. The developer should be made aware of the potential for finding fossils. If fossil material is later discovered it must be appropriately protected and the discovery reported to the appropriate Heritage Authority so that any appropriate mitigation by a palaeontological specialist can be considered and implemented, at the developer's expense.
High Sensitivity	Areas where fossil bearing rock units are present with a very high possibility of finding fossils of a specific assemblage zone. Fossils will most probably be present in outcrops and exposed bedrock. The chances of finding fossils during excavations by a professional palaeontologist are high. Palaeontological mitigation measures need to be incorporated into the Environmental Management Plan. The mitigation should involve the comprehensive recording and collection of surface and embedded fossils along and close to the development footprint by a professional palaeontologist.

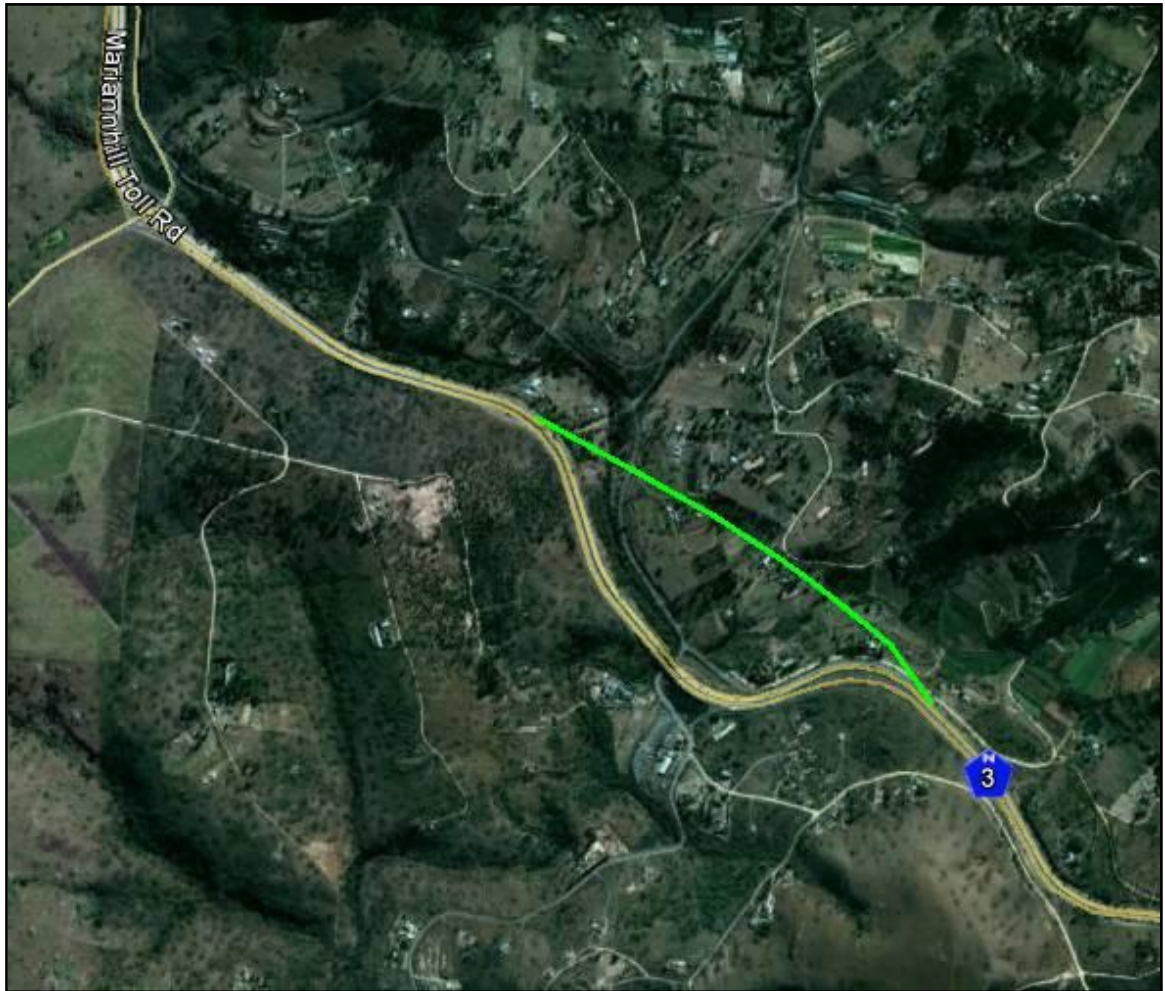
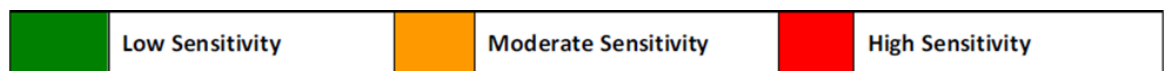


Figure 2 Palaeontological sensitivity of the proposed deviation



CONCLUSION

The proposed deviation of the N3 Highway near Key Ridge is located on quartzitic sedimentary rocks of the Natal Group and igneous Buhleni Gneiss of the Natal Structural and Metamorphic Province. No fossils have been described from the quartzitic sedimentary rocks of the Natal Group and the Buhleni Gneiss outcrops have no significance for palaeontological finds. For these reasons, no mitigation measures will be needed to preserve or rescue palaeontological data.

REFERENCES

Groenewald GH (2012). Palaeontological technical report for KwaZulu-Natal, AMAFA.

Johnson MR , Anhaeusser CR and Thomas RJ (Eds) (2006). The Geology of South Africa. GSSA, Council for Geoscience, Pretoria.

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.



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Geologist