5 DESCRIPTION OF AFFECTED ENVIRONMENT

This chapter provides a preliminary overview of the known / expected issues of concern given the characteristics of the specific project study area. Note that these are limited to either desktop studies or a preliminary site visit and desktop study to highlight potential significant issues of concern. The full detailed specialist studies will be carried out hereafter and will be presented in the EIA Phase of the project for consideration by the I&APs.

5.1 TOPOGRAPHY

The Overberg District is well known for the tourist value of its historical and natural features.

The study area for **Site Alternative 1** slopes from the west to east with a gradient of approximately 4%-5%. The area earmarked for the proposed substation development occurs at heights varying between 137m and 160m above mean sea level. The Houhoek Transmission Substation project footprint would be cut into the above slope.

The study area for **Site Alternative 2** slopes very steeply towards south east with a gradient of approximately 8%-10%. The area earmarked for the proposed substation development occurs at heights varying between 157m and 168m above mean sea level. The Houhoek Transmission Substation project footprint would be cut into the above slope.

The study area for **Site Alternative 3** slopes from north-west to south-east, with a gradient of approximately 2%. The area earmarked for the proposed substation development occurs at heights varying between 122m and 128m above mean sea level. The Houhoek Transmission Substation project footprint would be cut into the above slope. There is an existing earth dam located on site.

5.2 CLIMATE

The information in this section was obtained from the Draft EIA Report of Langhoogte Wind Farm (located less than 5km from the proposed study area for this project) (Arcus Gibb, 2012).

"The study area is ±20 km from the nearest coastline (Walker Bay) and situated at the "entrance" to an inland valley surrounded by mountain ranges. The resulting climate is marginally continental with orographic rain induced by the mountains. The region experiences rainfall through the year, with the majority of rainfall concentrated in the winter months (May-August). The climate of the area is characterised by a rainfall pattern of all-year-round rainfall, with a definite peak in the winter months. Average long-term annual rainfall is between 384 mm in the lower areas, rising to around 534 mm in the higher areas."

"The warmest temperatures occur during January and February with average maximums of 28.6°C and 28.9°C respectively. Maximums usually ranges from 35°C to 40°C., the temperature only rarely exceed 40°C. The coldest temperatures are experienced during the winter months. July and August have average minimum temperatures of 5.5°C and 5.9°C. Highest wind speeds occur during the summer months from October to March with an average wind speed of 7.5 km/h."

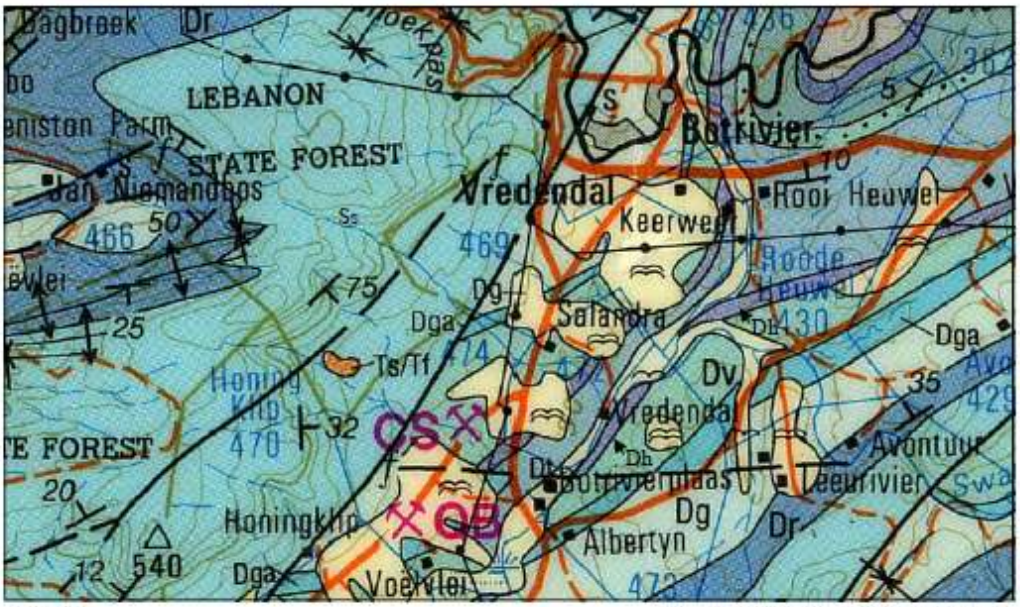
5.3 GEOLOGY

The Bokkeveld shales that underlie the Botrivier valley have weathered to form clays and loamy clay soils, with a strong ferricrete (koffieklip) element in certain areas. The ferricrete weathers to form the special iron-rich gravels characteristic of the area.

According to the available geological maps, 1:250 000 Geological Series 3319 WORCESTER map the regional geology of the three sites comprises Light grey-thick bedded, coarser grained Quartzitic Sandstone, cross-bedded with grit and pebble stringers and lanticles Quartzite, of Skurweberg formation, Nardouw Subgroup and Cape Supergroup (see **Figure 5-1** and **Figure 5-2** for further details about the regional geology).

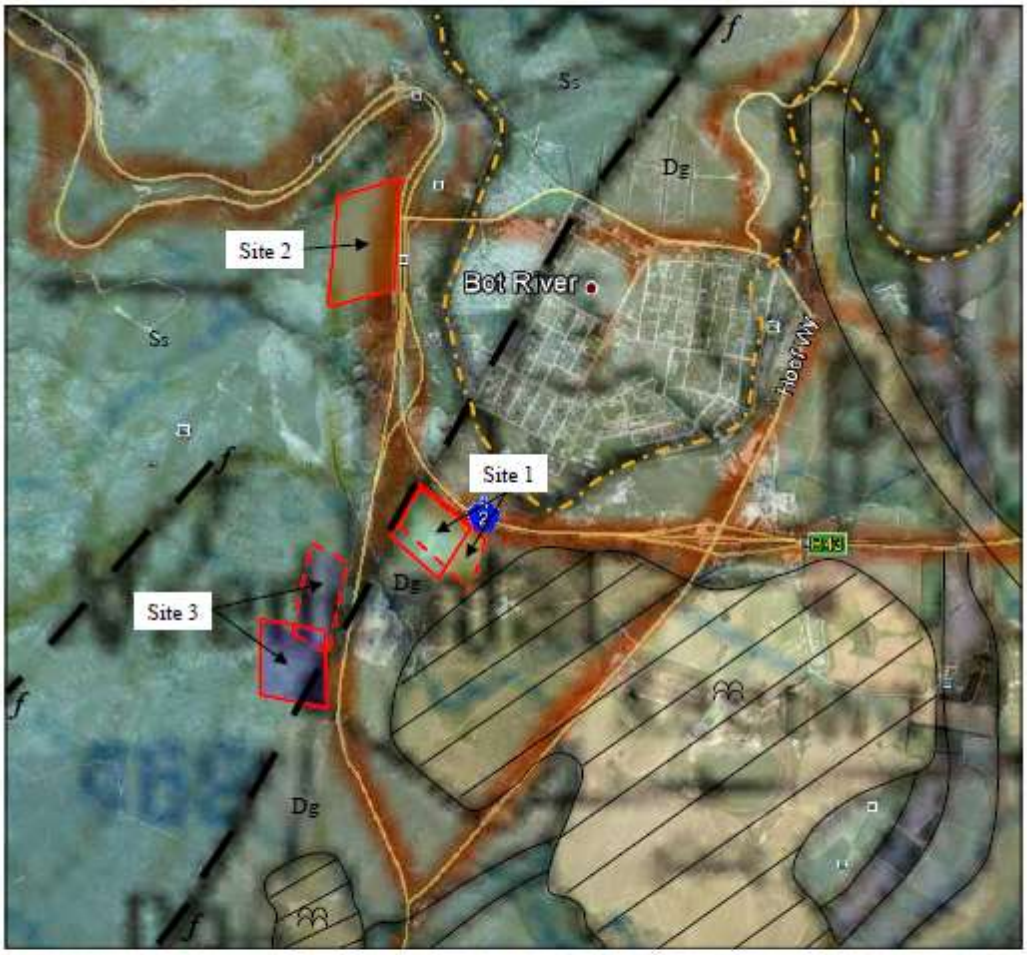
5.3.1 Groundwater

In general, the permanent water table could occur within the fractured quartzite sandstone aquifer at depth and should be deep enough not to affect the Houhoek Transmission Substation project. On Site Alternative 3, a shallow water table could be expected at areas near the existing earth dam.



Formation	Subgroup	GROUP	SUPERGROUP
Fine- to medium-grained micaceous sandstone and siltstone — Wuppertal	Bidouw	BOKKEVELD	CAPE
Light grey feldspathic and micaceous sandstone — Boplaas	Ceres		
Micaceous sandy shale and mudstone — Tra-Tra			
Light grey feldspathic sandstone — Hex River			
Dark grey fossiliferous shale, mudstone and siltstone — Voorstehoek			
Dark grey lithic and feldspathic sandstone and siltstone — Gamka			
Black to dark grey fossiliferous shale, mudstone and siltstone — Gydo			
Light grey well bedded quartzitic/feldspathic sandstone — Rietvlei	Nardouw	TABLE MOUNTAIN	
Light grey thick-bedded coarse grained quarzitic sandstone; cross-bedded with grit and pebbles — Skurweberg			
Brown-weathering quarzitic sandstone (thinner bedded than Ss) — Goudini			
Dark grey thinly laminated to massive shale, siltstone and lenticular sandstone — Cederberg			

Figure 5-1: Regional Geology of Study Area and surrounds



LEGEND

Enlargement of geological map in Figure 3

f - - f	Faults
	River - terrace gravel
Dg	Black to dark grey fossiliferous shale, mudstone and siltstone
Ss	Light grey thick-bedded coarse grained quarzitic sandstone; cross-bedded with grit and pebbles
	Railway line

Figure 5-2: Geology Overlay of Study Area

5.3.2 Seismicity

The SANS code (Seismic actions and general requirements for buildings) (SANS-10160-4;, 2011), shows that the three sites are situated in the area where the peak ground acceleration with a 10% probability of being exceeded in 50 year period is 98cm/sec^2 (**Figure 5-3**). Zone I is defined as “Regions of natural seismic activity”.

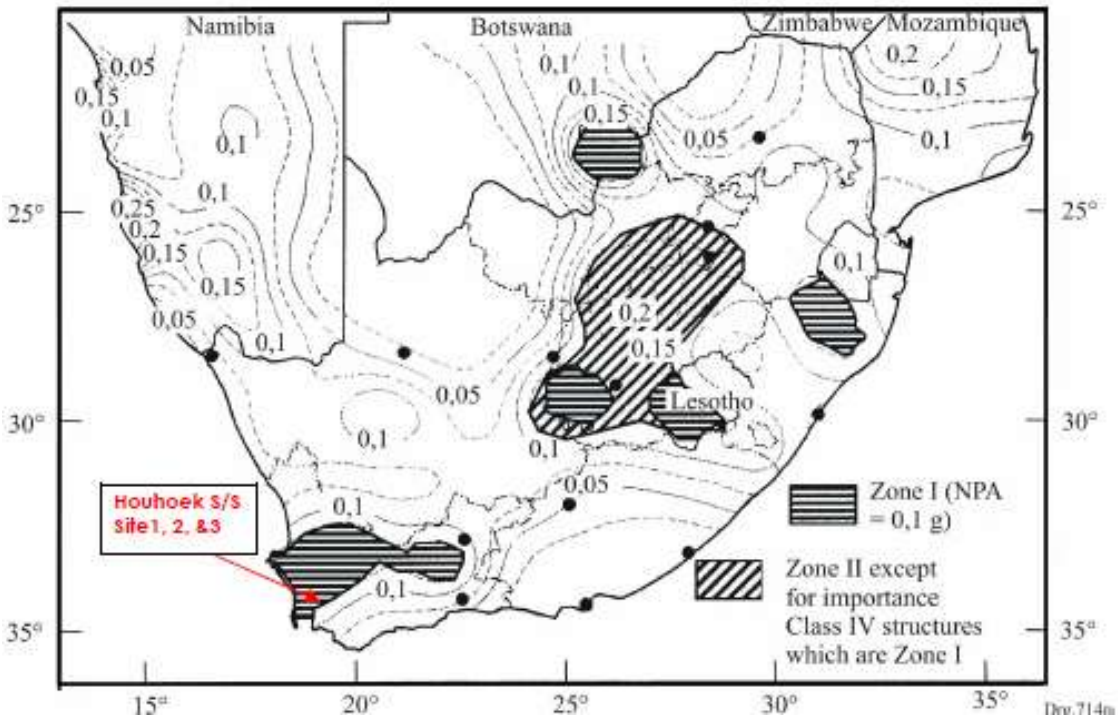


Figure 5-3: Seismic Hazard Map and Zones

A more recent data map produced by the Council of Geoscience is presented in **Figure 5-4**, showing peak ground accelerations with a 10% probability of being exceeded in 50 years. On this figure, the three sites are classified with ground accelerations of 0.15g (or 147cm/sec^2). This will be confirmed by the geotechnical report carried out during the EIA phase.

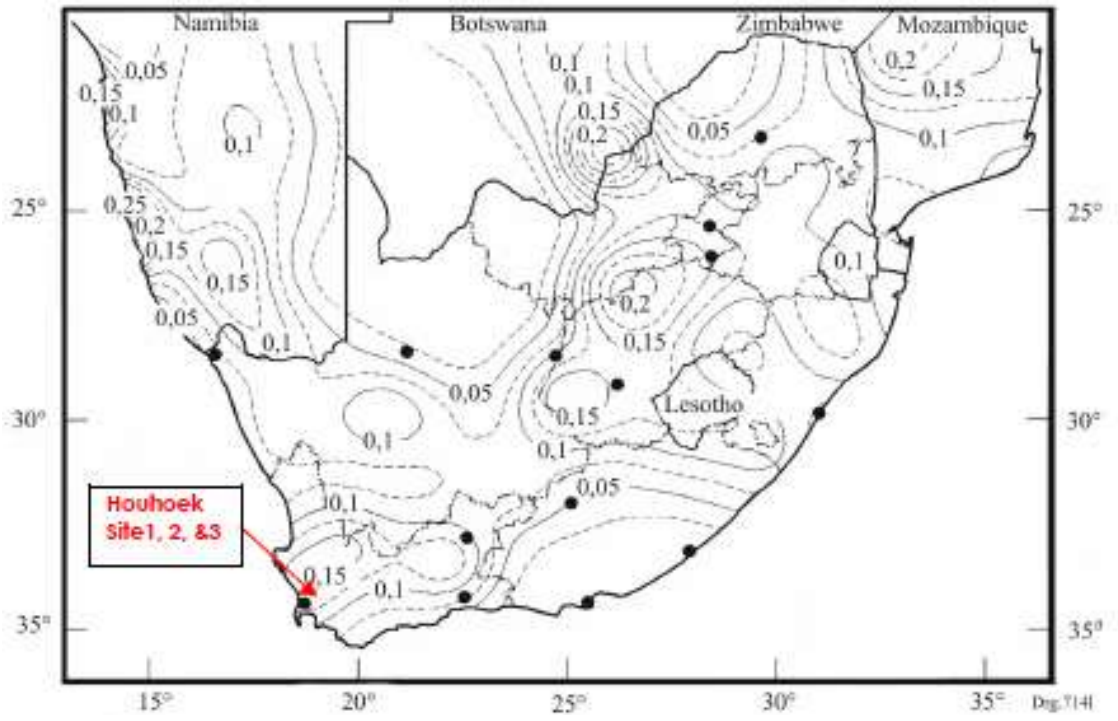


Figure 5-4: Recent Seismic Hazard Map (Council for Geoscience, 2003)

5.4 SOIL AND AGRICULTURAL POTENTIAL

The soils in the study areas are generally a mixture of coarse-grained sandy soils on rock, or duplex soils (sandy topsoil abruptly overlying a subsoil clay), and the agricultural potential varies from low to moderate at best.

The whole area is covered by locally derived sandy and gravelly colluvial deposits of variable thickness.

Soils in the study area, north of the R43 that includes **Site Alternative 1**, are generally **deep acid sands or loamy sands** (overlying shales). The soils at **Site Alternative 2** are **shallower, with a significant amount of exposed Table Mountain Group sandstone bedrock**, and elements of shaliferous sandstone. The soils at **Site Alternative 3** are **either shallow sands overlying shale-derived clays, pure shales, or ferricrete (koffieklip)-enriched shales**.

A fault, running in a south-westerly to north-easterly direction, results in a general division of the survey area into two parts with reference to the geology.

Site Alternative 1 (both layouts) and Site Alternative 2 are mainly underlain by quartzitic sandstone, cross-bedded with grit and pebble stringers of the Skurweberg Formation, Table Mountain Group. Site Alternative 3 (both layouts) consists of shale, mudstone and siltstone of the Gydo Formation, Bokkeveld Group (Council for Geoscience, 1997).

At this point in the process a broad soil description of seven (7) soil association groups only is given in **Table 5-1** and represented on the map presented in **Figure 5-5**.

Table 5-1: Preliminary soil map units (according to Soil Classification Working Group, 1991)

Map units	General Description	Effective depth (mm)
Cf 1	Soil / Rock complex. Shallow, coarse-textured soils on sandstone (Cartref and Mispah soil forms), with rock outcrops	< 300
Cf 2	Coarse-textured, gravelly and stony, lithosolic and podzolic soil association (Cartref, Houwhoek, Lamotte, Concordia and subdominant Kroonstad and Fernwood soil forms))	600 – 900
Ct 1	Poorly-drained, coarse-textured sandy soils (Constantia, Lamotte, Fernwood and Concordia soil forms)	600 – 1200
Es 1	Duplex soils; poorly-drained, coarse-textured, gravelly topsoil abruptly overlying dense prismatic structured clay (Estcourt, Cartref, Kroonstad soil forms)	300 – 600
Es 2	Duplex soils ; poorly-drained, fine to coarse-textured, gravelly and stony topsoil abruptly overlying dense prismatic structured clay (Estcourt, Kroonstad soil forms)	600 – 700
Pn 1	Poorly-drained, coarse-textured, gravelly, yellow and grey sandy topsoil with hydromorphic subsoil (Pinedene, Avalon and Kroonstad soil forms)	600 – 700
Ss 1	Duplex soils; poorly-drained, fine to medium-textured, gravelly topsoil abruptly overlying dense prismatic structured clay (Sterkspruit and Estcourt soil forms)	300 – 600

The soils in the study area generally have relatively sandy topsoil overlying (often abruptly) a subsoil layer that has more clay and a higher degree of structure. The map units where this situation is most critical will include the **Es1**, **Es2** and **Ss1** map units.

The steeper parts of the study area landscape contain a coarse-textured sandy material in the topsoil horizon. These soils are included in map units **Cf1** and **Cf2**.

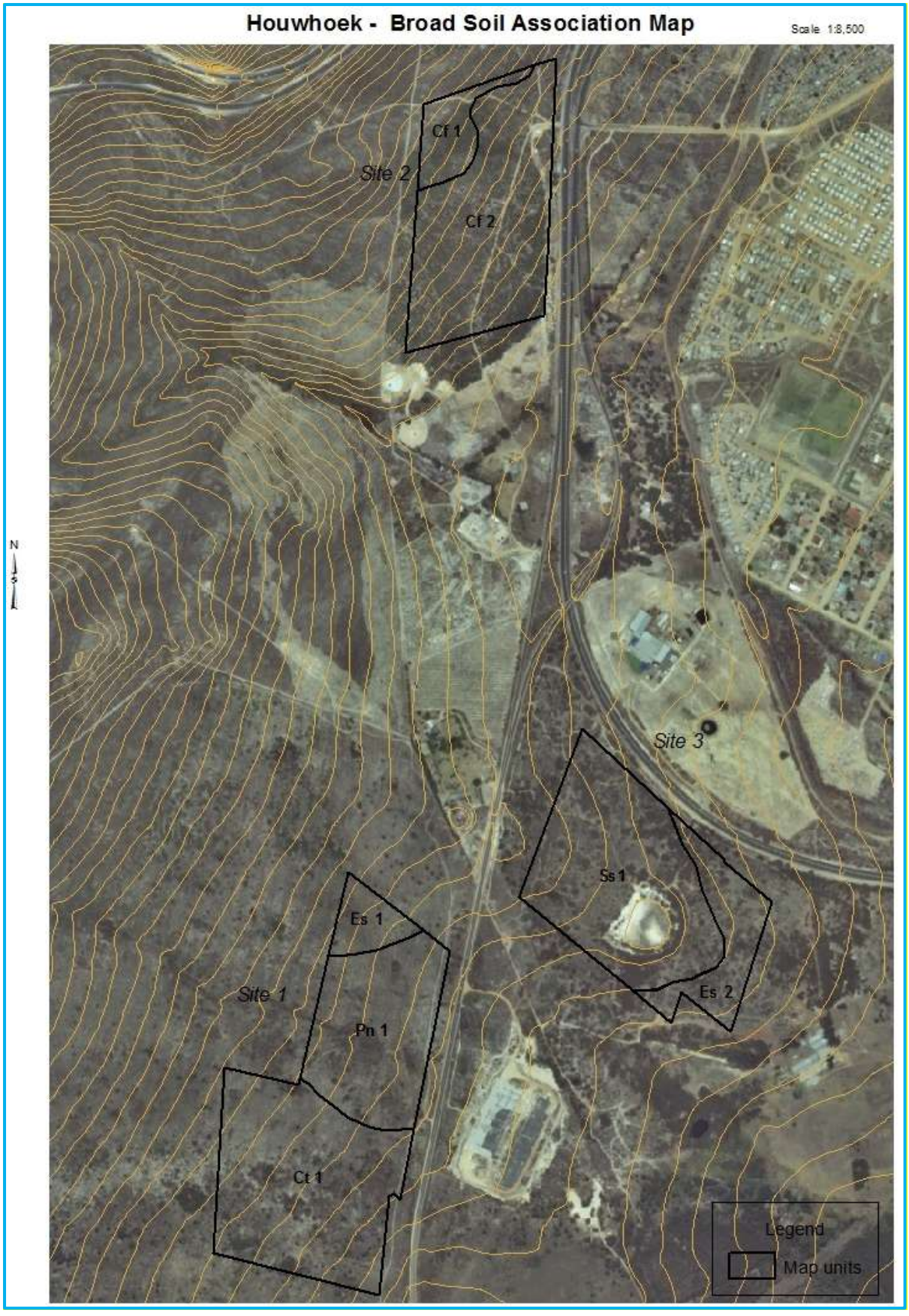


Figure 5-5: Broad soil association of the study site alternatives

5.5 FRESHWATER ECOSYSTEMS (WATERCOURSES, DAMS AND WETLANDS)

The entire study area falls within the Southern Folded Mountains aquatic ecoregion, as delineated by (Kleynhans, *et al.*, 2005). This ecoregion is characterised by a highly diverse topography and a similarly diverse array of vegetation types, with Mountain Fynbos, Grassy Fynbos and Little Succulent Karoo being the most characteristic vegetation types.

The study area contains moderate and steep slopes that form the small valleys in which mostly non-perennial rivers and potentially also valley-bottom wetlands ((SANBI, 2009) occur. The largest valley in the nearby area is the Bot River valley approximately 2km to the east of the site, through which the perennial Bot River flows in a north-south direction. The Bot River and its floodplain wetland are classified as a Freshwater Ecosystem Priority Areas (FEPA) river and wetland respectively. The **Bot River**, rising south of the Theewaterskloof Dam, runs more or less north-south, passing to the east of the town of Botrivier, and flowing into the Atlantic Ocean through the **Bot River Lagoon** that lies between Kleinmond and Hawston. The marshy Bot River Lagoon forms wetlands that are home to thousands of water fowl and South Africa's only herd of wild horses that roam a wetland habitat. The altitude of the proposed areas for the substation is generally low-lying (<200m), but the LILO Transmission power lines require routing over a relatively steep part of the Houhoekberg mountain range at an altitude of approximately 380m.

The surrounds of the study area includes several rivers and water features such as the **Theewaterskloof Dam** and **Hottentots-Holland Mountain Catchment Area**. The **Houwhoek River** joins the Bot River from the west, just north of the town of Botrivier, and the **Swart River** joins the Bot River a little further south.

The Overberg Wetland Map, which was compiled as the aquatic component for the Overberg CBA Map (Holness & Bradshaw, 2010), did not identify any natural wetlands within the study area (only one dam was mapped in the area). The FEPA project, which used the Overberg Wetland Map as an input layer, did not map any rivers or natural wetlands at the site alternatives. The closest FEPAs identified by the NFEPA project are the Bot River and its associated floodplain wetland, but these freshwater ecosystems are unlikely to be affected by the proposed Houhoek Transmission Substation project.

Figure 5-7 shows the preliminary map of freshwater ecosystems produced for the study area. Several non-perennial rivers and four small dams were mapped in the study area. The rivers in the study area drain towards the perennial Bot River system. Several wetlands have been mapped on the Overberg Wetland Map or by the FEPA project immediately south of the town of Botrivier and further to the east on the Bot River floodplain (not included in **Figure 5-7**).

Several rivers appear to have been incorrectly mapped on the relevant 1:50,000 topographical map (3419AA), as indicated on **Figure 5-7** (see 'probably non-riverine' features), one of which was mapped as flowing through Site Alternative 2 but was not verified to be absent due to access constraints (see **Chapter 3.8**: Limitations).

As explained in **Chapter 3.8**, to minimise potential impacts on river ecosystems, 50m wide 'no-go' buffer zones were demarcated along the rivers falling within the study area, but no buffers were recommended at this stage for artificial features such as dams and the

drainage channel leading into the dam at Site Alternative 3. There is at least one river flowing through Site Alternative 2 (as observed from a high point above the site) although its exact course through the site has not been ground-truthed. There is also a river flowing through the proposed development footprint of Alternative Layout 2 on Site Alternative 1. The river flowing through the footprint of Alternative Layout 2 of Site Alternative 1 appears to be highly ephemeral, and it has been incised through erosion and encroached upon by alien invasive vegetation (mainly *Acacia* spp.). As such, a reduction in the recommended buffer area may be possible during the EIA Phase, once the detailed Ecological Assessment is conducted (see **Chapter 10.1.4**: Terms of Reference for the Ecological Assessment).

Although the dam on Site Alternative 3 is an artificial feature, which is understood to be fed by groundwater extracted via a nearby borehole, the site visit revealed that this dam does have some ecological value given that it is well vegetated by aquatic / wetland plants (mainly *Eleocharis limosa*, c.f. *Isolepis prolifera* and *Aponogeton* sp.) and thus provides wetland habitat suitable for habitation by invertebrates, amphibians and water birds (see **Figure 5-6**).

Figure 5-6: Photograph of Wetland Habitat on Site Alternative 3

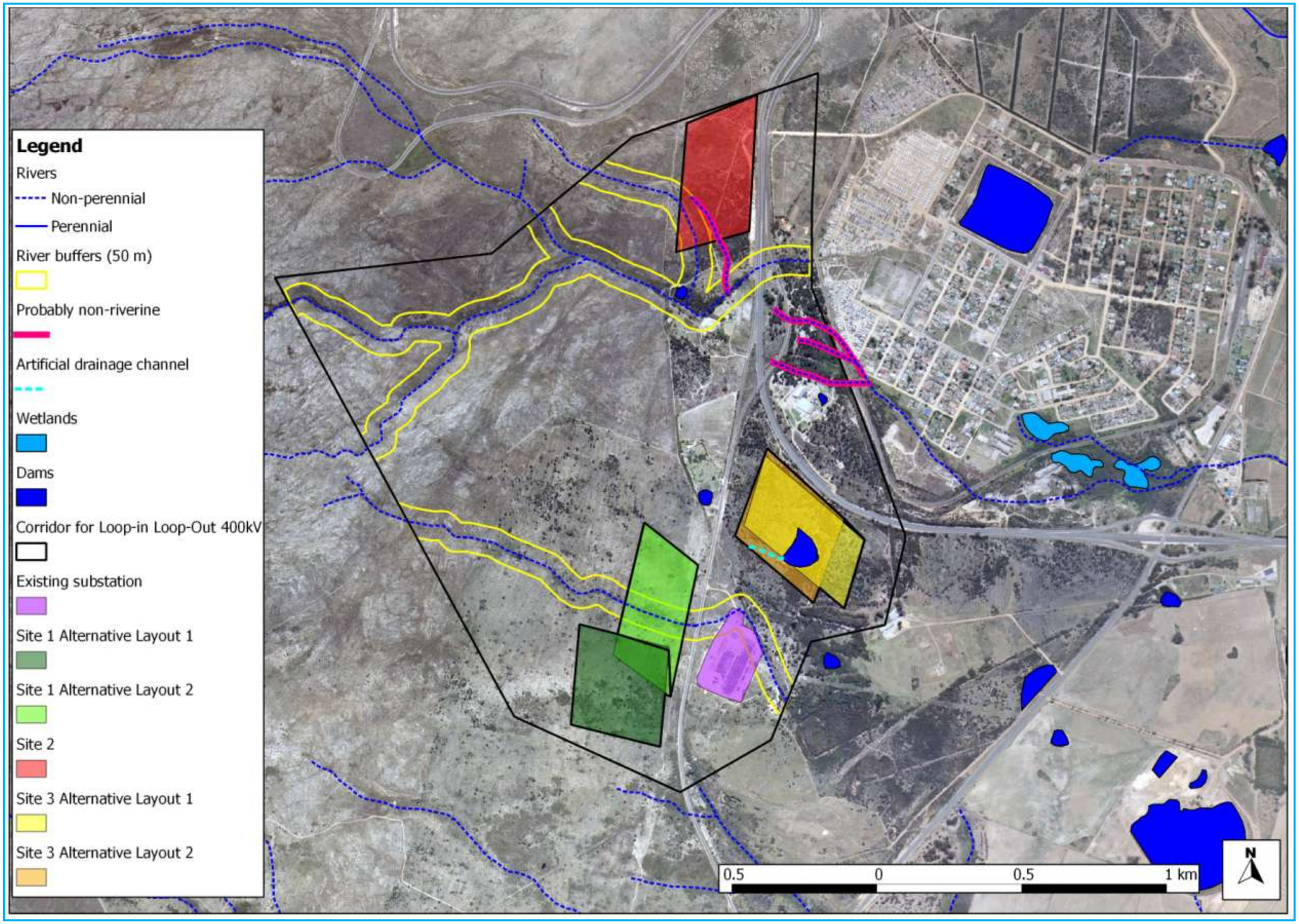


Figure 5-7: Regional Wetland Map of Study Area (at higher resolution than the Draft Scoping Report)

5.6 ECOLOGY

5.6.1 National and Regional Context

The study area is located at the western edge of the Cape Overberg Region, which falls within the Fynbos Biome and the south-west coastal region of the Cape Floristic Region (CFR). The CFR is one of only six Floristic Regions in the world, and is the only one confined to a single country. It is also by far the smallest floristic region, occupying only 0.1% of the world's land surface, and supporting approximately 9,000 plant species, almost half of all the plant species in South Africa. At least 70% of all the species in the Cape region do not occur elsewhere (also known as **endemics**), and many have very small home ranges (also known as **narrow endemics**). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the recent nationwide plant Red Listing process undertaken is that 67% of the threatened plant species in the country occur only in the south-western Cape, and these total over 1,800 species (Raimondo, *et al.*, 2009). It should thus be clear that the south-western Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The Overberg Critical Biodiversity Area (CBA) map for this area (Holness & Bradshaw, 2010) shows that all three sites are classified as CBA. This map is not copied into the current report as it is not particularly useful, nor is it based on any ground-truthing exercise, and typically includes any even partly natural (but badly degraded) habitat as a CBA (*pers. obs. of Ecologist*) The current report is regarded as a substantially more accurate assessment of the true ecological value of the sites, being based on actual ground-truthing.

The vegetation map of South Africa (Mucina & Rutherford, 2006) indicates that four different vegetation types would originally have been present in the greater study area, but in reality this can be simplified down to two extant vegetation types (*pers. obs. of Ecologist*). Essentially, all the vegetation in the study area north of the R43 and west of the road, can be considered as **Kogelberg Sandstone Fynbos**, and the vegetation east of the road can be considered **Western Rûens Shale Renosterveld** (with elements of Rûens Silcrete Renosterveld and Kogelberg Sandstone Fynbos). The coming together of four vegetation types in this fairly small area suggests that there would originally have been many ecotones (habitat transitions) in this area, and this is true, but unfortunately these have been largely lost due to soil disturbance, cultivation, alien invasive vegetation and construction. These ecotones are not usually sharp boundaries, but typically span a couple of hundred metres, and thus putting a line on a map is somewhat arbitrary at anything finer than a regional scale. For this reason the actual SA vegetation map is not included in this report, as it is more distracting than helpful.

The National List of Threatened Ecosystems (DEA, 2011) has listed both Kogelberg Sandstone Fynbos and Western Rûens Shale Renosterveld as **Critically Endangered** vegetation types. The former is well conserved (75% of original extent) and approximately 83% of its original extent still remains, but it is listed on account of its exceptional species diversity and the very high number of rare, endemic or threatened plant species that are supported by this

vegetation type (DEA, 2011). The Shale Renosterveld is listed because it has been significantly impacted by cultivation, having already lost at least 86% of its original extent, and nothing (0%) of this vegetation type is formally conserved, leaving it very vulnerable to further loss.

From a faunal perspective, the area has not been identified in any regional or national level studies (Cape Action for People and the Environment (CAPE), Reptile Atlas Project, Butterfly Atlas Project etc.) as an area of particular importance or diversity.

Nature reserves in the sub-region around the project area include:

- Hottentots-Holland Nature Reserve
- Theewaters Nature Reserve
- Witdraai Private Nature Reserve
- Groenlandberg Nature Reserve
- Babilonstoring Nature Reserve
- Kogelberg Nature Reserve
- Houwhoek Nature Reserve

5.6.2 Site Alternative 1

Both layout alternatives of Site Alternative 1 have been previously cultivated, probably for cereals, but this cultivation probably ceased more than twenty years ago, and there has been partial natural rehabilitation since. This disturbance can be seen in the aerial imagery, where characteristic lines caused by ploughing are evident, and on site, where the plant species present are typical of a previously disturbed area that has undergone partial passive rehabilitation.

Indigenous species typical of a disturbed habitat in this area include:

- *Cynodon dactylon* (fynkweek)
- *Carpobrotus edulis* (suurvy)
- *Stoebe plumosa* (slangbos)
- *Passerina corymbosa* (gonna)
- *Aristida junciformis*
- *Merxmuellera stricta* (wiregrass)
- *Athanasia trifurcata* (kouterbos)
- *Moraea flaccida* (tulp)
- *Osteospermum moniliferum* (bietou)
- *Chrysocoma ciliata* (bitterbos)
- *Helichrysum patulum* (kooigoed)
- *Senecio burchelli* (hongerblom)
- *Anthospermum spathulatum*
- *Hyparrhenia hirta* (thatching grass; S Cape invasive)

Alien invasive species tend to be patchy, and woody invasive species generally cover less than 2% of each alternative. The most prominent woody invasive species are:

- *Acacia saligna* (Port Jackson)
- *A. longifolia* (longleaf wattle)

- *A. mearnsii* (black wattle)
- *A. pycnantha* (golden wattle)
- *Pinus radiata* (cluster pine)
- *Hakea sericea*

Additional indigenous species recorded, not necessarily indicative of disturbance, included:

- *Amphithalea imbricata*
- *Aristea africana*
- *Restio capensis*
- *Ursinia anthemoides*
- *Metalasia inverse*
- *Helichrysum moeserianum*
- *Restio viminea*
- *Ehrharta calycina*
- *Ficinia secunda*
- *Cliffortia juniperina*
- *Trichogyne stipularis*
- *Muraltia rhamnoides*
- *Erica anguliger*
- *E. imbricate*
- *Ornithogalum thyrsoides* (tjienks)
- *Serruria inconspicua*
- *Berkheya armata*
- *Pelargonium chamaedryfolium* (burnt areas)
- *Restio monanthos*
- *Lachenalia* sp.
- *Trachyandra flexifolia*

The drainage line through Layout Alternative 2 does not support any wetland specific vegetation, which is indicative of the fact that it holds water for only very short periods (see **Chapter 5.5** for further details).

The only plant Species of Conservation Concern (SCC)[1] (*sensu* (Raimondo, *et al.*, 2009)) recorded on site was *Serruria inconspicua*, which is Red Listed as Vulnerable (Raimondo, *et al.*, 2009). Only a single plant was found, in the south-eastern corner of the Site Alternative 2 study area, and its presence here is not considered particularly significant. There is deemed to be a low likelihood of viable populations of other SCC occurring in the Site Alternative 1 study area, primarily as a result of the previous cultivation.

The **Critically Endangered *Erica rhodopis*** has been recorded in similar habitat (although less disturbed) next to the existing Houhoek Substation site (Helme, 2004), and there is thus a chance that it may still be present in low numbers in either of the site alternative study areas

1 The Red List of South African Plants (Raimondo, et al., 2009) has assessed all plant species in South Africa, and **all** indigenous species are now technically Red Listed or Red Data Book species, and thus it is preferable to use the term Species of Conservation Concern to refer to species that are listed as either Threatened or Rare.

on this site. If this species occurs in viable numbers in any of the sites it would be significant, and would be a potential Red Flag to the development of that area.

5.6.3 Site Alternative 2

Site Alternative 2 supports remnants of Kogelberg Sandstone Fynbos, but the vegetation on site has been severely disturbed by road construction, and alien plant invasion. Until recently the area between the N2 and the dirt road (about 40% of the site) was 70% covered by a dense pine invasion, but this has all been recently felled. The upper portion still supports dense pine, and other alien vegetation (including *Acacia longifolia* and *A. saligna*), and these cover an average of 30-60% of this part of the site. This does not appear to have been a formal pine plantation, but was self-sown and thus very dense in places, and less so in others.

Indigenous plant diversity has been negatively impacted by the dense cover of alien vegetation, and is probably less than 20% of what would be expected in similar but pristine vegetation nearby.

Some of the indigenous species noted include:

- *Wachendorfia paniculata*
- *Lichtensteinia lacera*
- *Restio vimineus*
- *Restio triticeus*
- *Gladiolus hyalinus*
- *Leucadendron salignum*
- *Roella* sp.
- *Hypodiscus aristatus*
- *H. argenteus*
- *Cannomois parviflora*
- *Erica anguliger*
- *Willdenowia glomerata*
- *Carpobrotus edulis*
- *Elytropappus scaber*
- *Berkheya armata*
- *B. glabrata*
- *Restio capensis*
- *Crassula capensis*
- *Romulea tabularis*
- *Oxalis luteola*

The only plant SCC (*sensu* (Raimondo, *et al.*, 2009)) recorded on site was *Serruria flagellifolia*, which is Red Listed as Vulnerable (Raimondo et al 2009). Only a single plant was found, just above the dirt road in the northern part of the site, and its presence here is not considered particularly significant, although there may be a larger population of this cryptic, creeping species on site, and there are large populations in the adjacent mountain (Protea Atlas Project data). There is deemed to be a low to medium likelihood of viable populations

of other SCC occurring in the Site Alternative 2 study area, primarily as a result of the dense alien plant invasion and associated soil disturbance.

5.6.4 Site Alternative 3

Site Alternative 3 lies between the existing substation and the N2 highway, and occurs at a point where sandy soils meet shale derived clays and stony ferricrete (koffieklip). Prior to disturbance it would have been a very interesting botanical area due to these numerous ecotones. Both layout alternatives have been disturbed by heavy machinery at some stage in the fairly distant past (but it is not clear if the site was ever ploughed), which is probably the reason why the areas now support such dense stands of alien invasive vegetation.

Woody alien vegetation cover ranges approximately 30% – 50% (ignoring the effects of the recent fire), and the primary alien invasive species are:

- *Leptospermum laevigatum* (Australian myrtle)
- *Pinus radiata* (pine)
- *Hakea sericea* (silky hakea)
- *Acacia saligna* (Port Jackson)

Indigenous plant species noted include:

- *Berkheya herbacea*
- *Oxalis pes caprae*
- *Oxalis versicolor*
- *Moraea fugacissima*
- *Restio capensis*
- *Restio vimineus*
- *Cliffortia ruscifolia*
- *Passerina corymbosa*
- *Disa bracteata*
- *Elytropappus rhinocerotis*
- *Stoebe plumosa*

No plant SCC (*sensu* (Raimondo, *et al.*, 2009)) were recorded on Site Alternative 3, and there is deemed to be a medium likelihood of viable populations of various SCC occurring in the study area. *Cliffortia ferricola* is a recently described and Critically Endangered (Raimondo, *et al.*, 2009) species that is only known from the Bot River area, and has been recorded from similar habitat not more than 500m from the site. *Phylica diosmoides* (Endangered) (Raimondo, *et al.*, 2009) is another local endemic that has also been recorded from nearby. Both these species, and others, could thus potentially occur within the study area, but observation was severely hampered by the recent fire, which had temporarily eliminated most of the shrubby plant cover.

5.6.5 Faunal Overview

Approximately 15 species of reptile have been recorded from the overall grid square (3418AA), most of which are probably also present in the greater study area. Fewer than 7 of these species are likely to be present within the development footprints of any of the site/layout alternatives. This can be regarded as a low level of reptile diversity on a national basis.

The only Red Listed reptile currently known from this grid square (3418AA) is the Cape Dwarf Chameleon (*Bradypodion pumilum*) (Animal Demography Unit, 2013), and the species is Red Listed as Vulnerable (Bates, *et al.*, in press). The species is in fact unlikely to be present within the actual study area, as the species tends to prefer areas with denser cover (including vineyards), and does not usually inhabit areas dominated by alien invasive vegetation (C. Dorse – pers. comm.).

No mammals were directly observed on site during fieldwork, but the greater site is likely to support a representative sample of the local fauna, including Grysbok, Duiker, Chacma Baboon, Cape Grey and Slender Mongoose, Porcupine, Striped Field Mouse and Cape Gerbils.

Two species of frogs were heard calling on site. The Cape Mountain Rain Frog (*Breviceps montanus*) was heard calling in the upper areas above Site Alternative 1, and Clicking Stream Frog (*Stronglyopus grayii*) was present in the excavated dam in Site Alternative 3. Both are regionally common, and the latter is particularly varied in its habitat requirements, and occurs throughout the southern and eastern parts of the country.

No threatened amphibians or mammals are expected to occur in significant or viable numbers in the proposed Houhoek MTS study areas ((Minter, *et al.*, 2004); (EWT, 2004); (Measy, 2011)), and none of the study areas are thought to be exceptional in any regard in terms of these animals.

There are only 9 species records for this grid square (3418AA) in the Butterfly Virtual Museum (Animal Demography Unit, 2013), and none of these are regarded as SCC. The partly degraded nature of much of the study area means that overall butterfly diversity is probably low on a regional and national basis.

The absence of suitable roosting areas such as large rocks, caves and cliffs on site suggests that bat diversity is unlikely to be exceptional in this area, and the primary roosting sites are in fact likely to be alien invasive trees. No observations on bats were made, but no records of threatened bat species could be traced to this area (Monadjem, *et al.*, 2010).

5.6.6 Ecological Conservation Value

The botanical conservation value of a site is a product of plant species diversity, plant community composition, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability (functionality) and connectivity, vulnerability to impacts, and reversibility of threats (rehabilitation potential). Maps of the regional botanical conservation value are included as **Figure 5-8**, **Figure 5-9** and **Figure 5-10**.

Both layout alternatives of **Site Alternative 1** are deemed to have a Low to Medium regional ecological conservation value, with the exception of the drainage line and associated buffer crossing Layout Alternative 2, which has a Medium regional conservation value.

The upper parts of **Site Alternative 2** are deemed to have a Medium regional ecological conservation value, whilst the lower parts (more disturbed) have a Low to Medium regional conservation value.

Both alternatives of **Site Alternative 3** are deemed to have a Medium to High regional ecological conservation value, which is a reflection of the wetland elements associated with the excavated dam and the richer soils (ferricrete and shale), and associated possibility of various plant SCC.

Figure 5-8: Ecological Sensitivity Map: Site Alternative 1 and Site Alternative 3

Figure 5-9: Ecological Sensitivity Map: Site Alternative 2

Figure 5-10 shows that most of the area through which the proposed Transmission and Distribution power lines will need to be routed is regarded as being of High botanical sensitivity, on account of it being largely undisturbed Kogelberg Sandstone Fynbos (Critically Endangered) and it being very likely to support significant numbers of (as many as 15) rare, localised or threatened plant species.

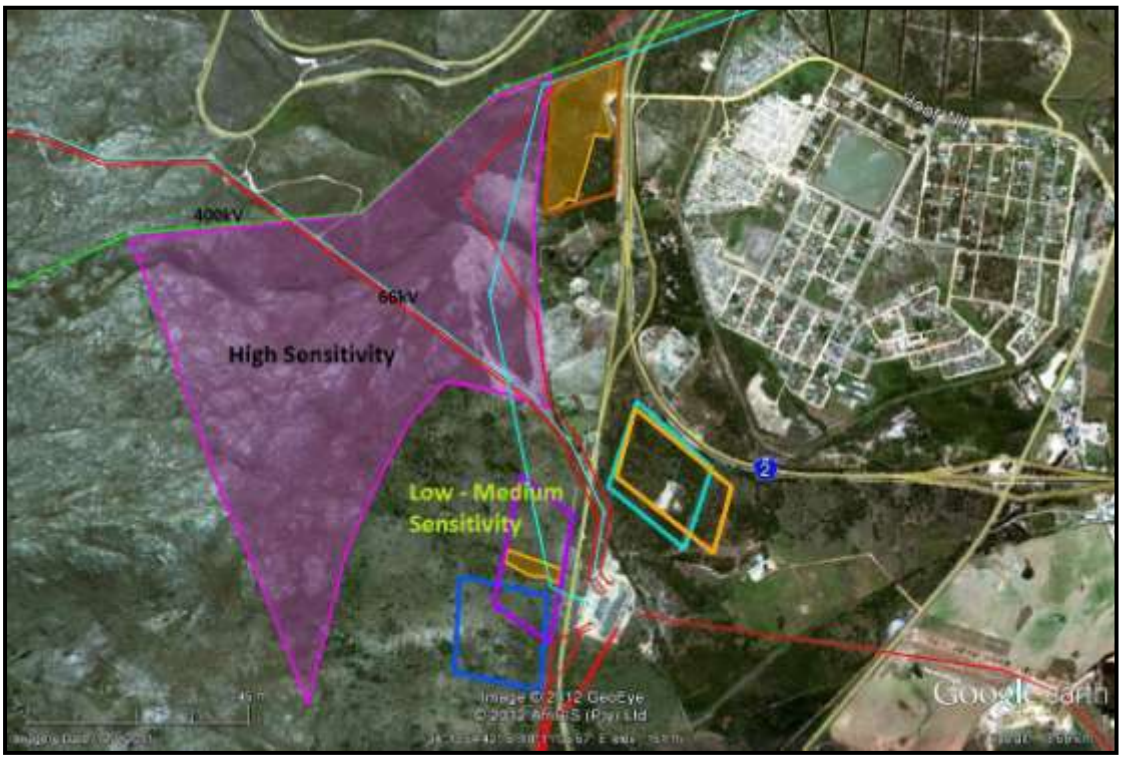


Figure 5-10: Ecological Sensitivity Map: Study Area for Transmission and Distribution Power Lines

The faunal conservation value of the area is likely to reflect the botanical conservation value, as faunal communities are strongly dependent on and often determined by habitat. Given that the study area is unlikely to support any outstanding faunal groupings (no regionally important populations; no threatened species; generally low diversity) the maps of the botanical conservation value are regarded as being more useful for development planning purposes.

5.7 AVIFAUNA

5.7.1 Regional Vegetation in Avifauna Context

The study area is wedged between the Fynbos-covered Eastern False Bay Mountains Important Bird Areas (IBA) (Barnes, 1998) and the Overberg mosaic of grain fields interspersed with pastures, which starts just east of Botrivier (see **Figure 5-11**). The Eastern False Bay Mountains IBA is located at the western extremity of the Cape fold belt and encompasses a continuous chain of mountains consisting of several State Forests, Mountain Catchment Areas and Nature Reserves. The IBA runs north from the Kogelberg State Forest for 120km to the Kluitjieskraal State Forest, southwest of Tulbagh. The mesic mountain Fynbos, which occurs on the mountain slopes of the Cape fold belt, is dominated by a multitude of communities, with the primary constituents being *Proteaceae*, *Ericaceae* and *Restionaceae* (Barnes, 1998). The natural vegetation at the proposed site is Kogelberg Sandstone Fynbos, which occurs on high mountains, with steep to gentle slopes and undulating plains and hills of varied aspect. General appearance of vegetation is low, closed, shrubland, with scattered emergent tall shrubs. Numerous seeps and seasonally started mountain plateau wetlands are common (Mucina & Rutherford, 2006).

Figure 5-11: Location of False Bay Mountains IBA (green shaded) relative to the study area

a) Structurally Untransformed Areas

It is widely accepted that vegetation structure is more critical in determining bird habitat, than the actual plant species composition (Harrison, *et al.*, 1997). The criteria used, by the Southern African Bird Atlas Project (SABAP) 1 authors to amalgamate botanically defined vegetation units, or to keep them separate, were:

- The existence of clear differences in vegetation structure, **likely to be relevant to birds**.
- The results of published community studies on **bird/vegetation associations**.

SABAP1 classifies the natural untransformed vegetation in 3419AA as Fynbos vegetation (Harrison, *et al.*, 1997). Fynbos can be divided into two categories, Fynbos proper and Renosterveld. Despite having a high diversity of plant species, Fynbos and Renosterveld have a relatively low diversity of bird species. Structurally untransformed Fynbos scrub occurs mostly on the western side of the study area against the mountain slopes, which form part of the Eastern False Bay Mountains IBA. None of the proposed substations site alternatives fall within structurally untransformed habitat (**Figure 5-12**).

Figure 5-12: Bird Habitat in the Study Area (red = structurally untransformed, yellow = structurally semi-transformed, purple = structurally highly transformed)

Red data species that could potentially occur in structurally untransformed areas on the site are:

- Black Harrier (*Circus maurus*)
- Secretarybird (*Sagittarius serpentarius*)
- Martial Eagle (*Polemaetus bellicosus*)
- Lanner Falcon (*Falco biarmicus*)
- Peregrine Falcon (*Falco peregrinus*)

Non-Red Data power line sensitive species include:

- Jackal Buzzard (*Buteo rufofuscus*)
- Booted Eagle (*Aquila pennatus*)
- Verreaux's Eagle (*Auila verreauxii*)
- Cape Eagle Owl (*Bubo capensis*)

b) Structurally Semi-Transformed Areas

The study area contains areas where the Fynbos was cleared for agricultural activity in the past, which is now in a state of natural rehabilitation. These areas have previously been cultivated, probably for cereals, but this cultivation probably ceased more than twenty years ago, and there has been partial natural rehabilitation since then. This disturbance can be seen in the aerial imagery, where characteristic lines caused by ploughing are evident, and on site, where the plant species present are typical of a previously disturbed area that has undergone partial passive rehabilitation (Ecological Assessment, 2012). Structurally this area is mainly scrub with a few scattered alien trees. These areas could occasionally be utilised by a limited number of Red Data species, mostly raptors such as Peregrine Falcon, Lanner Falcon and Martial Eagle, for foraging. Non-Red Data power line sensitive species that could also utilise this habitat include:

- Black-shouldered Kite (*Elanus caeruleus*)
- Jackal Buzzard (*Buteo rufofuscus*)
- Spotted Eagle-Owl (*Bubo africanus*)
- Steppe Buzzard (*Buteo vulpinus*)
- Booted Eagle (*Aquila pennatus*)

Substation Site Alternative 1 falls within the semi-transformed habitat (**Figure 5-12**).

c) Structurally Highly Transformed areas

The study area has been heavily transformed in places, mostly through industrial infrastructure and alien tree infestation, which has formed dense stands in places. The most prominent woody invasive species are listed in **Chapter 5.6** above. This habitat is generally not very attractive to Red data species, but raptors such as Martial Eagle may occasionally use the trees for perching. There are several non-Red Data power line sensitive species that could utilise this habitat, and depending on the height and density of the trees, even breed in them. This includes:

- Black-shouldered Kite (*Elanus caeruleus*)
- Jackal Buzzard (*Buteo rufofuscus*)
- Spotted Eagle-Owl (*Bubo africanus*)
- Steppe Buzzard (*Buteo vulpinus*)
- Black Sparrowhawk (*Accipiter melanoleucus*)
- Rufous-chested Sparrowhawk (*Accipiter rufiventris*)
- African Fish-Eagle (*Haliaeetus vocifer*)
- African Harrier-Hawk (*Polyboroides typus*)

Substation Site Alternatives 2 and 3 fall within the structurally highly transformed habitat. However, the majority of trees on the aforementioned substation alternatives are generally not tall enough for the aforementioned species to use them for breeding purposes, except perhaps Black-shouldered Kite.

There is a man-made dam on substation Site Alternative 3, which is surrounded by dense stands of alien trees. Although the dam is an artificial feature, which is understood to be fed by groundwater extracted via a nearby borehole, the site visit revealed that this dam does have some ecological value given that it is well vegetated by aquatic/wetland plants (mainly *Eleocharis limosa*, c.f. *Isolepis prolifera* and *Aponogeton* sp.) and thus provide wetland habitat suitable for habitation by invertebrates, amphibians and therefore may also attract water birds. The terrestrial area surrounding this dam is, however, highly disturbed by alien plant invasion and general transformation of the landscape for human activities (as stated in **Chapter 5.5**). During the site visit in November 2012, the dam was practically dry and therefore did not support any water birds. This situation is likely to change in the winter rainy season when the water levels should be higher. Waterbirds that could be attracted to the dam include several non-Red Data species such as:

- African Snipe (*Gallinago nigripennis*)
- Common Moorhen (*Gallinula chloropus*)
- Red-knobbed Coot (*Fulica cristata*)
- Yellow-billed Duck (*Anas undulate*)
- Yellow-billed Egret (*Mesophoyx intermedia*)
- African Spoonbill (*Platalea alba*)
- Three-banded Plover (*Charadrius tricollaris*)

It is unlikely that any Red Data power line sensitive species will be specifically attracted to the dam. Immediately east of the study area, the typical Overberg mosaic of grain fields interspersed with pastures, known as the Overberg Wheatbelt, starts and continues eastwards for about 200km. This habitat is of specific importance to Blue Crane and Denham's Bustard (Young, *et al.*, 2003). It is unlikely that the latter two species will regularly occur in the study area, except as vagrants, as the habitat is not suitable.

Figure 5-12 shows the habitat composition in the study area. Appendix 1 contains photographic records of the avifaunal habitat at the site.

5.7.2 Relevant Bird Populations

SABAP2 recorded a total of 187 species (13 Red Data) in the 3419AA Quarter-Degree Grid Cell (QDGC) (Barnes, 2000). Reporting rates are an indication of the relative density of a species on the ground in that it reflects the number of times that a species was recorded relative to the total amount of cards that were completed for the QDGC. In this instance, due to the relatively ample amount of checklists that have been completed, the reporting rate was regarded as a reliable reflection of densities on the ground.

Table 5-2 provides a guideline of the power line sensitive Red Data species that could potentially be encountered anywhere within the QDGC where suitable habitat is available. It also contains an assessment of the potential for a species to occur at the site. Species with a negligible potential to occur at the study area are excluded (e.g. coastal species).

Table 5-2: Species of Conservation Concern Recorded in 3419AA by SABAP2 (excluding coastal species and vagrants)

Species	Conservation Status (Barnes, 2000)	Preferred Habitat ((Harrison, *et al.*, 1997), (Barnes, 2000), (Hockey, *et al.*, 2005), personal observations)	SABAP2 Reporting Rate 3419AA (%)
Peregrine Falcon (*Falco peregrinus*)	Near Threatened	Mostly restricted to mountainous, riparian or coastal habitats, where high cliffs provide breeding and roosting sites. Breeding pairs prefer habitats that favour specialised, high-speed, aerial hunting, eg high cliffs overlooking vegetation with raised and/or discontinuous canopy (e.g. forest, Fynbos, woodland), or expanses of open water. Also uses quarries and dam walls, and frequents city centres where tall buildings substitute for rock faces.	2.6
Black Harrier (*Circus maurus*)	Vulnerable	In Western Cape mostly in Fynbos, especially Strandveld and Mountain Fynbos; less common in dry restios and Renosterveld remnants	2.1
Secretarybird (*Sagittarius serpentarius*)	Near Threatened	Grassland, open shrubland and agricultural fields	1.1
Lanner Falcon (*Falco biarmicus*)	Near Threatened	Most frequent in open grassland, open or cleared woodland, and agricultural areas. Breeding pairs generally favour habitats where cliffs available as nest and roost sites, but will use alternative sites (e.g. trees, electricity pylons, buildings) if cliffs absent.	1.1
Blue Crane (*Anthropoides paradiseus*)	Vulnerable	In Western Cape, confined to cereal crop fields and planted pastures. In Overberg, switches seasonally between harvested cereal croplands (Nov-May), recently germinated cereals (Jun), and planted pastures (Jul-Sept); ploughed fields used year-round.	44.4
Denham's Bustard (*Neotis denhamii*)	Vulnerable	In the Western Cape, inhabits mosaic of cultivated dry-land pastures, incl. grasses, lucerne, clovers (*Medicago* spp), crop fields (mainly cereals) and natural vegetation (short Fynbos, Renosterveld and Strandveld shrublands). Pastures favoured during winter (Apr-Aug), and harvested crop fields during summer (Nov-Mar). Avoids recently ploughed lands and fields with growing crops. Natural vegetation favoured during breeding season (Sept-Dec) but avoided at other times of year; use of artificial habitats exceeds that of natural vegetation year-round (typically < 10%; 45% Sept-Dec).	3.2
Martial Eagle (*Polemaetus bellicosus*)	Vulnerable	In the Western Cape in open shrubland with drainage line woodland or high-tension pylons, and open farmland with clumps of trees.	1.1

** As at 15 October 2012*

5.8 SOCIAL ENVIRONMENT

5.8.1 General Description of the Social Environment

The Houhoek Transmission Substation is close to the town of Botrivier, which is situated off the N2 Highway, between Cape Town and Caledon. The study area thus falls within the jurisdiction of the Theewaterskloof Local Municipality (TLM) and the Overberg District Municipality (ODM) in the Western Cape Province.

The TLM, which is the largest local authority within the ODM, includes Villiersdorp, Grabouw, Botrivier, Caledon/Myddleton, Genadendal, Greyton and Riviersonderend. During 2007, it was estimated that the population total for the TLM reached approximately 86,500 individuals, with Botrivier having a population of approximately 4,000 residents.

The TLM is a rural area, with various open spaces and numerous farming activities. The majority of the land is thus occupied by agriculture, small holdings and similar land uses. Botrivier is mainly characterised by tourism-based activities, with some manufacturing activity. There is a potential for expansion of its light manufacturing sectors (Theewaterskloof Local Municipality, 2011).

5.8.2 Economic Sectors

Agricultural production in the area contributes to 36% of the local economy, with the manufacturing sector accounting for 12% of the local economy. The TLM can thus be described as an agricultural region due to its large tracts of agricultural land, with only a few small centres spread throughout the area. The economy is primarily agrarian (almost 50% including the agro-processing activities in the region), with a growing regional tourism, construction, financial and business services sectors. Grabouw is the largest economic centre, followed by Caledon. The area has a wealth of natural resources and excellent agri-tourism offerings.

Even though the agricultural sector in the area performed well, the sector's limited expansion potential is of concern. A multi-pronged strategy that could diversify and stimulate the local economy was recently agreed to. However, this is a long term programme, and will require increased bulk infrastructure capacity to be implemented and land to be released.

The area is however, also under pressure from the large pool of unskilled migrants from the Eastern Cape, who flock into the area in search of work and a better life. Consequently, the number of unemployed people has grown.

5.8.3 Tourism Industry

At this stage tourism in and around the town of Botrivier is focused on the Botrivier Hotel (recently renovated), and local events such as the Barrels and Beards Harvest Celebration Festival and the Botriviera Spring Festival. Adventure tourism in the form of mountain-biking and trail running events in the area is growing and seem to become more popular (Overberg Website, 2006). Visitors to the local area can also partake in horse riding trails, quad biking, hiking trails and visits to the local wineries. Scattered accommodation facilities for tourists are also on the increase.

The development of the tourism sector, which contributes 13% to the local economy, also offers a secondary income base for the local farming community. It aims to attract investment into the restaurants, retail and services sectors, all of which could improve the attractiveness of the greater area as a residential destination for people seeking a quieter and better quality of life.

5.8.4 Demographic and Socio-Economic Characteristics

According to StatsSA (Community Survey of 2007), the TLM had a total population of 86,719 individuals within 23,464 households. A decline in the population was seen based on the previous total population figure of 93,276 individuals during the statistical survey of 2001 (StatsSA, 2007). Contrary to the decline, the TLM Integrated Development Plan (IDP) estimated the total population within the area at 105,875 in 2008 and 106,172 in 2009. The TLM is thus the most populous municipality in the ODM, as it hosts 44% of the total district population (Theewaterskloof Local Municipality, 2011). Botrivier falls within Ward 7 and is said to have approximately 1,085 households with an additional 412 households forming part of the informal settlement, New Frans.

The unemployment rate in the municipal area was estimated at 39%, with 31% of the households not having any income. Ward 7 has one primary health care clinic, with the main water source being groundwater. Most of the erven in Botrivier are served by a waterborne sanitation system, while the remainder of households make use of conservancy tanks or a septic tank/soak away system (Theewaterskloof Local Municipality, 2011).

5.8.5 Land-Use Profile

The study area is characterised by the town of Botrivier and the Vredendal settlement[2]. The rural landscape includes farmland (wine farms like the Wildekrans Wine Estate, and the production of wheat), Fynbos and natural mountainous areas.

The N2 Highway stretches along the west of Botrivier from the Houwhoek Pass, where after it turns in an easterly direction to the south of the town. The R43 provincial road splits from the N2 Highway, which links Botrivier with the R44 and towns such as Kleinmond and Hermanus.

The spatial vision of the TLM for Botrivier is to promote the town as one of the N2 Highway transport corridor “anchor” nodes and to stimulate growth through rail and road-based transport-linked industrial and associated development (Theewaterskloof Local Municipality, 2011).

5.8.6 Infrastructure

The study area already contains extensive electricity infrastructure in the form of the existing Houhoek Distribution substation and several Transmission and Distribution power lines. In addition, on a regional scale, there are currently four wind farms planned for the area between Bot River and Caledon, which would result in additional Distribution power lines being constructed to connect them to the Eskom grid.

2 Please note that this is not the Vredendal town of Matzikama Local Municipality in the northern Olifants River Valley.

There is also a water pipeline and sewage pipeline that crosses the R43 from Botrivier to a pump station and reservoir, which is located south of Site Alternative 2.

5.8.7 Town Planning

Botrivier as a town has very little space for expansion and its main area of expansion is towards the south. The north is restricted due to steep gradients, the west, partly steep gradients, the N2 buffer, as well as nature conservation areas to the east of the N2. The west is seen as the area with tourism potential for the town. The town is mainly an agricultural service centre with potential for light industrial activity and development of the tourism sector. The urban edge of Botrivier is indicated as a red line in **Figure 5-13**.

The TLM SDF indicated that the town of Botrivier has a lack of industrial erven to stimulate economic growth and create the potential for economic development, as well as to strengthen the town's strategic location advantage (Theewaterskloof Local Municipality, 2012).

The purple area in **Figure 5-13** has been earmarked for industrial development to accommodate industrial growth. This proposed industrial node will unlock the area and the N2 growth corridor for future economic growth, encourage economic growth and create job opportunities within walking distance from proposed and existing residential areas in Botrivier.

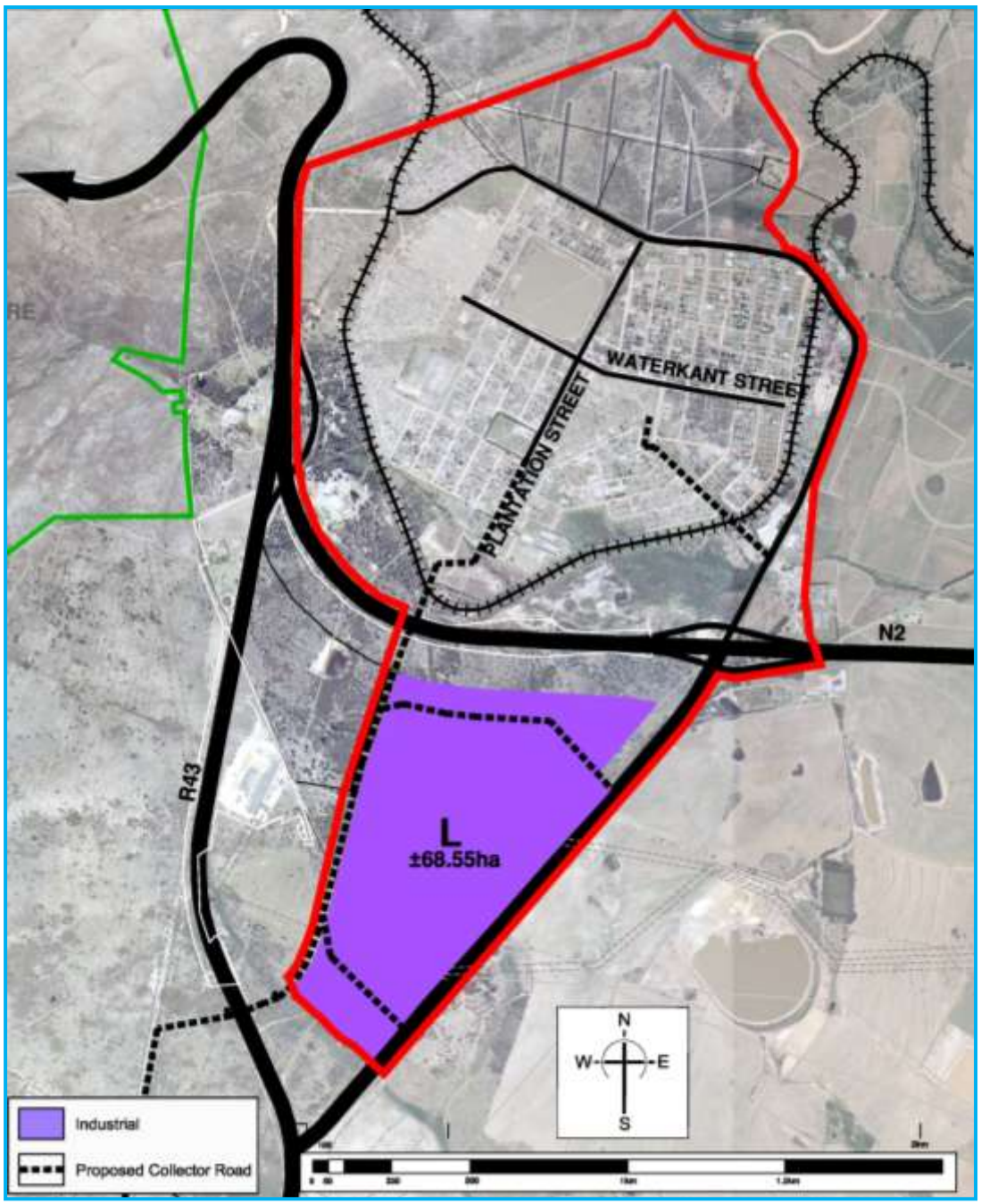


Figure 5-13: Urban edge of Botrivier (Theewaterskloof Local Municipality, 2012)

5.9 VISUAL ENVIRONMENT

5.9.1 Regional Landscape Context

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, land form, soils, vegetation, land use and human settlement.' It creates the specific sense of place or essential character and 'spirit of the place' (Spoon Press, 2002). The first step in the VIA process is determining the existing landscape context of the region and of the sites where the project is proposed.

The Overberg District is well known for the tourist value of its historical and natural features. Natural features include several rivers and water features as described in **Chapter 5.1**. The Bot River is associated with a wide valley that is encompassed by mountains on either side which form a prominent natural feature within the region.

Vegetation in the region is characterised by typical Fynbos plant species. Fynbos is a fragile resource and is very sensitive to threats, both natural and human-induced. See **Chapter 5.6.1** for the national and regional importance of Fynbos vegetation in the study area. Nature reserves are also found in the region, as described in **Chapter 5.1**.

5.9.2 Local Landscape Context

The local natural context includes the Bot River and Houwhoek Mountains as mentioned above. Manmade interventions include the town of Botrivier (see **Chapter 5.10.2** for a brief history about the town), the existing 132kV Houhoek Eskom Distribution Substation with its associated power lines, as well as other Eskom Transmission power lines. Transport infrastructure includes the N2, R43 and a railway line. Land use and activities in the area include wine farms and agricultural fields of wheat (see **Figure 5-14** for photographs of local context and **Figure 3-5** for Locality Map).

Other interesting local features include the Van der Stel mountain pass that leads to the Theewaterskloof dam. This area hosts a variety of working farms that produce flowers, wine, lavender, olive oil, apples, and milk, as well as stud farms with mountain lodges, guest farms and cottages (Overberg Online, 2012).

As indicated in **Figure 3-5**, the existing Houhoek substation is located to the south of the town of Botrivier. As a result of the substation, the area is strongly associated with existing transmission line infrastructure which can be clearly seen in the panoramic photograph. This main photograph in the montage below was taken from the Houwhoek pass. The smaller photographs below that show characteristic and important land-uses in the study area.

5.9.3 Project Visibility and Exposure

Making use of survey data supplemented with Surveyor General 1:50 000 elevation data, a terrain model was generated for the area around the proposed project. As depicted in **Figure 5-15**, the terrain slopes down from the north-west towards the south-east with the Houwhoek Mountain in the north-west and the town of Botrivier and the Bot River valley in the east and south-east. Site Alternative 2 has the steepest and most unlevel topography and is located on an elevation of between 250m and 170m above sea level (amsl) with a south-western aspect, thus facing the town of Botrivier and the valley below. This location will result in high visibility and exposure of potential viewers to the proposed project components.

Site Alternative 1 (both layouts) is located on an elevation of between 125m and 170m amsl, with only a minor portion of Layout Alternative 1 lying below 125m amsl. Both these alternatives have south-eastern aspects but, due to their lower elevation and location within the topography, proposed project components would be less visible and exposed to potential viewers.

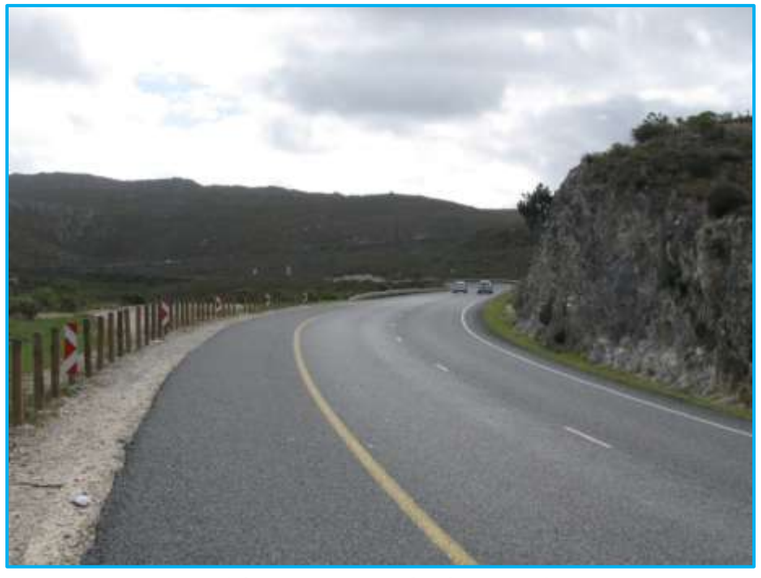
Site Alternative 3 (both layouts) has very similar elevations, aspects and slopes. It is located on an elevation of between 170m and 85m amsl, which is slightly above the elevation of the town of Botrivier. This would presumably result in these two layout alternatives being less visible and exposed from potential viewers in terms of topography.

A viewshed was generated for each of the site alternatives. For all site alternatives, the highest above point ground level for the components of the Houhoek MTS project that was used in the calculation was 5m. See viewshed maps that indicate the visibility of the site alternatives in **Figure 5-16** for Site Alternative 1, **Figure 5-17** for Site Alternative 2 and **Figure 5-18** for Site Alternative 3.

Panoramic photograph towards the east from Houwhoek Pass depicting the proposed sites and the main landscape features

Existing Houhoek Distribution Substation

Wildekrans Wine Estate



N2 Highway over Houwhoek Mountains

Figure 5-14: Local Context Photographs

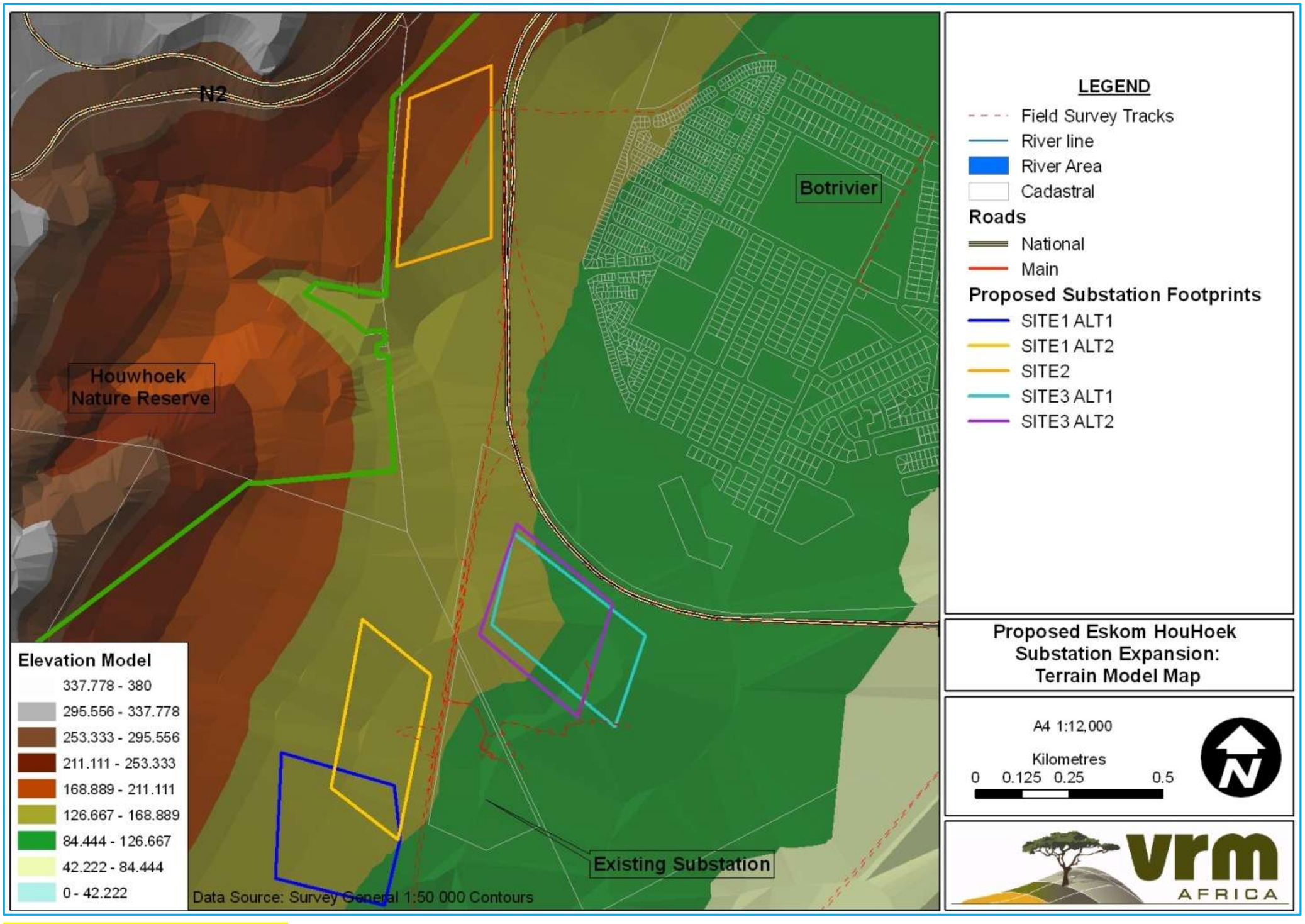


Figure 5-15: Terrain Model Map of Study Area

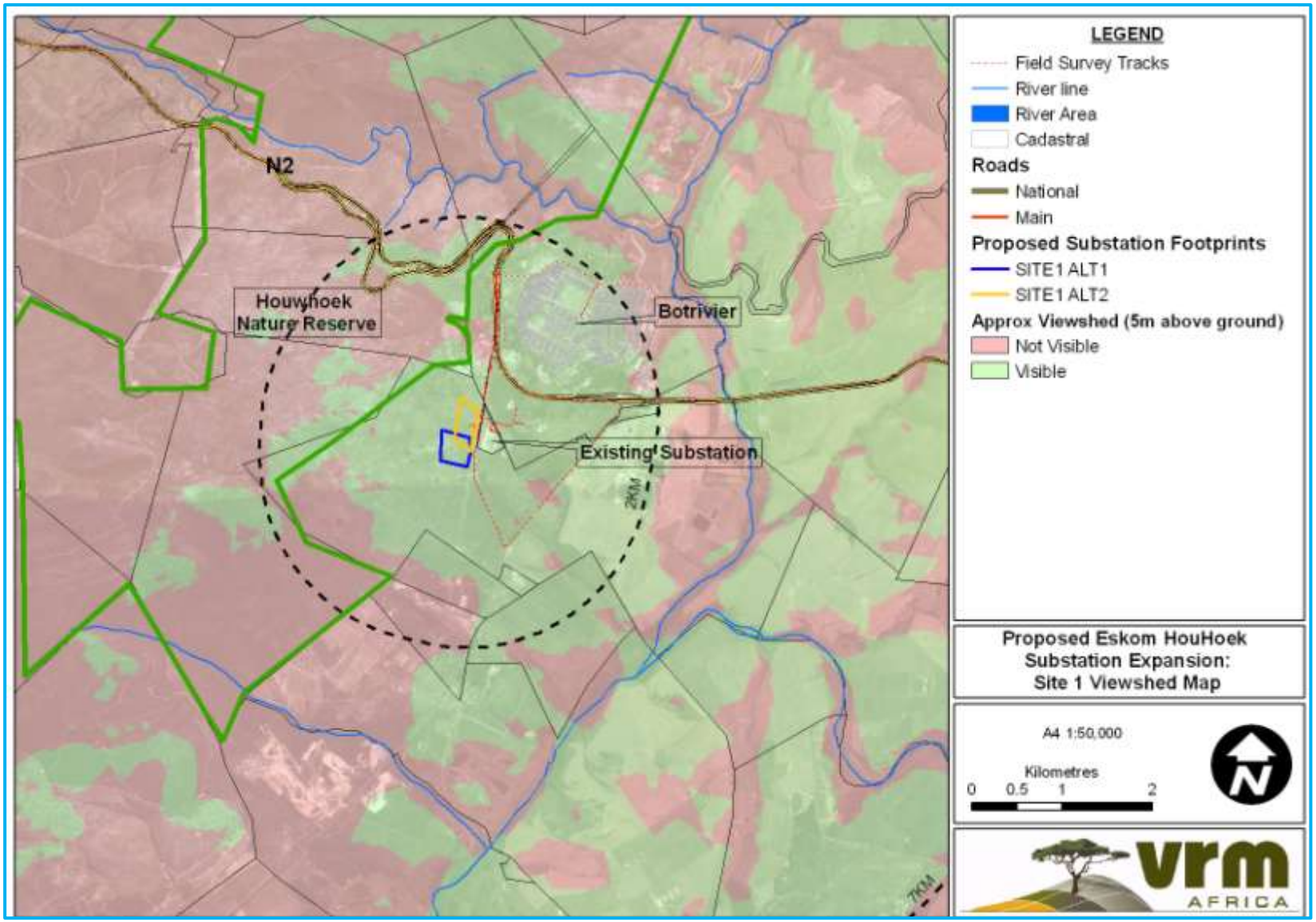


Figure 5-16: Viewshed Analysis for Site Alternative 1 (both layouts)

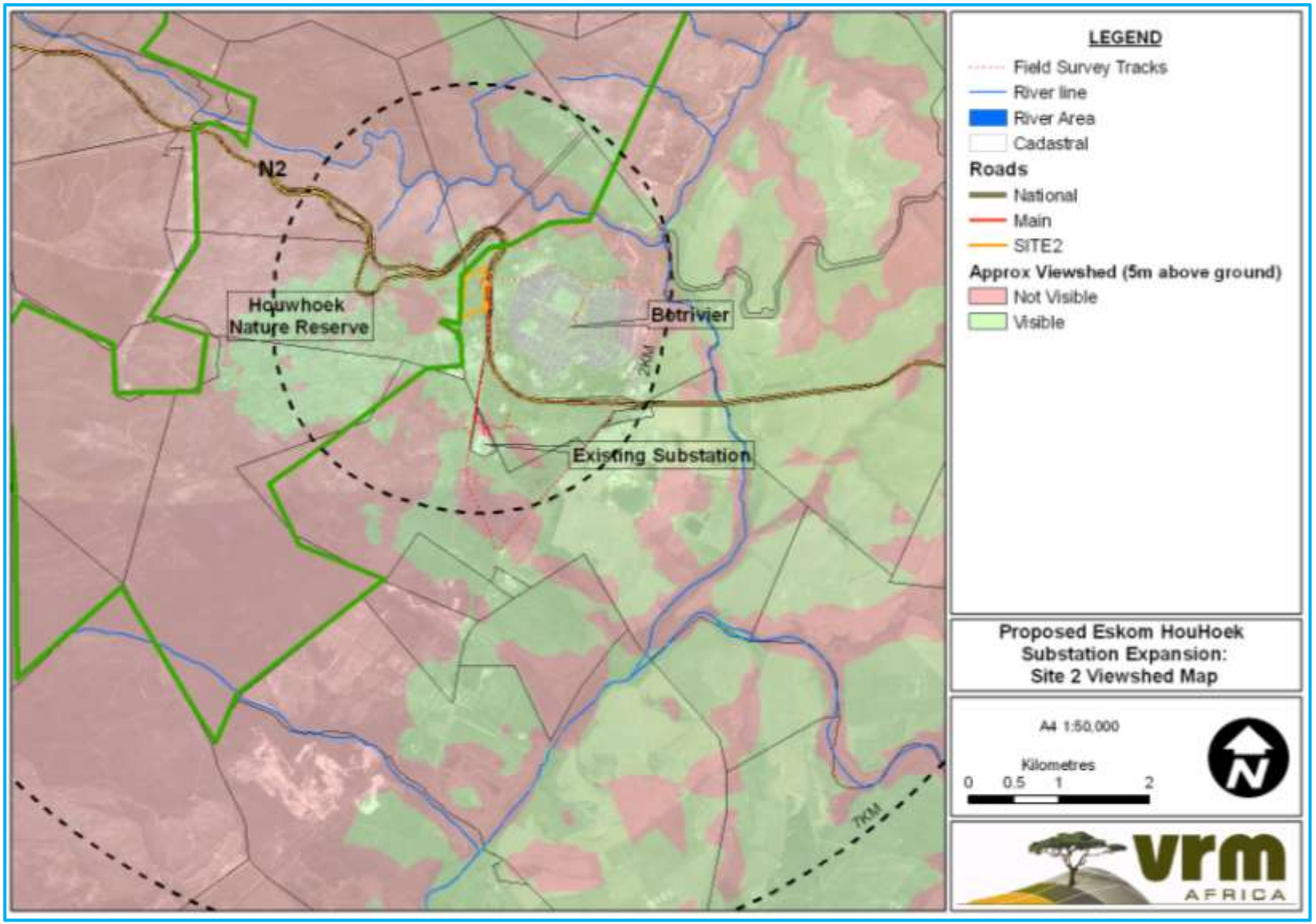


Figure 5-17: Viewshed Analysis for Site Alternative 2

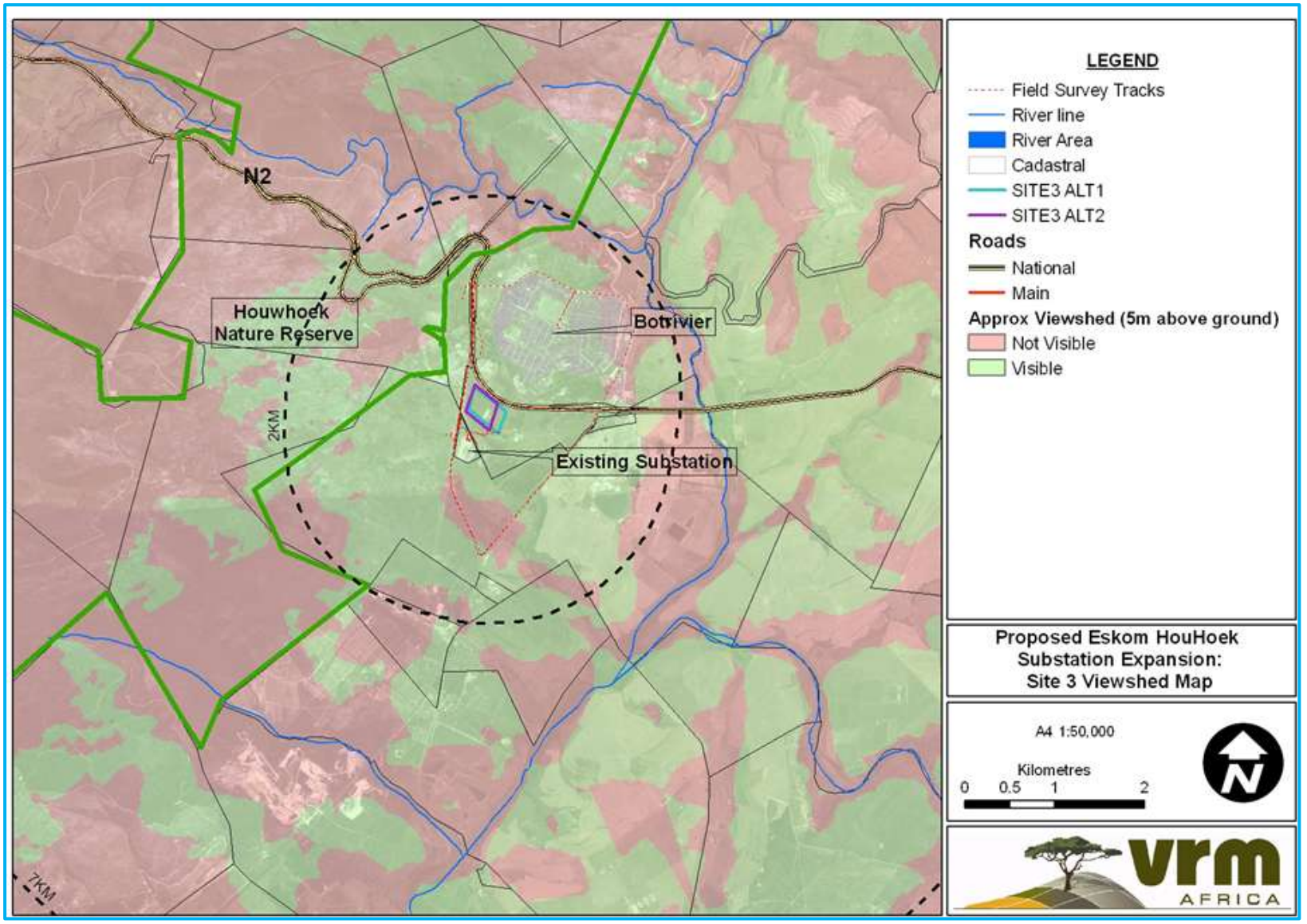


Figure 5-18: Viewshed Analysis for Site Alternative 3 (both layouts)

5.10 HERITAGE ENVIRONMENT

Prior to the arrival of the first Dutch freeburgers, the land was settled by the Khoekhoen, who moved across the landscape, following a trans-human cycle with their livestock. It was the attraction of trade with the Khoekhoen, which prompted the establishment of a VOC outpost at Compagnies Drift (the present Beaumont Wine Estate at Botrivier) prior to 1745.

This area has been subject to generations of agriculture. The farm Botrivier, for example, was one of the earliest farms in the Overberg to obtain a licence for the sowing of wheat dating back to 1708 (Du Toit, 2004) and merino sheep were bring grazed on the farm of Boontjieskraal (midway between Botrivier and Caledon) by 1803.

There are many historic farms in the broader region, some with buildings dating back to the 18th Century. Botrivier and the hinterland was accessed by a historic pass, which descended down the mountain towards Botrivier – this pass survived in part to this day, while the lower reaches are still driveable in an off-road vehicle.

The entire surrounding area is rural in character, with wheat and stock farming being the primary activities. This landscape has been transformed by generations of farming and represents an agricultural landscape (also termed "Rural Farmland Landscape") of cultural significance. The study area consists mainly of old re-vegetated agricultural land on the lower slopes of the Kogelberg.

Existing electrical infrastructures (132kV Houhoek Substation, 132kV and 400kV power lines) traverse the study area. The broader area is also considered to have aesthetic value with high tourism potential being situated adjacent to the N2 Highway and on the route to a number of important tourist towns such as Greyton, Genadendal and Hermanus. See **Chapter 5.9** for further details of the visual environment and **Chapter 5.6** for further details of the vegetation.

5.10.1 Palaeontology

According to (Almond, 2012), the Bokkeveld Group formations that underlie the Botrivier area are known to be richly fossiliferous elsewhere in the Western Cape. However, in the Botrivier-Caledon region, their original fossil content appears to have been almost completely destroyed by a combination of intense tectonic deformation (folding, faulting, cleavage development) and deep chemical weathering. The Table Mountain Group formations represented extreme west of the study area (Houhoekberge) are only sparsely fossiliferous, and have also suffered intense chemical weathering. The effective paleontological sensitivity of all the rock units represented within the study area is consequently low to very low.

5.10.2 Pre-Colonial and Colonial Archaeology

The study area will contain scattered Stone Age archaeological material dating from the Early, Middle and Late Stone Age periods. The survey of the Caledon Wind Energy Facility (WEF) (Webley & Halkett, 2011) and the Langhoogte WEF identified at least nine scatters of Early Stone Age material on ploughed lands. The stone tools included quartzite flakes, flaked cobbles, cores including discoid cores and some crude bifaces (hand axes). In the survey on the farms Klipheuwel and Dassiesfontein to the south of the N2 Highway, some scatters of

Early Stone Age material was also identified (Hart, 2010). Another consultant (Kaplan, 2006) has also undertaken surveys around the Botrivier area and found a number of Early Stone Age artefact scatters.

The small, picturesque village of Botrivier lies in the foothills of the Houwhoek Mountains, *en route* to Hermanus. The Bot River, after which the hamlet is named, meanders its way through a fertile valley surrounded by mountains covered in Fynbos, historical wine farms and fields of wheat. A place of crossing in the Bot River originally served as a spot where early European settlers bartered butter with the Khoi-Khoi tribes, and the river was attributed with the name 'butter' from both sides – the Afrikaans word for butter is 'botter' and the Khoi-Khoi called it 'Couga', which means 'lots of butter' (Net-Focus Interactive, 2012).

5.10.3 Cultural Landscape

The general historic context of the study area is significant (Overstrand Heritage Landscape Group, 2009). However the cultural landscape at the actual study area has already been heavily impacted by Transmission and Distribution power lines, the N2 and the existing Houhoek Substation. There are some historic buildings on properties in the study area, such as Wildekraans Wine Estate to the east, and Compagnies Drift (now Beaumont Wine Estate) to the west, next to the village of Botrivier. These however are too far from the study area to be affected by the proposed project. The study area is very localised and situated well clear of any known historic properties. There is no evidence of any historical structures or ruins on any of the proposed alternative sites.

While the N2 highway is not strictly an historic route, it is a potentially sensitive visual receptor, which will need to be considered in terms of the placement of facilities (see the visual landscape in **Chapter 5.9**).

5.11 TRANSPORTATION NETWORK

5.11.1 Existing Transportation Network

The main roads within the study area are the N2 national highway and the R43 provincial road. From the town of Botrivier along the N2, Somerset West can be accessed to the west, and Caledon can be accessed to the east. Hermanus can be accessed along the R43 to the south of Botrivier and the study area. The R42 is also linked in a Y-shape and intersects the N2 at two off-ramps within 2km of each other (**Figure 3-5**).

Hoof Way is located along the northern boundary of Botrivier. The western connection of Hoof Way is with the N2, which is directly opposite Site Alternative 2. Hoof Way continues as a boundary around Botrivier and intersects with the N2 again to the south-west of Botrivier. This is the same intersection as described in the paragraph above. Hoof Way then continues in a south-easterly direction and is named the R43.

There is an access road from the N2 Highway that leads to the existing Houhoek Distribution Substation. Under the present circumstances, Site Alternative 3 may also be accessed via this road.

The Botrivier Train Station is located at the north-eastern corner of the town. The associated railway line enters Botrivier from the north-western corner and forms the boundary around the existing residential area of Botrivier.

5.11.2 Planned Road Network Improvements

The following road network improvements are planned for the study area:

- **Upgrading/Widening of the R43:**
  - The Western Cape: Department of Transport and Public Works (WC: DoT) was approached to obtain its planning for the upgrading/widening of the R43. It was established that although it is the WC: DoT's intention to upgrade the R43, conceptual planning to identify the geometric alignment and ultimate cross-section has not yet been undertaken. The Department is, therefore, not in a position to provide guidance in this respect.
- **Upgrading/Tolling of the N2 Freeway:**
  - A meeting was held with HHO, the transportation consultant for the N2 Toll Consortium, and plans were obtained showing the extent of road improvements and the location of the tolling facilities in the vicinity of the potential sites for the proposed Houhoek Transmission Substation. The improvements are summarised in the plan in **Figure 5-19**.
  - As part of the upgrading of both the R43 and the N2, access to adjacent properties will be rationalised and many of the properties that presently obtain access directly off either of these two roads will have their existing access closed and an alternative access provided
  - The planning for the tolling of the N2 freeway shows that the preliminary design for the proposed Toll Plaza on the R43 incorporates the access to the existing 132kV Houhoek Eskom Distribution Substation.

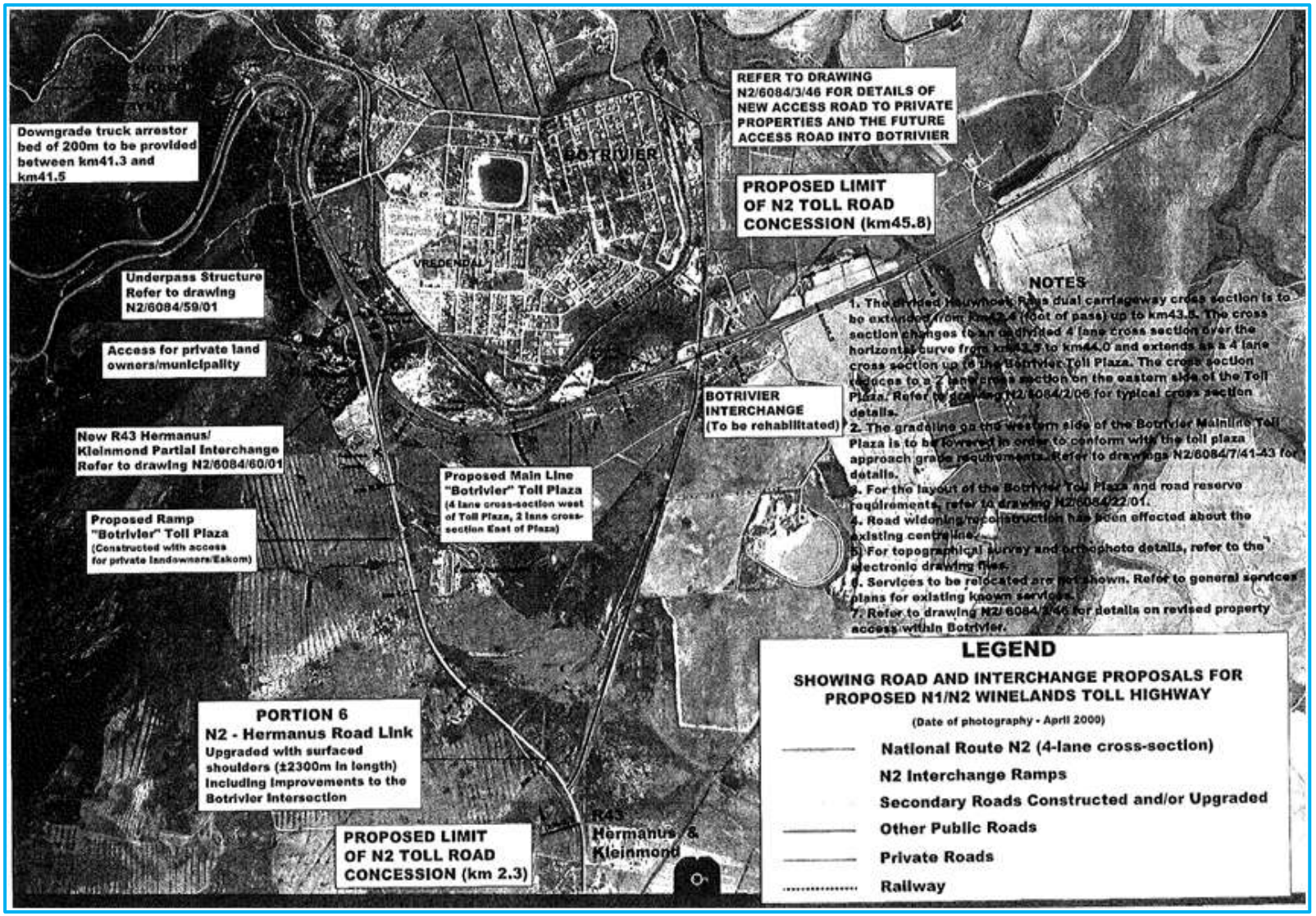


Figure 5-19: Planned Road Network Improvements (N2 Toll Consortium)