

numerous tribal and settler heritage sites. The previous heritage surveys found numerous types of heritage and cultural resources in the broader Aquarius project area:

- Stone walled settlements dating from the Late Iron Age
- Formal and informal graveyards
- Structures such as residential houses which are older than sixty years and which qualify as historical structures
- Remains which date from the more recent past.

Considering the above it is possible that Late Iron Age and Middle Stone Age resources may be found at the proposed site. In many cases these resources are found at the base of hills and koppies. These resources are protected by the National Heritage Resources Act (No 25 of 1999) and may not be affected (demolished, altered, renovated, removed) without approval.

2.4 EXISTING STATUS OF THE SOCIO-ECONOMIC ENVIRONMENT

This section describes the existing status of current land uses and the socio-economic environment that may be affected by the proposed project.

2.4.1 PRE-PROJECT LAND USE

The sites for the proposed open pits are currently used for grazing and wilderness

2.4.2 SOCIO-ECONOMIC PROFILE

The regional setting of the both project areas is included in Table 2-1 and illustrated in **Error! Reference source not found..**

TABLE 2-1: REGIONAL SETTING

Aspect	Details of the proposed Hoogland area
District	Ehlanzeni District Council
Local authorities	Thaba Chewu Local Municipality
Closest towns/communities	The nearest towns are Roossenekal, approximately forty (40) kilometres to the west, Lydenburg thirty (30) kilometres to the east and Dullstroom approximately forty (40) kilometres to the south (See Figure 1-2 and Figure 2-2).
Catchment	The site lies within the headwaters of quaternary catchment B41G and is intersected by three main tributaries, including a number of other minor watercourses. These rivers flow in a westerly direction to their confluence with the Groot Dwars River.
Topographic features	The Steenkampsberg Mountain range lies to the east and south of the site, the deeply incised headwaters/valley of the Grot Dwars River to the west and

Aspect	Details of the proposed Hoogland area
	the De Berg peak (2330m), being the highest peak in Mpumalanga to the south

Information provided below is based on the 1996 and 2001 census data from Stats SA.

The mine falls within the jurisdiction of the Ehlanzeni District Council and the Thaba Chewu Local Municipality in the Mpumalanga Province. A brief summary of the socio-economic information given in the mine's EMP is provided below. It should be noted that this information is based on the 1996 census data. Updated information will be provided in the EIA/EMP amendment report.

Levels of unemployment in the Mpumalanga Province are high, with only about 22% of the population employed. A greater portion (about 46%) of the population of the Thaba Chewu Local Municipality is employed, but the rates of remuneration of employees in this municipality are generally very low. Farming, fishing and forestry are the main sources of employment.

Mining employs only 0.52 % of the people in the Thaba Chewu Municipality.

In the vicinity of the mine, services such as police stations, high schools, post offices, hospitals and waste collection are absent. There is no public transport

2.5 EXISTING STATUS OF RELEVANT INFRASTRUCTURE

The information in this section was identified from site inspections. The surrounding structures listed below have been identified from site.

A significant power line (and the associated ESKOM servitude) lies to the east of the project area in a north-south direction.

The only areas within the project boundary that have been transformed are a few dams and homesteads, with significant alien plant invasion taking place in the south-east. Most of the project area comprises untransformed and relatively undisturbed natural grassland and thicket / bushland/wilderness that has been and is currently grazed by livestock. Most of the project area comprises untransformed and relatively undisturbed grassland and thicket that has been and is currently grazed by livestock. Significant land use transformation has taken place to the north in the form of mining (i.e. 1.5km) and limited cropland agriculture (kiwi orchards) also occurs in the north-east (i.e. 2.5km). The farms Triangle 72 JT and De Berg 71 JT, along the southern and south-eastern boundaries of the study area, constitute a proclaimed private nature reserve¹; the De Berg Conservancy/Davel Private Nature Reserve (see

¹ Government Gazette No. 3134, 27 January 1965.

Figure 2-1). Discussions with the Mpumalanga Parks and Tourism Agency (MPTA) indicate that this nature reserve proclaimed, in 1965 has a limited land use buffer zone of 1km around the perimeter of the reserve. This restrictions around this nature reserve and the buffer zone will be investigated in the next phase of the EIA. The only areas within the project boundary that have been transformed are a few dams and homesteads, with significant alien plant invasion taking place in the south-east of the project area.

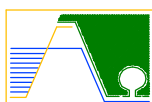
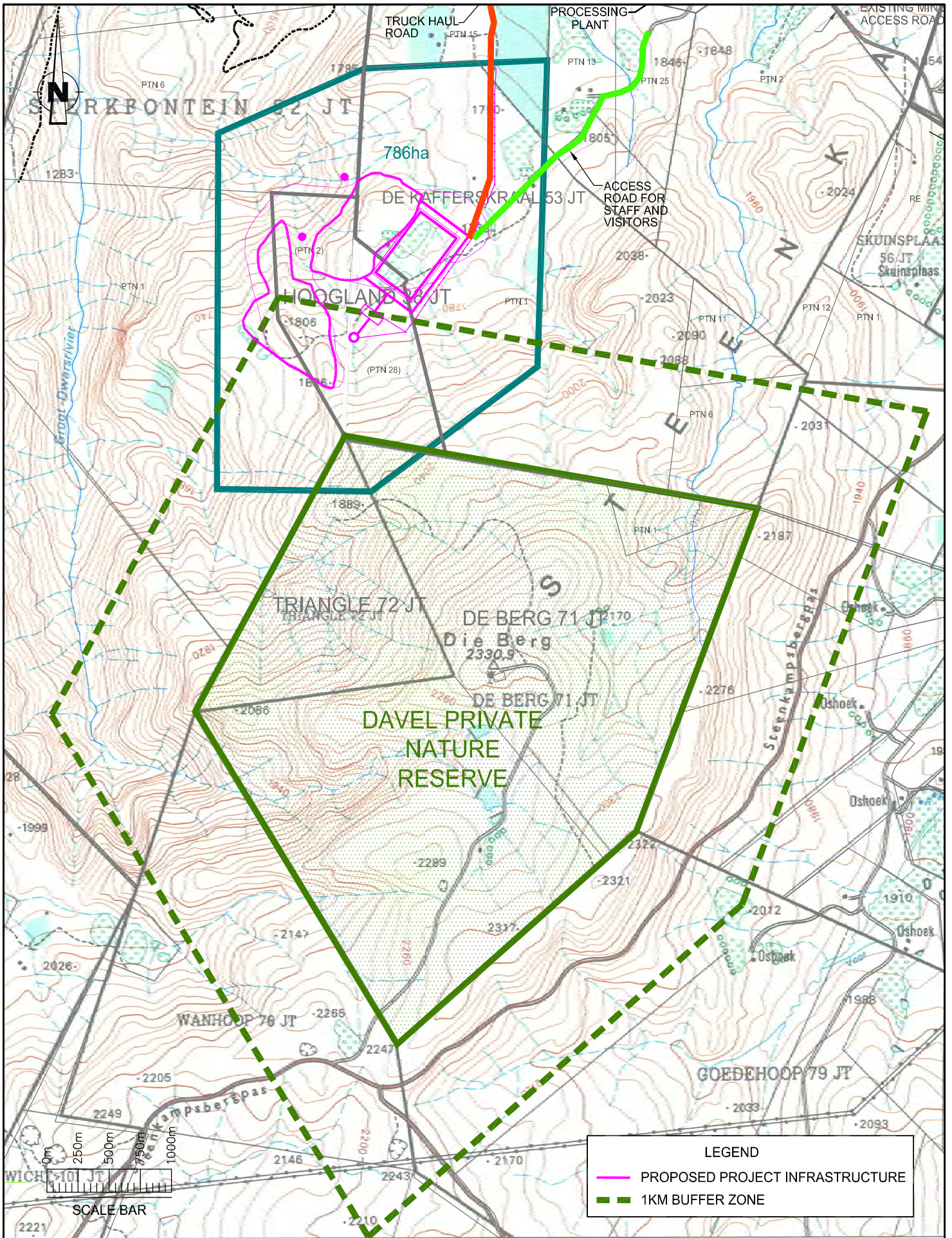
The following roads are located in the vicinity of the study area:

- Provincial Road P171/1 (Route R577): This route which links Lydenburg with Roosenekal is aligned in a north-east to south-west direction through the study area about 4.5 km to the south-east of project site.
- Provincial Road D212: This road which links Route R577 to Route R555 and Steelpoort is aligned in a south to north direction though the eastern side of the study area.
- Provincial Road D874 (South): This section of the road links Route R577 to the Everest Platinum Mine.
- Provincial Road D874 (North)/Boschfontein Road: This section of the road which is aligned in south to north direction along the foot of the Steenkampsberge West Valley, links Road D874 (South) to Road D212

2.5.1 OTHER MINING OPERATIONS IN THE VICINITY

The various existing mining operations in the immediate area include:

- Debrochun and
- Booyendal.



2.5.2 RECREATIONAL FACILITIES WITHIN THE VICINITY

There are sensitive public views located at highpoints to the southwest of the proposed project site. These highpoints have panoramic vistas of the valley below. Some of these farms cater for ecotourism and activities such as fly-fishing, hiking and 4 X 4 trails that could come into view of the proposed Hoogland project. There are also a number of trout and games farms in the area (i.e. to the west of the proposed Hoogland area).

2.5.3 EXISTING AQPSA INFRASTRUCTURE

The key existing mine related infrastructure includes:

- Opencast and underground workings
- Mining and ventilation shafts
- Processing plant for the concentration of both UG2 and Merensky ore
- Waste facilities for sludge, waste rock, tailings dams and slag
- A significant range of support infrastructure and services for transport, water supply, power supply, cooling, maintenance, repairs, and management of non-mineralised waste.

2.5.4 TRANSPORT INFRASTRUCTURE

The key surrounding transport structures include:

- The regional railway line; and
- Provincial road network;
 - Provincial Road P1711/1 (Route R577): This route which links Lydenburg with Roossenekal is aligned in a north-east to south-west direction through the study area about 4.5 km to the south-east of project site.
 - Provincial Road D212: This road which links Route R577 to Route R555 and Steelpoort is aligned in a south to north direction through the eastern side of the study area.
 - Provincial Road D874 (South): This section of the road links Route R577 to the Everest Platinum Mine.
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2.5.5 POWERLINES

A regional powerline traverses the south of the site and this is owned and managed by Eskom.



THE EVEREST PLATINUM MINE LOCATED WITHIN THE LOCAL GEOLOGY OF THE EASTERN LIMB OF THE BUSHVELD COMPLEX

01/2011

FIGURE 2.2

E017-06

2.6 EXISTING STATUS OF THE BIOPHYSICAL ENVIRONMENT

This section describes the existing status of the biophysical environment that may be affected by the proposed project.

2.6.1 GEOLOGY

The Bushveld Complex consists of two lithologically distinct units that are mainly intrusive into the Transvaal Supergroup: a lower sequence of layered mafic and ultramafic rocks, known as the Rustenburg Layered Suite (RLS), and an overlying unit of granites, known as the Lebowa Granite Suite. All the chromitite and platinum mineralization is located in the RLS. These layered rocks have a maximum thickness of up to about 8 km and occur in four areas known as the western, Potgietersrus, eastern and Bethal lobes. The existing mine falls within the eastern limb of the Bushveld Complex (refer to Figure 2-2).

The Rustenburg Layered Sequence comprises five stratigraphic zones as follows:

- the marginal zone that comprises pyroxenites and norites that have no economic potential;
- the lower zone which comprises ultramafic rocks such as, pyroxenites harzburgites containing thin, high grade chromite seams;
- the critical zone pyroxenites, norites and anorthocites that host all the significant PGM and chromites deposits;
- the main zone that consists of homogenous norites and gabbros that are locally exploited as dimension stone; and
- the upper zone norites, gabbros and diorites which host over 20 massive magnetite seams some of which are exploited for vanadium and iron ore.

At the mine, the Marginal, upper Critical and lower part of the Main Zones of the Rustenburg Layered Suite are all present. The ore reserves within the proposed Hoogland project area comprise the critical zone.

The mine is currently exploiting a UG2 reef resource that forms part of the Rustenburg Layered Suite of the eastern limb of the Bushveld Complex.

Outside of the mine's property, the UG2 reef outcrops along the western side of the Groot Dwars River valley for over 20 km. In the vicinity of the mine, the ore body forms an elongated erosional remnant that projects eastwards under the Groot Dwars River and is preserved within a basin-like structure on the eastern side of the valley. The reef outcrops and subcrops around almost the entire perimeter of the basin with the exception of the western part of the southern flank, where the UG2 reef is downthrown along a fault, and the western side of the ore body, where the reef passes under the Groot Dwars River

and merges with the rest of the UG2 reef that underlies the entire western side of the river valley. The mine's ore body dips towards the Groot Dwars River valley.

The proposed Hoogland reserve comprises two isolated outcrops of UG2 reef, adjacent to the existing mining orebodies. This is the target ore that AQPSA wishes to mine open cast.

2.6.2 TOPOGRAPHY

The project area is situated adjacent to the Steenkampsberg Mountains, just north of De Berg, the highest peak in Mpumalanga Province at 2 331 metres above mean sea level. The physiography is characterised by predominantly steep, north-facing slopes near the southern part of the project area, a central fairly level terrace, and cliffs and steep, north-facing slopes along the northern boundary. The dominant landscape types are Dry Mountainous / Hilly Highlands (northern and western slopes) and Dry Undulating / Flat Afromontane (central plains), with the higher slopes in the south falling under the landscape type Dry Mountainous / Hilly Afromontane (Emery, 2002).

The project site is located approximately 1750 mamsl (Figure 1-2). The steep slopes range in gradient between 5 - 16%.

2.6.3 CLIMATE

2.6.3.1 Regional climate

The mine is in the eastern escarpment on the border of the Highveld and Limpopo climatic zones (Schulze, 1974). Shadow effects are likely to affect microclimate, especially in winter, by reducing temperature and increasing moisture holding capacity on southern slopes. In summer, elevated areas are frequently exposed to mist that accompanies the inflow of moist air from the Indian Ocean. Rain falls in the area in the form of showers and thunderstorms and mostly between October and March.

2.6.3.2 Weather stations

There are several South African Weather Service stations in the region of the project area. The most appropriate station from which rainfall data was sourced is De Kafferskraal Weather Station.

2.6.3.3 Rainfall and evaporation

Rainfall records for weather stations in the vicinity of mine were obtained from the Weather Bureau. Monthly rainfall has been recorded over a 14 year period at De Kafferskraal Weather Station located on the farm De Kafferskraal 53 JT at the TKO farm, close to the mine. The rainfall data records that were obtained from the mine for the 2008/2009 hydrological year indicate a total rainfall of 1067 mm for this period (from the De Kafferskraal Weather Station). The highest rainfall recorded occurred during the month of November 2008 and February 2009, when 298 and 286 mm were recorded respectively.

The highest intensity storm recorded for the De Kafferskraal Weather Station was 75 mm in 24 hours in February 1985 and for the Maartenshoop Weather Station was 255 mm in 24 hours in February 1939.

The Lydenburg Weather Station is the only station with evaporation data in the surrounding area (Weather Bureau, 2002). Mean monthly S-pan evaporation data shows that the evaporation exceeds precipitation. Owing to the altitude difference between the Lydenburg and the mine (1412 m amsl and 1814 m amsl, respectively) it is believed that the evaporation figures for the mine should be less than those of the Lydenburg Weather Station.

2.6.3.4 Temperature

Maartenshoop is only a rainfall monitoring station and therefore temperature data from the De Kafferskraal and Lydenburg Weather Stations were used. Data shows that summers are warm, temperatures rarely exceed 30°C, and winters are mild.

2.6.3.5 Wind

The Lydenburg Weather Station is the nearest station to the mine with wind records. Generally winds recorded at Lydenburg Weather Station are light (1.6 to 3.3 m/s) and blow predominately from the north west and south east throughout the year.

2.6.4 SOIL AND LAND CAPABILITY

The soils in the study area demonstrate a soil catena (i.e. a sequence of soils developed from similar parent material under similar climatic conditions but whose characteristics differ because of variations in relief and drainage) dominated predominantly by freely drained soils in the high areas. The soils are generally of a low agricultural potential with only small portions containing a soil depth of up to 750 mm. Mainly red soils of the Hutton group dominate the proposed open cast sites. Soils of the Mispah group occur with rocky surfaces. In most of the area of the proposed open cast sites, rocky outcrops are dominant.

The soil samples collected by the ARC (2010) show that the soils have high clay content in both the topsoil and subsoil and they are acidic, with a high degree of leaching, due predominately to the high rainfall in the area. The soils have low P (phosphate) levels, reflecting the lack of any recent fertilisation.

2.6.5 TERRESTRIAL HABITATS

Regionally, the study area falls into the Eastern Bankenveld Level I Ecoregion. This Ecoregion is characterised by closed hills and mountains with moderate and high relief. North-eastern Mountain Grassland and Mixed Bushveld are the dominant vegetation types and drainage density is predominantly medium. In terms of the Mpumalanga Biodiversity Conservation Plan (MBCP) (i.e. Mpumalanga's biodiversity is ranked into seven categories, namely protected areas, irreplaceable areas, highly

significant areas, important & necessary areas, ecological corridors, areas of least concern and no natural habitat remaining), the entire study area has been classified as Highly Significant.

The study area is also positioned at the boundary of two threatened terrestrial ecosystems as listed in Notice 1477 of Government Gazette No. 32689 (6 November 2009) (SANBI & DEAT, 2009); namely the Sekhukhune Mountainlands (classification - endangered) and the Dullstroom Plateau Grasslands (classification – endangered). Furthermore, the study area is situated at the boundary of two centres of plant endemism (Van Wyk & Smith, 2001; Lötter et al., 2002); the Sekhukhuneland Centre of Plant Endemism (SCPE) and Lydenburg Centre of Plant Endemism (LCPE). This would indicate that the site will host some unique vegetation and diverse species.

2.6.6 FAUNA (NATURAL ANIMAL LIFE)

The diversity of vegetation communities present on site are able to provide a diversity of niches to support a number of animal species that range from mammals, birds and reptiles to insects and ants.

Mammals

Twenty mammal species were confirmed to occur within the study area, based on fieldwork and discussions with landowners. Four of these have a national Red Data status of Near Threatened:

- Serval - a single adult seen at night in a seepage wetland at the proposed office footprint;
- Brown Hyaena – anecdotal report from landowners;
- Honey Badger – anecdotal report from landowners; spoor located on an adjacent property; and
- Geoffroy's Horseshoe Bat – a specimen collected by Lientjie Cohen (MTPA) from a cluster of large boulders within the study area, in the dense thicket below the high cliffs in the proposed north pit footprint. Landowners report that bats have disappeared from the site in recent years.

Another three species have been allocated provincial Red Data status of Near Threatened (African Clawless Otter, Aardvark and Leopard). Evidence of the otter and Aardvark were located during fieldwork, while landowners report the confirmed presence of leopard. A full list of species will be included in the EIA/EMP amendment report.

Birds

A total of 107 bird species was confirmed to occur within the study area during fieldwork. Two of these have a national Red Data status of Vulnerable:

- Cape Vulture - several birds seen soaring over the study area in February and June 2010;
- Short-tailed Pipit – this rare and highly localised species was seen displaying and then a breeding pair was found incubating three eggs in a well-concealed nest in the vicinity of the proposed south pit, There are very few confirmed breeding records of this species in Mpumalanga.