7 BASELINE RECEIVING ENVIRONMENT

Zitholele Consulting (Pty) Ltd appointed Cymbian Enviro-Social Consulting Services to undertake the Biophysical Specialist Studies for this project, including:

- Vegetation Assessment;
- Soil and Land Capability Assessment;
- Wetland Delineation;
- Geology;
- Visual; and
- Avifauna.

The Heritage Impact Assessment was conducted by Julius Pistorius and the Social Assessment was undertaken by Master Q Research (Pty) Ltd.

7.1 Bio-Physical Environment

This section details the bio-physical receiving environment at the project location. Although the aim of this section is to detail the vegetation, wetlands, soil and land capability, certain factors have been included as they provide perspective to the soil and vegetation sections.

For more information on this section please refer to Appendix R.

7.1.1 Geology

Data Collection

The geological analysis was undertaken through the desktop evaluation using a Geographic Information System (GIS) and the relevant data sources. The geological data was taken from the Environmental Potential Atlas Data from the DEAT as well as the Geological Desk Study Report for the EIA for the proposed alternative routes and infrastructure[2].

Regional Description

The results from the assessment are graphically represented in Figure 6 below.

The geology towards the western section of the proposed power lines, incorporating Minerva and Lulamisa substations, is dominated by Archean granite, Meinhardskraal granite, Sand River gneiss and gneiss of the Halfway House granite.

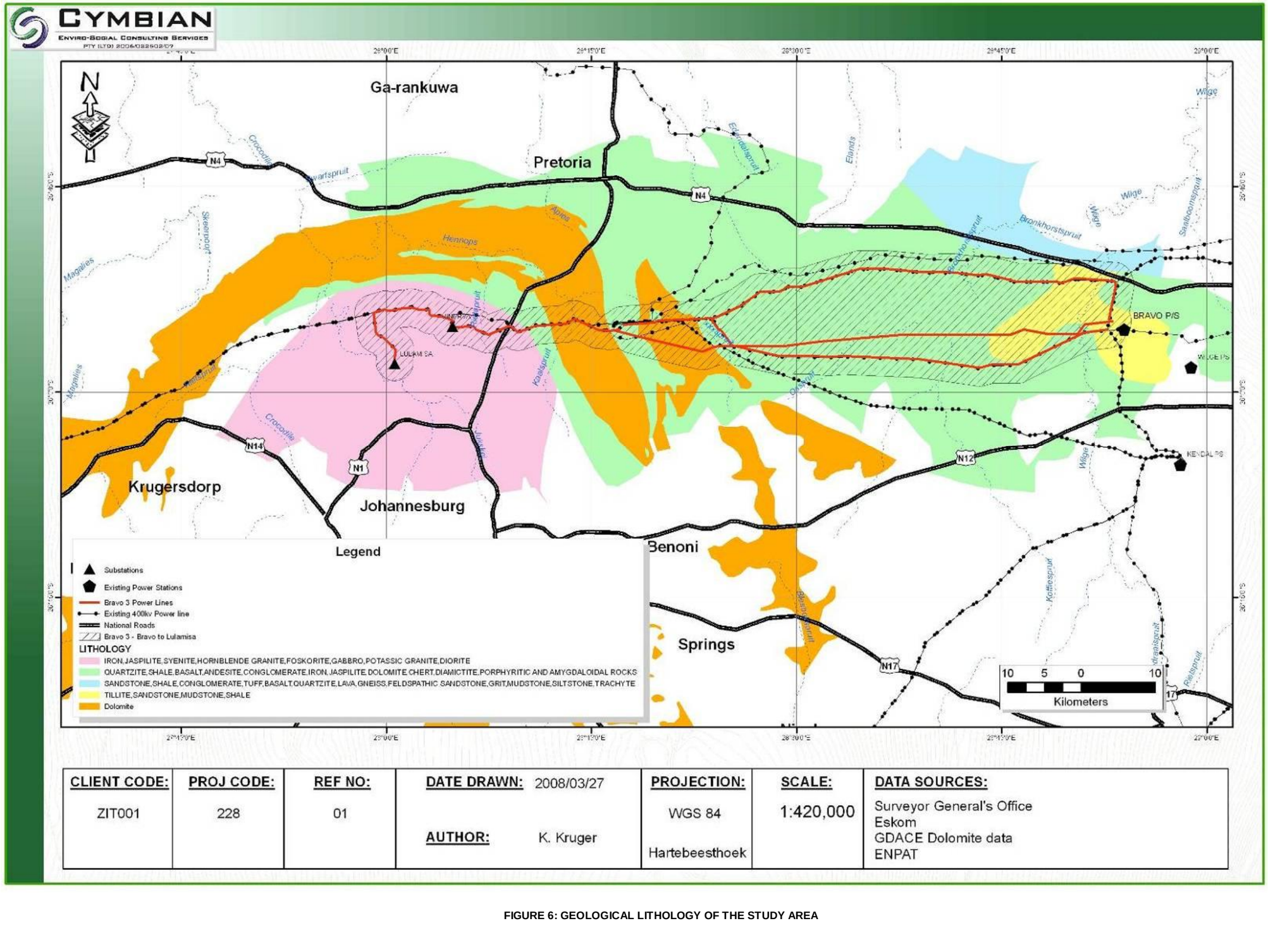


FIGURE 6: GEOLOGICAL LITHOLOGY OF THE STUDY AREA

The central part of the route overlies large sections of dolomite just south of Pretoria. These sections should be seen as sensitive as the dolomite provides a risk of sinkhole formation. The geology of the central section of the proposed power lines includes formations of the Transvaal, Rooiberg and Griqualand-West super groups, while the eastern section of the of the proposed power lines is dominated by formations of the Dwyka group.

7.1.2 Climate

Data Collection

Climate information was attained using the climate of South Africa database, Land Types of the Maps 2526 Rustenburg, 2528 Pretoria (Land Type Survey Staff 1987)[3], as well as from The Vegetation of South Africa, Lesotho and Swaziland (Mucina and Rutherford 2006).

Regional Description

The region experiences strongly seasonal summer-rainfall with very dry winters. Mean Annual Precipitation (MAP) varies between 570 mm and 730 mm. The area has a warm temperate climate, with mean monthly minimum temperature of 11.7°C and a mean monthly maximum temperature of 24.0°C. A mean annual temperature (MAT) of 15.8°C is recorded.

Incidences of frosts are frequent, however it is higher in the west (30-40 days), than in the east (10-35 days). The mean annual potential evaporation (MAPE) is approximately 2 184 mm.

Site Description

The MAP for Funda Muni Training Centre, the nearest official recording station to the study site is approximately 678 mm. Maximum and minimum temperatures recorded at the station are 35.0°C and -2.5°C respectively. The rainfall and temperature data for the Funda Muni Training Centre weather station are discussed below.

Ambient Temperature

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher the plume is able to rise), and determining the development of the mixing and inversion layers.

[3] Land Type Survey Staff (1987). Land Types of the Maps 2526 Rustenburg, 2528 Pretoria. Memoirs of the Agricultural Natural Resources of South Africa No. 8

Table 8: Rainfall and temperature data for the Funda Muni Training Centre weather station

Month	Average Rainfall	Max Rainfall 24hrs	Mean Monthly Temperature	Ave Daily Temp (°C)	
	(mm)	(mm)	(°C)	Max	Min
Jan	75	44	21.7	27.4	16.0
Feb	98	71	21.3	26.9	15.8
Mar	60	41	20.5	26.3	14.7
Apr	73	158	17.8	23.7	11.9
May	6	17	15.2	21.8	8.6
Jun	11	26	12.2	18.7	5.7
Jul	3	8	12.4	19.2	5.6
Aug	8	18	15.2	22.0	8.4
Sep	44	73	16.9	23.8	10.4
Oct	72	51	19.0	25.5	12.5
Nov	101	37	20.5	26.1	14.9
Dec	127	67	20.9	26.5	15.4
Annual	678	158	17.8	24.0	11.7

7.1.3 Surface Water

Data Collection

Surface water data was taken from the WR90 Data supplied by the Department of Water Affairs and Forestry (DWAF) as well as data supplied by the Gauteng Department of Agriculture, Conservation and Environment (GDACE).

Regional Description

The area covered by the three alternative power line corridors run over several main drainage networks (Figure 8), but majority of the water drains in two major directions. The first is found in the central to western parts of the site and all the drainage flows northwest towards the Hartbeesport Dam and the Crocodile River. The second drainage network drains towards the northeast and culminates in the Olifants River.

Site Description

Three maps were generated to provide clarity because of the scale of the area that needed to be covered. From Figure 9, Figure 10 and Figure 11, there are several rivers and dams that all three alternative routes cross over. The Bronkhorstspruit River intersects all three alternatives and Bronkhorstspruit Dam intersects Alternative 2. Other rivers and streams that are intersected by the three alternative routes are the Wilge, Osspruit, Kaalspruit, Rietspruit and other small streams that follow drainage lines as indicated in Figure 9, Figure 10 and Figure 11. Figure 7 below clearly indicates existing river crossings along the route. The aim of the crossings is to always remain outside the flood line

FIGURE 7: EXISTING POWER LINE RIVER CROSSINGS

All water bodies including drainage lines that occur in the area have particular fauna and flora that are adapted to survive in these particular conditions. All these areas are earmarked as sensitive areas and should be avoided as far as possible by placing a buffer zone around each sensitive area

Particular attention needs to be focused on Alternative 2 because of the locality and the difficulty that will arise in the construction phase of the power line. This alternative runs straight across the Bronkhorstspruit Dam which will be a large problem to overcome in the future both from a construction and environmental scope.

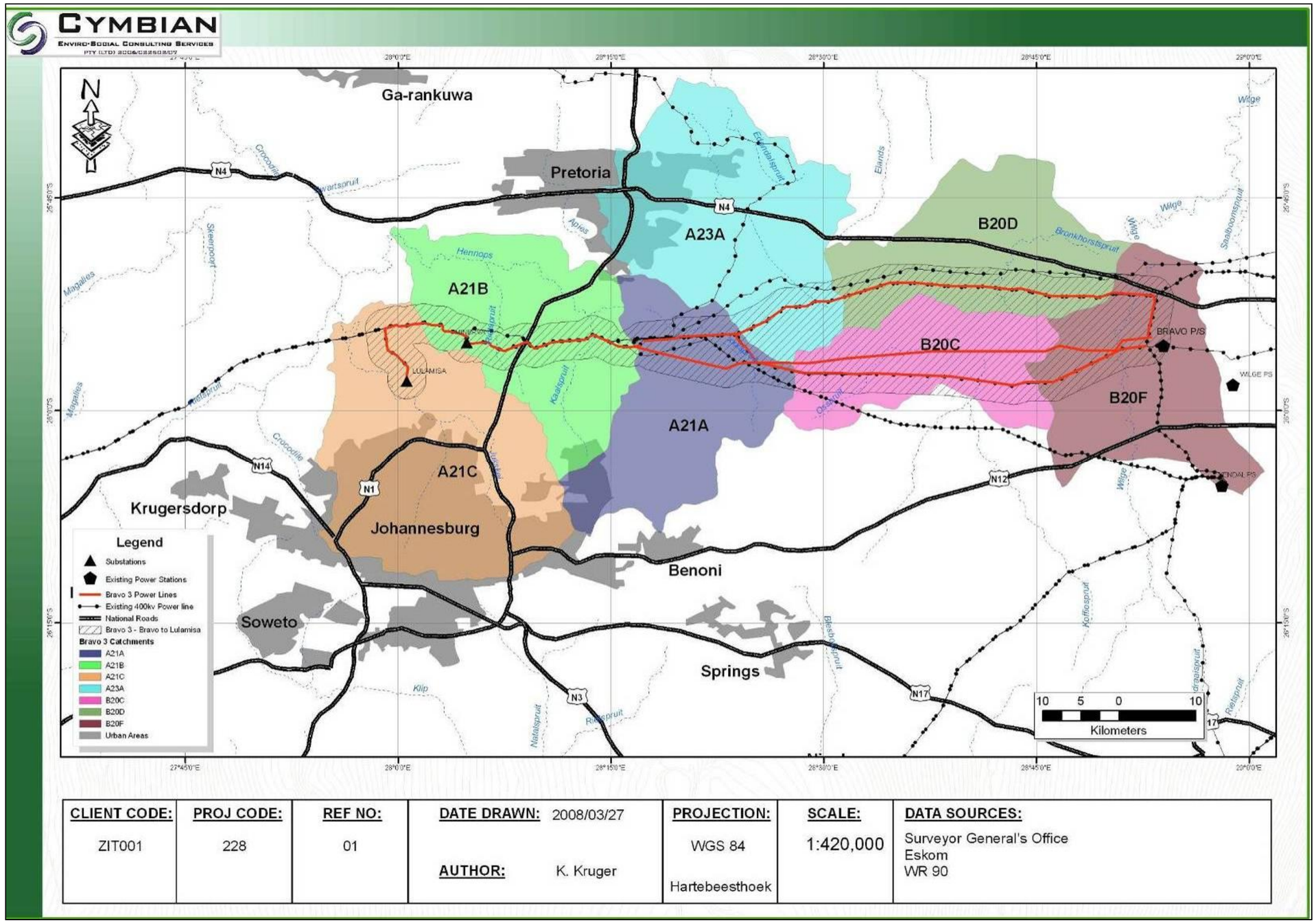
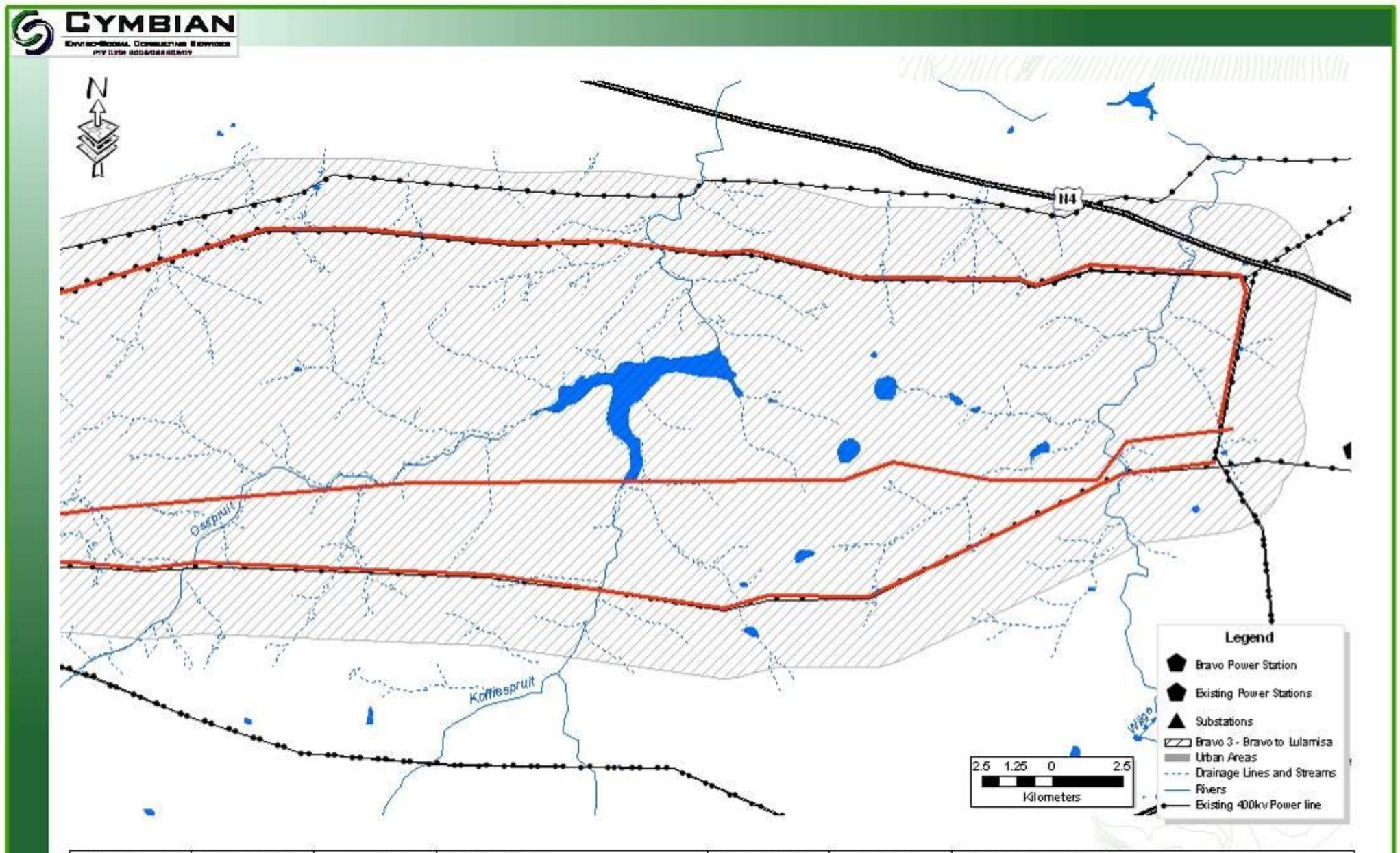


FIGURE 8: SURFACE WATER AND CATCHMENTS



CLIENT CODE:	PROJ CODE:	REF NO:	DATE DRAWN:	PROJECTION:	SCALE:	DATA SOURCES:
ZIT001	228	01	2008/11/25 AUTHOR: B.Coutts	WGS 84 Hartebeesthoek	1:170,983	Surveyor General's Office Eskom Department of Agriculture Land Capability Data

FIGURE 9: SURFACE WATER AND DRAINAGE FEATURES OF THE EASTERN SECTION OF THE SITE

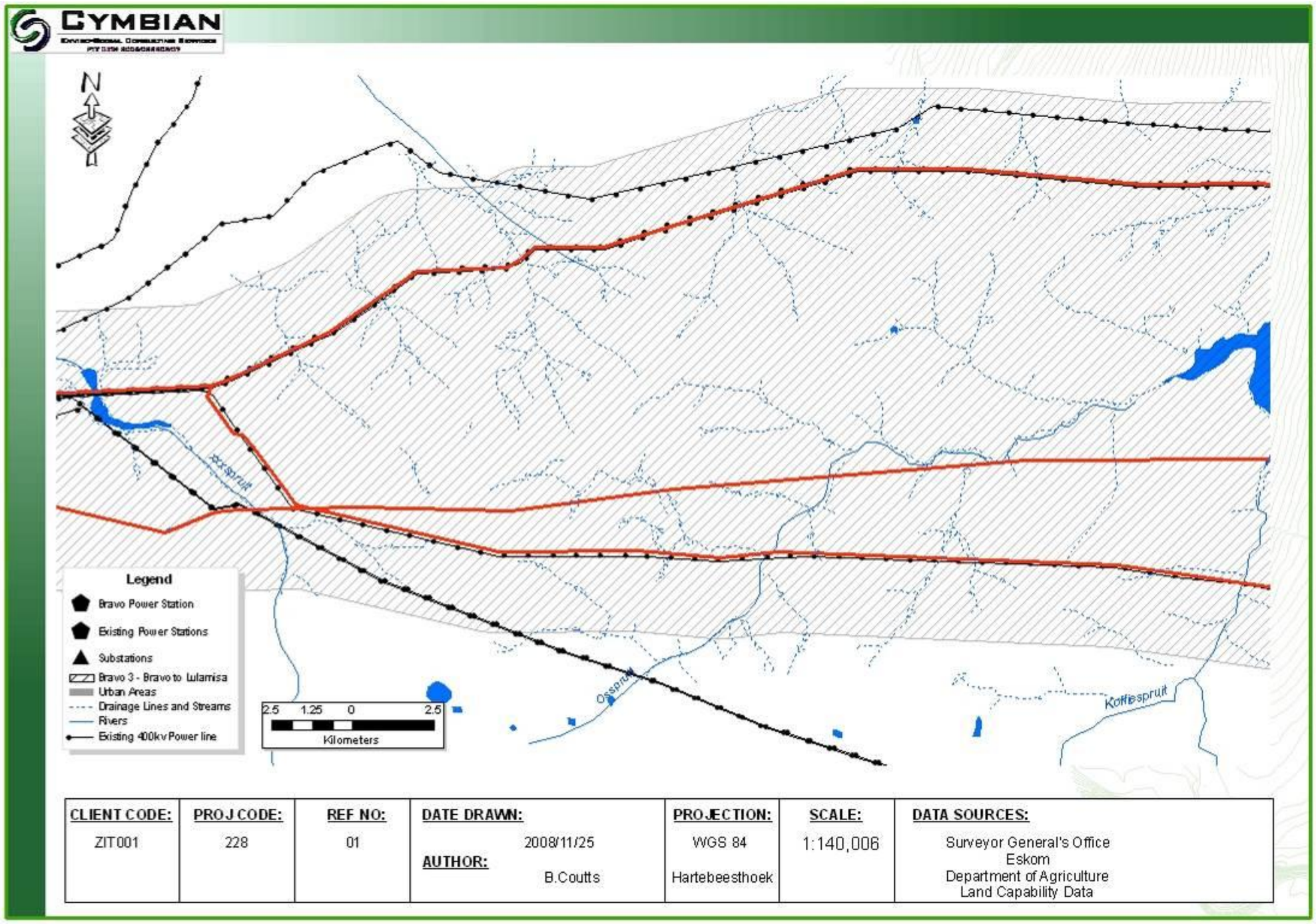


FIGURE 10: SURFACE WATER AND DRAINAGE FEATURES OF THE CENTRAL PART OF THE SITE

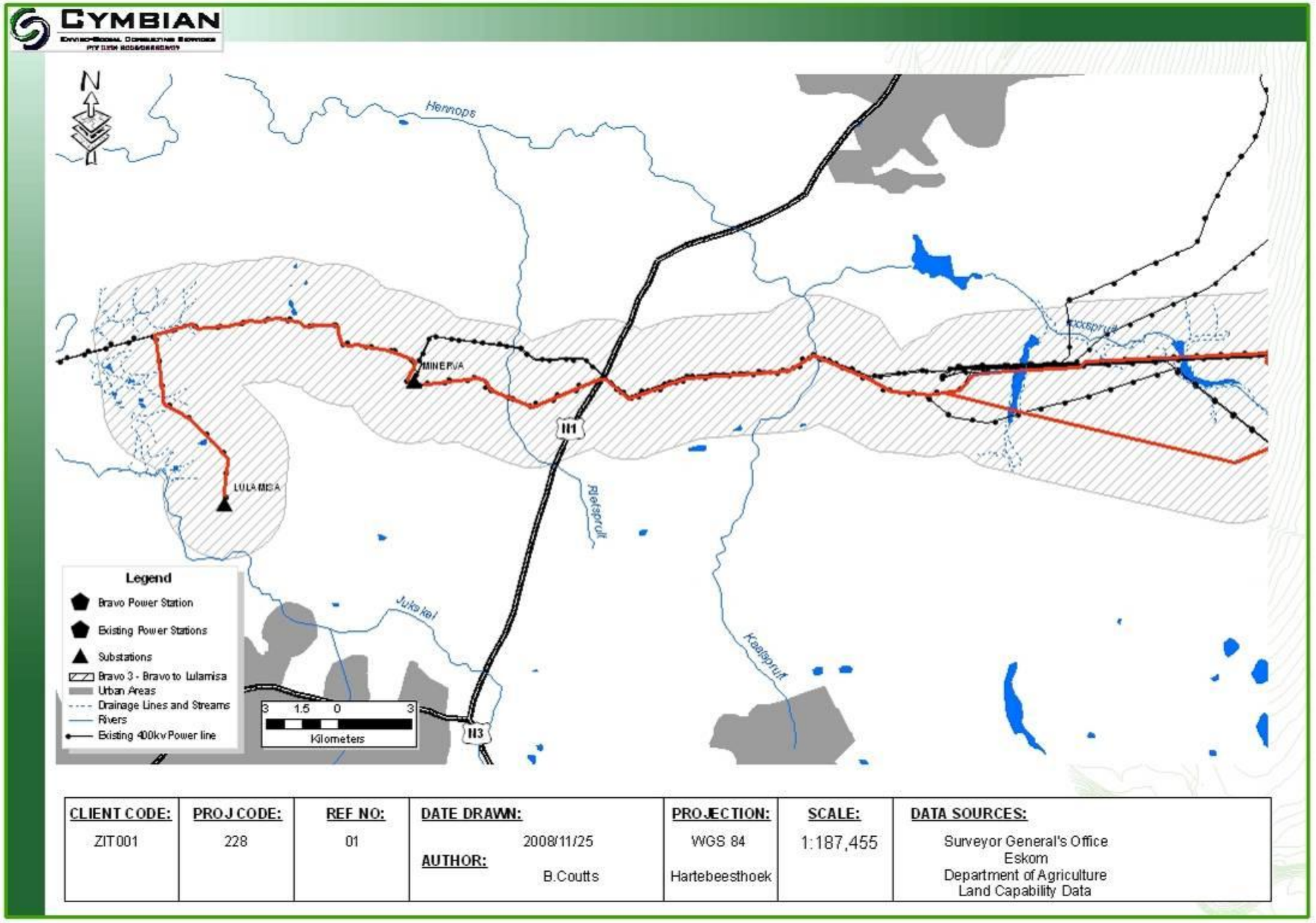


FIGURE 11: SURFACE WATER AND DRAINAGE FEATURES OF THE WESTERN PART OF THE SITE

7.1.4 Topography

Data Collection

The topography of the area was taken from the Surveyor General 1:50 000 topocadastral map sheets of the area, namely 2528 CC, CD, DD, DC, and 2527 DD.

Using the Arcview GIS software the contour information was used to develop a digital elevation model of the region as shown in Figure 13, Figure 14 and Figure 15 below.

Regional Description

The topography of the area exhibits a highly variable landscape with extensive sloping plains and ridges elevated over undulating surrounding plains. The undulating plains include some low hills and pan depressions.

A TIN model of the contours on site is represented in Figure 13, Figure 14 and Figure 15, illustrating the elevations found on site. The elevation ranges from 1 180 to 1 660 mamsl on site with the western sections of the route located in the lower lying areas that drain towards the Hartbeespoort Dam. The central part of the corridors traverse several ridges and high-lying areas, while the eastern section traverses relatively flat areas with east-west running ridges prominent.

Site Description

A number of ridges occur in the area as indicated in Figure 16 below. In several places the proposed corridors traverse along ridges, especially in the Bronkhorstspruit area. The ridges are the only land in the area that is not suitable for agriculture and therefore the power line servitudes have been placed along the ridges. This has had the added bonus that the ridges have remained relatively undisturbed, barring the power line pylon footings. The vegetation along the ridges is in good condition as the servitudes are not open for grazing. Refer to Figure 12 for photographs of the power lines on ridges.

FIGURE 12: POWER LINES LOCATED ON A RIDGE