

WDM is malaria free and has a rather mild climate that adds to the district's appeal as a tourist destination. The area is also in fairly close proximity to the Gauteng Province which makes it not only an appealing destination, but also a prime location to develop game farms.

A large portion of Capricorn District Municipality depends on agricultural development and economically on potatoes as the most important crop in the CDM.

Field cropping and animal production are the main activities in the study area. During recent years game farming has become a major economic activity in the area and this upsurge in eco-tourism and commercial hunting has led to a decrease in traditional agricultural activities. It is likely that game farming activities will increase. The assumption was therefore made that the grazing portions identified along the corridors are for the purposes of game farming.

Extensive mining reserves of the platinum group metals and ferrochrome reserves are present within the study area. This has given rise to extensive mining activities in the eastern portion of the study area. In addition, the prevalence of coal resources to the west of the study area has given rise to extensive coal mining activities in this area. It is expected that mining, electricity/water, services, and trade/catering will increase in future due to the construction of the Matimba Power Station near Lephalale.

4.1.3. Heritage Resources

Four archaeological or heritage zones can be distinguished in the Mokopane Integration Project study area considered from an ecological, historical and pre-historical perspective. These are:

- » the plains to the west of Polokwane and Mokopane which are dotted with scattered mountains, kopjes and knolls across a vast plain;
- » the Waterberg mountain mass in the central part of the study area;
- » flat outstretched bush and sand veldt to the west of the Waterberg mountains and a number of isolated flat-topped hills (mesa); and
- » kopjes in thorn-veldt in the north-western part of the study area.

The plains towards the west of Polokwane and Mokopane are characterised by a number of large mountains and smaller kopjes and knolls (refer to Photograph 4.2). Some of these mountains, further towards the west, near the Potgietersrust Platinum Mine, bear historical names such as Mapela, Masenya, Tshaba and the historically well-known Fonthane.



Photograph 4.2: The plains with scattered mountains and kopjes west of Polokwane and Mokopane served as the sphere of influence of the Langa Ndebele during the Late Iron Age and historical period

These mountains serve as historical beacons outlining the spheres of influence of the Langa-Ndebele, a Nguni group that settled in this area during the sixteenth and seventeenth centuries. The Ledwaba/Maune Ndebele clans, who are related to the Langa-Ndebele, live in the Bergzicht-Kalkspruit and Mašašane townships.

The extensive Waterberg mountain mass in the central part of the study area covers the largest part of the project area. This mountainous terrain is divided by both the Mogol and Mogalakwena Rivers which runs from the south to the north through this mountain range. No dense concentrations of archaeological or other heritage sites have yet been recorded in this eco-zone. However, krantzes and ridges along the northern and southern escarp of this part of the project area, as well as valleys that criss-cross the mountain range, harbour some rock paintings. Caves and rock shelters also occur where Stone Age hunter-gatherers established semi-permanent settlements, particularly during the Middle Stone Age. Corridors 2 & 3 traverse the Waterberg mountain range (refer to Photograph 4.3).



Photograph 4.3: The Waterberg mountains mass in the central part of the project area. Some historical farmstead complexes occur in this part of the study area.

On the far western extremity of the Waterberg, after passing the last foothills in this range, open sand veldt covered with thorn trees is predominant. This land was formerly the sphere of influence of the pre-historical San and historical Vaalperse who roamed the area in small family groups acting as nomadic hunters and herders. Early Iron Age farmers also lived near the western perimeter of the Waterberg where they herded cattle, possibly practised limited crop planting but smelted iron on a substantial scale at the site of Diamand. Corridors 2 and 3 traverse the western edge and foothills of the Waterberg mountain range (refer to Photograph 4.3).

Isolated kopjes and flat-topped hills (mesas) in thorn-veldt occur across the north-western part of the study area where these topographical features corresponds with the northern perimeters of the spheres of influence of the Seleka-Ndebele and the Batlhalerwa (Shongwane) (refer to Photograph 4.4). Both these clans have their origins in the Late Iron Age and historical periods. The Shongwane originate from Zimbabwe and settled in the far north-western corner of the study area during the 18th century. They are historically associated with Nora and Bobididi, two of the flat-topped hills in the area. In this far north-western part of the study area these communities practised farming and metal working, the remains of which still occur in the area.



Photograph 4.4: Flat-topped hills in the north-western part of the project area. Here, the Seleka-Ndebele and Shongwane clans established spheres of influence during the Late Iron Age and historical period

Mokopane and Polokwane in the east of the study area represent two of the oldest colonial towns in the former Transvaal Province. This area incorporates the plains with granite hills to the west of Mokopane, which were also home to the Ndebele tribes of Kekana and Langa. These clans occupied places such as Maraba, Mashashane and Vaaltyn to the north-west of Mokopane (refer to Photograph 4.5). Lephalale in the west is much younger, being established as a result of the area's coal reserves.

Each of the eco-zones identified is therefore associated with human groups from the past. Descendants of these populations, such as the Ndebele, Vaalpense, colonials and Shongwane still live and work in the area and can be found in towns and villages in or close to the study area.

A limited number of **Stone Age** sites have been identified in and near the Project Area. This is primarily the result of the fact that Stone Age sites are difficult to detect as they may be (partly) buried under the ground and that they mostly consist of stone tools that are scattered across the surface of the land. It is clear that Stone Age sites are under-represented in the study area and that some of these sites will be found during the walk-through study or even at a later stage, e.g. when the power line corridors are constructed and stone tools are excavated when towers are erected.



Photograph 4.5: The vast, homogenous plains to the west of the Waterberg where the Vaalpense and their predecessors and contemporaries, the San, lived as hunters and foragers in ephemeral types of settlements

Most of the **Late Iron Age** stone walled sites in the study area have been identified in the Witkoppen Mountains, to the west of these mountains and in the former sphere of influence of the Langa Ndebele. A single occurrence also has been recorded on Daggakraal 591LR. In general, however, these types of sites are uncommon towards the central and western mountainous parts of the study area.

A number of widely distributed **colonial farmsteads** have been recorded in the western and central parts of the study area where colonial settlement took place during the nineteenth century. Many of these farmsteads do not necessarily qualify as historical significant structures as they either have been altered (renovated) in the past whilst others have been abandoned and have fallen into disrepair.

At least one commemorative beacon was distinguished in the study area, namely the beacon commemorating the opening of the Kloof Pass.

A significant number of **graveyards** were recorded. These are associated with historical homesteads in the Langa Ndebele sphere of influence, the Luxemburg area, with colonial farmsteads and graveyards occurring in rural villages. The number of graveyards recorded is probably not a true reflection of the real number of graveyards that may exist. Undetected graves or graveyards may occur as many informal and abandoned graveyards are difficult to detect.

Formal, historical graveyards are usually found where colonial settlements occur, such as towards the western and central parts of the study area. Informal graves and graveyards were recorded in the spheres of influence of the Langa-Ndebele, in the Luxemburg area as well as on the outskirts of rural villages where they may occur in or near the study area. Heritage sites recorded in the study area are reflected in Figure 4.6.

4.2. Biophysical Characteristics of the Study Area

4.2.1. Geographical Profile

Situated on a plateau approximately 1 300 m above sea level, the Limpopo Province has warm to hot summers with moderate winters. The province has an average annual rainfall of between 577 and 1 000 mm. Average summer temperatures within the study area rise to approximately 28°C and drop to around 17°C. Average winter temperatures range from 4.7°C to 19°C.

The study area covers a considerable piece of land in the Limpopo Province as it runs from the Delta Substation near Lephalale in the west across the Waterberg mountain range to the Witkop Substation near Polokwane and Mokopane in the east. Most of the study area comprises areas of natural habitat, including Thicket, Bushland and Woodland. The eastern part of the study area is characterised by moderate transformation and extensive areas of cultivation and degraded woodland (Figure 4.6).

The proposed power line corridors cross landform types ranging from plains in the north to areas consisting of hills and mountains in the south. These hills and ridges are especially important since they are likely to sustain populations of conservation-important invertebrate species.

The dominant vegetation type found within the study area is woodland, i.e. Arid or Moist woodland. The woodland biome covers most of the northern and eastern sections of southern Africa. Woodland is defined as having a grassy under-storey and a distinct woody upper-storey of trees and tall shrubs. Arid woodland comprises predominantly fine-leaved, semi-deciduous *Acacia*-dominated woodlands on rich soils. This vegetation type occur where there is intermediate, though variable, rainfall with hot, wet summers and cool, dry winters. Moist woodland comprises predominantly broadleaved, winter deciduous woodland. Soil types are varied but are generally nutrient poor.

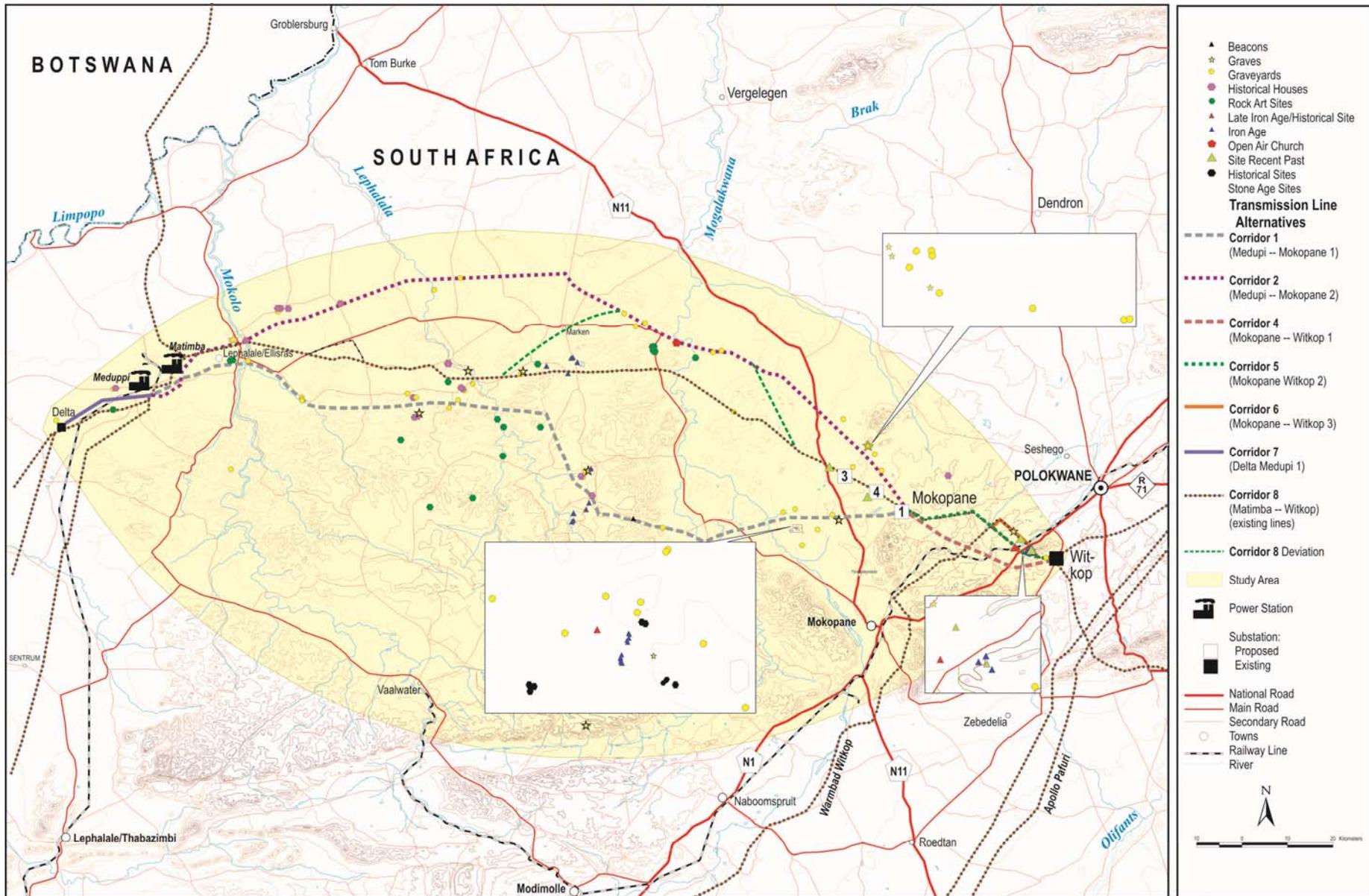


Figure 4.6: Heritage resources recorded in the study area

The majority of the northern and eastern parts of the study area are in a state of transformation, with a number of settlements dotted throughout the immediate surrounds intermingled with mining areas and both commercial and subsistence forms of cultivation. As a result, the vegetation of the areas within corridors 1 and 2 have been largely transformed. This transformation is continuing with increasing development in these areas. The habitat in the area has been subjected to severe pressure from the neighbouring communities and the various land use types.

4.2.2. Ecological Profile

Some areas within the study area have known importance in terms of floristic and faunal attributes. These areas frequently exhibit characteristics of a pristine nature, the presence of Red Data flora species, a high diversity or atypical or threatened vegetation types and habitat types.

The western part of the study area is largely untransformed, but a high degree of transformation is evident in the eastern areas, particularly around urban areas where agriculture constitutes an important land use activity. Agriculture is mainly restricted to the eastern areas and in close vicinity of larger rivers where irrigated agriculture is practised. The transformation of land reflects the land use and topography of the region. Areas that are topographically diverse are generally not suited for intensive land use categories such as urbanisation or agriculture and comprise extensive land uses such as game farming, eco-tourism and cattle farming. Remaining natural habitat within these parts comprise relatively large tracts that are characterised by low isolation and fragmentation factors. Conversely, areas that are characterised by plains and gently undulating topography is generally densely populated and also characterised by fairly intensive utilisation factors. Remaining natural habitat within these parts comprise small areas that are characterised by high isolation and fragmentation factors. A total of 10 regional vegetation types are represented within the proposed power line corridor alternatives, two of which is ascribed a Vulnerable conservation status, namely Central Sandy Bushveld and Makhado Sweet Bushveld.

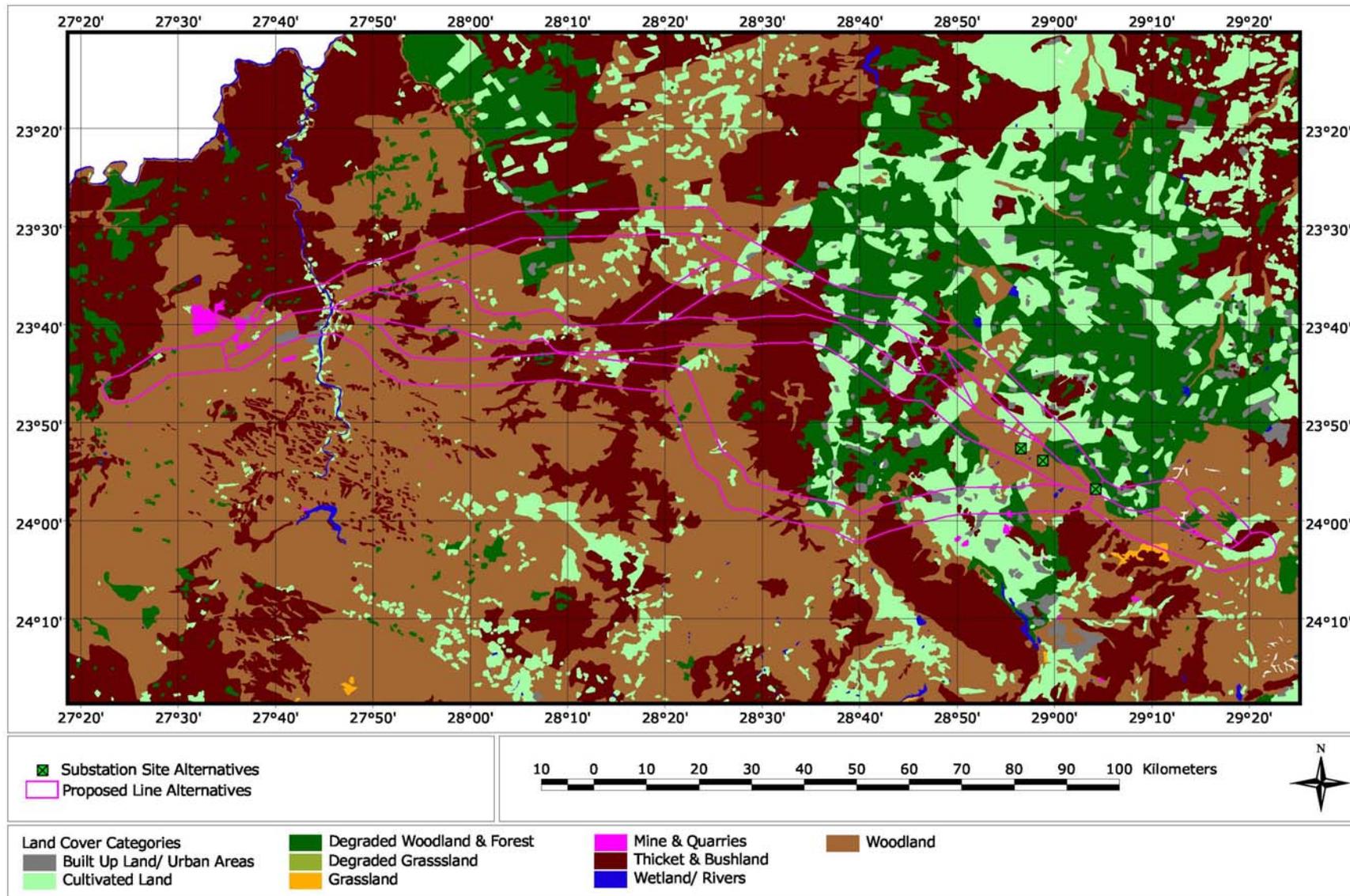


Figure 4.7: Landcover of the study area

The following VEGMAP vegetation units are present within the study area (Figure 4.8):

- » Central Sandy Bushveld
- » Limpopo Sweet Bushveld
- » Makhado Sweet Bushveld
- » Mamabolo Mountain Bushveld
- » Polokwane Plateau Bushveld
- » Roodeberg Bushveld
- » Subtropical Alluvial Vegetation and
- » Waterberg Mountain Bushveld.

The conservation status of the different vegetation types occurring in the study area is listed below in Table 4.1.

Table 4.1: VEGMAP Conservation Status

VEGMAP Unit	% Conserved	% Transformed	Target	Status
Central Sandy Bushveld	3%	24%	19%	Vulnerable
Limpopo Sweet Bushveld	<1%	5%	19%	Least Threatened
Makhado Sweet Bushveld	1%	27%	19%	Vulnerable
Mamabolo Mountain Bushveld	8%	6%	24%	Least Threatened
Polokwane Plateau Bushveld	2%	17%	19%	Least Threatened
Roodeberg Bushveld	6%	18%	19%	Least Threatened
Subtropical Alluvial Vegetation	71%	16%	31%	Least Threatened
Waterberg Mountain Bushveld	9%	3%	24%	Least Threatened

A number of formal nature reserves and other formalised conservation areas were identified in the study area (refer to Figure 4.9), including, *inter alia*, the D’Nyala Game Reserve, Kwalata, Lapalala Nature Reserve, Touchstone Nature Reserve, Moepel Farms, Shelanti Game Ranch, Keta Cattle Game Project, Witvinger Reserve, Shayamanzi Red Leopards Project, Percy Fyfe Nature Reserve, Kuschke Nature Reserve, Wit Vinger Nature Reserve, and the Waterberg Biosphere Reserve.

The Waterberg Biosphere Reserve was officially established in 1990 with the aim to maximise the Waterberg area’s potential for conservation, sustainable development and social upliftment. A key aspect in the formation of the Biosphere was the formation of partnerships amongst all the stakeholders who share the area, ranging from privately owned reserves and game farms, to tribal and state owned areas such as Moepel farms. The total reserve is approximately 14 500 km², with an estimated 6 people per km².

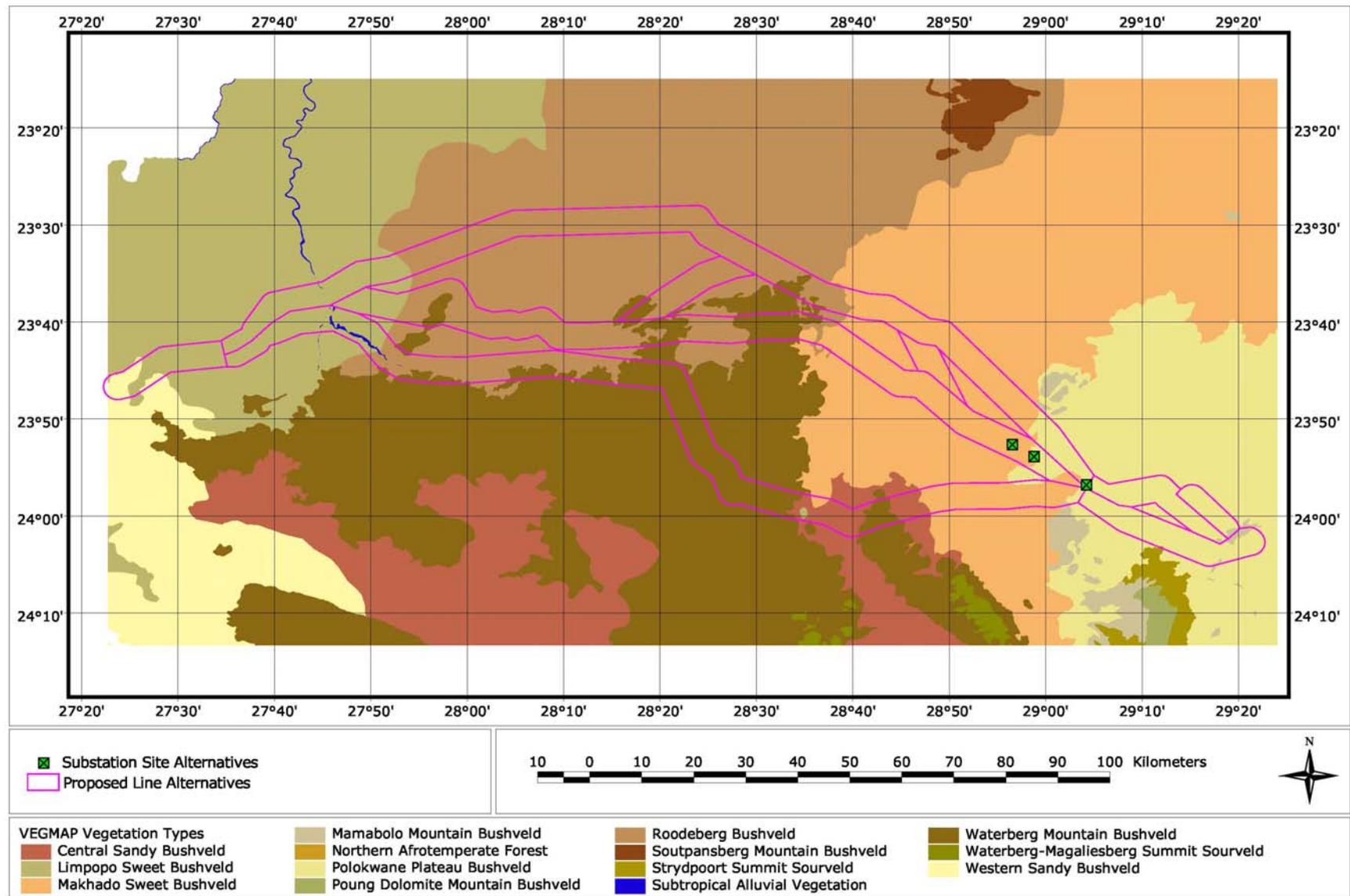


Figure 4.8: VEGMAP Vegetation types of the study area

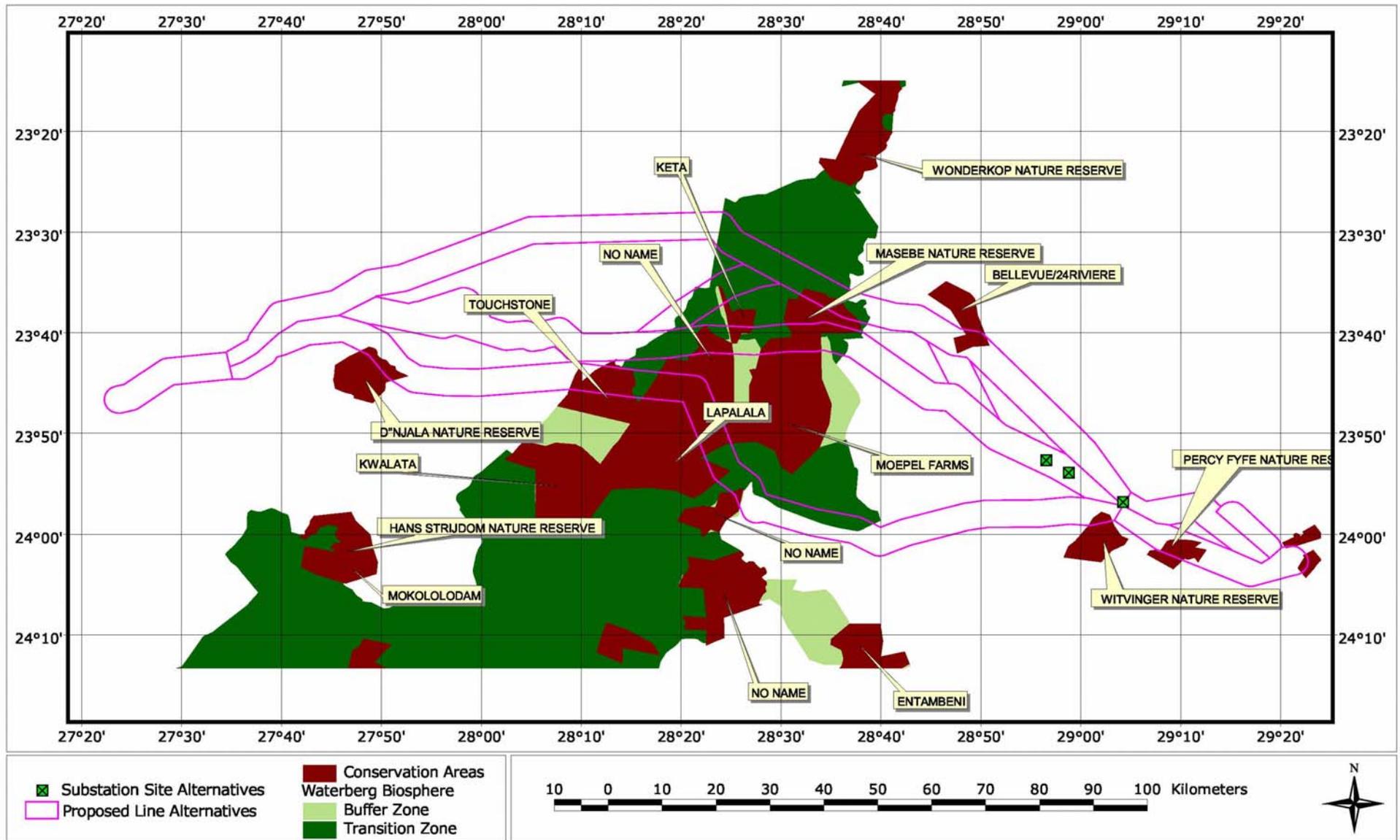


Figure 4.9: Formal conservation areas identified in the study area

The area was mostly characterised by cattle and crop farming, but during the past 15 years there has been a gradual shift in land use to that of conservation and the sustainable use of wildlife ranging from tourism and eco-tourism to hunting.

Woodland habitat, in its undisturbed state, is suitable for a wide range of birds. With the presence of river systems and numerous agricultural fields, the study area is considered to be particularly attractive to many species of birds. The Southern African Bird Atlas Project recorded a total of 30 Red-Data bird species across the study area. In addition, the White Stork and Abdim's Stork (Protected internationally under the Bonn Convention on Migratory Species) are considered as a threatened species for the purpose of this study. Several of the Red Data species recorded here are known to be extremely vulnerable to the impacts of power lines, through collision.

The following bird micro-habitats were identified within the immediate surrounds of the alternative corridors:

- » **Dams:** There are several small artificial impoundments within the study area. Whilst dams have altered flow patterns of streams and rivers, and affected many bird species detrimentally, a number of species have benefited from their construction. The construction of these dams has probably resulted in a range expansion for many water bird species that were formerly restricted to areas of higher rainfall.
- » **Arable land:** Arable or cultivated land represents a significant feeding area for many bird species in any landscape for the following reasons: through opening up the soil surface, land preparation makes many insects, seeds, bulbs and other food sources suddenly accessible to birds and other predators; the crop or pasture plants cultivated are often eaten themselves by birds, or attract insects which are in turn eaten by birds; during the dry season arable lands often represent the only green or attractive food sources in an otherwise dry landscape. In this study area, there are significant arable lands, both commercial and subsistence varieties.
- » **Rivers, pans and wetlands:** There are at least three major rivers that occur within the study area—the Lephalale, Mokolo and Mogalakwena Rivers. Riparian vegetation is characterised by tall, fringing riverine forest and well developed woodland quite distinct from the surrounding dryland vegetation. These well vegetated areas usually support a diverse and distinct forest and woodland avifauna (Taylor *et al.* 1999). These are areas of particular importance for birds, with riparian vegetation being extremely important to threatened riverine bird species and waterbird communities. Some other small

perennial wetlands and seasonal pan examples are also scattered throughout the study area.

- » **Escarpment areas:** The mountainous areas along study Corridors 1, 3 and the existing Matimba-Witkop corridor represent a very distinct habitat type. This is most likely to be used by species such as the Cape Griffon Vulture, various raptors, Black Stork and Bald Ibis.

- » **Woodland:** Patches of the study area are communal land, especially along the northern alignment, and are heavily grazed by livestock. In these areas, the tree cover has been drastically reduced, and the vegetation is generally in a severe state of degradation. In the commercial game farming areas, particularly along the central and southern corridors, the original woodland vegetation still persists and human population densities are reasonably limited, compared to some of the other areas. In these areas, the presence of cattle and game carcasses could attract vultures, Marabou Storks and the occasional Tawny Eagle. The open woodland country will also be attractive to snake eagles, particularly Black-breasted Snake Eagles. In these areas, it could be expected that most of the medium to large raptors will still occur.

DESCRIPTION OF THE ENVIRONMENT AFFECTED BY PROPOSED SUBSTATION AND TURN-IN LINES

CHAPTER 5

This section of the EIA Report provides a description of the environment that may be affected by the **proposed Mokopane Substation** and associated turn-in lines. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be affected by, or could affect, the proposed development have been described. This information aims to provide the overall context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within Appendices F - L.

Alternative substation sites comparatively assessed within this EIA include Option 1 (located on the farm Doornfontein 721 LS), Option 3 (located on the farm Zuidholland 773 LS) and Option 4 (located on the farm Noord Braband 774 LS) (refer to Figure 5.1). These properties are all State-owned and are currently administered by the National Department of Land Affairs.

5.1. Location and Overview of the Study Area and Property Description

The proposed substation sites are located within the Mogalakwena Local Municipal area (LIM367), which in turn is located within the Waterberg District Municipality (DC36) of the Limpopo Province (refer to Figure 5.2). The following subsections provide a regional overview of the study area on a broad based provincial and district level.

The proposed substation site alternatives are situated within landform types ranging from lowlands with mountains in the west to low mountains in the east. None of the substation sites are situated within areas of known botanical or faunal importance. Several such sites are however present in close vicinity to the sites and are therefore likely to be affected by the turn-in lines.

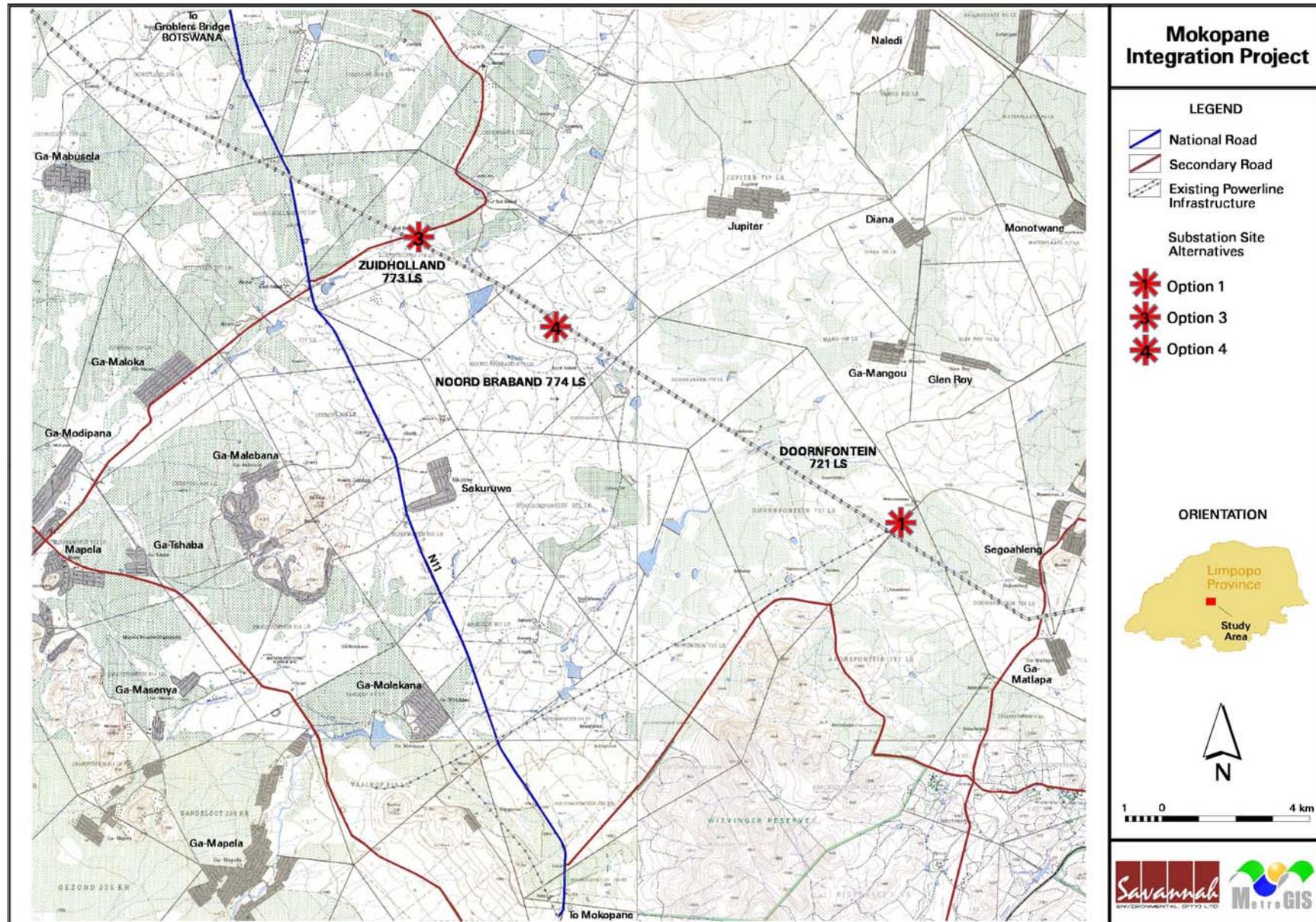


Figure 5.1: Substation site alternatives comparatively assessed in the EIA phase of the process

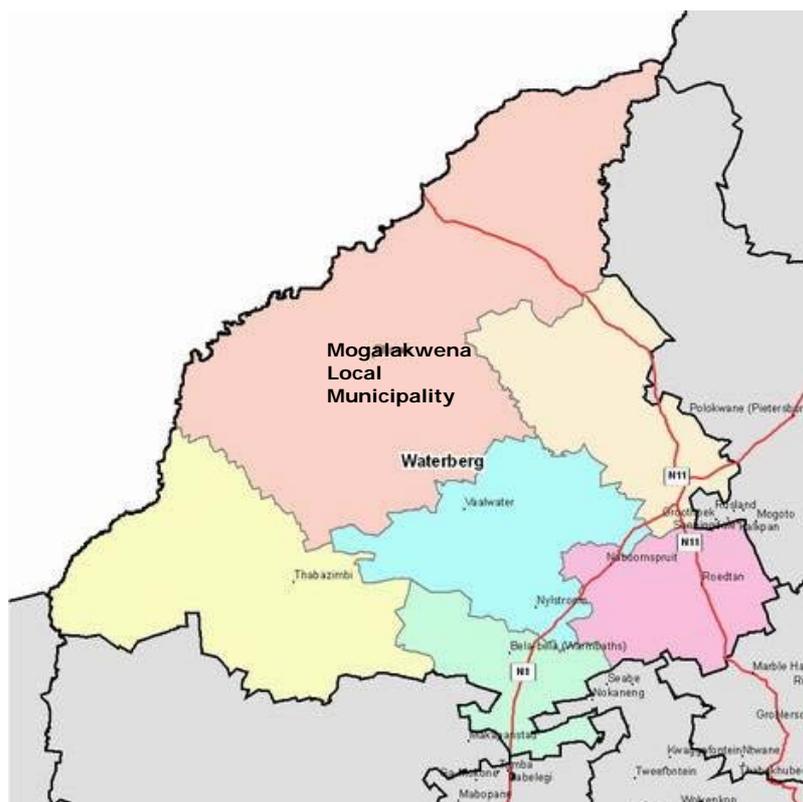


Figure 5.2: Delineation of Mogalakwena Local Municipality within the Waterberg District Municipality

5.2. Baseline and Social Characteristics of the Study Area

Baseline and social characteristics of the Mogalakwena Local Municipal and the Waterberg District Municipality are discussed in Section 4.2. Characteristics specific to the proposed substation sites are discussed below.

5.2.1. Demographic Profile

Figure 5.3 provides an overview of the formal settlements in the study area. At the time of the study, information was not available on the planned future development of these settlements.

- » *Option 1:* The closest human settlement to this site is Segoahleng, which is located some 3km east of the proposed site. Other human settlement in fairly close proximity to the proposed site includes Ga-Matlapa (approximately 4.7 km southeast), Glen Roy (approximately 4.3 km north), and Ga-Mangou (approximately 4.1 km north-northeast)

- » *Option 3:* The closest human settlements to this option is Dorsland, which is located approximately 2.8 km southeast and Suid-Holland, which is located approximately 3.3 km southwest of the proposed site. Other human

settlement in the vicinity of the proposed site includes Sakuruwa (approximately 6 km south), Ga-Maloka (approximately 7 km west-southwest), Ga-Malebana (approximately 7.5 km southwest), and Ga-Mabusela (approximately 9.1 km west)

- » *Option 4:* The closest human settlement is Sukuruwe, which is located approximately 4.9 km southwest of the proposed site. Other formal settlements in fairly close proximity to this option include Jupiter (approximately 5.4 km northeast), Suid-Holland (approximately 6.2 km west), Ga-Mangou (approximately 8.8km east) and Phetole (approximately 8.9 km north).

5.3. Biophysical Characteristics of the Study Area

5.3.1. Geographical Profile

The proposed substation site options are situated within landform types ranging from lowlands with mountains in the west to low mountains in the east (Figure 5.5). The proposed substation sites will be situated within areas described as woodland, regardless of the option selected.

5.3.2. Ecological Profile

The dominant vegetation type found within the study area is woodland of one type or another, i.e. arid or moist woodland. The majority of this study area is, however, in a state of transformation, with a number of settlements dotted throughout the immediate surrounds intermingled with mining areas and both commercial and subsistence forms of cultivation. As a result, a great deal of the vegetation within the study area has been and is being transformed. The habitat in the area has been subjected to severe pressure from the neighbouring communities and the various land use types.

The following VEGMAP¹⁰ vegetation units are present within the study area:

- » Makhado Sweet Bushveld
- » Mamabolo Mountain Bushveld
- » Polokwane Plateau Bushveld.

¹⁰ Refer to Ecological Specialist Report in Appendix F

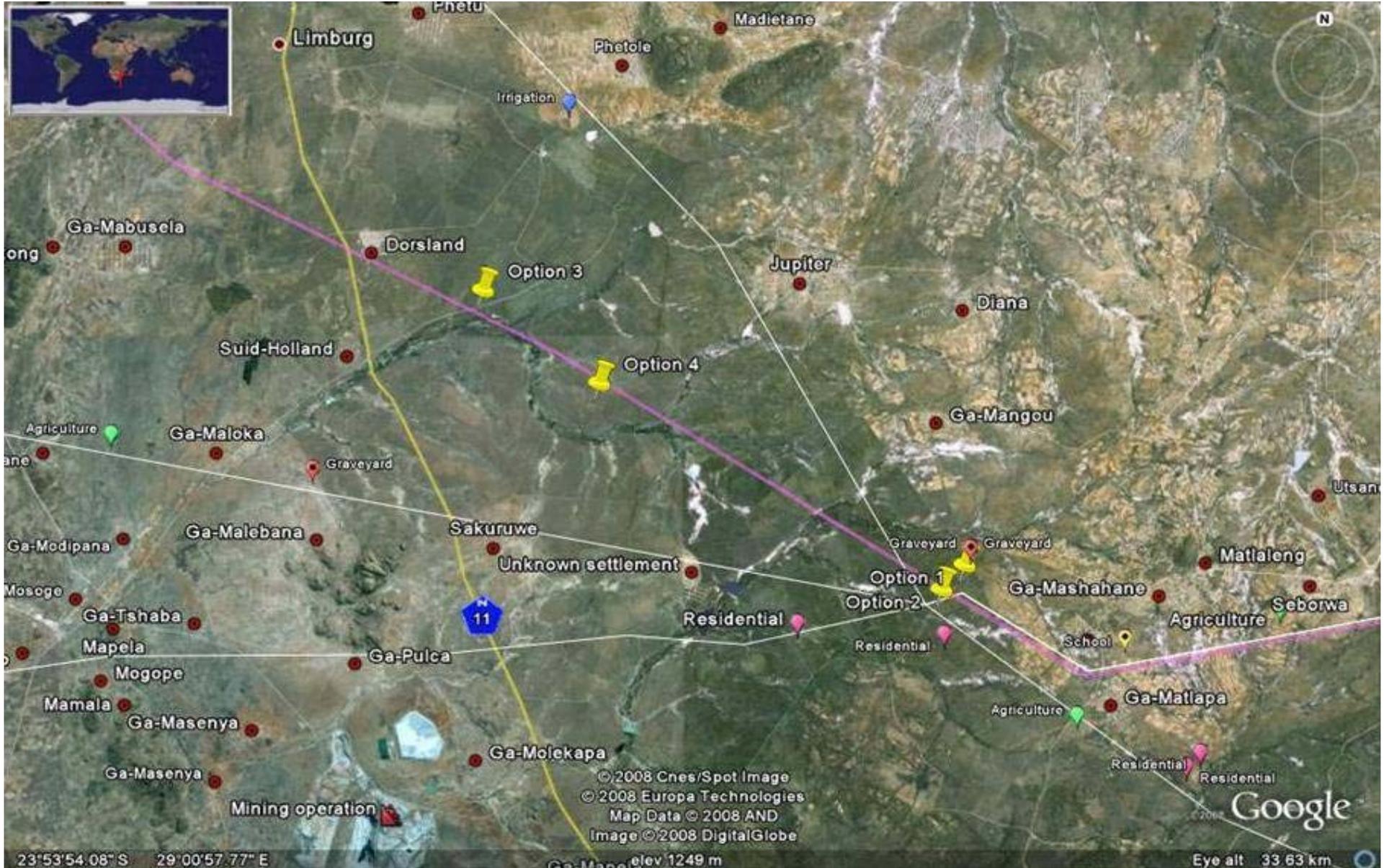


Figure 5.3: Formal settlements within the study area

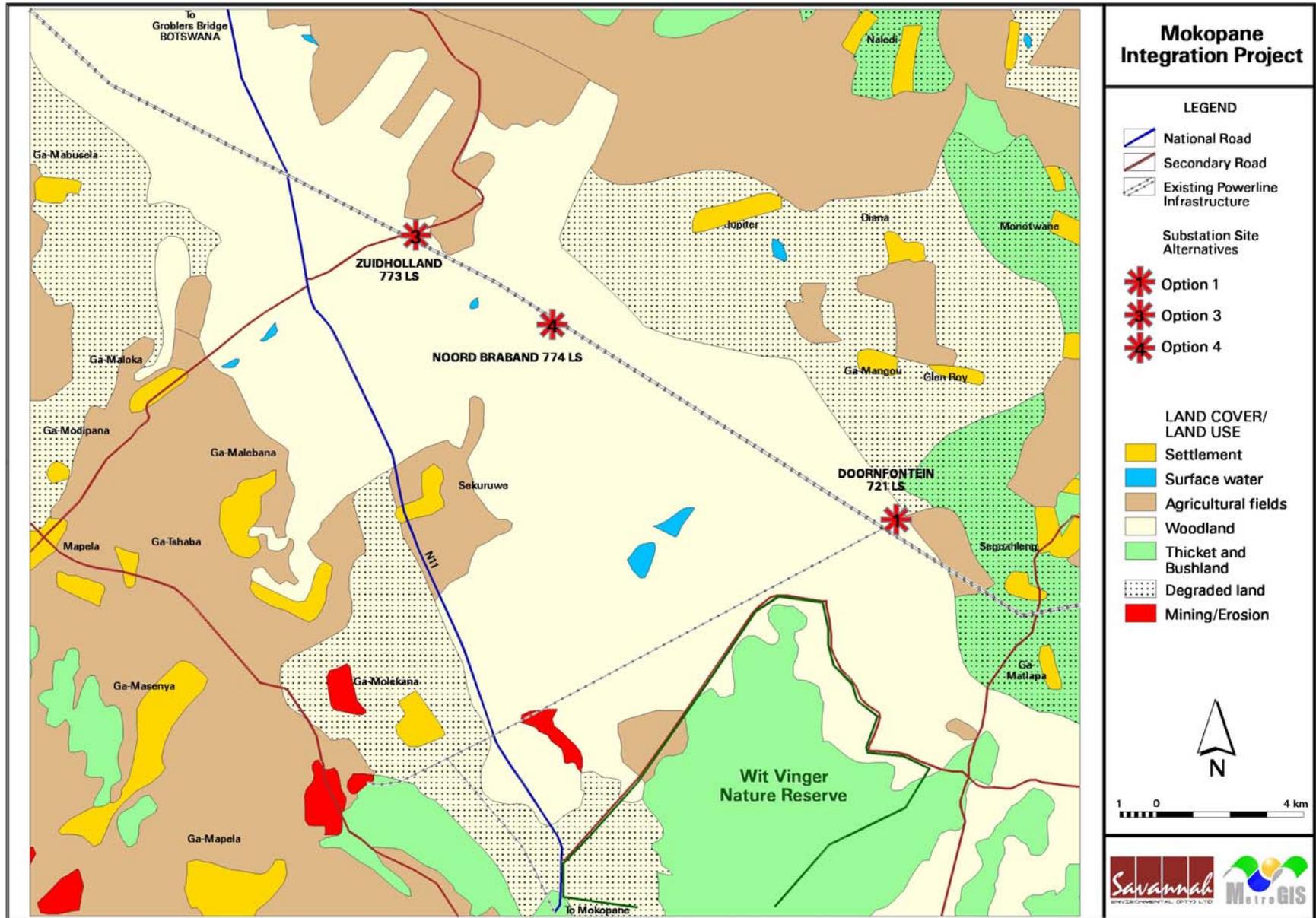


Figure 5.4 Land cover/land use map

Description of the Environment Affected
 by the proposed Substation and Turn-in Lines

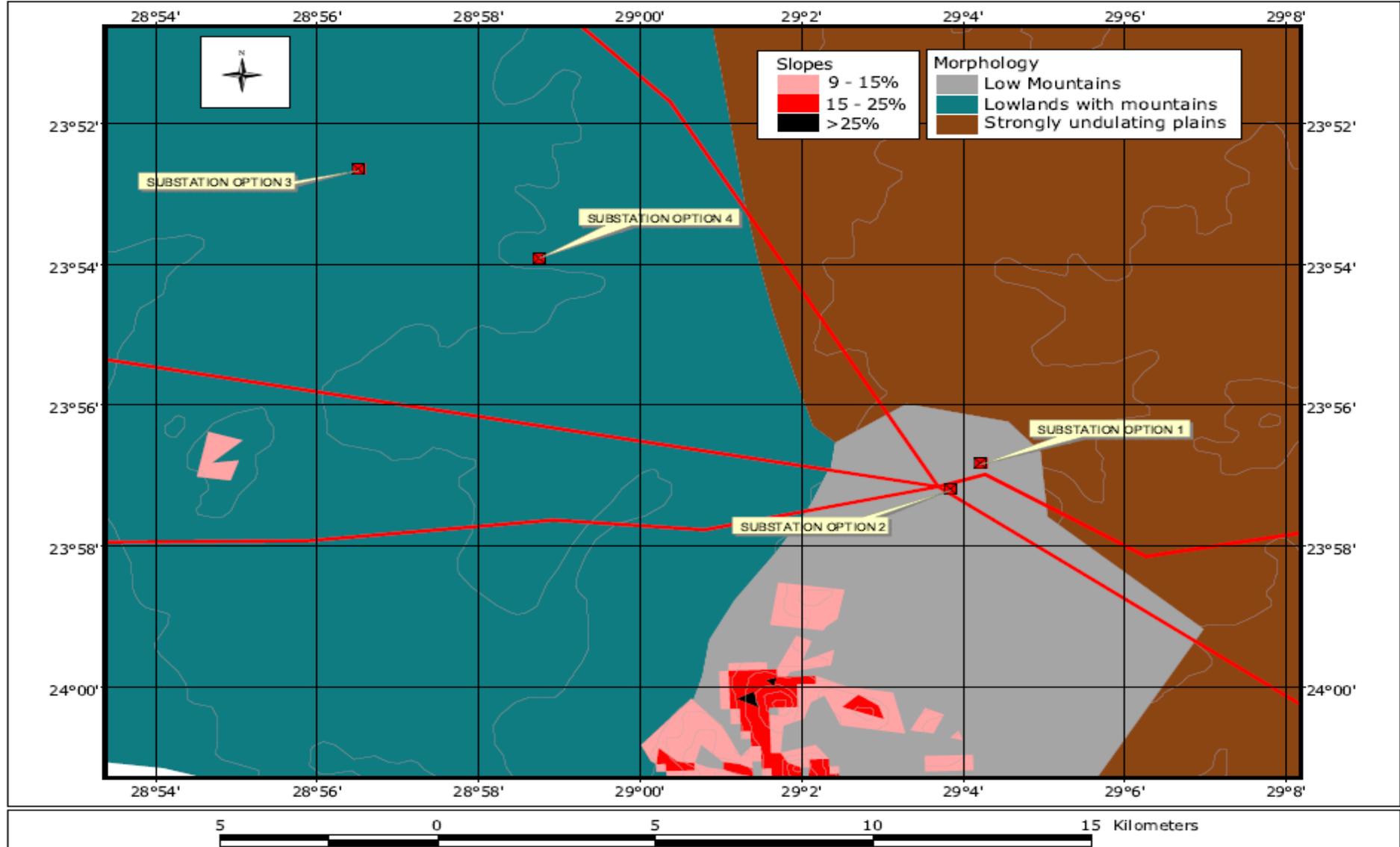


Figure 5.5: Topography & Slope analysis of the study area, highlighting areas with slopes exceeding 9% (Substation Site Option 2, although pictured above, is excluded from this EIA study)

The conservation status of the different vegetation types occurring in the study area is listed below in Table 5.1.

Table 5.1: Vegetation Conservation Status

VEGMAP Unit	% Conserved	% Transformed	Target	Status
Makhado Sweet Bushveld	1%	27%	19%	Vulnerable
Mamabolo Mountain Bushveld	8%	6%	24%	Least Threatened
Polokwane Plateau Bushveld	2%	17%	19%	Least Threatened

Although none of the substation sites are situated within areas of known botanical importance, several such sites are present in close vicinity to the sites and are likely to be affected by the turn-in lines. These areas frequently exhibit characteristics of a pristine nature, the presence of Red Data flora species, a high diversity or atypical or threatened vegetation types (Figure 5.7).

Wit Vinger Nature Reserve is situated approximately 2 km to the south-west of the Substation Option 1. Biodiversity attributes within these areas are not likely to be influenced by the turn-in lines.

No biosphere reserves are present within the immediate vicinity of the proposed development. Biodiversity attributes within these areas are not likely to be influenced by the turn-in lines.

The three alternative substation sites consist predominantly of degraded woodland with some pockets of riparian vegetation still remaining, particularly near Options 3 and 4. The Southern African Bird Atlas Project (Harrison *et al*, 1997) recorded a total of 194 and 206 bird species in the respective quarter degree squares during the atlas development period. Four of these species are classified as 'vulnerable' and six as 'near threatened'. In addition, the White Stork and Abdim's Stork (Protected internationally under the Bonn Convention on Migratory Species) are considered as threatened species for the purpose of this study.

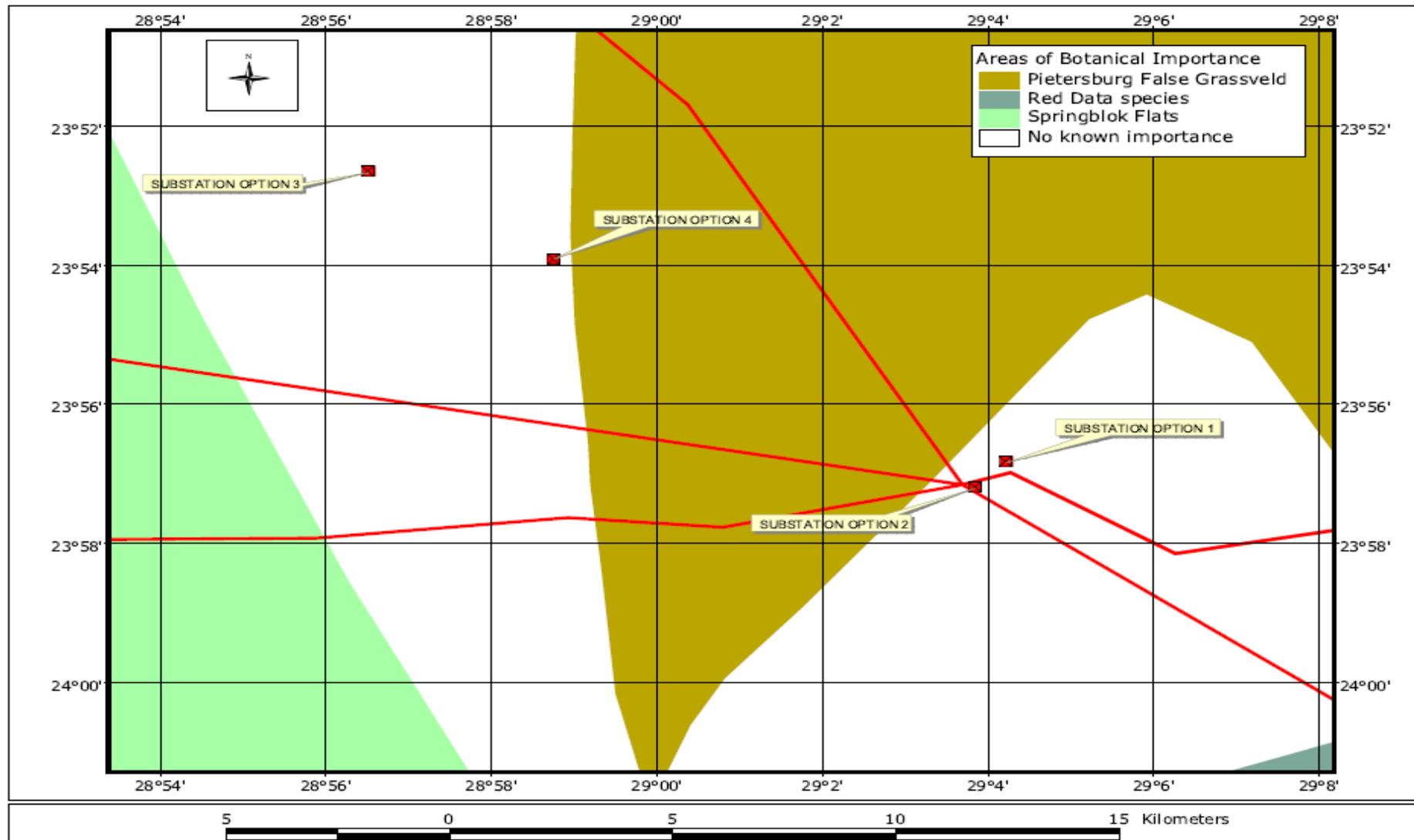


Figure 5.6: Areas of Botanical Importance in the study area (Substation Site Option 2 is excluded from this EIA study)

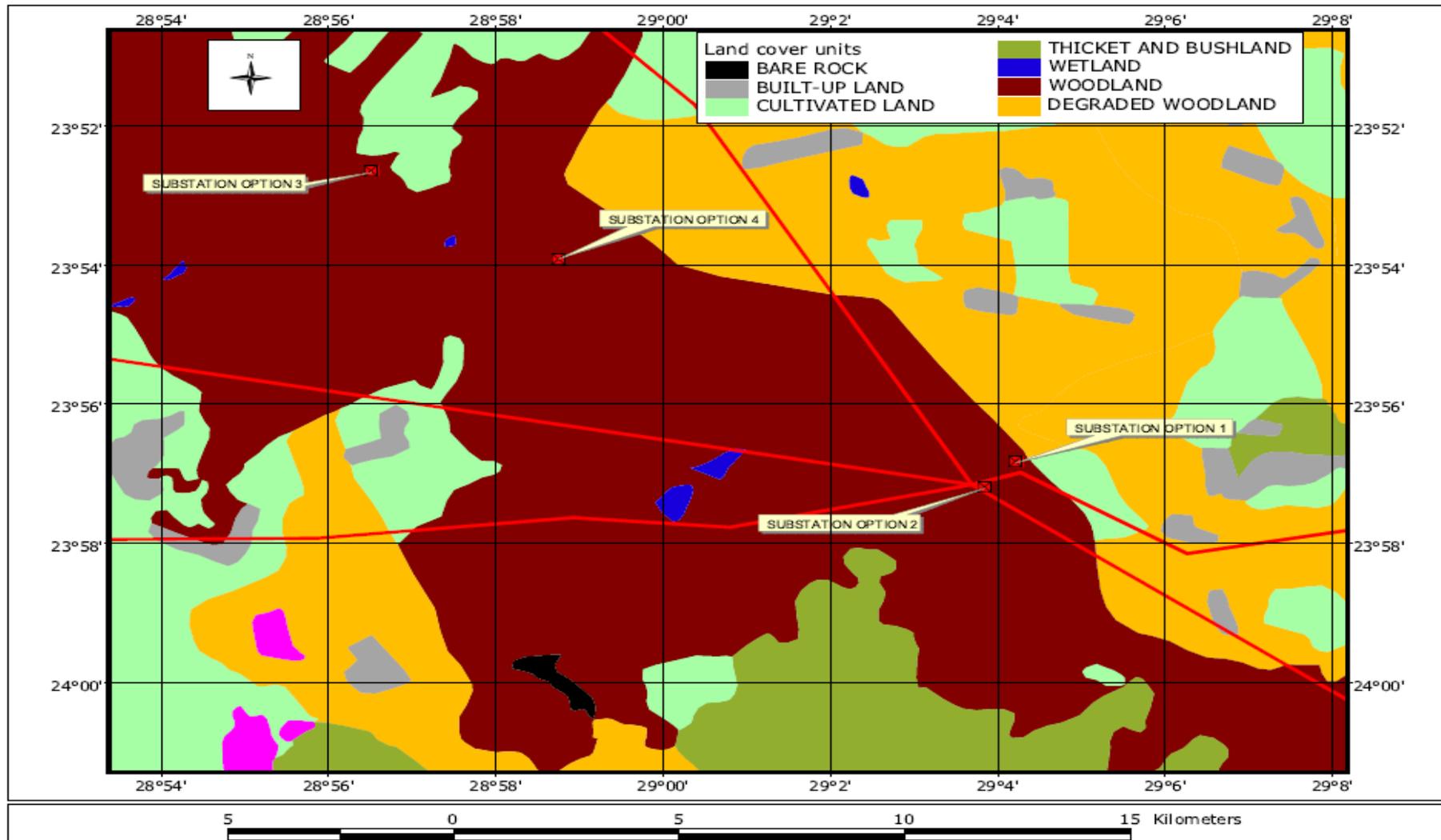


Figure 5.7: Landcover units in the study area (Substation Site Option 2 is excluded from this EIA study)

The following bird micro-habitats were identified within the immediate surrounds of the substation sites:

- » **Dams:** There are several small man-made impoundments within the study area. Whilst dams have altered flow patterns of streams and rivers, and affected many bird species detrimentally, a number of species have benefited from their construction. The construction of these dams has probably resulted in a range expansion for many water bird species that were formerly restricted to areas of higher rainfall.
- » **Arable land:** Arable or cultivated land represents a significant feeding area for many bird species in any landscape for the following reasons: through opening up the soil surface, land preparation makes many insects, seeds, bulbs and other food sources suddenly accessible to birds and other predators; the crop or pasture plants cultivated are often eaten themselves by birds, or attract insects which are in turn eaten by birds; during the dry season arable lands often represent the only green or attractive food sources in an otherwise dry landscape. In this study area, there are significant arable lands, both commercial and subsistence varieties.
- » **Rivers, pans and wetlands:** Substation Option 3 is located a short distance (0.3 km) from the Witrivier. Although sections of the river were dry at the time of the field visit, the tall fringing riparian forest and well developed woodland could support diverse and distinct woodland avifauna (Taylor et.al., 1999). These areas are of particular importance for birds, with riparian vegetation being extremely important to threatened riverine bird species and waterbird communities. Relevant to this study, Yellow-billed Stork, Greater and Lesser flamingos will frequent this river system.

Rivers are extremely important sources of water for most bird species and will be regularly utilised not only as a source of drinking water and food, but also for bathing.