

Hutton Soil Form

Hutton's are identified on the basis of the presence of an apedal (structureless) "red" B-horizon as indicated in Figure 13 below. These soils are the main agricultural soil found in South Africa, due to the deep, well-drained nature of these soils. The Hutton soils found on the site are restricted to the midslopes of the site..

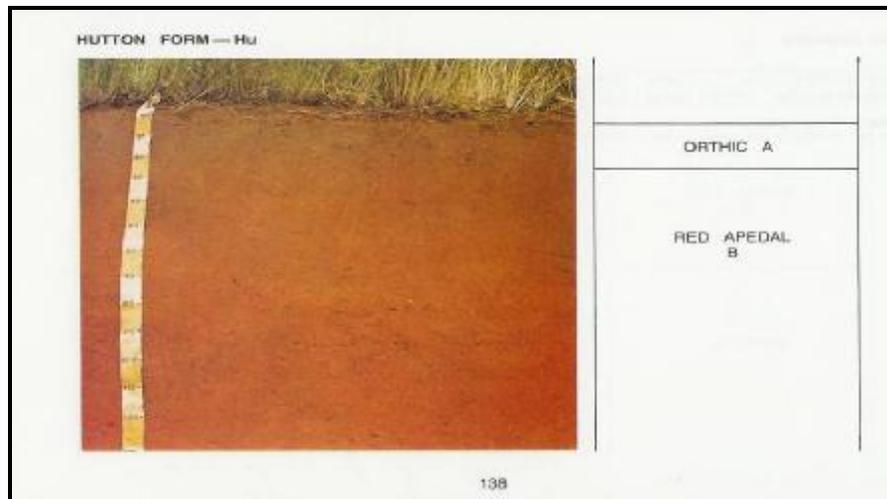


FIGURE 13: HUTTON SOIL FORM (SOIL CLASSIFICATION, 1991)

Katspruit Soil Form

The Katspruit soil form is most commonly found in areas of semi-permanent wetness. The soil is made up of an Orthic A-horizon over a diagnostic G-horizon and is indicated in Figure 14 below. The G-horizon has several unique diagnostic criteria as a horizon, namely:

- It is saturated with water for long periods unless drained;
- Is dominated by grey, low chroma matrix colours, often with blue or green tints, with or without mottling;
- Has not undergone marked removal of colloid matter, usually accumulation of colloid matter has taken place in the horizon;
- Has a consistency at least one grade firmer than that of the overlying horizon;
- Lacks saprolitic character; and
- Lacks plinthic character.

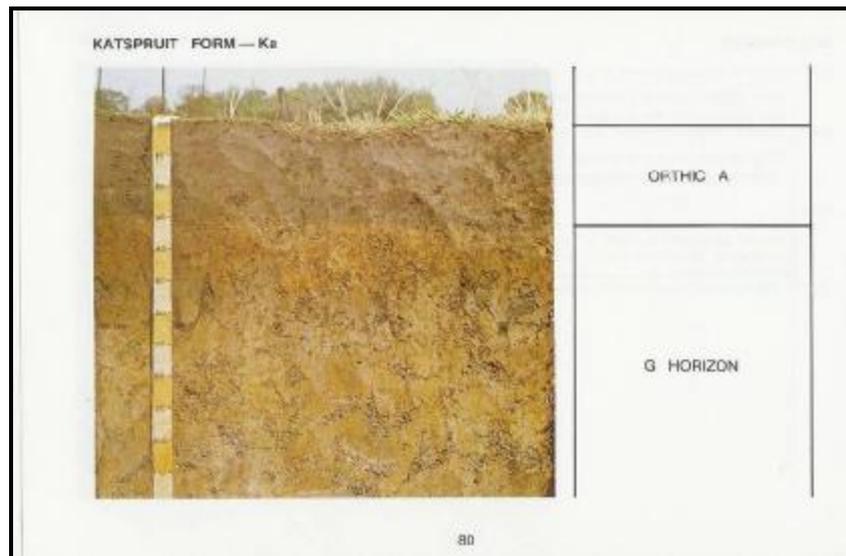


FIGURE 14: KATSPRUIT SOIL FORM (SOIL CLASSIFICATION, 1991)

7.1.6 Land Capability

Data Collection

A literature review was conducted in order to obtain any relevant information concerning the area, including information from the Environmental Potential Atlas (ENPAT), Weather Bureau and Department of Agriculture. Results from the soil study were taken into account when determining the land capability of the site.

The land capability assessment methodology as outlined by the National Department of Agriculture was used to assess the soil's capability on site.

Regional Description

The regional land capability is mostly class VI soils with many limitations. There are large patches of arable land and this is evidenced from the large number of cultivated lands found in the region. In the areas where the soil is too shallow or too wet to cultivate, livestock are grazed.

Site Description

The soils identified on site were classified according to the methodology proposed by the Agricultural Research Council – Institute for Soil, Climate and Water (2002). Factors evaluated are tabled below.

The site is made up of two main land capability classes, namely class VI-VII – light grazing and class V – grazing. The class VI and VII soils are not suitable for cultivation mainly due to shallow nature of the soils of this class. The class VI and VII soils have continuing limitations that cannot be corrected; in this case rock complexes, flood hazard, stoniness, and a shallow rooting zone constitute these limitations. The class V soils found on site are limited to the areas surrounding drainage lines or

streams and the Witbank Dam and are limited by the frequent flooding risk, shallow depth and poor drainage. Figure 15 illustrates the various land capability units on site.

TABLE 8: LAND CAPABILITY OF THE SOILS ON SITE FOR AGRICULTURAL USE

Soil	Clovelly & Hutton	Mispah	Katspruit
Area (ha)	263.0	101.0	63.0
% of site	61.6	23.7	14.7
Rock Complex	Yes – hard rock	Yes – hard rock	
Flooding Risk	F1 – None	F1 - None	F4 - Common
Erosion Risk	E4 – Moderate to High	E4 – Moderate to High	E3 - Moderate
Slope %	10.0	10.4	7.0
Texture	T1 – 15 – 45% Clay	T1 – 15 – 45% Clay	T1 – 15 – 45% Clay
Depth	D4 – 10 – 30 cm	D4 – 10 – 30 cm	D3 – 40 – 60 cm
Drainage	W2 – Well drained	W2 – Well drained	W5 – Poorly drained
Mech Limitations	MB2 – Large Stones and Boulders, Unploughable	MB3 – Shallow soils on rock	MB0 - None
pH	pH > 5	pH > 5	pH > 5
Soil Capability	VI	VII	V
Climate Class	C2	C2	C1
Land Capability	VI – Light Grazing	VII – Light Grazing	V - Grazing
	No limitation	Low to Moderate	Moderate
		High	Very Limiting

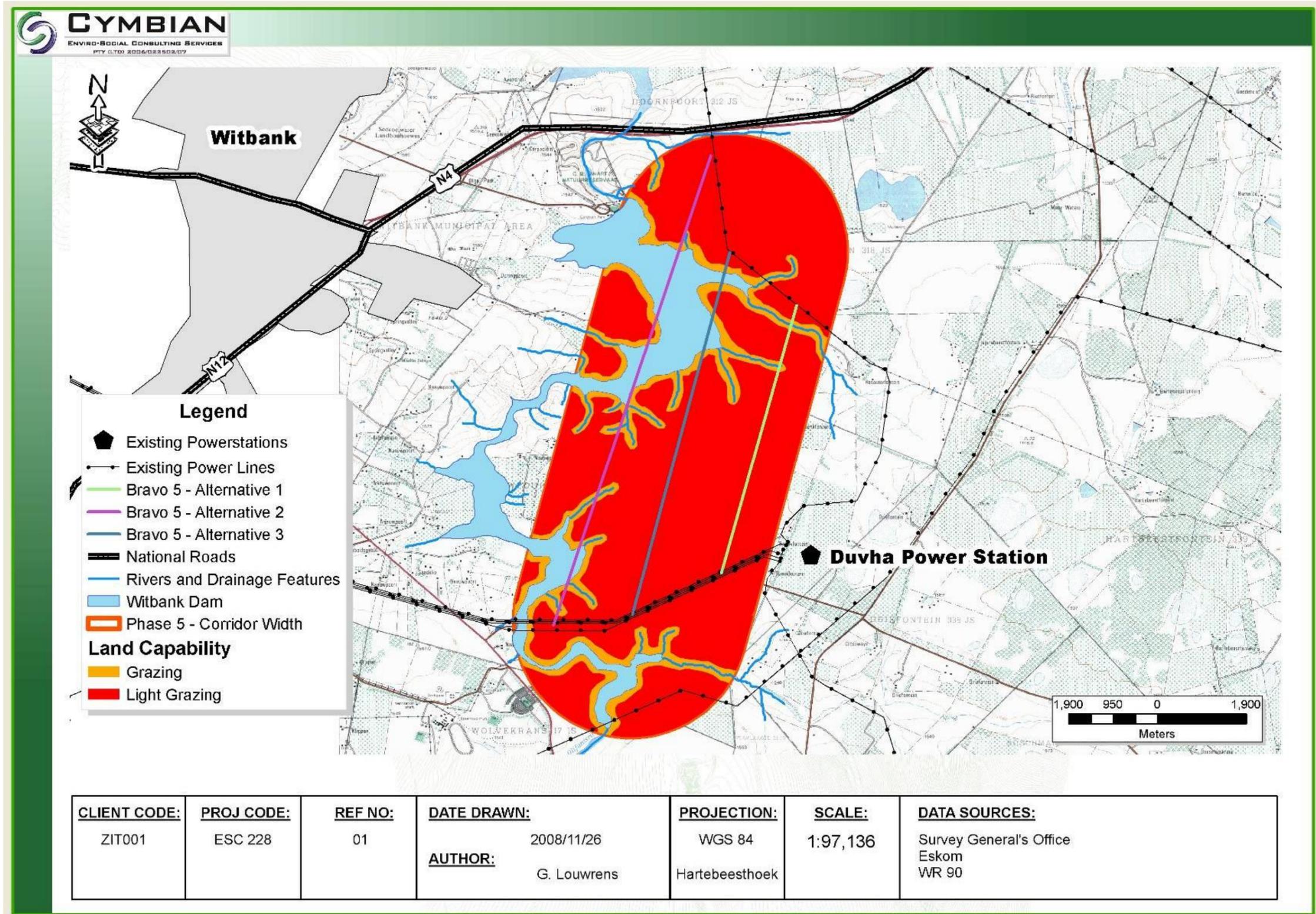


FIGURE 15: REGIONAL LAND CAPABILITY AT DUVHA POWER STATION.

7.1.7 Land Use

Data Collection

The Land Use data was obtained from the CSIR Land Cover database utilising a GIS desktop study and supplemented with visual observations on site.

Regional Description

Land-Use is dominated by maize and sunflower farming, coal mines and power stations. Land uses also occurring in the area include Commercial / Industrial, Conservation areas, Cultivated land, Forestry areas, Residential, Subsistence farming and Vacant or Unspecified land, however for the purposes of this report, land use of the region is grouped into urban, cultivation, grassland / plantations, mines and quarries and waterbodies / wetlands.

Site Description

The Land-Use on site is dominated by maize, grazed fields, quarries, residential and conservation. From the map below (Figure 17) it can be seen that the proposed by-pass line and buffer zone include all classes of land use. Water bodies are the only land use regarded as sensitive and as such certain mitigatory measures will be outlined. The study area is located in an area which is predominantly unimproved grassland and this type of land cover is associated with intensive grazing. It was noted that Corobrik make use of a quarry on site to manufacture bricks and that a small section of the ash dump from Duvha Power Station is located on site, the Golden Miles Estate is also located on site (Figure 16). With this in mind Alternative 1 is the most preferred alternative as it avoids the water bodies and also disturbs the shortest section of grazing land before entering the power station site.

	
<p>Ash Dump from the Duvha Power</p>	<p>Fields used for grazing</p>

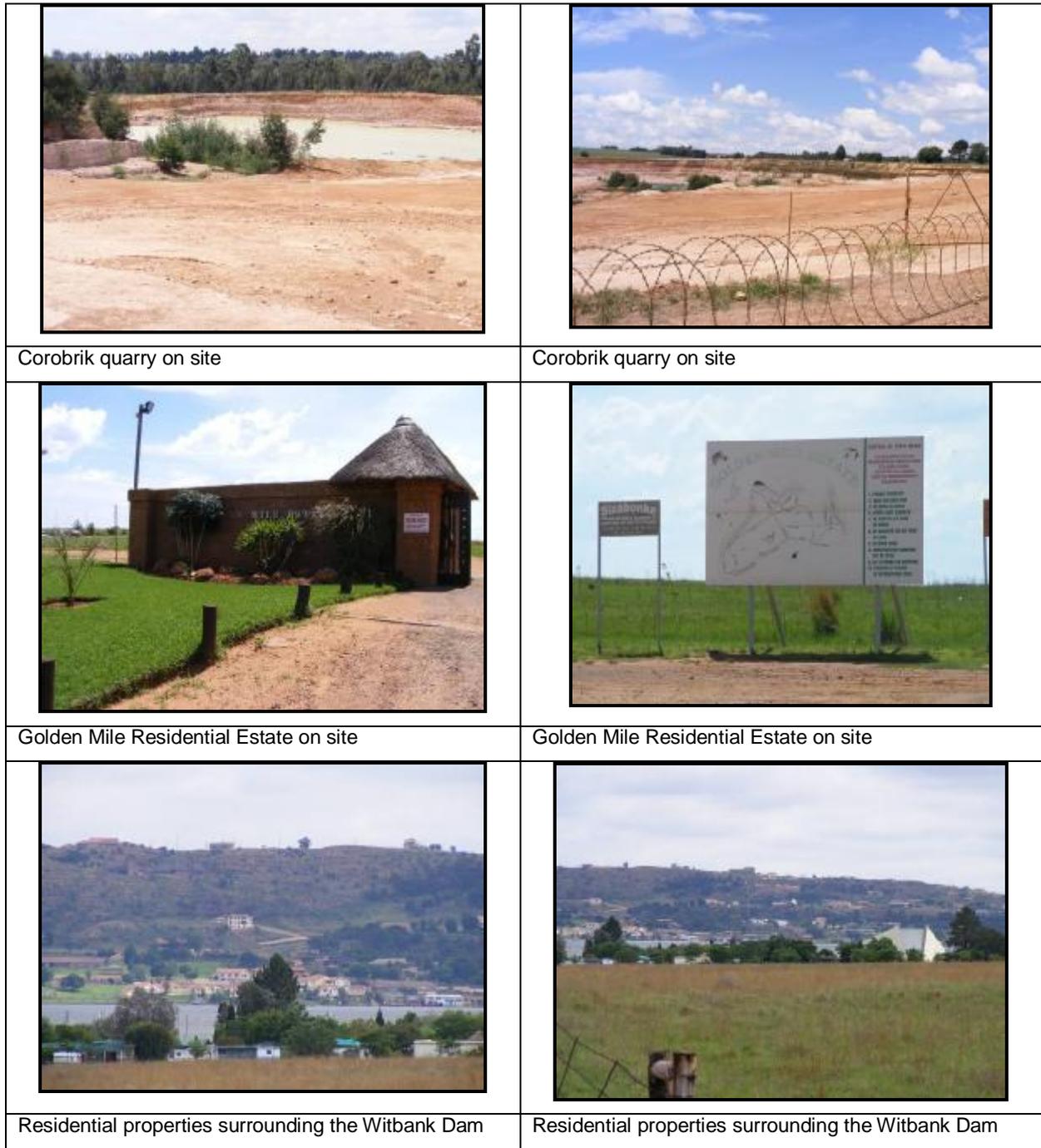


FIGURE 16: LAND USES ENCOUNTERED ON SITE.

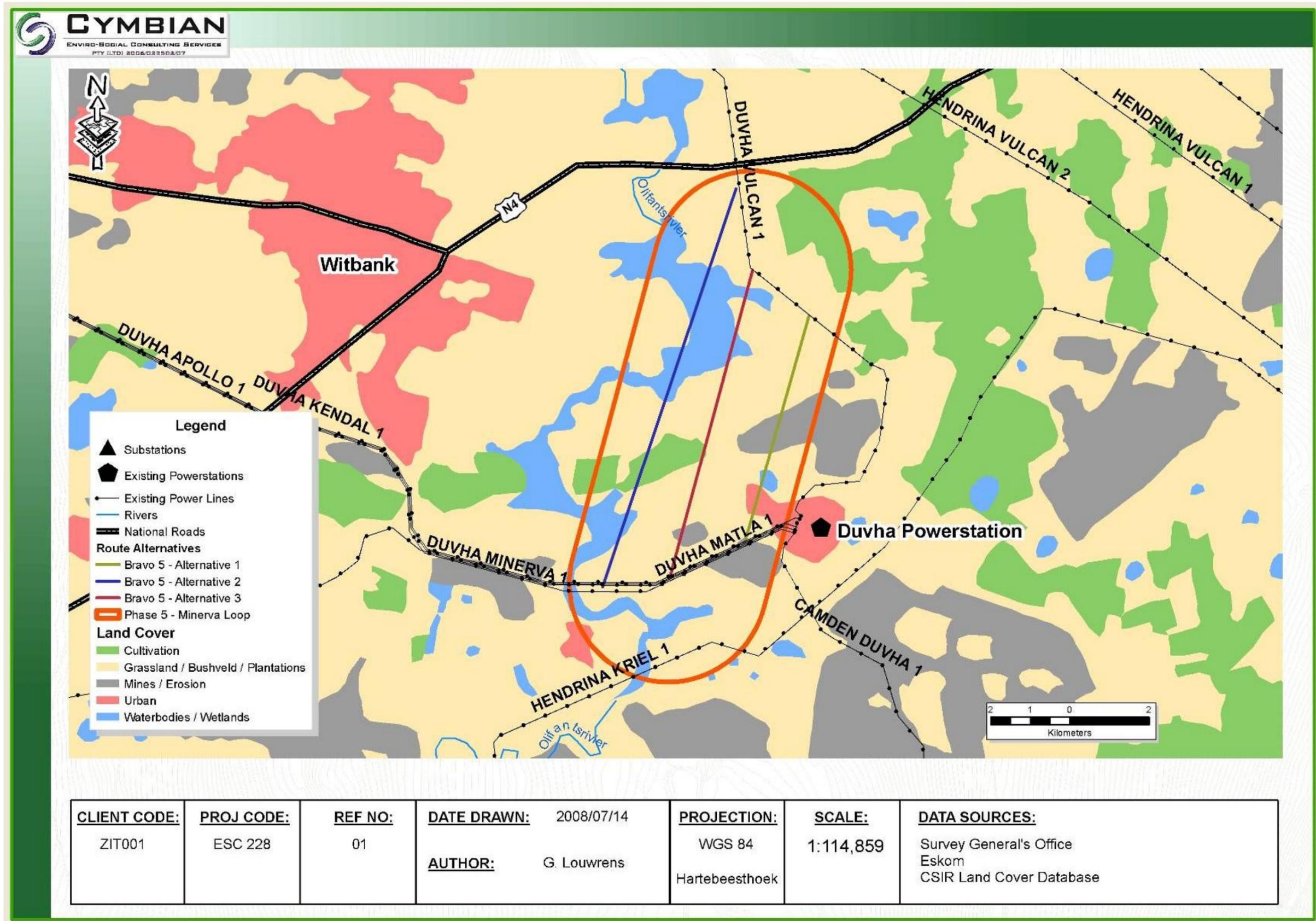


FIGURE 17: REGIONAL LAND USE NEAR DUVHA POWER STATION.

7.1.8 Vegetation

Data Collection

The floral study involved extensive fieldwork, a literature review and a desktop study utilizing GIS. The site was investigated during a one week site visit, conducted from the 10th-12th September 2008, in early spring. The area within the servitude was sampled using transects placed at 300m intervals. At random points along the transect an area of 20m x 20m was surveyed. All species within the 20m x 20m quadrant were identified, photographed and their occurrence noted. Sensitive features such as ridges or wetlands were sampled by walking randomly through the area concerned and identifying all species within the area.

The floral data below is taken from The Vegetation of South Africa, Lesotho and Swaziland (Mucina and Rutherford 2006). Also, while on site, the following field guides were used:

- Guide to Grasses of Southern Africa (Frits van Oudtshoorn, 1999);
- Field Guide to Trees of Southern Africa (Braam van Wyk and Piet van Wyk, 1997);
- Field Guide to the Wild Flowers of the Highveld (Braam van Wyk and Sasa Malan, 1998);
- Problem Plants of South Africa (Clive Bromilow, 2001);
- Medicinal Plants of South Africa (Ben-Erik van Wyk, Bosch van Oudtshoorn and Nigel Gericke, 2002)

The occurrence of the species was described as either:

- Very common (>50 % coverage);
- Common (10 – 50 % coverage);
- Sparse (5 – 10 % coverage); and
- Individuals (< 5 % coverage).

Regional Description

According to the South African National Biodiversity Institute, the study area falls within the Grassland Biome, where most of the county's maize production occurs. The study area comprises of the Rand Highveld Grassland, Eastern Highveld Grassland and Eastern Temperate Freshwater Wetlands vegetation units as classified by Mucina and Rutherford². Each of these vegetation units are described in more detail below.

Rand Highveld Grassland

Rand Highveld Grassland is found in the highly variable landscape with extensive sloping plains and ridges in the Gauteng, North-West, Free State and Mpumalanga Provinces. The vegetation type is found in areas between rocky ridges from Pretoria to Emahlaheni, extending onto ridges in the

Stoffberg and Roossenekal regions as well as in the vicinity of Derby and Potchefstroom, extending southwards and north-eastwards from there. The vegetation is species rich, sour grassland alternating with low shrubland on rocky outcrops. The most common grasses on the plains belong to the genera *Themeda*, *Eragrostis*, *Heteropogon* and *Elionurus*. High numbers of herbs, especially *Asteraceae* are also found. In rocky areas shrubs and trees also prevail and are mostly *Protea caffra*, *Acacia caffra*, *Celtis africana* and *Rhus spp.*

This vegetation type is poorly conserved (approx 1 %) and has a target of 24 % of the vegetation type to be conserved. Due to the low conservation status this vegetation type is classified as endangered. Almost half of the vegetation type has been transformed by cultivation, plantations, urbanisation or dam-building. Scattered aliens (*Acacia mearnsii*) are present in the unit.

Eastern Highveld Grassland

The Eastern Highveld Grassland is found in the Mpumalanga and Gauteng Provinces on the plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief. The landscape is dominated by undulating plains and low hills with short dense grassland dominating belong to the genera *Themeda*, *Aristida*, *Digitaria*, *Eragrostis*, *Tristachya* etc. Woody species are prevalent on the rocky outcrops. In terms of conservation and disturbance, 44 % of the vegetation type is already transformed by cultivation, plantations, mines, and urbanisation. No serious alien invasion, but *Acacia mearnsii* can dominate in certain areas

Eastern Temperate Freshwater Wetlands

Another vegetation type associated with the region is the Eastern Temperate Freshwater Wetlands, found around water bodies and embedded within the Grassland biome. Eastern Temperate Freshwater Wetlands are typically found in flat landscapes or shallow depressions filled with (temporary) water bodies supporting zoned systems of aquatic and hydrophilous (water loving) vegetation of temporarily flooded grasslands and ephemeral herblands. Important species include *Cyperus congestus*, *Phragmites australis*, *Marsilea farinose*, *Rorippa fluviatalis*, *Disa zuluensis*, *Crassula tuberella* and the carnivorous herb *Utricularia inflexa*. These wetlands are one of the most sensitive vegetation units found in the region and have been extensively modified by mining and industrial activities in the region.

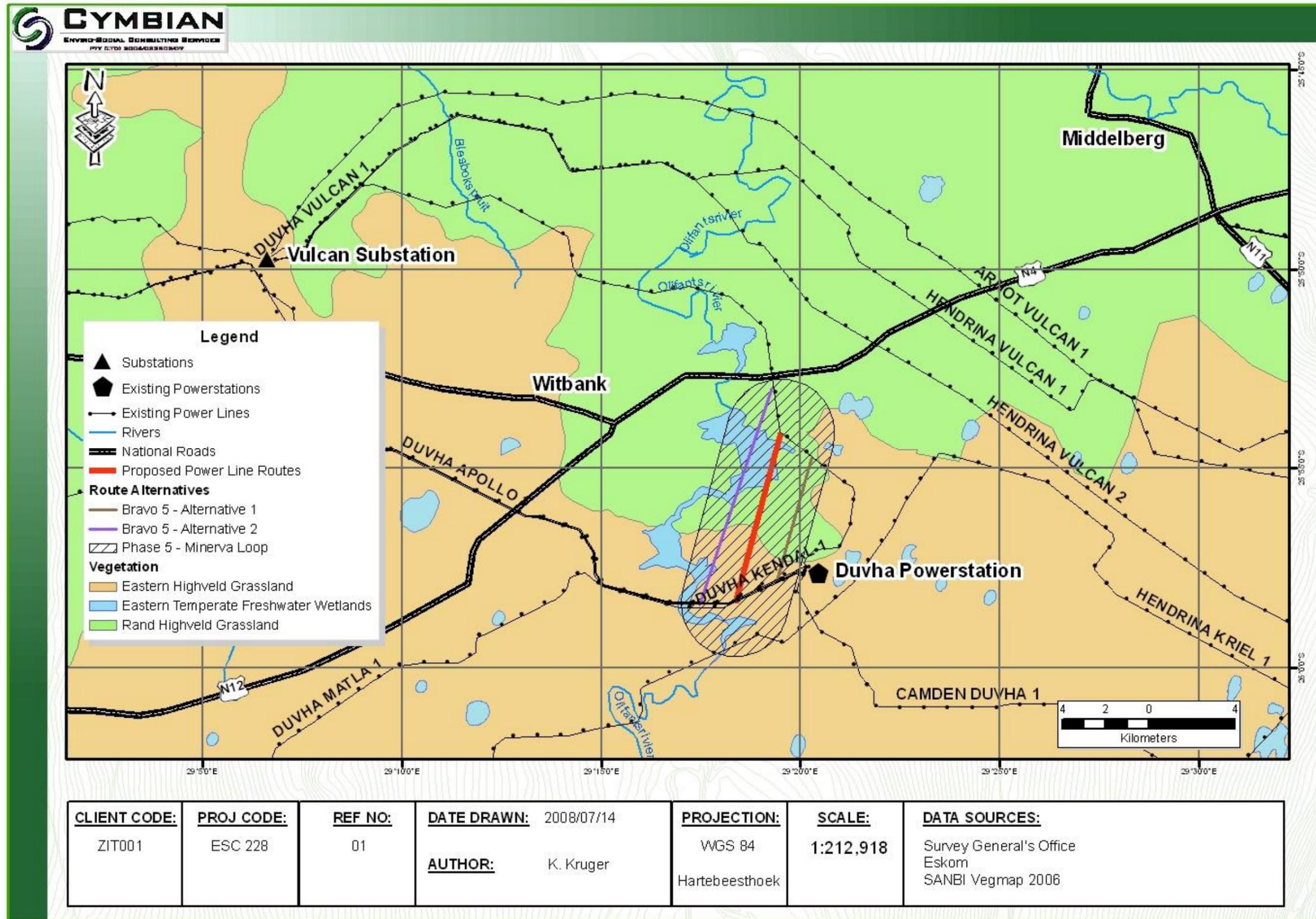


FIGURE 18: REGIONAL VEGETATION NEAR DUVHA POWER STATION.