

SECTION 5: DESCRIPTION OF THE ENVIRONMENT

5. DESCRIPTION OF THE ENVIRONMENT

[Regulation 31(2)(d)]

5.1 BIO-PHYSICAL ENVIRONMENT

5.1.1 TOPOGRAPHY AND DRAINAGE

The following information is extracted from the Reconnaissance Report compiled by Soilkraft CC.

The larger study area covers a broad valley located between two mountainous ridges. The northern ridge located on the farms' boundaries is associated with the Sandriviersberge, whilst another mountainous ridge is located on the southern border of the two Buffelskloof farms. The northern mountainous ridge has a maximum peak of 1802m above mean sea level. The peak is known as Skilpadkop. A slightly higher peak (1827m above mean sea level) is located at beacon 23 just north of the study area, but outside the premises. A maximum altitude of 1658m prevails on the south eastern border of the farm Buffelspoort 459KQ, as recorded at beacon 13. The mountainous ridges are characterised by steep gradients and cliffs.

The central portion of the facility spans a broad valley between the two mountainous ridges. The valley is broad with no major deep incisions. A number of relatively small non-perennial streams originate in the study area and ultimately accumulates into a confluence of the Sand River. One of the tributaries is the Buffelskloofspruit, which feeds the Rookpoort dam on the facility premises.

Areas affected by floodlines is the existing D Training camp which is traversed by several streams. A portion of the oxidation ponds servicing Camps C,D and E are situated within the floodline [Refer to Appendix 8 for a copy of the floodlines indicated in relation to the existing and proposed new facilities]

5.1.2 REGIONAL CLIMATE

Recorded temperature ranges in the vicinity of Thabazimbi vary from a minimum of -3,7°C in winter time to a maximum of 36,0°C in summer. The region experiences fairly frequent (light) frost during winter times.

5.1.3 RAINFALL

Mean annual rainfall in the region ranges from 450mm to 750mm, depending on the relief and topographical location.

5.1.4 VEGETATION

Eco-Agent CC Ecological Consultants were commissioned to undertake a Plant and Mammals Species Richness and Habitat Assessment. Herewith extracts from the report compiled by Eco-Agent CC Ecological Consultants [Refer **Appendix 13** for a copy of the Report and associated sensitivity map]

The site is located in a wooded valley between mountain ranges to the north and south, with the site boundaries along the summits. The mountain ranges are characterized by impressive rock faces and wooded slopes. A major feature of the site is the Rookpoort Dam located in a mountain gorge close to the southern boundary.

Acocks (1953) classified the plant associations of the site and region as Sour Bushveld veld type. Low and Rebelo (1996) defined the plant assemblage in the district as Waterberg Moist Mountain Bushveld veld type. More recently Mucina and Rutherford (2006) identified the area as answering to the definition of their Waterberg Mountain Bushveld vegetation type, probably with elements of the Central Sandy Bushveld vegetation type.

All 11 sites which are proposed for development or upgrading were assessed. In general the vegetation of the eleven sites are very similar, representing Central Sandy Bushveld. The vegetation and plant species composition of the eleven sites are, however, described separately.

(i) EXISTING ADMINISTRATION CAMP (TO BE UPGRADED)

This camp is situated at approximately 24° 32' 57"S; 27° 44' 37"E. The area is already developed and the natural vegetation has partly been cleared and altered. Although the shrubby bush and ground cover have been cleared, many tree species still remained. The site was initially probably chosen for the camp due to the large trees that occurred there.

The species richness of this area is high, with 2 protected tree species but no red data species present.

It was concluded that this area is already developed and the upgrade can be supported.



Figures 20,21 & 22 provides different views of the Existing Admin Camp

(ii) NEW RESIDENTIAL EXTENSION TO EXISTING HOUSING

This area is situated directly east of the Existing Training Camp A, across the spruit at approximately 24° 33' 01"S; 27° 44' 58"E. The area is already developed and the natural vegetation has partly been cleared and altered, for the construction of housing. The site is adjacent to the spruit, though the newly proposed extension are located east of the existing houses, away from the spruit into bushveld. The steep slopes of the mountain are situated directly north of the proposed development. The vegetation is dense bush, about 5-6 m tall, covering 60% and dominated by *Dichrostachys cinerea*.



Figure 33: The dense bush at the site proposed for new residential development at A: Training Camp

The species richness of this area is high, with no protected tree species and no red data species present. The area is partly already developed and the dense bush is degraded and encroached by *Dichrostachys cinerea*.

The upgrade can be supported, though no development closer to the spruit or closer to the mountain slopes will be supported.

(iii) NEW CAMP E TRAINING AREA

This area is situated at approximately 24° 33' 47"S; 27° 46' 24"E, on Groenfontein, at the current cross-roads leading to the D Training Camp. The vegetation is dense bush, similar to that of Site 2, about 5-6 m tall, covering 60-70% and dominated by *Dichrostachys cinerea*. A power / telephone line transects the site, where the vegetation has been cleared. The general impression is that the vegetation is degraded and encroached by *Dichrostachys cinerea*



Figure 24: Disturbed vegetation at the proposed new E Camp

The species richness of this area is high, with no protected tree species and no red data species present. The dense bush is degraded and encroached by *Dichrostachys cinerea*.

The development can be supported.

(iv) EXISTING D TRAINING CAMP (TO BE UPGRADED)

There is an existing Training Camp (D), situated towards the north on Groenfontein, at approximately 24° 31' 20"S; 27° 43' 43"E. This Camp is located in a small kloof into the mountain. A small spruit drains down the kloof. The area in general would be regarded as sensitive, though the existing facilities are already in use for a long time. Fortunately the existing development covers a very small area. The camp area is for training of senior police officers; the camp terrain is well developed, neat and well kept. The existing buildings have thatched roofs. It is planned to upgrade the existing facilities at D Camp.

The site is located between the tributaries of two small spruits, within the mountains, which causes the site to be ecologically sensitive. The natural vegetation has partly been cleared and altered, for the construction of the existing camp. Within the area of the camp the vegetation has partly been cleared, lawn grass established with mainly large indigenous trees remaining. Some exotic (alien) trees and other garden plants have been planted in the gardens. These are not all recorded for the survey. Little grass and forb species remained due to the maintenance of the gardens.



Figure 25 & 26: The existing D Training Camp – developed area& natural area

In spite of the bush clearing and the well kept garden, the species richness of indigenous species is high, particularly for the tree species, but no protected tree species and no red data species were recorded.

The area is already partly developed and the area is well maintained. It is strongly recommended that the new developments must not go closer to the spruits, remaining outside the riparian zone with a buffer zone. It is further suggested to avoid developing on to the mountain hillsides, try to avoid clearing large areas of natural bush. Furthermore, try to keep as many as possible of the large trees, to maintain the bush atmosphere.

Should these mitigation measures be adhered to, the upgrade of the facility can be supported.

(v) NEW AMMUNITION SAFE AT EXISTING SAFE

There is an existing ammunition safe towards the west of the main A Camp. This area is situated at approximately 24° 33' 10"S; 27° 43' 43"E, on Buffelskloof. A new additional safe is planned directly east of the existing safe. The vegetation is tall tree veld 5-7 m tall and covering about 50%. For this facility all vegetation will have to be cleared (safety measures). The vegetation is dominated by *Burkea africana* and *Dichrostachys cinerea*. The species richness of this area is high, with no protected tree species and no red data species present. The dense bush is well developed with many large trees.

The development can be supported, considering that this type of vegetation is not rare and conserved within the larger area of the site.

(vi) EXISTING B TRAINING CAMP (TO BE DEMOLISHED AND REPLACED)

This area is situated south of the Thabazimbi-Alma road, just north of the Rookpoort Dam, on Buffelskloof, at approximately 24° 34' 08"S; 27° 44' 24"E.

The area is already developed and the natural vegetation has partly been cleared and altered, for the construction of housing and other facilities. All these facilities are temporary, though some alien plants have been planted in the gardens. The existing camp is surrounded by natural, though somewhat disturbed, bushveld. This camp will be demolished and replaced by a new facility. Currently the facility closest to the Rookpoort dam edge is about 200 m. The new facility will not be closer to the dam than the current facility. The vegetation has partly been cleared for the existing facility, though the new camp will extent into natural bush.



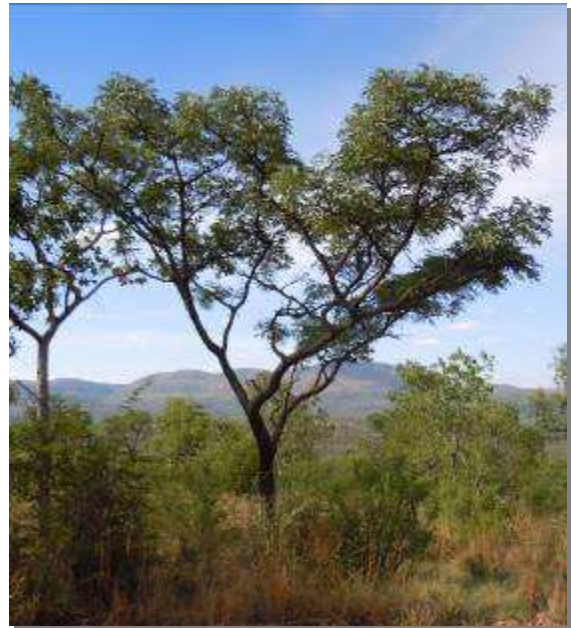
Figure 27 & 28: The existing B Training Camp and surrounding natural bush areas

(vii) NEW SHOOTING RANGE AND ADMINISTRATION BLOCK

This area is situated at approximately 24° 34' 59"S; 27° 45' 36"E, on Buffelspoort, at the foot of the north-facing slopes of the mountain. The mountain forms a safe background for the shooting. The vegetation is dense bush, about 3-5 m tall, the taller trees cover about 5% while the denser shrub layer covers about 30%. *Combretum apiculatum* and *Acacia caffra* are prominent trees. The protected trees *Sclerocarya birrea* (marula) and *Philenoptera violacea* (apple-leaf) are present on this site.



Figure 29 & 30: Vegetation on the foot slope at the site of the proposed new Shooting Range



(viii) NEW A: TRAINING CAMP

This new camp is situated on an existing tented camp, south of the Thabazimbi-Alma road, on Buffelskloof, at approximately 24° 33' 48"S; 27° 45' 36"E.. The temporary tented camp was built in an area with clumps of large Tamboti trees and an unique plant species composition. Typical bushveld vegetation surrounds the tall tree clumps. The vegetation has partly been cleared for the existing tented facility, though the new camp is proposed to extend into natural bush.

It is suggested to move the position of the new camp slightly into the surrounding bushveld in order to protect the tall tree bush clumps of Tamboti trees. The development can be supported.



Figure 31: A view of the area proposed for establishment of the New A Training Camp

(ix) NEW ADMINISTRATION BUILDING AND EXTENSION THE EXISTING LANDING STRIP

The existing landing strip is situated south of the Thabazimbi-Alma road, between the existing C Training Camp and the proposed new A Training Camp, on Buffelskloof, at approximately 24° 33' 20"S; 27° 47' 00"E. This landing strip stretches north-west to south-east. The new proposed extension will stretch north-east to south-west, at a right angle to the existing strip. The proposed administration building is close to the junction of the two landing strips. The natural vegetation is fairly open shrubby bushveld, more suitable for landing aircraft than the surrounding taller bushveld.



Figure 32 & 33: The area of the existing & newly proposed Landing Strip

The species richness of this area is medium, with no protected tree species and no red data species present. The development can be supported.

(x) NEW SEWER LINES

Three new gravity fed sewer lines are proposed. These are in addition to the existing sewer lines.

FROM THE EXISTING A TRAINING CAMP TO THE EXISTING WESTERN SEWAGE WORKS A & B

This line runs from the existing A Training Camp in a south-westerly direction through the bushveld vegetation on Groenfontein, and then crosses the Thabazimbi-Alma road to the Sewage Works situated on Buffelskloof.

The following two plant communities are crossed:

Tall Mixed Bushveld north of the Thabazimbi-Alma road. The species richness of this area is high, with 2 protected tree species but no red data species present. Where-as this is a linear development, many species will be encountered, though this is a narrow transect and most larger trees can be avoided. Care should be taken to avoid the protected trees. Note that a permit from the Dept of Agriculture and Forestry will be needed should any protected tree be removed.

Bushveld south of the Thabazimbi-Alma road: The species richness of this area is high, with no protected tree species and no red data species present. Where-as this is a linear development, many species will be encountered, though this is a narrow transect and most larger trees can be avoided.

FROM THE NEW A: TRAINING CAMP AND FROM THE ADMINISTRATION BLOCK AT THE LANDING STRIP TO THE EXISTING EASTERN SEWAGE WORKS C, D & E

This sewage line is proposed to run from the new A Training Camp (currently the tented camp) directly eastwards, all along the Groenfontein-Buffelspoort boundary line, to the existing Sewage Works C, D & E. A short line is also planned from the proposed Administration Building at the Landing Strip to join the existing sewage line that runs from the existing E Training Camp to the existing Sewage Works C, D & E.

The species richness of this area is medium, with no protected tree species and no red data species present. The development can be supported.

(xi) FARM ROADS

Some of the farm roads may have to be upgraded. The vegetation along the roads corresponds to the specific sections described above. It should however be noted that should protected trees be in the way of the construction, a permit for their removal will be have to be obtained from the Dept of Agriculture and Forestry.

(xii) RIPARIAN ZONES OF SPRUITS AT A: TRAINING CAMP

A spruit that originates in the mountains north of the existing A Training Camp runs southwards and feeds the Rookpoort Dam. This spruit runs between the existing A Training Camp and the Residential Area east of A Training Camp. It is proposed that both these two

facilities be upgraded. The spruit, including both western and eastern riparian zones, is about 100 m wide. Care should be taken that the upgrade development of especially A training Camp does not encroach into the riparian zone or the buffer zone that should be at least 32 m. (Note: The buffer zone recommended for areas outside the urban edge is usually 100 m, but in this particular case this is not feasible, as the developed area, or at least the disturbed area of A Training Camp is already within 100 m of the riparian zone).

Care should be taken that all the possible developments in this area should ensure that no degradation of the riparian zone and no enhanced erosion are caused by the development.

(xiii) RIPARIAN ZONES OF SPRUITS AT AT D TRAINING CAMP

Training Camp D is located in the mountains, with two small drainage lines running west and south of the foot print area. Although these two drainage line are quite small, they form part of the spruit system and no development should encroach into the riparian zones. The existing developments are very close to the riparian zones. The new upgrade developments should not encroach into the riparian zones, and remain as indicated on the proposed development plans.

5.1.5 MAMMAL HABITAT ASSESSMENT

Herewith extract form the Plant and Mammals Species Richness and Habitat Assessment compiled by Eco-Agent CC Ecological Consultants (Refer **Appendix 13** for full report).

All four major mammal habitats are present on the site, i.e. terrestrial, arboreal, rupicolous and wetland / aquatic. The development will not affect the mountainous terrain, or the dam and wetland areas.

Of the 86 mammal species expected to occur on the study site no less than 32 were confirmed during the site visit. This remarkable species richness is only possible within savannahs with high vertical stratification, and is comparable to formal conservation areas in similar woodland ecotypes (viz. Marakele National Park) with all four habitat types amply present.

It should be noted that potential occurrences is interpreted as to be possible over a period of time as result of expansion and contractions of population densities and ranges which stimulate migration. All feral mammal species expected to occur on the study site (e.g. house mice, house rats, dogs and cats) were omitted from the assessment since these species normally associate with human settlements. Mega carnivores and herbivores have long since been extirpated to favour livestock farming. Latterly large tracks of land in the district have been re-devoted to game farming and eco-tourism. On the site itself many medium-sized mammals occur naturally (viz. primates, warthog, kudu impala, duiker, steenbok, leopard, and hyena) whereas others have been re-introduced (giraffe, zebra).

Most of the species of the resident diversity are common and widespread (viz. scrub hares, mole rats, grass mice, multimammate mice, gerbil, the bats listed, genet, yellow and slender mongooses, duiker, steenbok and others). The Rooiberg caves in the vicinity of the site are a well-known bat caves harbouring a number of cave-dwelling species (viz. *Miniopterus schreibersii* and *Rhinolophus clivosus*). Others mammal species are not common (such as leopards and brown hyenas): several large mammals have been reintroduced.

Relative high species richness is due to the extensive size of the natural areas on the site, and of the rural nature of the entire district. The conservation status of the site is deemed "Excellent", which also contributes to species richness. The high species richness of the entire site is enhanced by high habitat diversity, and a high connectivity allowing near-to-natural migration. Veld fires are avoided or strictly controlled and this means that the quality of environmental conservation from a mammal perspective can be ranked a good. Connectivity with neighbouring areas is high and migration is virtually unhindered. The many drainage lines and especially the streams function as important dispersal corridors.

(i) RED LISTED MAMMALS

Twenty-one of the species assemblage is Red Listed. Those ranked as "Data Deficient" have not been adequately studied in their natural environment and quantitative data are lacking to express a reasoned opinion regarding their conservation status. They are therefore ranked as "Data Deficient" as a precautionary measure.

The main reason for species to become endangered is habitat destruction. Considering the extensive and pristine character of the site and district, habitat destruction is not a consideration and it can be assumed that Red Listed species occur at natural levels.

No other Red Data or sensitive species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

Some of the species that are present or have a high probability to occur on the site includes: *Elephantulus myurus* (Eastern rock elephant shrew), *Lepus saxatilis* (Scrub hare), and *Hystrix africaeaustralis* (Cape porcupine).

The assessment concluded the following:

- ✎ The planned development will not detract significantly from any of the ecosystems or habitat types defined on the site
- ✎ No loss or displaced of threatened or protected mammals is anticipated
- ✎ Loss of mammal habitat will, relatively to the overall size of the property, be insignificant on new developments and not applicable to existing facilities to be upgraded.

(ii) RECOMMENDED MITIGATION MEASURES

It is suggested that

- ✎ Building rubble is removed from the property
- ✎ That the trench for the new gravity feed sewage line is filled, with topsoil replaced.
- ✎ That planting of alien plants for landscaping is avoided in favour of endemics.
- ✎ Existing and new roads could be the cause for erosion, and it thus suggested that appropriate precautions are taken.

The intended development will not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

5.1.6 AVIAN BIODIVERSITY ASSESSMENT

Eco-Agent CC Ecological Consultants were appointed by Interdesign Landscape Architects, on behalf of the Department of Public Works, to assess avian biodiversity on the sites proposed for additions and alterations to the facilities of the Thabazimbi SAPS Operational and Tactical Academy. Herewith extracts from the report compiled by Eco-Agent CC, please refer to **Appendix 14** for the full report.

During a site visit, selected roads and tracks on the property were driven, with regular stops made to record avian diversity and habitat types by walking random transects. Coordinates were taken at localities of note, and attention was also paid to the biological condition and diversity within at least 500 meters on adjoining properties.

(i) BIRD SPECIES

On the site visit(s) the presence of bird species or the probability of their occurrence was assessed based on the habitat types recognized on and around the study site. This was done with due regard to the well-recorded general distributions of southern African birds at the quarter-degree grid cell (QDGC) scale (SABAP 1, Harrison et al. 1997) or the pentad (5' lat. x 5' long) scale (SABAP 2, on-going, Animal Demography Unit website www.safring2.org), coupled to the assessment and experience of the qualitative and quantitative nature of the habitats recognized on site by the specialist. Due to the mobility of most birds, the specialist also scanned at least 500 m of adjoining properties for important faunal habitats and avian species, and took note of the extent and proximity of other major areas of natural habitat and conservation potential within the normal flying distance of birds. The specialist also extended his assessment of the extent, qualities, and limits of the various habitat types, both on site and on adjacent properties, by study of satellite images from Google Earth. While the QDGC mapping of South African bird species provides the best current information of what birds to expect where, the roughly 26-23 km (west-east) x 27.3 km grid area usually far exceeds the area of most assessment sites and can only be expected to support regularly a subset of the QDGC species recorded, depending on the subset of possible QDGC habitats available on the site. Furthermore, the bird species listed for each QDGC are only those recorded during the atlas survey period and not necessarily as comprehensive as they may appear, with biases neglecting cryptic species and less accessible grids.

(ii) RESULTS

The visit was made in midsummer, after Palaearctic and intra-African migrant bird species had arrived. The weather during the visit was after good early summer and recent rains had fallen, under mild clear to partly cloudy conditions, and with only a slight breeze.

(iii) REGIONAL BIRD HABITAT

The general habitat at the site as identified for bird distributions occurs within the Moist Woodland biome (Allan et al. in Harrison et al. 1997) and, more specifically, the proposed development sites along the valley in the Central Sandy Bushveld vegetation unit of the Central Bushveld within the Savanna Biome (SVcb of Mucina & Rutherford 2006). All but the relatively small areas at the existing and proposed development sites comprise mainly large- or small-tree to shrubby woodland at various densities, situated within extensive surrounding areas of the same or similar bushveld habitats. The aerial mobility of birds also demands attention to the principal habitats surrounding the study site and their conservation status, not just those along the immediate borders but also more distant habitats that might provide sources for species visiting the site and sinks for those breeding on site. In this context, the Marakele National Park and Welgevonden Game Reserve to the north are important sources, but the mosaic of other small private conservation areas throughout the Waterberg to the north and Springbok Flats to the south are also relevant to avian megapopulations throughout the general area.

(iv) ON SITE BIRD HABITAT ASSESSMENT

The principal habitat throughout the property is various forms of woodland and/or bushveld. The only obviously different habitat is the Rookpoort Dam, significant as an attractant to birds because of its relatively large size as a water body within the greater area. For the purposes of this assessment, the roads/tracks and associated bare areas, and the existing buildings, are also discussed separately because they are listed as part of the developments that require assessment. From the perspective of flighted avian species, the relatively small extent and wide scatter of each of the individual developments, existing and proposed, are not considered relevant to interrupt the local movements and/or wider distributions of the bird species present.

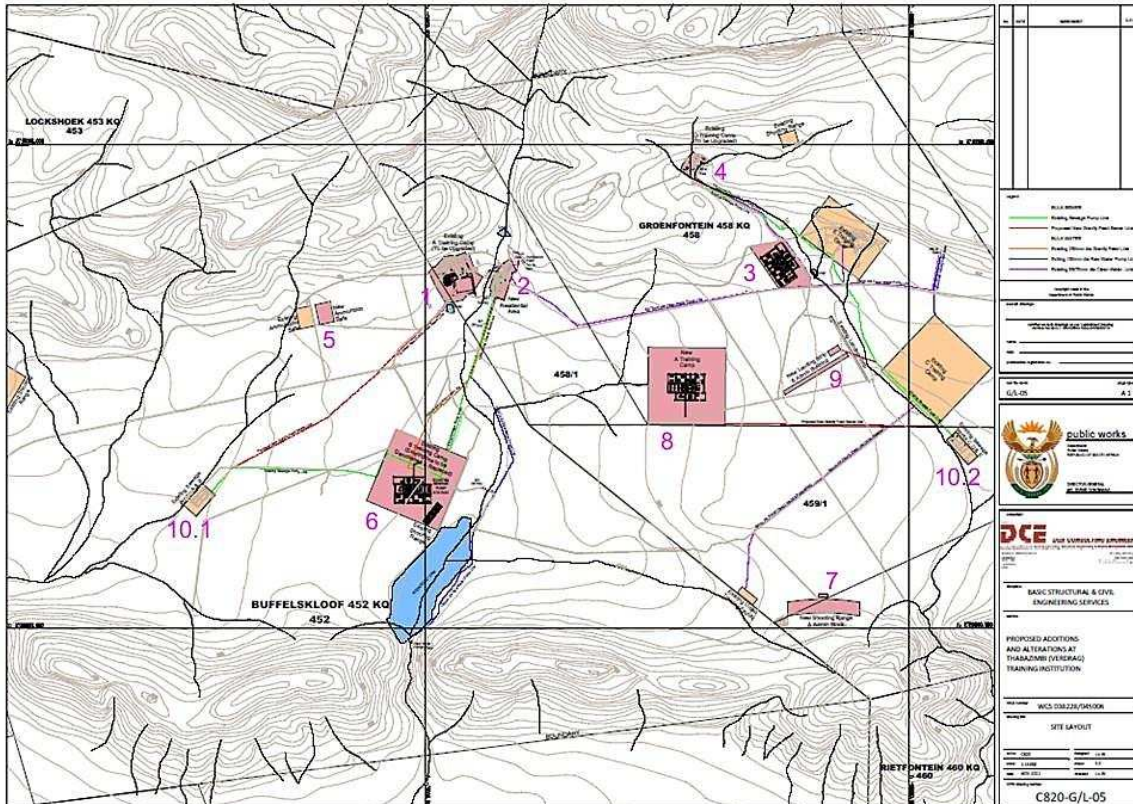


Figure 34: Location of the sites and numerical reference included in the specialist report

SAVANNA WOODLAND/BUSHVELD

1a) Taller and denser woodland, Sites 1, 2, 4, 7. This habitat was found mostly along the base of the hills and especially along the banks of the drainage lines, including up into the valleys and gorges of the mountains. Some of the larger trees included *Acacia*, *Burkea*, *Celtis*, *Euphorbia*, *Faurea*, *Ficus*, *Lannea*, *Peltophorum* and *Zizyphus*. Ground cover is generally shaded and sparse, but taller and coarser on the more exposed rocky slopes. Several species that occur on the rocks and cliffs among the tall trees are actually more dependent on this substrate than on the wooded cover. Some open marshy patches with tall dense grasses and sedges occurred alongside the seasonal drainage lines and seeps, with open grassy areas under or between the trees retained on the development sites, but sometimes encroached by *Dicrostachys* shrubs (Photos 1-3).

LOWER, DENSER WOODLAND

1b) Sites 5, 6, 10.1.1, 10.1.2. Smaller, more densely-packed trees with coarse grass cover wherever sunlight penetrates in less dense area, mainly on degraded patches in the western half of the valley. Obvious tree species include *Burkea*, *Combretum*, *Dombeya*, *Terminalia* and *Searsia*, with various shrubs including *Grewia* and, especially in previously disturbed areas, *Terminalia sericea* and/or *Dicrostachys cinerea* encroachment. Most openings are formed by eroded sheet washes alongside drainage lines, except for old fields or gravel pits near the D926 gravel road

LOW, SHRUBBY BUSHVELD

1c) Sites 3, 8, 9, 10.2. Generally smaller trees with more open areas, some of this apparently due to shallower, more-gravelly soils (as revealed by bare areas at washes and/or erosion areas), but also due to past effects of unsuitable veld management and transformation on the farm Buffelspoort 459 KQ. Some stands of larger trees along watercourses, notably *Spirostachys*, but the rest mostly *Acacia*, *Dombeya*, *Euclea*, *Lannea*, *Mundulea* and *Searsia* species, with *Dicrostachys cinerea* shrubs encroaching in degraded areas and small

Terminalia sericea trees in others. The shallower soils across the property, but especially in the south-eastern sector, seem especially prone to erosion, some of it as sheets on natural or on previously degraded areas, but most obvious as ditches along some of the unmaintained roads/tracks (

ROOKPOORT DAM AND SMALLER DAMS/POOLS

2) This large dam, supported by some of the smaller permanent small dams/pools, is attractive to birds because of its large size, especially within an area of mainly small farms dams and few permanent natural water bodies due to the permeable sandy soils. It is fed by streams and springs from the Sandrivier range, most of which are seasonal, and the exit stream is also small, so associated riverine systems are minor attractants. Although well-stocked with fish, the dam is deep with rocky margins and few perching sites, the only shallow and muddy margins restricted to its upper reaches where the main reed beds, lily pads and associated wetland vegetation occur.

ROADS AND BARE DEGRADED/ERODED AREAS

3) Sites 11 and others. This is not really a separate or important avian habitat, but is one of the site-categories requested for assessment. Degraded bare and eroded areas are included with the roads as all are prone to the same problems of erosion and management requirements



Figure 35: View south along the road leading to Site 7, just past the urban training facility, showing the eroded road from lack of drainage to reduce velocity of rainwater runoff, even though the road has been surfaced



Figure 36: Gravel borrow pit near the urban training facility, showing the bare surface exposed to erosion, but the positive

benefit of the water that has gathered as a temporary source for wild animals is also relevant, and may be enhanced by adding a clay lining during rehabilitation.

BUILDINGS AND OTHER MANMADE STRUCTURES

4) These structures are used as nest sites by some commensal species (e.g. House Sparrow, Common Myna), but mostly by others that would otherwise nest on or under ledges on the surrounding cliffs and erosion dongas (e.g. smallows, swifts, chats)

Otherwise, the broader habitats adjacent to the study sites are mainly extensions of those present on site, apparently even further than the 500-m buffer examined on satellite images. Just further east along the valley much of the bushveld has been cleared as grazing fields, with small dams obvious along the watercourses, while to the west *Acacia*-dominated savanna begins on the drier, flatter sandy terrain. The different neighbouring habitats support birds not expected regularly on the property habitats, but the latter extend for some distance north into the Waterberg and south of the Meletse hills.

Table 24: Ratings of recognised avian habitats on and around (site + 500 m buffer)

Avian Habitats	Conservation Priority					Sensitivity	
	High	Medium-high	Medium	Medium-low	Low	High	Low
1a) Taller, denser woodlands	X					X	
1b) Low, dense woodlands		X				X	
1c) Low, shrubby woodlands			X				X
2) Drainage lines and Rookpoort Dam		X				X	
3) Roads, bare degraded areas				X			X

(v) EXPECTED AND OBSERVED BIRD SPECIES DIVERSITY

At least 281 bird species can be expected for the site, based on the 2427DA and 2427DB QDGCs. The specialist assessed that even more, 324 bird species, have a high, medium or low probability to occur on site, based on the diverse and rich habitats available, excluding some from the lists that occur mainly on the more extensive secondary grasslands to the east and the drier Western Sandy Bushveld to the west. Of the 281 species reported the specialist confirmed the presence of 107 species (38%), including 20 species not seen during the site visit but reported by Warrant Officer H. Kruger, which offers a good sample in support of general species: habitat correlations. The specialist scored 171 out of the 324 species (53%) as having a highly probability of occurrence, 81 species (25%) a medium probability and 72 species (22%) a low probability, and of these the specialist confirmed (or had reported) the presence of 99, 5 and 3 (all reported) species, respectively. **Refer to the full report** for the list of bird species diversity observed (reported) or expected on and around the SAPS Operational and Tactical Academy, Thabazimbi

(vi) THREATENED AND RED-LISTED BIRD SPECIES

Thirteen species of international and/or national conservation concern (Birdlife International's IUCN Red Data species 2012; Barnes 2000), ranging from Near Threatened to Vulnerable, were considered as possible to occur on site, although none was recorded during the November 2012 assessment. Most of these threatened species fall into a few obvious categories by habitat preference (Table 25) and their likelihood of occurrence on the SAPS property (Table 26).

Table 25: List of threatened species that will possibly make use of the habitats on and around the SAPS Operational and Tactical Academy, Thabazimbi, Limpopo, showing their preferred habitat types. Note, one species may have more than one habitat preference for different purposes (e.g. feeding vs. nesting).

Threatened Status	Species	Preferred Habitat Type(s)		
		Savanna woodland and/or bushveld	Dams and other water bodies	Roads, bare areas and manmade structures
Near Threatened	Half-collared Kingfisher		X	
	Greater Painted-snipe		X	
	Lanner Falcon	X	X	
	Peregrine Falcon	X	X	
	Black Stork		X	
	Woolly-necked Stork		X	

	Red-billed Oxpecker	X		
Vulnerable	Southern Ground-hornbill	X		
	Blue Crane		X	
	Corn Crake	X		
	Cape Vulture	X	X	X
	Martial Eagle	X	X	X
	Secretarybird	X		
TOTALS	13	8	9	2

Table 26: The expected frequency of occurrence of threatened bird species on and around the SAPS Operational and Tactical Academy, Thabazimbi, Limpopo, based on the quantity and quality of habitats available.

Threatened Status	Species	Expected frequency of occurrence on site			
		Regular resident	Frequent visitor	Erratic visitor	Infrequent vagrant
Near Threatened	Half-collared Kingfisher			X	
	Greater Painted-snipe				X
	Lanner Falcon		X		
	Peregrine Falcon		X		
	Black Stork		X		
	Woolly-necked Stork				X
	Red-billed Oxpecker		X		
Vulnerable	Southern Ground-hornbill				X
	Blue Crane				X
	Corn Crake			X	
	Cape Vulture	X			
	Martial Eagle		X		
	Secretarybird			X	
TOTALS	13	1	5	3	4

These analyses indicate that by far the most important habitats to conserve for threatened species are the natural savanna woodlands and bushveld (for 8 species), and the various water bodies, in particular the Rookpoort Dam (for 9 species). Eight of the threatened bird species (**Lanner Falcon, Peregrine Falcon, Black Stork, Woolly-necked Stork, Southern Ground-hornbill, Blue Crane, Cape Vulture, Martial Eagle, Secretarybird**) are large and/or wide-ranging birds, expected naturally to have low densities and large home ranges, so that the SAPS property can form only part of their home ranges. However, conservation of a mosaic of suitable habitats across the region seems the only option to retain these low-density species, within an ever expanding counter-mosaic of habitats transformed and/or degraded by human activities. The other smaller threatened species (**Half-collared Kingfisher, Greater Painted-snipe, Red-billed Oxpecker, Corn Crake**) have more specialised, often patchy, habitat requirements that also need protection within the broader savanna biome. The recently Vulnerable **Southern Ground-hornbill**, despite being technically extirpated from the bushveld, is only included in the list because birds from a nearby reintroduction project at Macula did visit the SAPS property during their wanderings, suggesting that the property still has the potential to be included as a safe and suitable habitat.

Only one threatened species, the Vulnerable and near endemic **Cape Vulture**, is expected to be a regular resident on or above the property, mainly due to the proximity of one of its largest breeding colonies at Kransberg in the Marakele National Park. Birds will pass regularly over the area in search of carrion, some of which might come from game mammals that die on the property, and so this poison-free environment adds to the patches of such important safe habitat within the extensive foraging range of the colony.

Five species are expected to be frequent visitors. The Near Threatened **Lanner** and **Peregrine Falcons** are expected to nest on cliff ledges in the surrounding mountains and hunt for birds and other prey over the valleys and flats below. The Vulnerable **Martial Eagle** is also expected to nest in the general area, most likely in a large tree in a secluded kloof or high on the foothills, and then soar over a territory of at least 150 km² of flatter habitats below in search of its varied animal prey. The Near Threatened **Black Stork** builds its stick nest on high cliffs and then glides down to rivers, dams and pools below in search of its aquatic animal prey. The fifth species, the Near Threatened **Red-billed Oxpecker**, is expected to use the larger game mammals on the property as its typical symbiotic hosts, for food, and the extensive woodland available would also provide suitable natural nest holes in trees.

The remaining seven threatened species are only expected on the property as erratic visitors or infrequent vagrants. The Near Threatened **Half-collared Kingfisher** will occur along permanent clear-water streams with marginal plants for perches, most probably in the valleys of the mountains, but are expected as erratic visitors in summer to similar seasonal habitats, as on the SAPS property, during any local movements. The Vulnerable **Corn Crane** is included primarily because it is threatened in its Eurasian breeding range during the austral summer, but it is only expected on the property as an erratic visitor during the boreal summer, visiting the patches of dense, often moist, weeds and grasses that comprise its preferred habitat. The **Secretary bird**, recently raised to Vulnerable, is only expected as an erratic visitor to the property because of the limited extent of the open and lightly wooded savanna that it prefers, found mainly in the eastern sector of the property, although it is probably a resident breeder on the secondary grasslands higher up in and east of the valley.

The four infrequent vagrants are included based more on the Precautionary Principle than for any particular role expected from the habitats on the SAPS property in their conservation, as indicated for the **Southern Ground-hornbill** above. The Near Threatened **Greater Painted-snipe** is included since the grassy seasonal pools that it prefers may occur on site from time to time in summer, although the permeable sandy soils on the property mean that such sites are few, apart from at some old excavations. The Near Threatened **Woolly-necked Stork** is only included because one once visited the Rookpoort Dam, but would otherwise have been expected only as an unlikely rare vagrant from the moister eastern habitats of the country. The Vulnerable **Blue Crane** is included because a few pairs are known to reside on grassland areas in the Waterberg, mainly to the north and east, and may visit the property in passing, maybe even roosting en route at the Rookpoort Dam, although the property does not really support its preferred grassland habitats.

By constraining developments to the smallest possible areas, minimising transformation of savanna and drainage lines, and optimising management of facilities and access routes, minimum environmental impact and maximum mitigation will be achieved.



Figure 37: Threatened and red listed species on site, top left the Red billed Oxpecker, top right the Cape Vulture and bottom the Peregrine Falcon

(vii) ECOLOGICAL IMPORTANCE OF THE STUDY SITE

The SAPS property supports mainly natural savanna woodland and bushveld, with only small patches of development for the necessary facilities and narrow servitudes for roads, communications, water and sewage. The extent of these patches individually is small, relative to the 9000 ha of the property and, additionally, the patches are widely and fairly evenly scattered throughout the natural habitats, which are also extensive on the surrounding properties. Such an extensive area of natural habitat forms an important conservation unit, especially for the low-density, often large bird species that are especially vulnerable to human encroachment. The Rookpoort Dame, a large water body in the area, is also an important attractant and/or staging habitat for water birds.

(viii) GENERAL IMPACTS ASSOCIATED WITH THE PROPOSED DEVELOPMENTS AND UPGRADES

Loss and degradation of natural habitat: Given the inherent mobility of birds, the individual size of each of the proposed developments is small and, within the relatively homogeneous and extensive natural habitats, of low conservation impact

Loss of conservation-significant taxa and/or changes in community structure: The small footprint of the proposed developments suggests low probabilities for negative conservation effects and no significant losses or reductions in species numbers. To some extent, the developments may enhance locally the survival of some resident species, such as by the novel food scraps, water and irrigated garden habitats available, especially during the dry winters when food is limiting and/or the rest of the savanna is experiencing drought

Increased habitat fragmentation & loss of connectivity: The assumption in this assessment is that, given the relatively small extent of the individual developments, there will be no significant fragmentation to or loss of connectivity between habitats. The only exception to this might be where a linear riparian habitat is disrupted by a development, although even here the presence of similar natural woodland around the disruption will minimise its impact.

Increased anthropogenic encroachment : The proposed developments will extend the extent of anthropogenic encroachment into the natural habitats, but only as small patches linked by narrow servitudes, similar to earlier farming encroachments but without the negative presence and grazing pressures of alien livestock or the clearing of vegetation for crop- or grazing-land.

(ix) Recommended mitigation measures

The mitigations can as well be applied to the existing developments as well as to the proposed developments, in a bid to move towards a common ecological management plan for the whole property.

Watercourses and associated water bodies: The main current and proposed disruption to watercourses occurs between Sites 1 & 2 (existing training camp A and its residential developments) and at Site 4 (existing training camp D and its upgrades). As delimited by the botanist, removal of existing and exclusion of proposed developments from the sensitive drainage lines is the ideal solution, with adequate buffer zones on both side to allow unhindered flooding and alluvial deposition. Elsewhere on the property, all road crossings or other breaches of watercourses should be inspected for signs that they constrict the watercourse and its riparian habitat, and/or cause unnatural erosion patterns;

Woodland and bushveld savannah: This habitat is less sensitive than the drainage ones mainly because of its dominant extent across the property, but it occurs with subtle local differences in tree height, density and diversity, plus in degradations induced by such past transformations as removal of large trees, partial clearing and/or bush encroachment. The primary mitigation in development of this habitat is to remove as few trees as possible during all developments. The suggestion by the botanist to move the new shooting range further out into the valley and away from the larger trees along the foothills, if feasible, is therefore also supported from an avian perspective. The possibility of placing the new ammunition safe, south rather than east of the existing safe, in much less dense woodland, should also be explored.

Roads and other bare areas. The bare roads and excavation areas are habitats used by only a few bird species but, in their current form, they present some of the most obvious negative effects of habitat management on the property. Almost all the roads seem to have been placed as more or less straight lines along previous farm boundaries and/or fence lines, with no regard for such ecological planning principles as use of natural contours (being positioned on ridge tops rather than slopes, or curved across and not down contours) or control of runoff (lack of designs to reduce water velocity such barrier ridges or lateral drains to curtail and direct runoff). This has led to mild to severe ditch, donga or sheet erosion in various places, even where the road had been secondarily resurfaced, and also constriction or redirection of natural drainage lines. A property-wide road plan should address these issues, maybe with the help of a transport engineer. Construction of new roads is to be avoided, the new damage to woodland and bushveld out-weighing ecological advantages, so the plan should rather look at closing and rehabilitating any unnecessary roads, and then re-engineering and improving drainage control on the existing routes. Encouragement of grasses on the roads, or at least their verges, and on other such bare areas as borrow pits, should also be considered.

5.1.7 GEOHYDROLOGY

WSM Leshika was commissioned to conduct a Hydrogeological Evaluation on the properties under consideration. Herewith extracts from the report refet to **Appendix 15** for full report.

(i) PHYSIOGRAPHY AND DRAINAGE

The site is located mainly in the A24G quaternary catchment with a small portion in the upper A24H catchment and covers the middle upper reaches of tributaries of the Sand River, which eventually drains into the Crocodile River. The area can be described as hilly along the southern slopes of the Sandrivier berge in the north with a flattish central valley and a lone of ridges forming the southern boundary. The relief varies between 1800 metres above mean sea level along the Sandriviersberge in the north to about 1080 on the western boundary where a tributary of the Sand River exits the property.

(ii) EXISTING BOREHOLE DATA

Six existing boreholes were said to exist on site. Yields have been estimated by considering the pump head gear and discharge pipe sizes. It is recommended that these boreholes be tested to determine their sustainable yields.

(iii) AQUIFERS

The main aquifers in the area are thought to be fractured and weathered aquifers in the Alma formation rocks and along the sill and dyke contact zones. The dykes often form groundwater barriers.

(iv) AQUIFER STORAGE

The aquifer storage is difficult to determine. As the predominant aquifer type is known to be a fractured and weathered aquifer, the storage is estimated from Vegters Maps to be very low or less than 0.001

(v) GROUNDWATER LEVELS AND FLOW

Although no water levels could be measured water levels in the area are expected to be less than 15 metres below ground level. Groundwater flow is thought to follow a subdued form of the surface topography, i.e flow in a southerly and westerly direction towards the Sand River.

(vi) RECHARGE AND ESTIMATED SUSTAINABLE ABSTRACTION POTENTIAL

Recharge can be described as the replenishment from rainfall to the aquifers. Information from the Groundwater Resources Assessment Study (GRA II) gives average annual recharge as about 8mm with about 4mm contributing to the base flow in the rivers. Taking drought periods into account the sustainable volume of groundwater that can be abstracted is estimated to be 210 000m³/annum or 580m³/day.

(vii) WATER QUALITY

The groundwater quality is expected to be good (Class 0-1) with slightly elevated iron content. No samples were available for analysis at the time of the site visit as the boreholes were not pumping. It is recommended that samples be taken to confirm the water quality and also to check if any contamination is present. It is recommended that samples be analysed for macro elements, hydrocarbons and bacteria.

(viii) IMPACT ASSESSMENT

It is anticipated that the following activities could impact on the groundwater resource:

- ✚ Abstraction of water: Only a portion of the facility is supplied with water from the groundwater resources. With the envisaged additions and alterations water supply is envisaged to come solely from the Rookpoort dam. Groundwater will only be used as a backup source. Thus groundwater abstraction will have an insignificant impact on the groundwater resource;
- ✚ Sewerage system: The existing sewerage system discharges sewerage into 2 different oxidation ponds which are poorly operated and maintained. Although the volumes appear to be small there is a small risk of contamination of the groundwater. It is recommended that during the upgrading the sewerage system be replaced with properly designed treatment works. It would also be preferable if all the sewerage can be treated in one plant. The existing oxidation ponds will then need to be closed and rehabilitated.
- ✚ NOTE: The report makes mention of a proposed fuel depot. It has since been confirmed to ILA that a fuel depot is not proposed as part of the upgrade and therefore this activity is not being applied for. The current fuel storage on site to ILA's knowledge falls below the threshold of the listed activities.

(xi) MANAGEMENT AND MONITORING

It is advised that a proper management and monitoring programme be implemented to ensure that groundwater resources are protected.

These should include:

- Measuring volumes of groundwater pumped;
- Measuring water levels at least quarterly;
- Take water samples from all production boreholes and analyse for microbiological and macro elements at least twice annually.

(xii) CONCLUSION AND RECOMMENDATIONS

From the evaluation the following conclusions are made:

- existing boreholes were found on site;
- Groundwater occurs mainly in fractured and weathered clastic sediments;
- Water table is relatively shallow with a southerly and westerly flow direction towards the Sand River;
- Storage capacity is expected to be low ≤ 0.001 ;
- Average annual recharge is estimated to be 8mm of which 4mm contributes to the base flow of the rivers;
- Existing groundwater quality is expected to be good – Class 0-1;
- The aquifer is not at risk of over abstraction as the water supply is proposed to come from the Rookpoort Dam with groundwater as backup;
- There is a small risk of pollution of the groundwater from the existing oxidation ponds and it is recommended that when the sewerage system is refurbished consideration should be given to establishing a proper sewerage works;

5.1.8 GEOTECHNICAL CONDITIONS

(i) REGIONAL GEOLOGY

The following information is extracted from the Reconnaissance Report compiled by Soilkraft CC (Refer to **Appendix 16** of the town planning documents for the report).

According to the regional geological map the study area is located in a complex geological environment. A number of geological stratigraphies are indicated in the area and are listed below in chronological order:

- **Alma Formation:** The Alma Formation is the youngest material indicated on the site and belongs to the Nylstroom Subgroup, Waterberg Group. The Formation contains sedimentary materials including feldspathic greywacke, sandstone, grit, conglomerate, boulder conglomerate. Arkose, micaceous sandstone and siltstone. The sedimentary materials most likely found their origin as alluvial fans, which explain the mixture in size of its constituents
- **Swaerhoek Formation:** The Swaerhoek Formation also belongs to the Nylstroom Subgroup, Waterberg Group. Like the Alma Formation, the Swaerhoek Formation comprises sedimentary materials including sub-greywacke sandstone, conglomerate, shale and siltstone. The origin of the Swaerhoek Formation is disputed with some authors maintaining a fan-delta deposition whilst others argue that there is evidence of material reworking on beachesReference 8.3. The basal intervals of the Swaerhoek are occasionally associated with the Bushveld Igneous Complex.
- **Diabase:** The regional geological map indicates a number of diabase dykes with a north west to south east strike within the Alma Formation and Swaerhoek Formation, though this is slightly contradictory seeing as the Waterberg Group sediments post-date the diabase. It is therefore likely that the Waterberg sediments have been deeply eroded at these locations until the underlying diabase materials have been exposed. The possibility also exists that this may be a misnomer as the two Formation of the Waterberg discussed above (the Swaerhoek Formation in particular) contain an array of erratically distributed lava intrusions.
- **Bushveld Igneous Complex Granite:** The Thabazimbi regional geological map does not discern between the different suites encountered in the Bushveld Igneous Complex, but only differentiates between bedrock materials. In this case, the regional map indicates a thin band of granitic materials of the Bushveld Igneous Complex near the southern border of the site. It is deduced that the granite belongs to the so-called main zone and consists of granophyritic, porphyritic, and pegmatitic granite. Judging from the regional setting, the material has possibly been displaced and is likely to be deformed.
- **Bushveld Igneous Complex Felsite:** A thin band of felsite is extrapolated near the southern border of the property. According to the regional information, the felsite locally contains tuff and agglomerate and occasionally occurs with quartz porphyry.
- **Chuniespoort Group:** Again, the dated Thabazimbi map does not differentiate between different dolomitic strata, apart from discerning the Black Reef Formation from the main dolomitic strata. From the description available, it can only be deduced that the dolomitic strata present south of the study area is associated with the Chuniespoort Group. Materials present in the area include dolomite, chert, shale and inter-bedded quartzite.

(i) GROUNDWATER

- **Perched Water:** Seepage water was encountered infrequently in a few of the trial holes excavated.
- **Permanent Water:** Vegter indicates the probability of drilling successfully for water in the area to be between 40% and 60%. In addition, should water be encountered, the chances are between 20% and 30% that the yield of such a borehole will exceed 2l/s. Groundwater in the area generally occurs in compact, dominantly arenaceous strata at depths between ten metres and twenty metres. The presence of the Rookpoort dam is likely to affect the state and saturation of local aquifers.

- (ii) **GEOTECHNICAL CONDITIONS** [Please refer to the attached report in **Appendix 16** for full specifications, the information extracted from the report below only indicates the conclusion]

Administration camp and residences

It is concluded that from a surface geotechnical investigation there are no fundamental flaws preventing the proposed upgrade of this camp. The geotechnical zones identified namely **S2** and **P** Seepage, are considered to be acceptable and can be addressed with engineering solutions.

Proposed new ammunition safe

As far as surface geotechnical properties go, there are no fundamental flaws excluding this area from contention for the proposed establishment of the new ammunition safe. The area is expected to be of **H/S1-S2/R** classification and therefore geotechnical aspects can be addressed with engineering solutions.

Proposed new alpha camp

It is concluded that there are no fundamental flaws excluding this proposed site from development, as far as surface geotechnical conditions are concerned. The site classification of **S1/R** suggests that engineering solutions can be applied to address prevailing conditions. In addition perched water may also have to be addressed.

Proposed upgrade of the existing bravo camp

It is concluded that from a surface geotechnical investigation there are no fundamental flaws preventing the proposed upgrade of this camp. The geotechnical zoning (i.e. **S1-S2/R**) is considered to be acceptable and can be addressed with engineering solutions. Particular attention must be paid during future investigations in this area to the possible occurrence, distribution and residual products of diabase intrusions. Residual materials of diabase are notorious for being expansive in a moist to semi-humid climate.

Delta camp

Once more it is concluded that there are no fundamental flaws disqualifying Delta camp from further development. Two factors must be kept in mind:

- The potential flood lines must be assessed to ensure that no structures fall within the 1:100 year flood lines. This applies to both non-perennial streams in/adjacent to the site;
- Should medium or heavy structures be constructed, the impact on the slope stability of the site must be evaluated. Any deep excavation made for large construction projects must be preceded by a comprehensive investigation regarding the soil profile's shear properties.

Proposed new echo camp

As with the other camps discussed up to this point, there are no fundamental issues which rule this site out of contention for the proposed establishment of the new Echo camp. With the awarded classification of **S-S1/R**, the largest issue in this camp will be excavability and the sporadic outcrop of bedrock.

Proposed new air strip and administration building

Administration Building

It is concluded that from a surface geotechnical investigation there are no fundamental flaws limiting construction of the proposed new administration building. The area is classified as **S1**, and subsequently foundation precautions will be required. Provision must also be made to address conditions of perched water.

Landing Strip / Runway

No design parameters were supplied regarding the proposed new runway and as a result only very broad recommendations can be given in this regard. In situ materials proved to be of G5 and G6 COLTO quality, with one sample failing to achieve a COLTO rating. As such, in situ materials may be considered for layer work construction, but must be done so with adequate quality control.

Proposed new shooting range and administration building

Whilst there are no fundamental flaws prohibiting the proposed construction of the administration building or shooting range (not considering the outcome of a dolomite stability investigation), this area in particular will require intense further investigation, depending on the proposed shooting range. At present no design information is available, so it is not clear what the approach towards construction would be. Despite the above, general guidelines will be that soil slope stability investigation and possibly rock slope stability excavation will be required, should any earthworks or excavations be planned for this area. Such investigations should precede any earthworks that are to be undertaken.

(iii) CONCLUSION

From a surface geotechnical viewpoint there are no fundamental flaws or limitations that prevent the proposed upgrade of the Verdrag facility. A detailed geotechnical investigations needs to be undertaken to verify and refine the findings of the feasibility study prior to proceeding with construction

5.1.9 GEOTECHNICAL INVESTIGATION TO DETERMINE THE PRESENCE OF DOLOMITE

The Department of Public Works commissioned Messrs VGI Consult to investigate the subsurface profile at the Verdrag Facility to determine the presence/absence of dolomite. Refer to **Appendix 13** for a copy of the Report. The investigation involved field inspections, a review of available data, a borehole drilling programme, analysis and reporting. The Report concludes that dolomite is anticipated to be absent or located at very great depth below the area and unlike to impact negatively on the stability of the Verdrag site.

5.2 SOCIO ECONOMIC ENVIRONMENT

[Regulation 31(2)(d)]

5.2.1 DISTRICT CHARACTERISTICS

ECONOMIC CHARACTERISTICS AND DRIVERS

The sector that contributes most to the GDP of the Waterberg District is mining. However, the sector that employs the largest number of people is agriculture. With future developments set to take place in the Waterberg District, it is likely that current GDP and employment trends will change. In terms of the population, three local municipalities registered positive growth with Modimolle registering the biggest growth followed by Mogalakwena. Changes of municipal demarcations may have impacted on the growth trends observed.

POPULATION CHARACTERISTICS

The Waterberg District Municipality area has an estimated total population of 572 625. Most of the people in the District are distributed around Mogalakwena, Lephalale, as well as the Thabazimbi local municipality areas respectively. The education levels are relatively low within the Waterberg District. The working population tend to fall into two main brackets that earn between R1 to R400 and R6401 to R12 800 per month.

SITE SUITABILITY

The location of the subject property in a remote rural area with very limited development makes it ideal for the purposes of the SAPS Training Institute, which requires a secluded and private setting. The nature of the training facilities for the SAPS furthermore requires that the respective camps on the site must be situated well apart and in dense vegetation, in order to prevent visual contact between the camp areas. The site is therefore extremely desirable in terms of its size, locality and nature for purposes of the SAPS training facilities. As indicated in Section 3 of this Report none of the activities proposed are considered to be in conflict with the specifications and requirements of the Waterberg District EMF.

5.2.2 LOCAL PLANNING INITIATIVES

5.2.2.1 WATERBERG SPATIAL DEVELOPMENT FRAMEWORK

The purpose of a Spatial Development Framework is to provide general direction to decision-making and action over a multi-year period. Spatial Planning can be defined as being "a high level planning process that is inherently integrative and strategic, that takes into account a wide range of factors and concerns and addresses the uniquely spatial aspects of those concerned".

The Waterberg District Municipality's Spatial Development Framework acknowledges the competition that exists between mining, residential development and the environment. It further states that the local municipalities have a responsibility to demarcate an urban edge within the boundaries of which, the municipality will endeavour to upgrade the levels of servicing. Beyond the urban edge it is envisaged that the rural communities will enjoy lower density environments. The proposed development will be independent in as far as servicing is concerned and continuous monitoring in terms of the Environmental Management Plan will assure the upkeep of the environmental assets. The services reports that form part of the application proves that adequate and sustainable resource capacity is available.

5.2.3.2 MODIMOLLE LOCAL MUNICIPALITY INTEGRATED DEVELOPMENT PLAN, 2010/2011

The development of the training institute will adhere to the objectives of sustainability, efficiency and equitability, while at the same time having a minimum impact on the physical environment. The proposed development falls outside the Waterberg Biosphere and its buffer zones, and is situated to the west of the town Alma, which is identified as a Local Service point in the municipal area

5.2.2.3 ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF) FOR THE WATERBERG DISTRICT, 2010

[Portions of the text below has been extracted directly from the EMF]

The Environmental Management Framework (EMF) is an initiative of the National Department of Environmental Affairs (DEA) in partnership with the Limpopo Department of Economic Development, Environment and Tourism (LEDET), and the Waterberg District Municipality (WDM).

The EMF will support decision-making in the Waterberg District Municipality area in order to facilitate appropriate and sustainable development. The EMF integrates policies and frameworks and aligns government mandates to streamline decision-making and to improve cooperative governance. The EMF has a number of specific objectives, which include identifying the status quo, development pressures and trends in the area and development of a decision support system for development in the area to ensure that environmental attributes, issues and priorities are taken into account.

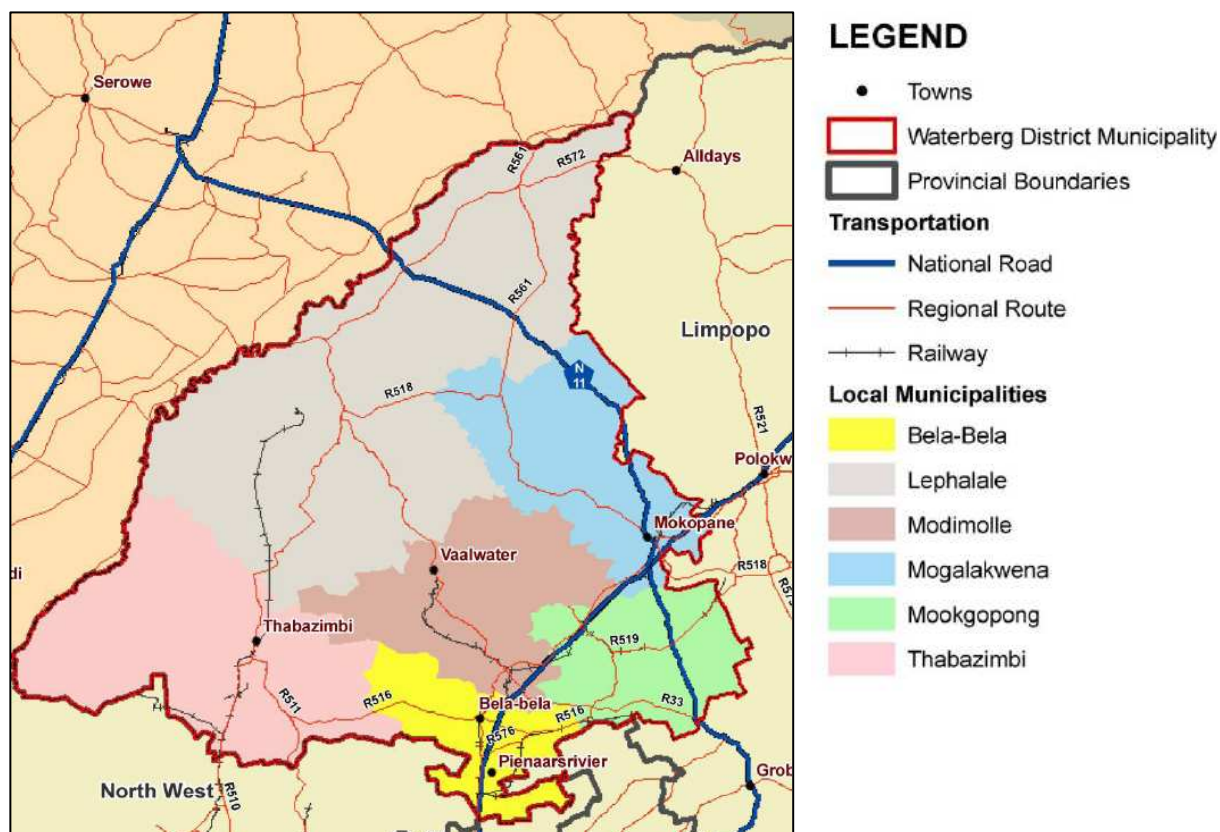


Figure 38: Locality Map Waterberg District

The requirements of the EMF have been considered and the development proposals' adherence thereto investigated. In the sections below specific requirements applicable to the affected area have been identified and the development proposals adherence thereto is highlighted.

(i) ENVIRONMENTAL MANAGEMENT ZONES

A sensitivity analysis together with the structural spatial elements (towns, villages, mineral resources, economic activities, etc.) was identified and provides the basis for the development of Environmental Management Zones classified by the EMF. Based on the findings contained in the draft Desired State Report, which formed part of the compilation of the EMF it was decided to do further analysis on the following aspects in order to refine a spatial base that would be relevant and accurate for the identification of Environmental Management Zones:

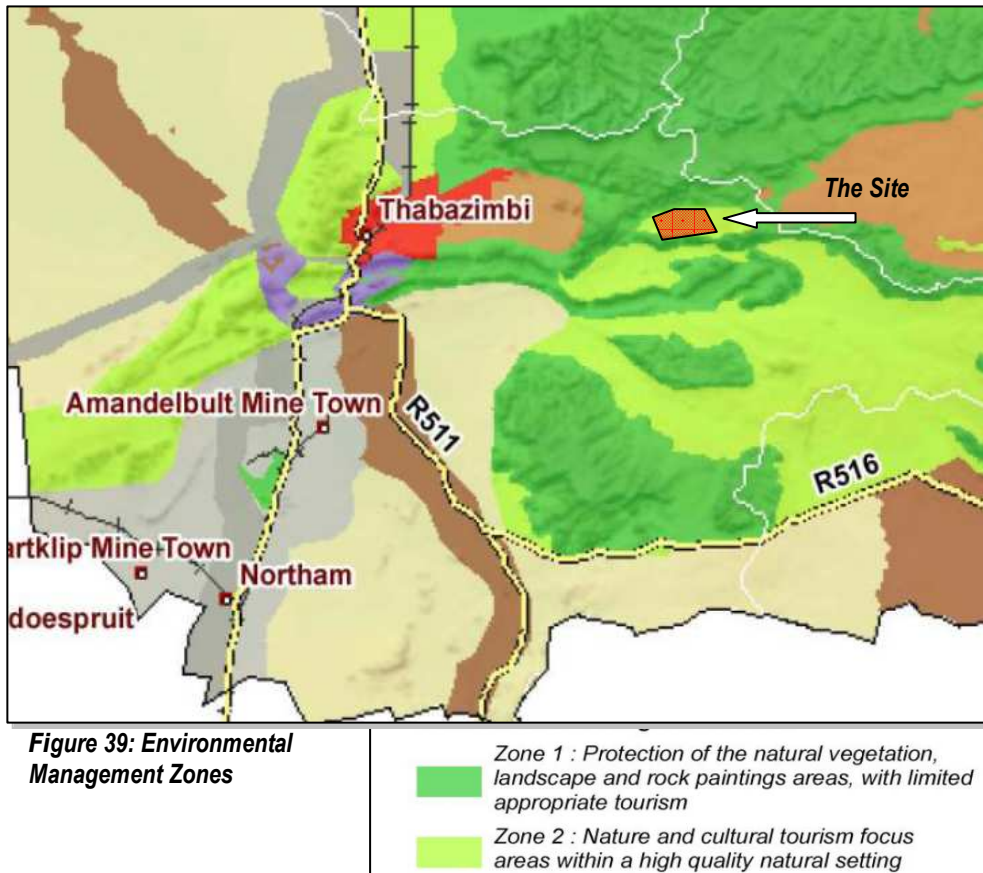
- General environmental sensitivity (ecological and landscape);
- Conservation planning (current protected areas and potential expansion areas);
- Water production priority areas; and
- Agricultural intensity (footprint).

The development area falls within the following zones:

ZONE 1: PROTECTION OF NATURAL VEGETATION, SCENIC LANDSCAPE AND ROCK PAINTING AREAS. WITH LIMITED APPROPRIATE TOURISM

The boundaries of the subject properties extend into this zone but none of the development activity with the exception of possibly the new shooting range is proposed in areas affected by this zone classification. It must be noted however that a shooting range contains very little hard footprint.

This zone represents areas with generally high natural, visual and cultural quality that provides the core natural and cultural resource base for the establishment of the Waterberg as a conservation destination. The protection of the area as a whole is important. Conservation is the priority land use in this zone and should be promoted as the core activity in every instance.



Service infrastructure should be limited to what is necessary but nonetheless be of a good quality.

The development proposal entails the maintenance and upgrade of existing infrastructure to ensure that it is sufficient and effective.

Preferred activities in this zone include the conservation of nature in protected areas in terms of the National Environmental Management: Protected Areas Act.

Compatible activities in this zone include amongst other limited tourism facilities that take place in a manner that:

- ✚ Limits disturbance to natural vegetation to the minimum possible after undertaking an environmental assessment as required in terms of GNR 546 **[in process]**;
- ✚ Does not consume additional natural resources **[limited supply required]**;
- ✚ Does not impact negatively on the sense of place of the area, being particularly sensitive to not breaking the skyline or impeding views **[low impact development, design guidelines have been provided in EMPr to limit visual impact]**;
- ✚ Recycles its waste products; and treats its sewerage before release into natural streams **[wastewater is not released into streams but treated through an Aerobic-Anaerobic stabilisation pond. The system proposed to replace the Aerobic-Anaerobic stabilisation pond in future will make purified effluent available for use as fire water and for irrigation purposes. Once the new systems become operational a water quality monitoring plan should be implemented]**

The Farms forming part of this application extend to a total of approximately 7,500 ha. With the exception of the small development areas scattered across these farms the greatest portion of the site is, for all intents and purposes, managed as a game reserve. There is thus a strong parallel between the site and a conventional nature reserve, with only a difference between tourist rest camps in the latter and training facilities in the former.

ZONE 2: NATURE AND CULTURAL TOURISM FOCUS AREAS WITH A HIGH QUALITY NATURAL SETTING

This zone represents areas with a generally high, natural, visual and cultural quality that has significant potential for the development of

nature and/or culture based tourism. It also forms the area from which the conservation use in Zone 1 can be explored.

Conservation is the secondary focus of this zone. As such conservation legislation should be observed and enforced. Conservation areas should be well maintained to encourage further tourism in this zone.

Preferred activities in this zone include:

- ✦ Conservation of nature in protected areas in terms of the National Environmental Management: Protected Areas Act;
- ✦ Limits disturbance to natural vegetation to the minimum possible after undertaking an environmental assessment as required in terms of GNR 546 [*in process*];
- ✦ Does not consume additional natural resources [*limited supply required*];
- ✦ Does not impact negatively on the sense of place of the area, being particularly sensitive to not breaking the skyline or impeding views [*low impact development, design guidelines have been provided in EMPr to limit visual impact*];
- ✦ Recycles its waste products; and treats its sewerage before release into natural streams [*wastewater is not released into streams but treated through an Aerobic-Anaerobic stabilisation pond. The system proposed to replace the Aerobic-Anaerobic stabilisation pond in future will make purified effluent available for use as fire water and for irrigation purposes. Once the new systems become operational a water quality monitoring plan should be implemented*]

The intended development will be restricted and the footprint of the development sites will be insignificant measured against the total size of the approximately 7500 hectares site. In most instances development and alterations will be on sites already developed and disturbed.

Wetlands are considered as sensitive, but no additional hard footprint will affect this habitat type with the exception of the replacement of broken pipelines and installation of infrastructure. The development will not result in a loss of ecologically sensitive and important habitat units, ecosystem functions, loss of mammal habitat nor of loss/displacement of threatened or protected species. Furthermore the feasibility of formally protecting the area in terms of the Protected Areas Act, Act 57 of 2003 should be considered by the Applicant.

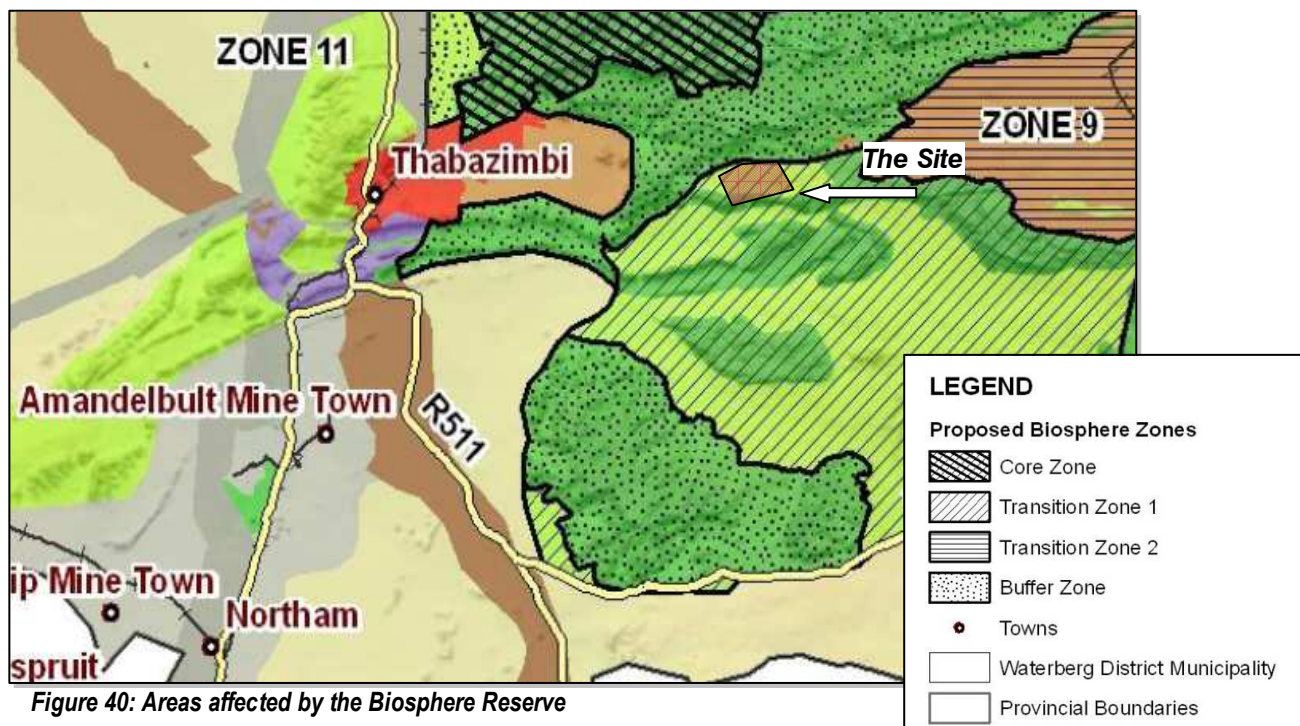
The development proposal is considered in line with the objectives of the Environmental Management Zones.

(ii) WATERBERG BIOSPHERE RESERVE

The Farm boundaries forming part of this application are situated within Transition Zone 1 of the identified Waterberg Biosphere Reserve Zones.

Transition Zone 1 allows for a higher level of tourism development but still retains the overall undisturbed natural character of this area.

The development proposal incorporates for the most part areas which are already transformed by limited development. Furthermore the land use is considered low impact due to the infrequency of visitors and as the infrastructure required is minimal as compared to for instance a higher density game lodge.



(iii) ENVIRONMENTAL MANAGEMENT GUIDELINES

In order to give guidance on certain important environmental issues, guidelines on the following issues have been included in the EMF:

- Solid waste management and recycling;
- Sewage disposal;
- Transformation of land;
- Duty of care and remediation of environmental damage;
- Compensative investment; and
- Stream flow management.

SEWERAGE DISPOSAL

The development makes use of an Aerobic-Anaerobic Stabilisation Pond system for treatment of wastewater. This system relies on evaporation and vegetation [reeds] for the removal of organic material. The current throughput is very little and up to date the facility has not required any removal of sludge. As per the Preliminary Design Report prepared by Messrs Dux Consulting Engineers maintenance on the ponds is required. A reed bed pond system acts as the secondary pond of the treatment plant and it is evident that it was not in use for quite some time and most of the reeds were destroyed due to a lack of water and animals feeding on the vegetation.

The embankments of the pond system need some maintenance as trees are growing on the embankment which can cause it to collapse once filled with water.

The wastewater treatment facility is being subject to a Waste Management License application which includes an Environmental Impact Assessment. Application is being made to register the existing facility and to apply for approval of the new waste water treatment facility which is being proposed [Refer Section 4]. and which will be phased in to replace the Aerobic-Anaerobic ponds in the future.

With the implementation of appropriate vegetation [which could act as an artificial wetland] and with the provision of a sufficient supply of water the operation of the system can be significantly improved to reduce impacts to the environment.

Alternative wastewater treatment facilities have been identified. The advantages and disadvantages associated with the current and alternative proposal have been investigated and are discussed in **Section 4.3**. The submerged media reactor system proposed for treatment of sewerage will be phased in to replace the existing ponds. The new system provides a solution to provide fire and irrigation water by means of the purified effluent. The new system requires low maintenance.

TRANSFORMATION OF LAND

The cumulative effect of the transformation of land in Zones 1, 2 and 9 will over time lead to the depreciation of the natural and production assets that occur in these areas. Given the importance of the resource base for the sustainable long term development of the area and fact that the EMF have provided for different zones for different types of activities, it is appropriate that transformation of land in Zones 1, 2 and 9 be limited to the extent possible.

- Properties in zones 1 and 2 should not be subdivided. Consolidation of properties should be encouraged whenever possible. *The development proposes consolidation of the farm portions.*
- Development in Zones 1, 2 and 9 should occur in carefully selected clusters that have minimum impact on the natural and scenic values of the area. *Development is largely proposed in areas already disturbed. The development footprint in undisturbed areas is very small.*
- Dispersed development in Zone 1, 2 and 9 should not be allowed. *The development clusters are scattered. However the footprints are small and for the most part the natural bushveld terrain has been retained and is being conserved and maintained;*
- Already disturbed areas in Zones 1 and 2 should be considered as the first option for development. *Development is largely proposed in areas already disturbed, the development footprint in undisturbed areas is very small.*
- Transformation of land should take the goals and targets of government as reflected in policies, legislation and other documents into account. Relevant legislation and documents include:
 - The National Environmental Management Act, 1998 (Act 107 of 1998) as amended (and its regulations);
 - The Limpopo Environmental Management Act, 2003 (Act 7 of 2003);
 - The National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) as amended (and its regulations);
 - The National Spatial Biodiversity Assessment, 2004 (and its technical support documents) ;
 - The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) as amended;
 - The National Forest Act, 1998 (Act 84 of 1998) as amended; and
 - The Municipal Systems Act, 2000 (Act 32 of 2000).

The development proposes consolidation of the Farm Portions. Development is largely proposed in areas already disturbed, the development footprint in undisturbed areas is very small and will be subject to the mitigation measures provided in the EMPr and those provided by the Fauna and Flora specialists.

DUTY OF CARE AND REMEDIATION OF ENVIRONMENTAL DAMAGE

In performing their compliance and monitoring and enforcement duties, the relevant national and provincial officials should ensure that any activities that are inconsistent with the objectives of an Environmental Management Zone, trigger the duty of care mechanism in NEMA.

None of the activities proposed are considered to be in conflict with the specifications and requirements of Zones 1 and 2.

(iv) SUSTAINABLE DEVELOPMENT CONTEXT

There are many definitions of sustainable development which may apply to a greater or lesser extent to the district. What is however important in this particular instance is that it should be focussed on all of the following, failing which the concept itself will in all likelihood not be sustainable in the district:

- It must ensure the adequate and appropriate protection of biodiversity in the district.
- It must ensure that the surface water resource in the area is managed in a manner that will ensure that it continues to provide in the needs of the area and that the water that is returned to the system is of an acceptable quality.
- It must ensure that the quantity and quality of the groundwater in the area is protected and kept at a level and quality where it can continue to sustain the activities that depend on it, especially rural communities
- It must ensure a continued and even increased income for the district and especially its poor communities.
- It must provide for increased levels of employment and better types of employment.
- It must provide incentives for the establishment of a more balanced population structure especially in respect to the age, health and general prosperity of the population.

The development proposal is considered as a low impact activity with limited disturbance to the natural environment. With an expansion of the facilities additional permanent jobs will be created. During the construction phase several temporary jobs will also become available. Maintenance to existing infrastructure will limit impacts to the environment and waste of natural resources.

5.3 HERITAGE IMPACT ASSESSMENT

Heritage specialist, Dr Johnny van Schalkwyk Heritage was commissioned to conduct a heritage impact assessment refer **Appendix 17** for a full copy of the Report. Herewith extracts from the Report.

The cultural landscape qualities of the region essentially consist of one component. The first is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component.

The following sites and features have been identified:

- ✚ Old farmstead dating to the beginning of the 20th century. According to the SAPS staff this is the old farmhouse and is still in use by them and was somewhat upgraded a few years ago. This structure is located in the new residential area. If the structure is to be demolished it should be documented in full, after which a permit for its demolishing can be obtained from SAHRA. [Refer **Point 1** in the locality map below] **The structure will not be demolished.**

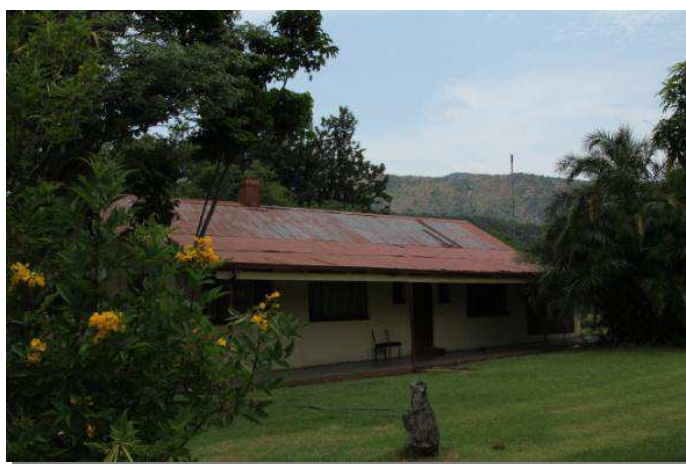


Figure 41: The Old Farmstead

- ✚ Remains of the old Groenfontein farmstead. This structure is located just east of the area of proposed new E Training camp. It is unlikely that there would be an impact on it. However, if there is to be an impact, the site should be documented in detail before the development takes place [Refer **Point 4** below]. **The structure is not affected by new development or any of the upgrades.**
- ✚ A small informal cemetery with approximately 10 graves. This site is located inside the existing A Training camp, which is to be upgraded. It is known to the SAPS authorities and is protected by a fence. It is recommended that it is kept in place and that the site is formalised and maintained. If this is not possible, the graves can be relocated after proper procedures have been followed and all the necessary permits are in place [Refer **Point 2** below]. **The cemetery will be conserved.**
- ✚ Memorial to a young police officer who drowned during a training exercise in 2004. This feature is located outside the area where development will take place and therefore there will be no impact. **No further action is required** [Refer **Point 3**].
- ✚ Based on current information regarding sites in the surrounding area, all sites known to occur in the study region are judged to have Grade III significance and therefore would not prevent the proposed development from continuing after the implementation of the proposed mitigation measures and its acceptance by SAHRA.

From a heritage point of view the proposed development can continue. However, if any archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

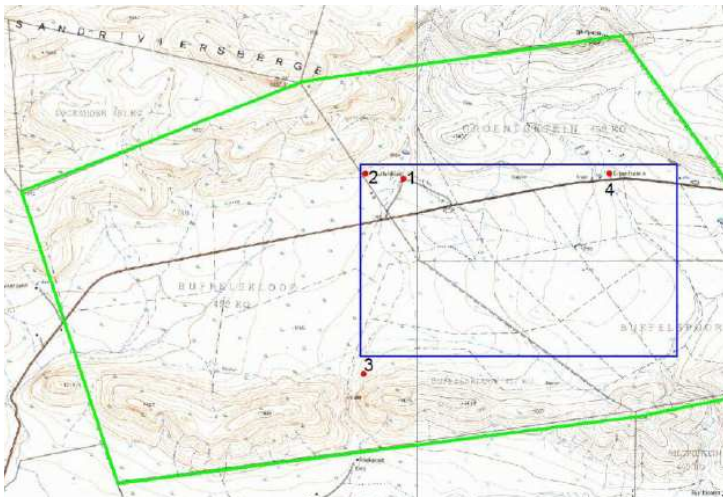


Figure 42: Study area showing location of identified sites



Figure 43: A view of the location of the farmstead remains

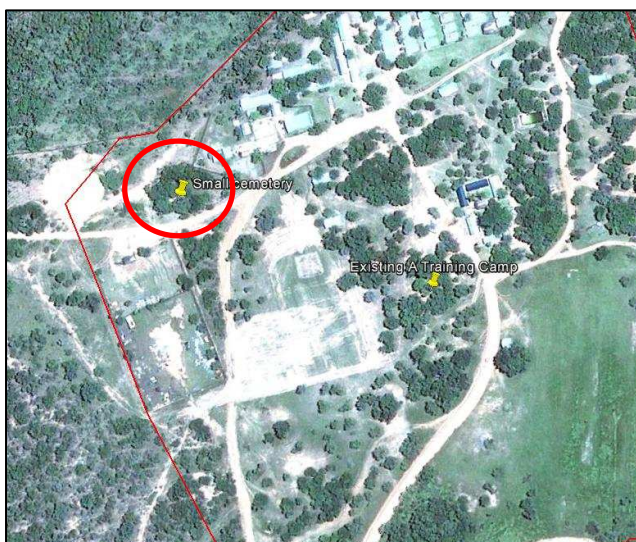


Figure 44: The location of the small cemetery is known to the SAPS personnel within the boundaries of the Administration Camp. The cemetery will not be affected by the upgrade and a conservation measures for the cemetery are included in the EMP

5.4 SECURITY AND SAFETY ISSUES

Preventing crime has become a key challenge to government in South Africa. A careful regard of the extent to which environmental design is being utilised to prevent crime is crucial if environmental design changes are to address the real problems.

According to A Manual for Crime Prevention through Planning and Design commissioned by the Department of Safety and Security and in partnership with them, developed by CSIR Building and Construction Technology; 'The notion that the physical environment can either increase or reduce opportunities for crime is not new. Internationally, it has been studied extensively over a number of decades. There is a general consensus that if the environment is planned, designed and managed appropriately, certain types of crimes can be reduced.

For a criminal event to occur, the following are required:

- a ready, willing and able offender;
- a vulnerable, attractive or provocative target/victim;
- a favourable environment; and
- the absence of willing, able and credible modulators.

The physical and social environment can either inhibit or enhance opportunities for crime.

Crime prevention through environmental design can be defined as the implementation of measures to reduce the causes of, and the opportunities for, criminal events and to address the fear of crime through the application of sound design and management principles to built environments.

Based on international studies and guided by local context, the following five principles have been identified which are crucial to establishing how the physical environment either reduces or increases the opportunities for crime:

- surveillance and visibility;
- territoriality;
- access and escape routes;
- image and aesthetics; and
- target hardening.

At a strategic level a number of planning approaches could be adopted to deal with some of the spatial problems that characterise South African cities and towns. These are:

- Addressing vacant land;
- 24-hour land use;
- Pedestrian use of infrastructure;
- Equitable use of infrastructure;
- Equitable provision of facilities; and
- Urban renewal.

A comprehensive strategy is required to ensure that vacant land is utilised in ways that will reduce the opportunities for crime. Flexible and integrated planning methods should be adopted by planners and local governments that accommodate changes in priorities and needs over time so as to allow land to be utilised for the purposes other than originally intended.

Illegal poaching of game is a major concern currently. The current land use on the application property reduces the risk of poaching on the application site however the majority of surrounding land uses involves game farming. It will be crucial to ensure that the construction activity associated with the upgrades at the SAPS facility does not contribute to an increase in illegal poaching. Mitigation measures have been included in the EMPr and must be adhered to at all times during the construction phase of the activity. The SAPS Training Facility will be required to take responsibility for the visitors accessing the facility during the operational phase too. The security of adjacent properties must not be compromised due to an increase in visitors to the facility. Security checks at the entrance gates must be in place to ensure all visitors are accounted for, movement of personnel, trainees, and visitors on site must be monitored.

The Verdrag training facility will be required to nominate and appoint a dedicated community liaison officer who will be responsible for regular communication with surrounding owners and for recording events of criminal activity with the assistance of surrounding land owners, in order to determine whether such activity is increasing during the construction phase. The contractor will also be required to keep a record of employees who must sign in and out for work each day. Construction workers will not be allowed to walk about the application site, they will be required to remain within the confines of the construction area boundaries. This will also be for individual safety to avoid accidents during police training activity. Construction workers may not leave the application site boundary without the approval of the foreman or contractor, and will be required to sign the register upon leaving the site and entering the site again. A penalty system should be considered for workers who do not adhere to this checking in and checking out system. Furthermore the Contractor will be required to provide transport. Workers should be collected at a central point in the mornings and transported to the application site and at the end of the day they must be transported back to the agreed central point [be it in Modimolle or Thabazimbi]. No workers may

be allowed to sleep on the site with the exception of 2 workers responsible for guarding equipment.

Security of the subject property and directly adjacent properties during the construction phase have been addressed in the Environmental Management Programme.

5.5 NOISE

The physical effect of noise, such as introducing an incompatible land use into a homogeneous environment, will usually devalue a property. Less radical changes in land use, such as the introduction of a housing project next to proposed housing developments of a similar nature would render the use of the surrounding residential area still functional for its purpose.

In terms of SABS 0103 and National Noise Regulations the following noise impact contours are perceived as being an increase in the noise levels;

- 🔊 2 dB: the average person may subjectively detect a change in the noise level
- 🔊 5 dB: the average community reaction will be little with sporadic complaints
- 🔊 7 dB: the noise is being defined as being disturbing
- 🔊 10 dB: the average person may perceive the increase as a subjective doubling of the noise level.

Due to the rural character of the area ambient noise levels are low.

During the construction phase, noise will be generated as a result of construction related activities. This impact is restricted to the period of construction.

Increased noise levels associated with the operation of the facility is related to the training activities such as the shooting activity and helicopter flying as well as increased traffic. However the application site is located in a valley bordered by mountains both to the north and south which acts as noise buffers for activity on the ground as the application site boundary extends high up onto the mountain slope. Land owners to the north and south will be exposed to limited noise from the ground. Aerial noise such as helicopter flights should be restricted to day light hours during week days as far as practically possible. The shooting range situated closest to the eastern boundary of the site [South of the P240/1] is at its closest point located approximately 1.6km from the eastern site boundary. This shooting range will be decommissioned once the new shooting range situated further west becomes operational. The new shooting range will at its closest point be situated approximately 3km from the eastern site boundary. It is located near the slope of the southern mountain which borders the property. Here the application site boundary extends to the top of the mountain. It is anticipated that noise impacts to neighbouring properties will be minimal. The road situated East of the existing C Training Camp, should also not be used for training activity but its use should be restricted to vehicle use by SAPS members for purposes of management and maintenance associated with the upkeep of the Farm only. The Dabchick Wildlife Reserve borders the application site along its Eastern boundary. The establishment relies on the rural character of the surrounds and the quite bush atmosphere for successful operation of its tourism facilities. The proposed training activities with associated road network are concentrated in the middle part of the application site [in the valley]. Sufficient open space buffers therefore remain along the site boundaries to restrict noise impacts emanating from the training activities. Traffic on the P240/1 road will increase with the expansion of the training facilities.

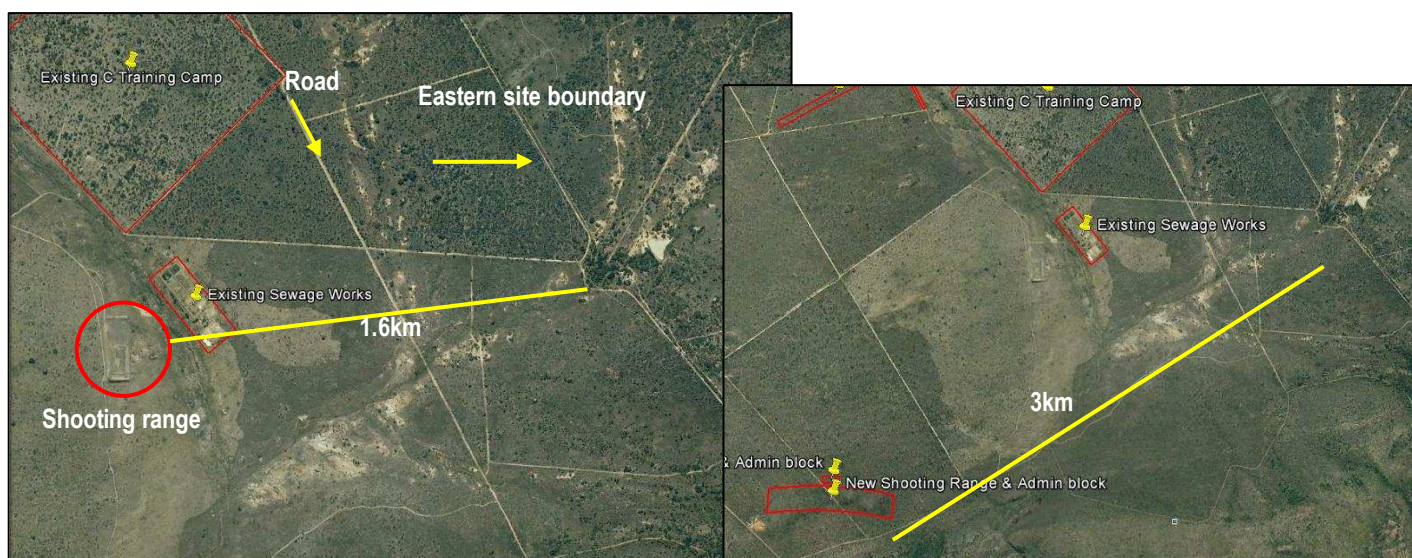


Figure 45: Location of the eastern site boundary south of the P240/1 road in relation to existing and new shooting ranges

With implementation of the EMP measures noise impacts to adjacent properties can be sufficiently mitigated and controlled.

5.6 VISUAL IMPACT

(i) LANDSCAPE CHARACTERISTICS AND VISUAL SCREENING

The application property is mostly natural bush with a few small pockets of development. The man-made elements on the site are minimal. The Rookpoort dam is the most dominant feature and contributes to the aesthetic quality of the terrain. With the exception of the old borrow pits, areas affected by erosion and the limited development pockets and dirt tracks, past and present human interference has not impacted negatively on the overall condition of the site. A degree of visual screening is provided on the application property due to vegetation cover and site topography. The property slopes from the north east downwards toward the south west, with a large part of the property situated within this valley.

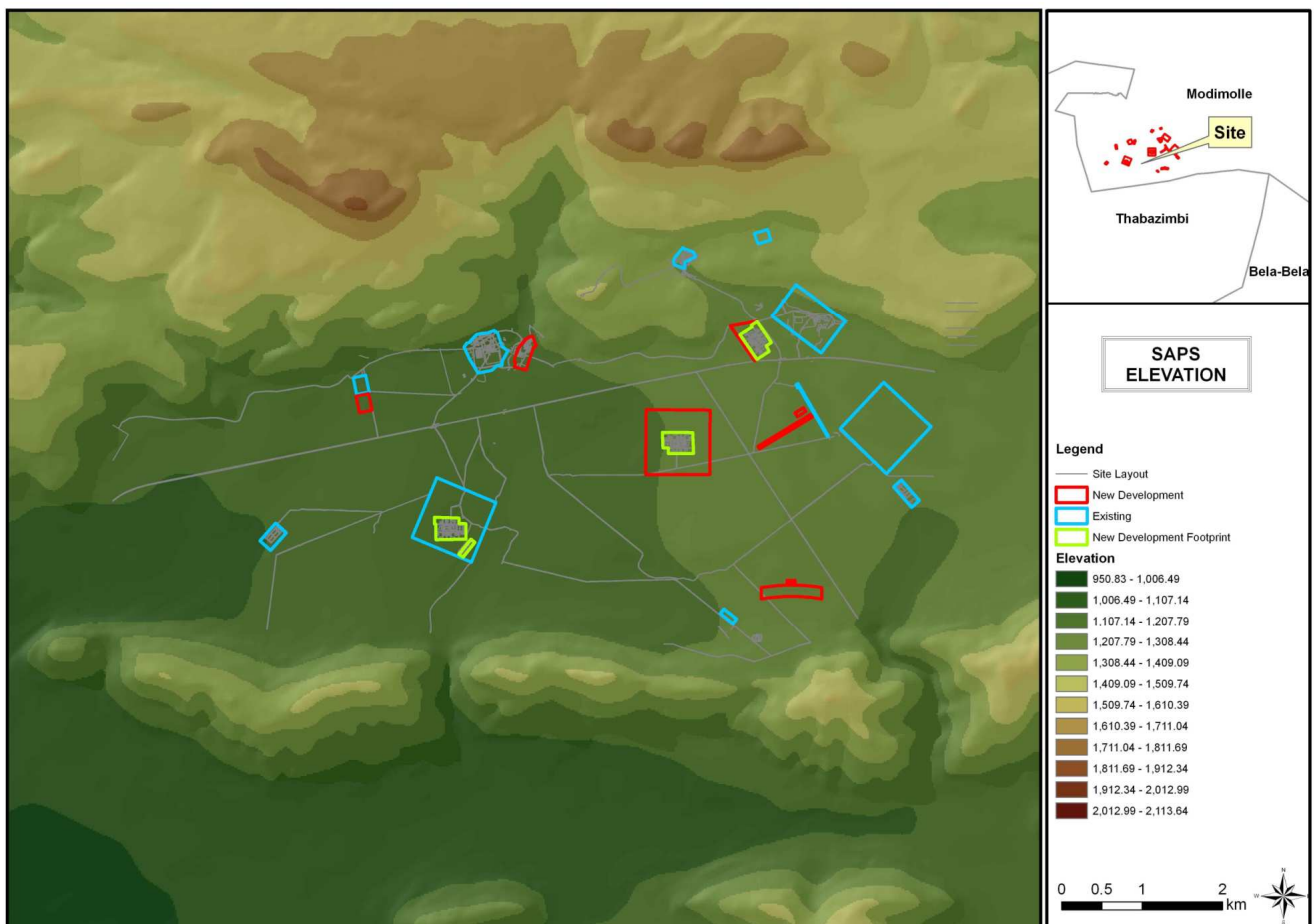


Figure 46 : Elevation map indicating slope toward the South West

(ii) PROJECT COMPATIBILITY

It is important to establish whether the proposed development is compatible with surrounding land uses and activities and ultimately the landscape character. Farming activities and low key eco tourism land uses are mainly functioning in the immediate surrounding area. The site characteristics provide the required setting for the training. The location of the subject property in a remote rural area with very limited development makes it ideal for the purposes of the SAPS Training Institute, which requires a secluded and private setting. The nature of the training facilities for the SAPS furthermore requires that the respective camps on the site must be situated well apart and in dense vegetation, in order to prevent visual contact between the camp areas. This is also the aim in terms of visibility from surrounding properties. It is evident from the existing development little vegetation is removed at Camp areas as it provides the privacy required.



Figure 47: Structures are small and little vegetation is removed at Camps which provides screening capacity

(iii) IDENTIFICATION OF OBSERVERS

Observers will experience the landscape in different ways depending on their activity and interest toward the landscape. Observers relevant to this study area can be categorised in the following main viewer groups:

- Residents;
- Tourists; and
- Motorists.

(iv) These viewer groups can be described according to their sensitivity which is an indication of the level of concern related to changes in the landscape.

Residents

Most often residents are highly sensitive and will express a high concern towards the scenic quality of their living conditions.

Tourists

Tourists are also classified as highly sensitive receptors owing to their inherent expectations and the visual interest in the landscape.

Motorists

Motorists are usually focused on the activity at hand and little of the road side scenery is experienced when travelling at great speeds. Their relative short duration of exposure to a supposed visual impact concludes the fact that they will express a low visual concern and are therefore classified as observers of low sensitivity.

(iv) VISIBILITY

ILA visited the Dabchick Wildlife Reserve which is situated along the eastern boundary of the application property on the Farm Kliprivier. Photos were taken from the Reserve looking toward the eastern boundary of the application property with the existing shooting range situated near the oxidation pond visible.

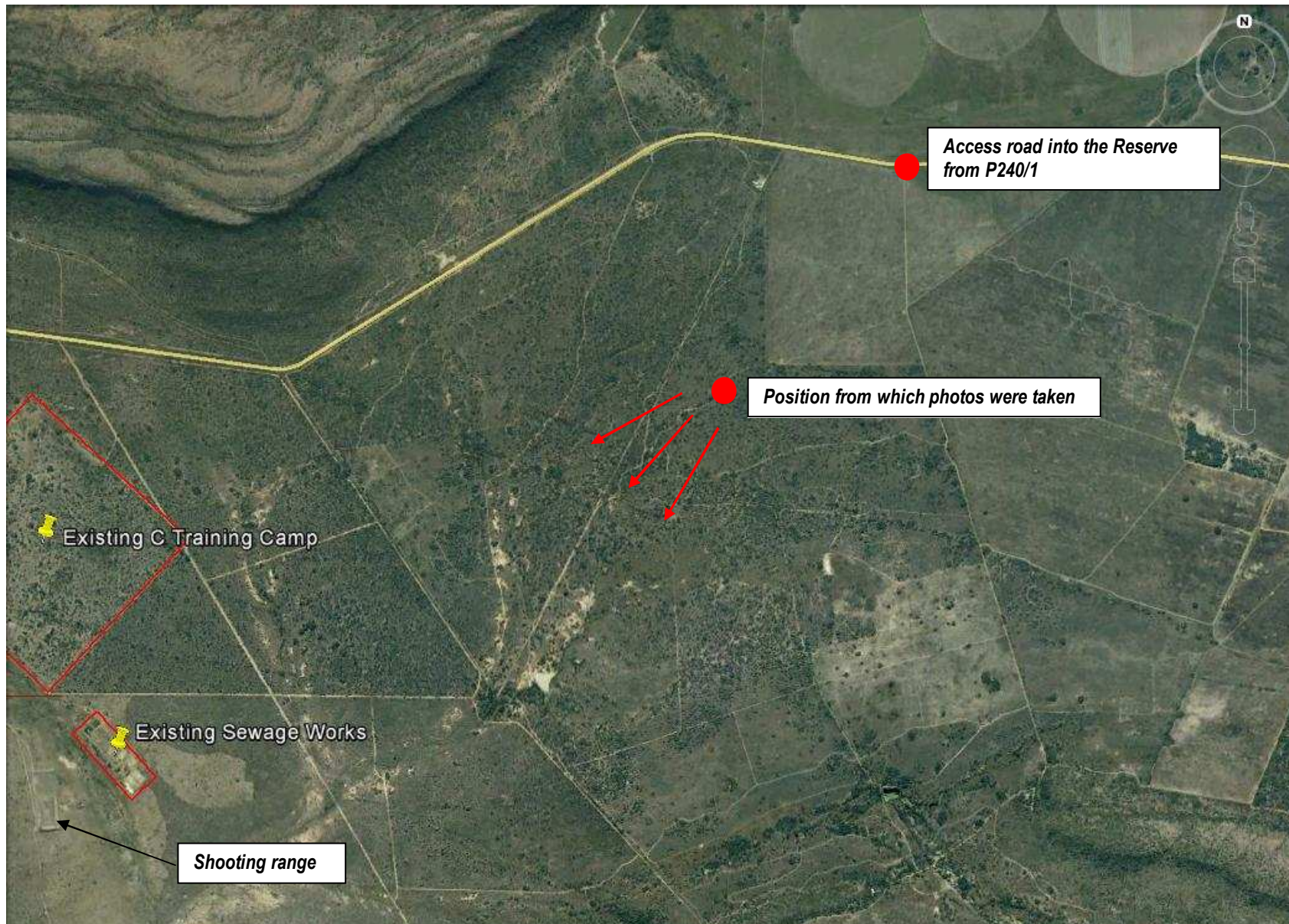


Figure 48: Location from which photos were taken



Figure 49: A view toward the existing shooting range from the point indicate in Figure 48





Figures 50 & 51: These photos were taken from higher ground within the Reserve looking toward the eastern boundary of the application property toward the shooting range [encircled]. Note the rise in topography further eastward from where it slopes eastward. The landscape is characterised by a diversity of colour in vegetation which adds to screening capability of a site



Due to the nature of the proposed land use and the type of buildings to be erected including the screening capacity of the property in terms of vegetation and topography it is anticipated that visibility of structures during the day will be minimal. However dust from vehicles travelling along dirt roads within the application property will be visible. It is therefore recommended that the road nearest the eastern boundary of the application property not be utilised for any training activity. The purpose of the road should be purely for management and maintenance of the property. Construction vehicles should not be permitted to use the roads near the boundary. Furthermore it is evident from the photos that due to the clearance of vegetation for the shooting range the exposed soil makes the area visible. Through limiting the area of surface disturbance during the construction phase, the extent and significance of the visual impact can be notably reduced. Measures for mitigation during the construction phase have been included in the EMPr.

Poor lighting design could result in visual impacts occurring at night if there is light trespass or glare as a result of excessive contrast between light and dark. Mitigation measures to limit obtrusive lighting conditions have been included in the EMPr.

(v) MITIGATION MEASURES

Herewith a summary of mitigation measures which are also included in the EMPr.

- ☛ Placements of units should be informed by topographical features which could contribute to screening, this includes existing vegetation;
- Through limiting the area of surface disturbance during the construction phase, the extent and significance of the visual impact can be notably reduced. Exposed soil is expected to contrast with the surrounding vegetation cover and will cause a visual intrusion. Herewith mitigation measures proposed to reduce surface disturbances:
- ☛ Locate administrative and stock yards in the least visible areas.
- ☛ Make use of the natural screening capacity of the site by placing these facilities in lower lying areas of the site, or adjacent to a dense vegetation patch with sufficient height to conceal these project components.
- ☛ Alternatively, the screening capacity of the site can be enhanced through the erection of a 2m shade cloth fence around these facilities. The colour of the shade cloth should be similar to that of the surrounding vegetation.
- ☛ Minimise disturbance during construction by demarcating construction areas. These areas to be limited to the minimum area required for construction.
- ☛ During building footprint determination as far as possible indigenous large trees should be incorporated in the lay-out of structures.
- ☛ Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed areas.
- ☛ Construction should proceed without lengthy interruptions;
- ☛ Strong contrasting colours create recognizable visual conflicts in the landscape and should not be allowed.
- ☛ The roofs of buildings will probably have the most significant influence in reducing visual impact and should resemble the colour of the surroundings.
- ☛ Highly reflective roofs such as untreated corrugated iron should be avoided at all cost. Colour selection should be made to achieve the best match with the surrounding landscape in both summer and winter.
- ☛ Plaster on outside walls should be coloured only in natural (earthy) colours;
- ☛ Built features of natural stone should be encouraged.
- ☛ Use specifically designed lighting equipment (full cut-off lighting fixtures) that minimizes the upward spread of light near to and above the horizontal.
- ☛ Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any observer is not more than 70°.
- ☛ Higher mounting heights allow lower main beam angles, which can assist in reducing glare.
- ☛ In areas with low ambient lighting levels, glare can be very obtrusive and extra care should be taken when positioning and aiming light equipment.
- ☛ Outside lighting required for decks or balconies should be designed and strategically placed to only provide illumination to that specific area.

With strict implementation of the mitigation measures as specified above, the impacts to be experienced by observers can be significantly decreased to result in an overall visually unobtrusive development during the operational phase.

SECTION 6: PUBLIC PARTICIPATION

[Regulation 31(2)(e)]

6.1 PROCESS FOLLOWED TO DATE

The public participation process is being conducted in terms of Chapter 6 of the EIA Regulations, 18 June 2010.

The initial public participation process undertaken by ILA, commenced on **03 May 2012** and included the following:

- ✚ A legal notice was placed in two (2) local newspapers, Die Pos and Die Kwêvoël ;
- ✚ Site notices were placed at the main entrance of the Verdrag Police Training Facility, Thabazimbi, at Obaro, Thabazimbi and Pick & Pay Thabazimbi
- ✚ Key stakeholders and/or Interested and Affected Parties (I&AP's) were notified by registered post, e-mail and fax. Letters were also distributed by hand to certain adjacent land owners

6.1.1 NEWSPAPER ADVERTISEMENT

An advertisement, notifying the public of the EIA process and inviting I&AP's to participate in the process by registering their comments with ILA (full contact details provided), was placed in the Kwêvoël on 4 May 2012 and in Die Pos on 4 May 2012 (Refer to **Appendix 18** for copy of advertisement placed)

6.1.2 SITE NOTICE

In order to notify the surrounding communities and immediate adjacent landowners of the proposed development, as well as inviting them to participate in the EIA process by registering their comments with ILA (full contact details provided), four site notices were erected on 3 May 2012 in visible locations (Refer to **Appendix 19** for proof of A4 copies of site notice).



Figure 52 & 53: Site Notice opposite the main entrance of the South African Police Training Facility Verdrag, Thabazimbi



Figure 54: Site Notice at Pick and Pay, Thabazimbi

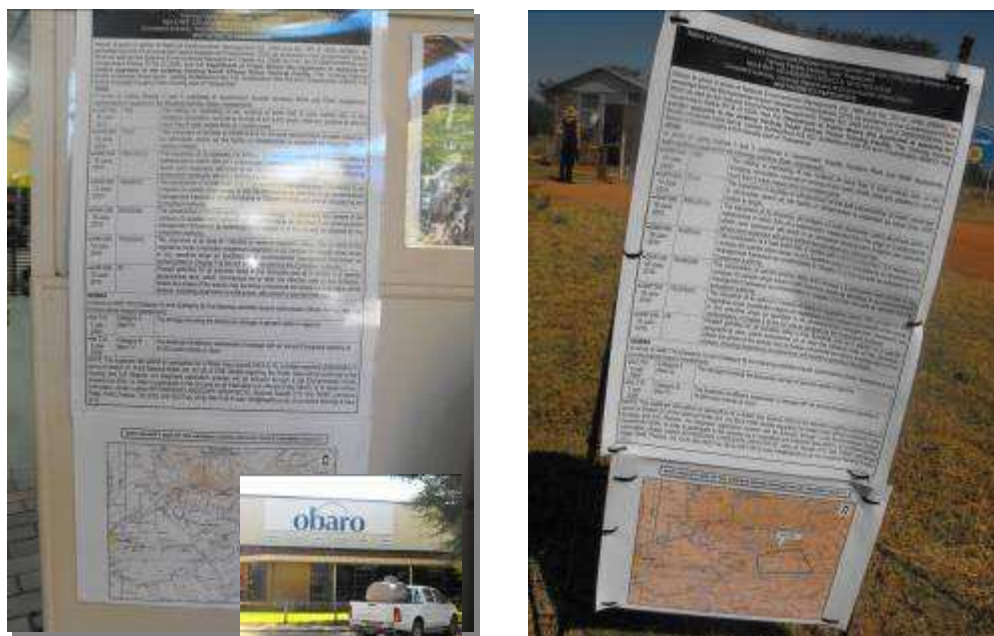


Figure 55 & 56: Site notice at Obaro, Thabazimbi and at the entrance gate to the property

6.1.3 DIRECT NOTIFICATION OF IDENTIFIED I&AP'S

A Background Information Document (BID) with comment and registration sheet was prepared and distributed to key stakeholders (Refer to **Appendix 20** for a copy of the BID, Registration sheet, acknowledgment of receipt and proofs that stakeholders were notified).

6.1.4 DATABASE

A database has been compiled containing details of identified stakeholders. The database will be continually updated throughout the EIA Process. Please refer to **Table 27** for the database.

TABLE 27: I & AP DATABASE

	Title	First Name	Last Name	Company	Contact Details
National Authority	Ms	Puseletso	Ntsane	Department of Public Works – Town Planner	
Local Authority	Clr	Paul	Scruton	Ward Councillor	bosauto@lantic.net
Local Authority	Mr	Hunter	Pagole	Modimolle Local Municipality	
Local Authority	Mr	Phathutshedzo	Siebe	Waterberg Local Municipality	014 717 2931 (fax)
NGO	Mr	Lemson	Betha	WESSA	lbetha@wessanorth.co.za
NGO	Ms	Harriet	Davis	Endangered Wildlife Trust (EWT)	harrietd@ewt.org.za
Provincial	Ms	Pumeza	Skepe	Department of Environmental Affairs (DEA)	PSkepe@environment.gov.za
Provincial	Ms	Zingiza	Phohlo	Department of Environmental Affairs (DEA)	ZPhohlo@environment.gov.za
Provincial	Mr	Rens (MLJ)	Botha	Department of Water Affairs (DWA)	BothaR@dwa.gov.za
Provincial	Ms	Jane	Mulaudzi	DWA - Hartbeespoort	JaneM@dwa.gov.za
Provincial	Ms	Caroline	Shai	DWA - Hartbeespoort	ShaiC@dwa.gov.za
Provincial	Mr	TP	Malungani	Ledet	malunganitp@ledet.gov.za
Provincial	Ms	Marubini	Mashuduma	Department of Agriculture and Forestry (DAFF)	mashuduma@daff.gov.za
National	Mr	Phillip	Hine	SAHRA	phine@sahra.org.za
Provincial	M		Selemela	Department of Agriculture and Forestry (DAFF)	SelemelaM@daff.gov.za
ADJACENT LAND OWNERS					
Remaining Extent: Farm Klipspruit 457 KQ & R/5	Mr	Stefan	Rossouw	Land Owner: Buffelspoort Boerdery 2008 Pty Ltd	freda.saunders@za.pwc.com
R/2 Klipspruit 457 KQ	Mr	Louis J	Le Grange	Land Owner: Shakawe Private Game Reserve	louis.legrange@za.pwc.com
Remaining Extent: Farm Kliprivier 464 KQ & R/6	Mr	Piet L	Roux	Land Owner: Kliprivier Besigheid Trust	plroux@netactive.co.za
R/1 Kliprivier 464 KQ	Mr	Frank R	Sullivan	Land Owner: Bentick Beleggings	fsullivan@healthsure.co.za
R/9 Kliprivier 464 KQ				Land Owner: Hoggenheimer Boerdery	Geelhoutlaan 47 Maraissteyn Park Edenvale 1610
R/2: R/ 3 Kliprivier 464 KQ	Ms	Sandrie	Fraser	Dabchick Wildlife Reserve	sandrief@kunkura.co.za
R/2: R/ 3 Kliprivier 464 KQ	Dr	Peter	Oberem	Dabchick Wildlife Reserve	peter.oberem@afrivet.co.za
Remaining Extent: Farm Rietfontein 460 KQ	Mr	Salem	Al Neyadi	SA RPHC Pty Ltd	Private Bag X36 Sunninghill 2157
Remaining extent: Farm Badenoch 454 KQ	Ms	Silvia L	De Jager	Pioen 1106 Pty Ltd	PO Box 7771 Johannesburg 2000

Remaining Extent: Farm Randstephne 455 KQ	Mr	Johann	Van Breda	Aquila Steel Thabazimbi (S Africa) Pty Ltd	jvanbreda@aquilaresources.co.za
ADJACENT LAND OWNERS					
Remaining Extent: Farm Donkerpoort 448 KQ	Mr	Johann	Van Breda	Aquila Steel Thabazimbi (S Africa) Pty Ltd	jvanbreda@aquilaresources.co.za
R/1 Donkerpoort 448 KQ	Mr	Jan Hendrik	Coetzer		JanC@ilclerumo.co.za
R/2 Donkerpoort 448 KQ				No info	
R/3 Donkerpoort 448 KQ				No info	
R/6 Donkerpoort 448 KQ				No Info	
Remaining Extent: Farm Blockshek 453 KQ	Mr	Denis J	Earp		296 Tyronne Avenue Bronberrik 0157
Remainng Extent : Farm Zandspruit 451 KQ	Mr	Louis	Van der Watt	Atterbury Properties	Louis@atterburt.co.za
Remaining Extent: Farm Zandspruit 449 KQ	Mr	Attie	Jonker	Jonker Trust	attiej@lantic.net
Remaining Extent: Farm Dassiesrand 417 KQ	Mr	James	Milton		PO Box 228 Northam 0360

6.1.5 DRAFT SCOPING REPORT AVAILABLE FOR PUBLIC REVIEW

The Draft Scoping Report was made available for review and comment by registered Interested and Affected Parties [I&AP's] between 16 July – 24 August 2012.

6.1.6 SUBMISSION OF FINAL SCOPING REPORT TO GDARD

All comments received on the Draft Scoping Report was included in the Final Scoping Report which was submitted to DEA on 30 August 2012. The Final Scoping Report was made available to registered I&AP's for a 21 day comment period between 29 August – 18 September 2012. The Final Scoping Report was approved in a letter of correspondence dated 15 October 2012, and ILA was instructed to continue with preparation of the Environmental Impact Assessment Report [Refer **Appendix 6** approval of Scoping Report DEA]. I&AP's were notified that the Final Scoping Report had been prepared. A copy of the Final Scoping Report was available on ILA's website for comment.

6.1.7 DRAFT EIA REPORT AVAILABLE FOR PUBLIC REVIEW

The Draft EIA Report will be made available for review by registered Interested and Affected parties for a 40 day period from 12 February – 26 March 2013. State Departments will be provided with hard copies of the Draft EIA Report. A copy of the Report will be made available for download by various links emailed to I&AP's and a hard copy of the report will also be available at Obaro in Thabazimbi.

6.2 COMMENTS AND RESPONSE REPORT

Comments submitted during the public participation process are being captured and entered into the Comments and Response Report as per the requirements of Regulations 56 & 57 of the EIA Regulations 2010. Comments captured up to date have been included in the Comments & Response Report included in **Table 28**.

Refer **Appendix 21** for comments received up to date

TABLE 28: COMMENTS AND RESPONSE REPORT FOLLOWING THE INITIAL PUBLIC PARTICIPATION PHASE FOR THE PROPOSED UPGRADE OF THE SOUTH AFRICAN POLICE TRAINING FACILITY VERDRAG, NEAR THABAZIMBI

ISSUES AND COMMENTS RAISED	COMMENTATOR/S	SOURCE	RESPONSE
COMMENTS RECEIVED ON INTIAL PUBLIC PARTICIPATION			
Biophysical Issues			
Requested investigation into the possible reallocation of the rifle range further away from his farm	Mr Frank Sullivan	Email correspondence	Registered. Mr Sullivan's request will be investigated and feasibility determined in terms of safety regulations and specifications for location of shooting ranges. The development of a new shooting range is proposed. Once the new shooting range is operational the other shooting ranges will be decommissioned.
Reported that in the past Verdrag has been known to be responsible for veldfires. Reports show that annually veldfires started as a result of training at Verdrag thus more people will definitely lead to more veldfires	Mr PJ le Roux	E-mail correspondence	The repeat of veldfires originating from Verdrag need to be address according the National Veld & Forest Fire Act (ACT 101 of 1998). All fire related problems can be addressed through the Thabazimbi Fire Protection Association (FPA), currently chaired by Mr. Anton Scheepers.
Fire roads and borders of Verdrag is not up to standard to protect neighbouring farms against veldfires originating at Verdrag	Mr PJ le Roux	E-mail correspondence	Warrant Officer Hennie Kruger from Verdrag Training Facility is sector leader of the Thabazimbi FPA. It was confirmed that all firebreaks along the borders of the Verdrag Training Facility comply with the Act. Verdrag has fire fighting teams and always have a fire cart available when pyrotechnical training is done. The newly proposed sewerage treatment works will provide additional fire water.
Fires caused by shooting exercises and the lack of adequate firebreaks	Mr L le Grange	E-mail correspondence	A representative of the Verdrag Training Facility confirmed that all firebreaks along the borders of the Verdrag Training Facility complies with the Act. It was also confirmed that a fire cart is always available when pyrotechnical training is done.
Fires caused by shooting exercises and the lack of adequate firebreaks	Mr S Rossouw	E-mail correspondence	A representative of the Verdrag Training Facility confirmed that all firebreaks along the borders of the Verdrag Training Facility complies with the Act. It was also confirmed that a fire cart is always available when pyrotechnical training is done
Socio - Economic Issues			
The trainees of Vedrag do not consider the people of the community in that they speed on the road and refuse to belong to other organisations in the community e.g. FPA	Mr PJ le Roux Dabchick Wildlife Reserve	E-mail correspondence	Registered parties are requested to keep record of incidents and to report it to the Training Facility. The Verdrag Training Facility is represented on the Thabazimbi FPA by Warrant Officer Hennie Kruger.

As direct neighbour to Verdrag Training Facility, Dabchick Wildlife Reserve obtains their Return of Investment (ROI) from the sense of place i.e. wild, peaceful bush atmosphere. Therefore they would appreciate it to be well informed; be able to give their inputs and be able to discuss the developments one on one	Dr P Oberem Dabchick Wildlife Reserve	E-mail correspondence	All relevant information and reports will be sent to registered I&AP's for comment. ILA met with Dr Oberem on 30 July 2012 and visit Dr Oberem's property on 6 August 2012.
Low flying helicopters	Mr L le Grange	E-mail correspondence	Low flying helicopter activities are related to training sessions. The Verdrag SAPS Training Facility is required to adhere to the rules and regulations of the Aviation Authority and Legislation.
Low flying helicopters	Mr S Rossouw	E-mail correspondence	Low flying helicopter activities are related to training sessions. The Verdrag SAPS Training Facility is required to adhere to the rules and regulations of the Aviation Authority and Legislation.
Trespassing of trainees onto adjacent properties during night marches	Mr L le Grange	E-mail correspondence	The SAPS Training Facility is not aware of regular trespassing of trainees onto neighbouring properties. All registered parties are requested to record these incidents and report incidences to the Training Facility.
Trespassing of trainees onto adjacent properties during night marches	Mr S Rossouw	E-mail correspondence	The SAPS Training Facility is not aware of regular trespassing of trainees onto neighbouring properties. All registered parties are requested to record these incidents and report incidences to the Training Facility.
Infrastructure and Services Issues			
No development may commence unless duly authorised in terms of the requirements under the National Water Act, 1998 (Act no. 36 of 1998)	Mr Rens Botha Department of Water Affairs	Email Correspondence	Messrs EcoAgent CC have been commissioned to apply for the issuing of the required licenses on behalf of the Applicant in terms of the National Water Act. Refer Section 3 of this Report
The Shooting range is too close to Skilpadkop	Mr PJ le Roux	E-mail correspondence	The upgrade proposal includes the development of a new shooting range. The existing shooting ranges will be decommissioned once the new shooting range is finalised and operational.
The main road is not properly maintained by the municipality at present. More trainees will mean more traffic which will lead to the road degrading even more.	Mr PJ le Roux	E-mail correspondence	The maintenance of the road is the responsibility of the Provincial Roads Department. All matters pertaining to the road need to be addressed to Mr James Mokobane of the Department of Roads - Thabazimbi However matters pertaining to the road resulting directly from construction activity associated with the SAPS Verdrag facility will be dealt with as follows - Should construction vehicles or construction activity cause damage to the P240 provincial road the Developer [DPW] shall be liable for such damage and shall compensate against any claim from a third party.

The current condition of the road as well as the impact of heavy vehicles on the road is a concern	Mr L le Grange	E-mail correspondence	The maintenance of the road is the responsibility of the Provincial Roads Department. All matters pertaining to the road need to be addressed to Mr James Mokobane of the Department of Roads – Thabazimbi. However matters pertaining to the road resulting directly from construction activity associated with the SAPS Verdrag facility will be dealt with as follows - Should construction vehicles or construction activity cause damage to the P240 provincial road the Developer [DPW] shall be liable for such damage and shall compensate against any claim from a third party. Recommendations have been included in the Draft Environmental Management Programme regarding road maintenance during the construction phase of the upgrade.
The current condition of the road as well as the impact of heavy traffic on the road is a concern	Mr S Rossouw	E-mail correspondence	The maintenance of the road is the responsibility of the Provincial Roads Department. All matters pertaining the road need to be addressed to Mr James Mokobane of the Department of Roads – Thabazimbi. Recommendations have been included in the Draft Environmental Management Programme regarding road maintenance during the construction phase of the upgrade. As above
ISSUES AND COMMENTS RAISED	COMMENTATOR/S	SOURCE	RESPONSE
Infrastructure and Services Issues [Continued]			
Requested to be registered no comments issued			
None	Ms Jane Maudzi Department of Water Affairs - Hartbeespoort	Email Correspondence	Registered
None	Ms Caroline Shai Department of Water Affairs - Hartbeespoort	Email Correspondence	Registered
Will only comment once hard copy of Draft Scoping Report has been received	TP Malungani LEDET	Email Correspondence	Registered
None	Mr Louis van der Watt	Email Correspondence	Registered
None	Mr Jan Coetzer	Email Correspondence	Registered

The Waterberg District Municipality found the proposed Land Development area application in consistence with the municipality's SDF's and policies in this regard. They recommend the approval of EIA due to the approval of Land development application (Township Establishment) by Limpopo Development Tribunal.	MV Letsoalo – Municipal Manager	Email Correspondence	Registered
ISSUES AND COMMENTS RAISED	COMMENTATOR/S	SOURCE	RESPONSE
COMMENTS RECEIVED ON DRAFT SCOPING REPORT			
Biophysical Issues			
<p>We are not in principle against the developments at Verdrag as proposed, however we do have concerns and we would like to ensure that there are no negative effects on the business into which we have invested. Aspects which concern us include:</p> <ul style="list-style-type: none"> ➤ Litter, ➤ Poaching (with more visitors to Verdrag) proper traffic control required to limit poaching; ➤ Waste management. 	Mr Peter Oberem obo Dabchick Wildlife Reserve (Pty) Ltd situated on the Farm Kliprivier 464-LQ	Concerns captured during a meeting held on 30 July with Mr Oberem	<p>Mitigation measures for the management of waste are included in the EMP, refer Section 8. The EMP have addressed matters pertaining to construction waste, general waste, hazardous waste and areas and facilities utilised for temporary storage of waste prior to removal to the landfill site.</p> <p>Access to the Verdrag property is controlled. The provincial road to the property will not be tarred. ILA conducted a site visit at the Dabchick Wildlife Reserve on 6 August. It was confirmed by Mr Martin Roux [employed at the Reserve], that as a result of the training at the shooting range on Verdrag situated adjacent to Dabchick [shooting range located near oxidation pond on eastern site boundary] it was difficult to determine when there was a real poaching threat as often employees at the Reserve would respond to gun shots as a possible poaching incident, but would find that shooting training was in process at the shooting range on Verdrag.</p> <p>The following is suggested for consideration by the Verdrag Management and the Dabchick Management & other affected neighbouring stakeholders. It is recommended that monthly progress reports / meetings be held during the construction phase where the affected stakeholders report on any incidents which could possibly be linked to the construction activity at Verdrag [e.g illegal trespassing of adjacent properties, increase in poaching etc]. There should be open and transparent communication between affected</p>

			stakeholders and the Verdrag Management. Copies of the progress report / minutes of meetings can be included in the monthly environmental audit reports.
			The following requirements have been included in the Environmental Management Programme to reduce poaching risks during the construction phase. Construction workers will not be allowed to stay at Verdrag. Transport must be provided where construction workers are collected from a central point in either Thabazimbi or Modimolle in the mornings and they must be dropped off at this point at the end of the working day. A register of workers must be kept and workers movements must be accounted for during the work day.
Socio – Economic Issues			
Concern that the upgrades to the SAPS facility will impact on the sense of place [bushveld feel] which could impact our business. Mitigation measures for the following must be clearly defined and included in the EMP: Light; Dust; Noise; View	Mr Peter Oberem obo Dabchick Wildlife Reserve (Pty) Ltd situated on the Farm Kliprivier 464-LQ	Concerns captured during a meeting held on 30 July with Mr Oberem	ILA conducted a site visit at Dabchick on 6 August. Findings of the site visit have been included under Section 5.6 of the Draft EIA Report. The following are preliminary findings: ➤ The shooting range situated near the eastern boundary of Verdrag is visible from Dabchick. Existing shooting ranges will be decommissioned once the new shooting range becomes operationa;; ➤ Due to site topography is anticipated that the new A training Camp will not be visible from Dabchick; Mitigation measures to limit light pollution and dust and noise during the construction phase have been included in the EMP.
ISSUES AND COMMENTS RAISED	COMMENTATOR/S	SOURCE	RESPONSE
COMMENTS RECEIVED ON FINAL SCOPING REPORT			
Socio – Economic Issues			

<p>According to the specialist report only the areas that are going to be developed were investigated for heritage resources. Please note that the report must at least indicate the size of the overall size of the property as well as the size of the areas surveyed. It was also indicated that dense vegetation limited the extensiveness of the survey. Although the archaeologist indicated that no archaeological resources were identified on the property, it is entirely likely that their presence may have been obscured by dense vegetation.</p> <p>However , two farmsteads were identified on the farm Groenfontein. The one farmstead (GPS Co-ordinates S 24.55002 E27.74781) is at least 100 years old. However it is still in use by the SAPS staff. According to the report the house was upgraded recently. The second site (GPS co-ordinates S24.54911 E27.78152) is the remains of the old Groenfontein farmstead. All that remains is the foundation of an old Rondavel Structure. The site is located near the area of the proposed New E Training Camp.</p> <p>A small informal cemetery is located at GPS co-ordinates S24.54917 E27.74169. The cemetery contains 10 graves marked with stone cairns, no headstones and the date of the burials could not be ascertained. The cemetery is fenced and SAPS is aware of its location.</p> <p>A memorial to a SAPS officer who dies during a swimming exercise is located just outside of the area to be developed. The memorial dates to 2004 and was erected by colleagues.</p> <p>Please note that the heritage resources, which are not formally declared are protected under Sections 34,35 and 36 of the NHRA and not under Section 27.</p> <p>Decision</p> <p>SAHRA recommends that the fenced cemetery containing 10 graves be incorporated into the new developments since SAPS is aware of its location and it can be easily accommodated. It is however further recommended that the cemetery must be kept clean and a conservation a management plan drafted and submitted to SAHRA BGG Unit for approval. The CMP must outline the measures that will be put in place for the future conservation of the</p>	<p>Mr Phillip Hine SAHRA</p>		<p>As confirmed in the Heritage Report none of the heritage structures will be impacted by the new developments and upgrades.</p> <p>The current budget did not make provision for the surveying of the entire property which measures approximately 8000 hectares therefore only areas proposed for development were surveyed. The cemetery will be conserved and is currently fenced. Conservation measures for the cemetery located within the boundary of the Administration Camp have been included in the EMP.</p> <p>A copy of the Draft EIA Report and Heritage Report will be submitted to the Limpopo Provincial Heritage Authority for comment.</p> <p>The current application is being managed under the Site Clearance specifications of the Applicant. The next phase to be initiated by the Applicant is known as the Design Phase. Due to budget constraints the palaeontological investigation will have to be done under the Design Phase. The requirement for such have been included in the EMP.</p>
--	----------------------------------	--	--

<p>Cemetery. Please note that these recommendations relates specifically to graves and graveyards that are 60 years and older. Cemeteries and graves younger than 60 years are protected by other legislation.</p> <p>Because the Project area is large and will require the upgrade of roads, construction of a landing strip, the upgrading of the water supply and reticulation etc., it is recommended that the specialist should in future report on the total area covered during the survey. A GPS track of the area surveyed would also be very useful. It is also advisable that all heritage resources identified should where possible be mapped in relation to infrastructure developments.</p> <p>Decisions on the farmsteads that were identified on the property must be sought from the Limpopo Provincial Heritage Authority.</p> <p>Please note that no palaeontological assessment was undertaken for this project. It is recommended that the developer consults a professional palaeontologist to conduct the necessary studies or at least a letter if exemption from a palaeontologist is submitted to SAHRA APM Unit motivating that a palaeontological impact assessment is not needed.</p>			
--	--	--	--

SECTION 7: DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACTS AND ISSUES

7. DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACTS AND ISSUES

[Regulation 31 (2) (I)]

This section of the report is aimed at providing a description and evaluation of issues and impacts associated with the construction and operational phases of this type of development.

Before impacts can be identified it is important to give account of the on-site activities anticipated during the construction and operational phases of the project. The activities envisaged are based on normal construction and operational programs associated with developments of this nature. They are referred to as environmental aspects as they represent the actions during the construction and operational phases that will influence environmental conditions to a large or lesser degree. Please note however that this is only an initial brief overview of anticipated impacts.

7.1 ANTICIPATED ENVIRONMENTAL AND SOCIAL ASPECTS

The anticipated aspects and impacts are associated with the preferred lay out as per Alternative 3.

7.1.1 CONSTRUCTION PHASE

Beneficial Impacts

- ✎ Skills development and creation of job opportunities; and
- ✎ Eradication of invaders and establishment of indigenous vegetation.

Adverse Impacts

- ✎ Invasion by weeds and invasive alien plants as a result of surface disturbance;
- ✎ Increased erosion risk due to de-vegetation of areas of construction resulting from construction of new infrastructure such as the, accommodation units, training facilities and installation of services and new sewerage treatment plants at Camp B and below Camp C;
- ✎ Poaching of fauna by construction team;
- ✎ Loss of wetland habitat due to construction activity within riparian zones (new sewer line from landing strip admin building will cross a stream, the replacement of the defunct pipelines will also result in construction activity within riparian areas where pipelines cross streams and the upgrade of stormwater culverts and pipes within riparian areas. Should the areas be rehabilitated habitat should be able to re-establish for underground infrastructure. If the culvert upgrades require a permanent footprint larger than the current infrastructure wetland habitat loss in these local areas will be permanent);
- ✎ Interception of subsurface flows installation of services [replacement of defunct pipelines and installation of new pipelines];
- ✎ Increased sedimentation in waterways due to construction activity within riparian areas and stormwater run-off from areas where vegetation has been cleared;
- ✎ Water quality deterioration [accidental spillage of hazardous substances or contaminated stormwater run-off];
- ✎ Temporary diversion of stream during installation of pipelines and upgrade of culverts will lead to destruction of aquatic vegetation and habitat loss;
- ✎ Temporary diversion of stream will lead to mobilisation of sediment and impact on water quality;
- ✎ Minimal soil and water contamination risk associated with the decommissioning of the existing oxidation ponds
- ✎ Impact on aesthetics of the area and *genius loci* (Sense of place);
- ✎ Noise emanating from construction & dust generation could impact on fauna;
- ✎ Heavy vehicle traffic increase that could impact negatively on safety and quality of existing roads and possible roadkill;
- ✎ Crime may increase as a result of contract workers in the area;
- ✎ Stockpile areas for construction material, generation and disposal of building waste & liquids and vehicle maintenance could impact on ground water, surface water (rivers), soil the and environment as a whole;
- ✎ Stockpile areas for construction material could pose threat to fauna (in terms of suffocation/poisoning etc);
- ✎ Possible damage / loss of subterranean artefacts;
- ✎ Removal of protected trees;

- ✚ Waste Management could impact on soil and ground water;
- ✚ Waste Management could pose threat to fauna;
- ✚ Sanitation (toilet facilities) could impact on soil and ground water; and
- ✚ Unsupervised and misuse of fire on site could impact negatively on the environment.

7.1.2 OPERATIONAL PHASE

Adverse

Beneficial Impacts

- ✚ Rehabilitation of disturbed areas [roads which will no longer be used and areas where pipelines were implemented which will now be discontinued, areas affected by erosion and the oxidation ponds once decommissioned];
- ✚ Upgrading of stormwater management infrastructure which could reduce erosion risks and protect riparian habitat and ecological functionality at outlet points and downstream. With implementation of a rehabilitation plan erosion on site can be managed.
- ✚ Upgrading and maintenance to existing sewerage and water infrastructure will reduce risk of environmental impacts such as sewerage leaks and water wastage due to defunct equipment;
- ✚ Skills development and long term job opportunities;
- ✚ Provision of additional facilities and improved quality facilities for SAPS training;
- ✚ Provision of movement corridors should grassed swales be implemented;
- ✚ Infiltration of stormwater runoff with implementation of RSuDS
- ✚ Simplified regulation and monitoring of purified effluent with use of submerged media reactor;
- ✚ Submerged media reactor provides a closed system with no insect infestations or odours

Adverse Impacts

- ✚ Permanent loss of habitat within permanent footprint of new buildings and infrastructure;
- ✚ Increased erosion if proper stormwater management measures are not implemented in areas where vegetation has been cleared [e.g. along road alignments]
- ✚ Waste generation could impact on capacity of landfill site;
- ✚ Waste generation & waste management could impact on fauna and lead to possible contamination of soil, surface and groundwater;
- ✚ Increased traffic generation during operational phase and maintenance of the P240 required;
- ✚ Increased noise pollution additional traffic along the P240/1;
- ✚ Possible contamination of groundwater should the development and wastewater treatment facility not be managed properly and equipment maintained and regularly inspected. The use of purified effluent poses a potential contamination risk to soil, surface and underground resources if the effluent does not meet the DWA specified standards;
- ✚ Roadkill due to night driving (staff, trainees);
- ✚ Potential fire hazard if effective fire management plan is not implemented and maintained.

7.1.3 ANTICIPATED CUMULATIVE IMPACTS

Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that should be the focus of cumulative impact analysis. While impacts can be differentiated by direct, indirect, and cumulative, the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time.

- (1) whether the resource is especially vulnerable to incremental effects;
- (2) whether the proposed action is one of several similar actions in the same geographic area;
- (3) whether other activities in the area have similar effects on the resource;
- (4) whether these effects have been historically significant for this resource; and
- (5) whether other analyses in the area have identified a cumulative effects concern.

The following cumulative impacts have been identified. These impacts are considered cumulative when assessed in addition to the existing and surrounding land uses: the cumulative impacts can be considered when the

Construction Phase

- ✚ Invasion by weeds and invasive alien plants as a result of surface disturbance
- ✚ Increased erosion risk due to de-vegetation of areas of construction
- ✚ Loss of wetland habitat due to construction activity within riparian zones
- ✚ Increased sedimentation in waterways

Operational Phase

- ✚ Rehabilitation of disturbed areas;

- ✚ Waste generation could impact on capacity of landfill site
- ✚ Increased traffic generation during operational phase and maintenance of the P240 required
- ✚ Loss of wetland habitat due to construction activity within riparian zones

7.4 SIGNIFICANCE OF IMPACTS

[Regulation 31 (2) (h)]

An assessment of the significance of each of the impacts identified during the Scoping Process has been performed by means of a qualitative methodology. The above-mentioned methodology and results of the assessment are reflected in this section of the report.

7.4.1 SIGNIFICANCE ASSESSMENT METHODOLOGY

ILA has used an objective Significance Assessment Methodology in accordance with the DEAT (2006) Guideline Document 5 (Assessment of Alternatives and Impacts), as well as any other considered by the professional team to be relevant.

In terms of the Significance Assessment Methodology, developed in accordance with the above guidelines, the significance of an impact is the product of a probability rating and a severity rating. A detailed description of the mentioned methodology follows below:

SIGNIFICANCE

Significance is the product of probability and severity.

PROBABILITY

Probability describes the likelihood of the impact actually occurring, and is rated as follows:

- ✚ Improbable - Low possibility of impact to occur due to design or history. Rating: 2
- ✚ Probable - Distinct possibility that impact will occur. Rating: 3
- ✚ Highly probable - Most likely that impact will occur. Rating: 4
- ✚ Definite - Impact will occur regardless of any prevention measures. Rating: 5

SEVERITY RATING

The severity rating is calculated from the factors allocated to intensity and duration. Intensity and duration factors are awarded to each impact, as described below.

INTENSITY FACTOR

The intensity factor is awarded to each impact according to the following method:

- ✚ Low intensity - nature and/or man made functions not affected (minor process damage or human/wildlife injury could occur). Factor 1
- ✚ Medium intensity - environment affected but natural and/or manmade functions and processes continue (Some process damage or human/ wildlife injury may have occurred). Factor 2
- ✚ High intensity - environment affected to the extent that natural and/or human-made functions are altered to the extent that it will temporarily or permanently cease (Major process damage or human/wildlife injury could occur). Factor 4

DURATION

Duration is assessed and a factor awarded in accordance with the following:

- ✚ Short term - <1 to 5 years. Factor 2
- ✚ Medium term - 5 to 15 years. Factor 3
- ✚ Long term - impact will only cease after the operational life of the activity has ended, either because of natural process or by human intervention. Factor 4
- ✚ Permanent - mitigation, either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient. Factor 4

SEVERITY FACTOR

The severity rating is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below. For example:

The Severity factor = Intensity factor X Duration factor
= 2 x 3

= 6

A severity factor of six (6) equals a severity rating of medium severity (Rating 3) as per table below:

TABLE 29: SEVERITY RATING

RATING	FACTOR
Low Severity (Rating 2)	Calculated values 2 to 4
Medium Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High severity (Rating 5)	Calculated values 13 to 16
Severity factors below 3 indicate no impact	

SIGNIFICANCE RATING

A Significance Rating is calculated by multiplying the severity rating with the probability rating. The significance rating should influence the development project as described below:

- ✚ Low significance (calculated Significance Rating 4 to 6)
 - ★ Positive impact and negative impacts of low significance should have no influence on the proposed development project.
- ✚ Medium significance (calculated Significance Rating >7 to 14)
 - ★ Positive impact: Should weigh towards a decision to continue
 - ★ Negative impact: Should be mitigated to a level where the impact would be of low significance before project can be approved.
- ✚ High significance (calculated Significance Rating 15 and more)
 - ★ Positive impact: Should weigh towards a decision to continue, should be enhanced in final design.
 - ★ Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be performed to reduce significance to at least low significance rating.

7.4.2 SIGNIFICANCE ASSESSMENT RESULTS

Impacts highlighted in Section 6 were each assessed according to the above methodology. Table 6 contains the results of the significance assessment before implementation of mitigation measures.

Note that the impact assessment has taken cognisance of the following exiting impacts to the wetlands and drainage channel:

- ✚ **Disruption of natural flows as a consequence of the construction of platforms and industrialisation of the affected catchments;**
- ✚ **Presence of surrounding infrastructure;**
- ✚ **Presence of a manmade dam.**
- ✚ **The impact assessment has considered the findings of all the finalised specialist reports.**

TABLE 30: RESULT OF THE SIGNIFICANCE ASSESSMENT [BEFORE AND AFTER MITIGATION] OF THE IMPACTS IDENTIFIED ASSOCIATED WITH THE PROPOSED UPGRADE OF THE VERDRAG SAPS TRAINING FACILITY

		SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
IMPACT		PR	I	D	SF	SR	SiR	PR	I	D	SF	SR	SiR
ALTERNATIVE 3 – PREFERRED PROPOSAL													
Lay out 3													
Sustainable design principles with the use of rural sustainable drainage systems for stormwater management													
Replacement of oxidation ponds with submerged media reactor													
CONSTRUCTION PHASE													
BIO-PHYSICAL ENVIRONMENT													
BENEFICIAL IMPACTS													
i	Eradication of invaders and establishment of indigenous vegetation	4	2	2	4	2	8 Medium	5	2	4	8	3	15 High
ADVERSE IMPACTS													
ii	Invasion by weeds and invasive alien plants as a result of surface disturbance	5	2	4	8	3	15 High	3	2	4	8	3	9 Medium
iii	Increased erosion risk due to de-vegetation of areas for construction	5	2	4	8	3	15 High	3	2	2	4	2	6 Low
iv	Increased poaching risk to fauna by construction team	4	4	2	8	3	12 Medium	3	4	2	8	3	9 Medium
v	Loss of wetland habitat due to construction activity within riparian zones	4	2	2	4	2	8 Medium	3	2	2	4	2	6 Low
vi	Interception of subsurface flows during installation of services	5	2	2	4	2	10 Medium	2	2	2	4	2	4 Low
vii	Increased sedimentation loads in waterways due to construction activity within riparian areas and stormwater runoff from areas where vegetation has been cleared	5	2	3	6	3	15 High	3	2	2	4	2	6 Low
viii	Water quality deterioration [accidental spillage of hazardous substances or contaminated runoff]	5	2	3	6	3	15 High	2	2	3	6	3	6 Low
ix	Noise & dust emanating from construction could impact on fauna	5	1	2	2	2	10 Medium	5	1	2	2	2	10 Medium
x	Heavy vehicle traffic increase that could contribute to possible road kill	5	4	2	8	3	15 High	3	4	2	8	3	9 Medium
xi	Temporary diversion of stream during installation of pipelines and upgrade of culverts will lead to destruction of aquatic vegetation and habitat loss	5	2	4	8	3	15 High	5	2	2	4	2	10 Medium
xii	Temporary diversion of stream will lead to mobilisation of sediment and impact on water quality	5	2	2	4	2	10 Medium	3	2	2	4	2	6 Low
xiii	Stockpiles areas for construction material, generation and disposal of building waste & liquids and vehicle maintenance could impact on groundwater surface water, soil and the environment as a whole	4	2	3	6	3	12 Medium	2	2	2	4	2	4 Low
xiv	Stockpile areas for construction material could pose threat to fauna [suffocation/poisoning]	4	4	2	8	3	12 Medium	2	4	2	8	3	6 Low

		SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
IMPACT		PR	I	D	SF	SR	SiR	PR	I	D	SF	SR	SiR
xv	Removal of protected trees and indigenous vegetation [impact on sensitive mountain ecology with placement of shooting range and high species richness in area of new ammunition safe]	5	2	4	8	3	15 High	2	2	4	8	3	6 Low
xvi	Waste management could impact on soil and water resources	4	4	3	12	4	16 High	2	2	3	6	3	6 Low
xvii	Waste management could pose threat to fauna	4	4	2	8	3	12 Medium	2	4	2	8	3	6 Low
xviii	Sanitation (toilet facilities) could impact on soil and groundwater	4	4	2	8	3	12 Medium	2	4	2	8	3	6 Low
xix	Unsupervised and misuse of fire on site could impact negatively on the environment	4	4	3	12	4	16 High	2	2	3	6	3	6 Low
CONSTRUCTION PHASE													
SOCIO-ECONOMIC ENVIRONMENT													
BENEFICIAL IMPACTS													
xx	Skills development and creation of job opportunities.	4	2	2	4	2	8 Medium	5	2	2	4	2	10 Medium
ADVERSE IMPACTS													
xxi	Crime may increase as a result of contract workers	4	4	2	8	3	12 Medium	2	4	2	8	3	6 Low
xxii	Possible damage/loss of subterranean artefacts	4	2	4	8	3	12 Medium	2	2	4	8	3	6 Low
xxiii	Impact on aesthetics of the area and sense of place – visual impact due to surface disturbance	4	1	4	4	2	8 Medium	2	1	4	4	2	4 Low
xxiv	Heavy vehicle traffic increase that could impact negatively on safety and quality of existing roads	5	1	2	2	2	10 Medium	4	1	2	2	2	8 Medium
xxv	Unsupervised and misuse of fire could impact negatively on surrounding land uses	4	4	3	12	4	16 High	2	2	3	6	3	6 Low
OPERATIONAL PHASE													
BIO-PHYSICAL ENVIRONMENT													
BENEFICIAL IMPACTS													
xxvi	Rehabilitation of disturbed areas [roads which will no longer be used, where pipelines will no longer be used, shooting ranges, oxidation ponds and areas affected by erosion]	3	2	4	8	3	9 Medium	4	4	4	16	5	20 High
xxvii	Upgrading of stormwater management infrastructure which could reduce erosion risks and protect riparian habitat and ecological functionality at outlet points and downstream.	3	2	4	8	3	9 Medium	4	4	4	16	5	20 High
xxviii	Upgrading and maintenance to existing sewerage and water infrastructure will reduce risk of environmental impacts such as sewerage leaks and water wastage due to defunct equipment	5	2	4	8	3	15 High	5	2	4	8	3	15 High
xxix	Provision of movement corridors with implementation of RSuDS such as grassed swales and detention basins	4	2	4	8	3	12 Medium	5	2	4	8	3	15 High

		SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
IMPACT		PR	I	D	SF	SR	SiR	PR	I	D	SF	SR	SiR
xxx	Infiltration of stormwater runoff with implementation of RSuDS such as grassed swales	3	2	4	8	3	9 Medium	5	2	4	8	3	15 High
xxxi	Regulating and monitoring effluent quality is easier with submerged media reactor	3	2	4	8	3	9 Medium	5	2	4	8	3	15 High
xxxii	Provision of recycled water through use of purified effluent for irrigation and fire water	3	2	4	8	3	9 Medium	5	2	4	8	3	15 High
xxxiii	Submerged media reactor provides a closed system with no odour or insect infestations	5	1	4	4	2	10 Medium	5	1	4	4	2	10 Medium
ADVERSE IMPACTS													
xxxiv	Permanent loss of habitat within permanent footprint of new buildings and infrastructure	5	2	4	8	3	15 High	3	1	4	4	2	6 Low
xxxv	Increased erosion risk and increased sedimentation loads carried to waterways if proper stormwater management measures are not implemented [along roads and other areas cleared of vegetation and at river crossings]	4	2	4	8	3	12 Medium	2	2	4	8	3	6 Low
xxxvi	Waste generation could impact on capacity of landfill site	5	2	4	8	3	15 High	2	2	4	8	3	6 Low
xxxvii	Waste generation & poor waste management could impact on fauna and lead to possible contamination of surface, soil and groundwater	5	2	4	8	3	15 High	2	2	4	8	3	6 Low
xxxviii	Possible contamination of groundwater should the development and wastewater treatment facility not be managed properly and if equipment is not maintained and regularly inspected. The use of purified effluent poses a potential contamination risk to soil, surface and underground water resources if the discharge does not meet DWA standards	4	4	4	16	4	16 High	2	2	4	8	3	6 Low
xxxix	Road kill due to night driving [staff, trainees]	5	2	4	8	3	15 High	2	2	4	8	3	6 Low
xl	Potential fire hazard if an effective fire management plan is not implemented and maintained	4	4	3	12	4	16 High	2	2	3	6	3	6 Low
SOCIO-ECONOMIC ENVIRONMENT													
BENEFICIAL IMPACTS													
xli	Skills development and long term job opportunities	4	2	4	8	3	12 Medium	5	2	4	8	3	15 High
xlvi	Provision of additional facilities and improved quality facilities for SAPS training	4	1	4	4	2	8 Medium	5	1	4	4	2	10 Medium
xlvi	Submerged media reactor provides a closed system with no odour or insect infestations	5	1	4	4	2	10 Medium	5	1	4	4	2	10 Medium
ADVERSE IMPACTS													
xlv	Potential fire hazard if an effective fire management plan is not implemented and maintained	4	4	3	12	4	16 High	2	2	3	6	3	6 Low

IMPACT		SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
		PR	I	D	SF	SR	SiR	PR	I	D	SF	SR	SiR
xlvi	Increased noise levels and dust generation along the P240 associated with increased traffic which could pose a nuisance to surrounding land owners	5	2	4	8	3	15 High	5	1	4	4	2	10 Medium
xlvi	Increased traffic on the P240 will require increased maintenance by the Provincial Authority – if maintenance is inadequate it could impact on safety of road users	5	2	4	8	3	15 High	5	1	4	4	2	10 Medium

NOTES:

- Beneficial impacts with a high significance rating should weigh towards a decision to continue with the project.
- Medium impacts of an adverse nature should be mitigated to a level where the impact would be of low significance before a decision is made to continue with the project.
- Impacts (adverse) with a high significance should influence the planning, layout and design of the proposed development to prevent the impact from occurring.

IMPACT		SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
		PR	I	D	SF	SR	SiR	PR	I	D	SF	SR	SiR
ALTERNATIVE 2 – THE IMPACTS ASSOCIATED WITH THIS PROPOSAL ARE SIMILAR TO THOSE OF ALTERNATIVE 3. THEREFORE ONLY IMPACTS WITH A DIFFERENT SIGNIFICANCE RATING HAVE BEEN INCLUDED													
Lay out 2													
Sustainable design principles with the use of rural sustainable drainage systems for stormwater management													
Replacement of oxidation ponds with submerged media reactor													
CONSTRUCTION PHASE													
BIO-PHYSICAL ENVIRONMENT													
ADVERSE IMPACTS													
xlvi	Removal of protected trees and indigenous vegetation [impact on sensitive mountain ecology with placement of shooting range and high species richness in area of new ammunition safe]	5	2	4	8	3	15 High	4	2	4	8	3	12 Medium
OPERATIONAL PHASE													
BIO-PHYSICAL ENVIRONMENT													
ADVERSE IMPACTS													
xlvi	Permanent loss of habitat within permanent footprint of new buildings and infrastructure	5	2	4	8	3	15 High	4	1	4	4	2	8 Medium

Table 32

		SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
IMPACT		PR	I	D	SF	SR	SiR	PR	I	D	SF	SR	SiR
ALTERNATIVE 1 – THE IMPACTS ASSOCIATED WITH THIS PROPOSAL ARE SIMILAR TO THOSE OF PROPOSAL 3. THEREFORE ONLY IMPACTS WITH A DIFFERENT SIGNIFICANCE RATING HAVE BEEN INCLUDED BELOW													
Lay out 1													
Sustainable design principles with the use of rural sustainable drainage systems for stormwater management													
Maintenance of existing oxidation ponds													
CONSTRUCTION PHASE													
BIO-PHYSICAL ENVIRONMENT													
ADVERSE IMPACTS													
xlix	Loss of wetland habitat due to construction activity within riparian zones	4	1	2	2	2	8 Medium	3	1	2	2	2	6 Low
l	Loss of wetland habitat for fauna, invertebrate and flora and permanent loss of biota within the area cleared for construction (cumulative);	5	2	4	8	3	15 High	4	2	4	8	3	12 Medium
li	Removal of protected trees and indigenous vegetation [impact on sensitive mountain ecology with placement of shooting range and high species richness in area of new ammunition safe]	5	2	4	8	3	15 High	4	2	4	8	3	12 Medium
OPERATIONAL PHASE													
BIO-PHYSICAL ENVIRONMENT													
ADVERSE IMPACTS													
lii	Permanent loss of habitat within permanent footprint of new buildings and infrastructure	5	2	4	8	3	15 High	4	2	4	8	3	12 Medium
liii	Fragmentation of wetland habitat for fauna, invertebrates and flora due to the road (cumulative);	5	2	4	8	3	15 High	4	2	4	8	3	12 Medium
liv	Modification of the floodline if building footprints extend below the floodline	5	2	4	8	3	15 High	5	2	4	8	3	15 High
lv	Potential contamination risk too surface and groundwater as contamination monitoring is difficult [e.g. difficult to predict ammonia levels]	4	2	4	8	3	12 Medium	3	2	4	8	3	9 Medium
lvi	Potential contamination risk – during rainy season or in cloudy whether sewerage can become spetic	4	2	4	8	3	12 Medium	4	2	4	8	3	12 Medium
lvii	Irrigation and fire water demand can't be met as sewerage facility cannot contribute to the provision of of such water	5	2	4	8	3	15 High	5	2	4	8	3	15 High

NOTES:

- ☛ Beneficial impacts with a high significance rating should weigh towards a decision to continue with the project.
 - ☛ Medium impacts of an adverse nature should be mitigated to a level where the impact would be of low significance before a decision is made to continue with the project.
- Impacts (adverse) with a high significance should influence the planning, layout and design of the proposed development to prevent the



impact from occurring

SECTION 8: ENVIRONMENTAL MANAGEMENT PROGRAMME**8. ENVIRONMENTAL MANAGEMENT PROGRAMME***[Regulation 33]*

This section of the report provides implementation and management activities to assist the planning and design, pre-construction, construction and operational phases of the development. A draft rehabilitation plan has been prepared. The Environmental Management Programme (EMPr) will especially concentrate on matters related to impact on the Physical, Biological and Social environments to ensure an environmentally sustainable project.

Sensitivities were highlighted by the specialists whom also provided specific mitigation measures.

Measures indicated in Table 8 must be implemented during the construction and operational phases of the proposed development in order to ensure responsible management of the aspects and associated impacts of the proposed development on the receiving environment.

Mitigation measures were formulated with the assistance of input received from the professionals indicated in Table 34 forming part of the project team:

Table 33: Professional Team

Specialist field	Specialist	Qualifications
Interdesign Landscape Architects	Mrs Karen Botes	BL (UP) MTech (Hort.) cum laude PrLArch.
Cultural Heritage Resources	Dr. Johnny van Schalkwyk	BA: UP BA (Hons) Archaeology UP Post Graduate Diploma in Museum Science UP BA (Hons) Anthropology UP MA Anthropology UP D.Litt et Phil (Anthropology UNISA
Vegetation Assessment including identification of riparian zones	Professor George Bredenkamp	B.Sc. (UP) Botany and Zoology as majors, B.Sc. (UP) Hons. cum laude Botany. T.H.E.D. cum laude Pretoria Teachers Training College. M.Sc. (UP) Ecology D.Sc. (Ph.D.) (UP) Plant Ecology <i>Pr.Sci.Nat. South African Council for Natural Scientific Professions Reg No 400086/83</i>
Hydrogeological Investigation	Mr Carel Haupt	BSc (Hons) Pr.Sci.Nat
Mammal Assessment	Dr Naas Rautenbach	B.Sc(UP), T.H.E.D (Pta TTC), M.Sc (UP) Ph.D. (Un Natal) <i>Professional Natural Scientist (Zoology) – S.A Council for Natural Scientific Professions, Registration # 400300/05</i>
Avian Biodiversity Assessment	Dr Alan Kemp	B.Sc. Rhodes University, Zoology and Entomology majors B.Sc. Hons. Rhodes University, Zoology Ph.D. Rhodes University, Zoology of Pretoria <i>Pr.Sci.Nat. South African Council for Natural Scientific Professions Registration Number 400059/09, Zoological and Ecological Sciences.</i>
Geotechnical Investigation	Mr Izak Breytenbach	Pr.Sci.Nat

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
PRE CONSTRUCTION PHASE					
Review and approval of EMPr	To ensure sound environmental management on site	<ul style="list-style-type: none"> The final EMPr must include considerations as deemed necessary and relevant by the relevant authority 	Department of Environmental Affairs	Approval of Final EMPr must be included in the Environmental Authorisation Conditions subject to environmental audits	Pre-construction phase
Duties of the National Department of Public Works [DESIGN PHASE]	The National Department of Public Works, remains ultimately responsible for ensuring that the development proceeds according to the requirements of the EMPr and the environmental authorisation	<ul style="list-style-type: none"> The current application is being managed under the Site Clearance specifications of the Department of Public Works. The next phase to be initiated by the Department of Public Works is known as the Design Phase. The following actions are required as part of this Design Phase Obtain necessary licences in terms of the National Water Act, 1998 prior to construction commencing on the following activities <ul style="list-style-type: none"> New proposed sewerage treatment works; Additional river crossings for installation of water and sewerage pipelines; Upgrade of culverts at river crossings The National Department of Public Works must during the Design Phase appoint an ecologist and landscape architect to prepare a site specific Rehabilitation Plan which must be submitted to DEA for approval prior to construction works commencing on the site. This rehabilitation plan must also provide rehabilitation designs for riparian areas, and must therefore also be approved by DWA. Specific measures to be addressed in the rehabilitation plan include: 	National Department of Public Works during the design phase [pre-construction] Landscape Architect, Ecologist, project engineer, geohydrologist	Approval of rehabilitation plan and stormwater management plan by the DEA and DWA. Submission of method statement to Landscape Architects. Submission of Groundwater Management Plan to DWA as part of the Water Use License application of the new sewerage treatment facilities. Submission of Site Development Plan to DEA as part of first pre-construction audit.	Pre-construction phases

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> ● Areas affected by erosion; ● Areas disturbed by construction ● Rehabilitation of decommissioned shooting ranges and oxidation ponds; ● Areas where use of infrastructure is discontinued [e.g. sewerage pipeline from Camp B to western oxidation ponds]; ● Formalisation of recreational open space ● Planting specifications for use of RSuDS such as grassed swales and detention basins ● Areas within the 1:100 year floodline affected by past construction and proposed upgrades ● The rehabilitation plan should consider establishment of an on site nursery ● The species specification must make provision for indigenous / endemic vegetation which promotes soil stability ● The plan must provide landscaping guidelines for planting of residential gardens. <p>➡ The National Department of Public Works must during the Design Phase appoint a project engineer who will be responsible for preparing a Stormwater Management Plan. Such plan must be approved by DWA and DEA prior to construction commencing. The stormwater management plan should promote the use of a combination of Rural sustainable drainage systems. Should soil conditions be suitable the use of grassed swales along roads is recommended to prevent erosion and sedimentation of water ways. It is recommended that</p>			

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>pervious surfaces be utilised for the following areas where runoff may be contaminated :</p> <ul style="list-style-type: none"> ● Vehicle maintenance yards; ● Vehicle parking areas; ● Waste storage areas; <p>➤ A Site Development Plan must be prepared by the Architect which accommodates the following measures to limit visual impacts:</p> <ul style="list-style-type: none"> ● Strong contrasting colours create recognizable visual conflicts in the landscape and should not be allowed. ● The roofs of buildings will probably have the most significant influence in reducing visual impact and should resemble the colour of the surroundings. ● Highly reflective roofs such as untreated corrugated iron should be avoided at all cost. Colour selection should be made to achieve the best match with the surrounding landscape in both summer and winter. ● Plaster on outside walls should be coloured only in natural (earthy) colours; ● Built features of natural stone should be encouraged. ● Use specifically designed lighting equipment (full cut-off lighting fixtures) that minimizes the upward spread of light near to and above the horizontal. ● Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any observer is not more than 70°. ● Higher mounting heights allow lower main beam angles, which can assist in reducing 			

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>glare.</p> <ul style="list-style-type: none"> ● In areas with low ambient lighting levels, glare can be very obtrusive and extra care should be taken when positioning and aiming light equipment. ● Outside lighting required for decks or balconies should be designed and strategically placed to only provide illumination to that specific area. ● Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible ➤ A method statement must be prepared by the project engineer describing methods for decommissioning oxidation ponds. Such method statement must be prepared in conjunction with the landscape architect to ensure rehabilitation proposals are adequate and applicable. ➤ The National Department of Public Works must during the Design Phase appoint a geohydrologist or suitably qualified specialist to prepare a Groundwater Management Plan. This plan must include specifications for monitoring potential contamination risks associated with the new sewerage works as and include sampling production boreholes ➤ The National Department of Public Works must appoint a specialist to conduct a palaeontological investigation or to apply for exemption of such a study prior to construction commencing 			
Duties of the National Department of Public Works [PLANNING PHASE PRIOR TO CONSTRUCTION COMMENCING]	The National Department of Public Works, remains ultimately responsible for ensuring that the development proceeds	<ul style="list-style-type: none"> ➤ Ensure that sufficient resources are available to all role players to perform their tasks in terms of the EMPr ➤ Include the EMPr and EIA specialist studies 	National Department of Public Works during the preconstruction phase ECO, Geotechnical	One pre-construction audit must be submitted to DEA which	Pre-construction phases

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
	according to the requirements of the EMPr and the environmental authorisation	<p>in the tender documentation so that the appointed contractor is bound to the conditions of the EMPr.</p> <ul style="list-style-type: none"> Take responsibility and the necessary actions required for restoring the environment in the event of negligence leading to damage of the environment. Appoint of an independent Environmental Control Officer (ECO) during the pre-construction phase to oversee all the environmental aspects relating to the development. The ECO shall be an independent suitably individual registered in accordance with the Natural Scientific Professions Act (No. 27 of 2003) and with experience in the field of Environmental Management and relevant experience as an environmental control officer. The ECO must have a thorough knowledge of relevant environmental policies, legislation, guidelines and standards. Provide the ECO with all reasonable assistance to facilitate effective monitoring The Detail Design Plan and all other construction drawings compiled by the Project Engineer shall be verified on site by the ECO prior to the onset of any construction work. Prior to the commencement of construction activities the entire construction servitude, including lay down areas and stock pile areas must be fenced off or clearly demarcated. All construction activity to be contained within this servitude. This process is to be undertaken by the Contractor and informed by the ECO. The 1:100 year floodline must be pegged by the land 	Engineer, Health and Safety Officer, ecologist and land surveyor.	<p>includes a Health and Safety Plan and findings of Geotechnical investigation.</p> <p>The audit report must include location of protected trees affected by building footprint, location of construction camps and areas to be utilised for stockpiling and surveyed construction footprint.</p> <p>Permit to be issued for relocation of protected trees if applicable</p>	

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>surveyor and all areas below are considered areas of no access or construction activity.</p> <p>✿ The Contractor shall submit to the ECO for his/her approval, plans of the exact location, extent and construction details of construction camps, offices, workshops and testing facilities on the site and the impact mitigation measures the Contractor proposes to put in place. The construction site camp may not be within the 32m of the delineated wetlands on site. Location of construction camps is recommended as follows due to the size of the property:</p> <p>✿ 1. Construction camp to be located at existing Bravo Camp in already disturbed area cleared of vegetation. This construction camp and associated stockpiles must serve upgrade of Bravo Camp Administration Camp, New residential area, new ammunition safe at Administration Camp and new shooting range also all new infrastructure related to these camps only;</p> <p>✿ 2. Construction camp at new proposed Camp E in area where vegetation is mostly disturbed [near dirt road]. This construction camp is to serve upgrade of new E Camp, D Camp, landing strip and New A training camp including all infrastructure associated with these camps. Access of construction vehicles to New A Camp may only be from New E Camp along Airfield ring [Air N-Air W as per the Road Network lay out Drawing C820-R/L-300]</p> <p>✿ Location of Ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles must be verified by the ECO. Placement of these facilities must</p>			

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>adhere to the requirements of the Environmental Authorisation and the Water Use Licence. In terms of the environmental legislation these facilities may not be located within 32m of the delineated wetlands.</p> <ul style="list-style-type: none"> ✚ The ECO together with an ecologist is to identify location of protected trees, the location is to be recorded by the land surveyor. If the lay out can for practical reasons not retain the tree a permit for removal is required. In such instance the National Department of Public Works to apply for permits from the Department of Agriculture, Forestry & Fisheries if any of the identified protected trees are to be removed. ✚ A detailed geotechnical investigations needs to be undertaken to verify and refine the findings of the geotechnical feasibility study prior to proceeding with construction ✚ Test pits dug during the geotechnical investigation must be properly compacted to prevent differential settlements from taking place if construction is to cross over the test pit excavations; ✚ Appoint a Health and Safety consultant for monitoring of Health & Safety issues in terms of the applicable legislation. 			
Appointment and duties of Environmental Control Officer (ECO)	To ensure monitoring and implementation of the EMPr, by an independent third party. To report on the National Department of Public Works compliance with the EMPr	<ul style="list-style-type: none"> ✚ The ECO shall be an independent suitably individual registered in accordance with the Natural Scientific Professions Act (No. 27 of 2003) and with experience in the field of Environmental Management and relevant experience as an environmental control officer. The ECO must have a thorough knowledge of relevant environmental policies, legislation, guidelines and 	National Department of Public Works, ECO, Contractor	Submission of monthly audit reports to DEA with contact details of ECO;	Pre-construction and construction phases

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		standards. • The Environmental Control Officer (ECO) must monitor the National Department of Public Works and contractor's compliance with the EMPr on a monthly basis during the construction phase and bi-annually during the operation phase or as and when required by DEA. • The ECO must attend all relevant project meetings on a continuous basis. • Prior to the commencing of activities on site, the contractors must ensure that the construction crew attend an environmental briefing and training session with respect to guidelines outlined in this EMPr. The session is to be presented by the ECO			
Appointment and duties of the Environmental Officer (EO)	To ensure day to day monitoring of construction activities on site, compliance and co-operation of all personnel	• The contractor must appoint an EO • The EO must have a minimum of two years prior experience as an EO • The EO must preferably be fluent in the languages of the work crew	Contractor EO	DEA to be provided with contact details of EO	Pre-construction phase
Review of the Contractor's Health and Safety Plan	To ensure compliance with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) To ensure a construction site that is safe not only to workers, but also to the surrounding properties and the owners/residents	• The contractor must at all times comply with the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the regulations under this Act. • The contractor must appoint a Health and Safety Officer to prepare and submit a Health and Safety Plan that addresses all aspects related to maintaining a safe and healthy environment, as per the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), including the Construction Regulations (GNR 1010, Government Gazette 25207 of 18 July 2003). The plan must be submitted to an approved Health & Safety Inspection	Contractor Contractor , Health and Safety Officer	Safety plan to be included in first pre-construction phase audit report; for submission to DEA; Health and Safety audits to be prepared by a Health & Safety Consultant	Pre-construction and construction phases

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>Authority</p> <ul style="list-style-type: none"> The safety plan must include a method statement, stipulating requirements in terms of fire control and procedures to be followed in the event of fire, including fire fighting and fire training. Emergency procedures must be produced and communicated to all employees on site. This will ensure that accidents are responded to appropriately and the impacts thereof are minimised. This will also ensure that potential liabilities and damage to the environment and lives are avoided. The nearest emergency service provider must be identified as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, as well as the police and ambulance service must be available at a prominent location at the construction site and the construction crew camp. The contractor must have a basic spill control kit available at the construction camp and around the construction site. These kits must include absorbent material that can handle all forms of hydrocarbon. The contractor shall ensure that at least the site foreman and the EO have received formal training in the use of the spill control kit. 	<p>Health and Safety Officer</p> <p>Health and Safety Officer</p> <p>Contractor, EO</p>	Training records	
The EMPr	To ensure effective environmental management on site during construction and operation	<ul style="list-style-type: none"> This EMPr must be made binding to the main contractor as well as individual contractors and must be included in tender documentation for the construction contract. Contract with contractor to include penalties in the event of non-compliance with this EMPr. A penalty system will be devised prior 	National Department of Public Works, ECO	Minutes of handover should reflect that EMP has been made available to main contractor; Records to be kept	Pre-construction and construction phase & construction phase

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		to commencement of construction, during the planning phase. ✚ If the details of the responsible party changes these details must be given through to DEA		i.e. environmental incident log and complaint record sheet	
Awareness of the workforce	To ensure effective environmental management on site during construction and operation	✚ It is the contractor's responsibility to ensure that the workforce is aware of and conforms to the environmental guidelines that are applicable in this EMP through preparing an environmental awareness plan to be dealt with as part of the employee induction. An environmental awareness training and awareness session is to be presented by the ECO	Contractor ECO	No reports of environmental incidents. Preparation of environmental awareness plan	Continuous
TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
CONSTRUCTION PHASE					
ADVERSE IMPACTS					
Socio-economic					
Nuisance to neighbours i.e. noise	Limit noise emanating from construction.	✚ Construction shall only take place between 08:00 and 17:00 on weekdays and between 08:00 and 13:00 on Saturdays, in order to minimise the disturbance caused by noise emanating from the construction site; ✚ The area on which the proposed construction activities will take place should be demarcated/fenced off in order to limit the extent of the impacts associated with these activities to a confined area. Where possible, it is proposed that the boundary wall/palisade fence be erected prior to commencement of construction works. Fencing should allow migration of small mammals. ✚ In terms of the National Environmental Management: Air Quality Act (Act 39 of	Contractor and Project Engineer	No reports of non compliance	Construction phase

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		2004) (NEM:AQA), there are minimum environmental monitoring standards which must be complied with.			
Heavy vehicle traffic increase on external infrastructure, which could impact negatively on safety of existing roads and increase dust generation. Traffic obstruction during the construction period.	Minimize impact on traffic flow and all major access routes.	<ul style="list-style-type: none"> ➤ A road safety programme must be implemented in order to inform all relevant parties of the possible risks of the construction site. Red flags should be used to warn the public and construction vehicle operators at least 100m before crossing points or access route into the construction area and ensuring adequate and correct road signage in the construction affected area. ➤ Limit construction activities strictly to daylight hours. ➤ Dust controlling measures such as spraying of the construction site should be implemented to reduce the impact of dust generated during construction. ➤ When construction vehicles are transporting sand and other construction materials between construction areas the back of the truck must be covered with a tarpaulin; ➤ The tyres of the construction vehicles must be sprayed with water regularly and roads used by trucks must be sprayed regularly to limit dust this includes the P240. Should construction vehicles or construction activity cause damage to the P240 provincial road the Developer [DPW] shall be liable for such damage and shall compensate against any claim from a third party. ➤ Sand stockpile heaps should be dampened regularly ➤ Designated routes are to be determined 	Contractor and Project Engineer and ECO	No reports of non compliance	Construction phase

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		for construction vehicles in conjunction with the ECO.			
Possible damage to heritage resources, subterranean artefacts	Preservation of heritage resources/ archaeological artefacts and graves.	<ul style="list-style-type: none"> ✚ No archaeological structures/ artefacts may be removed, destroyed or interfered with prior to issuing of permit by SAHRA. ✚ The Contractor must immediately cease construction activities and inform the ECO and Developer, should they come across any archaeological artefacts/ sites. The relevant provincial authority [PHRA-G] must be notified ✚ The relevant heritage resources authority and the archaeologist must be informed as a matter of urgency should any human remains be exposed on the terrain for further action. ✚ The cemetery at the Administration camp is fenced. Signage must be erected to inform construction workers and other personnel, visitors, trainees of the presence of the cemetery; ✚ The cemetery must be kept neat and tidy and access should be available for people who wish to visit the cemetery, however such access must be controlled; ✚ The cemetery area must be maintained ✚ The remains of the old farmstead situated near the New Echo Camp must be fenced prior to construction commencing 	Contractor, National Department of Public Works, ECO, Engineer	No destruction of archaeological finds / removal of artefacts Audit report to include photographic record of fencing and signage of heritage resources	Construction phase
Crime may increase as a result of contract workers in the area	Prevent loss of assets of surrounding landowners	<ul style="list-style-type: none"> ✚ No building activities to be allowed after hours during weekdays[except Saturday mornings], or over weekends ✚ Building contractor to mainly make use of labour from local communities which will imply no contract workers residing on the premises. ✚ Workers should be provided with transport 	Contractor, Verdrag Community liaison officer	No reports of non compliance	Construction phase

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>to and from the application property. Workers should be collected at a central point in the mornings for work and transported back to this point at the end of the workday.</p> <ul style="list-style-type: none"> Only a limited number of two night watchmen to be allowed to overnight on property to ensure safety of equipment stored on site. The Verdrag training facility will be required to nominate and appoint a dedicated community liaison officer during the construction phase, who will be responsible for regular communication with surrounding owners and for recording events of criminal activity with the assistance of surrounding land owners, in order to determine whether such activity is increasing during the construction phase. The Contractor will be required to keep a record of employees who must sign in and out for work each day. Construction workers will not be allowed to walk about the application site, they will be required to remain within the confines of the construction area boundaries and dedicated eating areas. Construction workers may not leave the application site boundary without the approval of the foreman or contractor and will be required to sign the register upon leaving the site and entering the site again. A penalty system should be considered for workers who do not adhere to this checking in and checking out system. 			
Limit visual impacts caused by	Reduce visual impacts resulting	Locate administrative and stock yards in	Contractor, ECO	No reports of non	Construction

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
construction activity	from the construction activity to limit impacts experienced by surrounding observers	<p>the least visible areas.</p> <ul style="list-style-type: none"> ✿ Make use of the natural screening capacity of the site by placing these facilities in lower lying areas of the site, or adjacent to a dense vegetation patch with sufficient height to conceal these project components. ✿ Alternatively, the screening capacity of the site can be enhanced through the erection of a 2m shade cloth fence around these facilities. The colour of the shade cloth should be similar to that of the surrounding vegetation. ✿ Minimise disturbance during construction by demarcating construction areas. These areas to be limited to the minimum area required for construction. ✿ Construction should proceed without lengthy interruptions 		compliance	phase

CONSTRUCTION PHASE					
ADVERSE IMPACTS					
Biophysical					
Record of environmental incidents	<p>To ensure that incidents are recorded and remedial action is taken that would restore the environment to acceptable conditions</p> <p>To ensure quick and appropriate response to environmental incidents</p> <p>To prevent recurrence of similar incidents</p>	<ul style="list-style-type: none"> ✚ The contractor shall take corrective action to mitigate an incident appropriate to the nature and scale of the incident, immediately after the occurrence of the incident. Such corrective action must be informed by inputs from the EO and measures included in this EMP;. ✚ The ECO must be contacted upon occurrence of an environmental incident; ✚ Residual environmental damage that remains after having taken corrective action shall be rehabilitated ✚ Change operating procedures where necessary to prevent recurrence of similar accident ✚ Record all incidents on an Environmental Incident Report, within 24 hours of the incident occurring. Additional documents, including photos shall be appended to the incident report to provide a comprehensive record of the incident and the corrective and preventative action taken. Failure to do so shall result in a penalty. ✚ The ECO must be notified of any incidents and shall be required to report these to the relevant authority ✚ All incidents will be investigated in collaboration with the ECO. The focus of these investigations shall not be to apportion blame to specific employees, but to ascertain the root cause of the incident and to prevent a recurrence of similar incidents 	Contractor, EO, ECO	Environmental incident log / Report to be included in monthly audit report	Construction phases

Stockpile areas for construction materials and liquids and vehicle maintenance could impact on groundwater. Stockpile areas often host hazardous substances such as cement, petrol, diesel, oil, etc.	Risk of soil, ground and surface water pollution and air pollution due to construction waste and stockpiling should be prevented.	<p>The following guidelines apply for the use of cement on site:</p> <ul style="list-style-type: none"> ☛ Careful control of all on site operations that involve the use of cement and concrete; ☛ Limit cement and concrete mixing to single sites where possible; ☛ Use plastic trays and liners when mixing cement and concrete or made of other suitable impermeable material. No cement or concrete may be mixed on open soil; ☛ Dispose of all visible remains of excess cement and concrete after the completion of tasks. Solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste].; ☛ Fuels, solvents and other hazardous liquids [oils for or from construction vehicles] must be stored on site in vessels equipped with secondary containment structures to prevent contamination of soil, groundwater and surface waters due to accidental spills or releases. ☛ Stockpile areas must be located away from watercourses in an area identified by the ECO, on a flat gradient. 	Contractor, EO, ECO	No reports of non compliance	Construction phase
Construction works could impact negatively on the fauna [Habitat fragmentation]	Minimise impact on fauna and flora in sensitive vegetation areas.	<ul style="list-style-type: none"> ☛ The placement of culverts under the roads should allow smaller species to migrate under the road alignment; ☛ Disturbed areas must be rehabilitated as per the specifications of the rehabilitation plan as soon as possible ☛ The contractor must ensure that no fauna species are disturbed, trapped, hunted or killed during the construction phase. ☛ All activities on site must comply with the 	Contractor, Engineer and ECO, Ecologist and Landscape Architect	No reports of non compliance. Implementation of approved rehabilitation plan	Construction phase

		<p>regulations of the Animal Protection Act, 1962 (Act No.71 of 1962).</p> <ul style="list-style-type: none"> • No fauna are to be trapped, hunted or killed on the application site or adjacent properties • If any bird, mammal, amphibian or reptile is found during construction the ECO is to be notified by the EO. These animals must be relocated to undisturbed areas or to conservation areas close by, by a person who has applicable experience in the relocation of these species. Such person to be identified by the ECO. • The Contractor shall advise his workers of the penalties associated with the needless destruction of wildlife, as set out in the Animals Protection Act, 1962 (Act 71 of 1962) sec. 2 (fine R2,000.00 and/or 12 months imprisonment). • Fence structures should be of the palisade fence type, and should be at least 150 mm apart. The palisade fence should be without any ground-level impediments; • Allowance should be made during construction for the free movement of all natural biota through unnatural barriers, such as fences, walls and stormwater management features; 			
Damage to and removal of conservation worthy vegetation communities. Loss of wetland habitat and de-vegetation of construction areas	Flora endemic of area and biome to be preserved.	<ul style="list-style-type: none"> • Disturbed areas must be rehabilitated as per the specifications of the rehabilitation plan as soon as possible; • Construction activity may not extend beyond the construction servitude as agreed with the ECO. • No construction activity, this includes associated activity such as lay down areas, stockpile areas etc may be situated within the demarcated sensitive areas [32m wetland buffer]; 	Contractor, EO and ECO, rehabilitation specialist	Permits to be issued by DEA for relocation of protected species if necessary. Environmental audits reports to indicate any transgressions	Construction phase

		<ul style="list-style-type: none"> The EO is required to monitor this daily and the ECO is to report to the DEA on a monthly basis. Should any activity be found to be transgressing this requirement the EO is to notify the ECO and the ECO is to notify DEA 			
De-vegetation of areas of construction and loss of topsoil due to construction activity which could result in wind and water erosion as well as dust generation	Prevention of associated soil loss, increased sedimentation deposits, dust generation, erosion risks	<ul style="list-style-type: none"> Construction schedules to indicate which areas can be cleared for construction work Construction sites should be watered/wetted on a regular, monitored basis to prevent dust formation. Regular inspections by the ECO to ensure compliance with these regulations. Where rehabilitation of cleared areas is planned topsoil should be preserved for this purpose Areas to be rehabilitated as soon as possible after disturbance to satisfaction of the ECO The temporary storage of topsoil, inert spoil, fill, etc. must be away from stormwater systems Wind erosion could be limited by dampening of soil. This could also assist in reducing dust associated with construction activities; The construction process should be phased so as to limit the extent of exposed areas at any one time, and so that for any specific area, the time between initial disturbance and completion of construction is as short as possible; Construction activities should take place within the dry season, specifically construction within riparian areas and streams [replacement of pipelines at river crossings etc]; Disturbed areas should be rehabilitated on 	Contractor, EO, ECO, and Project Engineer	No incidents of erosion reported, implementation of approved rehabilitation and stormwater management plan	Construction phase

		an ongoing basis to prevent long-term impacts and severe erosion.			
Increased sedimentation loads in waterways due to construction activity within riparian areas and stormwater runoff from areas where vegetation has been cleared	Prevent in sedimentation run off into waterways, protect stream integrity and allow stable area for works to be completed	<ul style="list-style-type: none"> It is recommended that streams affected by the upgrade of culverts and installation of pipelines be temporarily diverted to reduce increased sediment loads into the waterways. Project engineer to provide detail, Contractor to implement Diversion methods should include the following : Ensure bed of diversion is stable and does not erode when utilised and line diversion banks with gabions to stabilise; Size diversion accordingly to stream flow and for any high flow events; Discharge diversion back into watercourse below works and at an area where erosion and scour will not occur, or stabilise discharge point; Keep gradient of diversion similar to that of stream to ensure inlet and outlet do not scour; Complete works as soon as possible so that diversion is only used for a short period; Clear works area of remaining water to a suitable sediment control once diversion is in place i.e. sediment retention pond; Work in dry weather to reduce risk of diversion failure; Constant monitoring of the diversion is needed to ensure it is effective and does not cause sediment to enter the watercourse. This includes monitoring of the diversion liner; Care must be exercised to ensure that 	Project engineer, contractor, ECO	Photographic record of diversions to be included in audit reports to DEA. No evidence of siltation in waterways. Areas downstream of construction activity must be monitored.	Construction phase

		streamflow does not get under or behind the channel liner and cause erosion of the channel banks and subsequent downstream siltation.			
Stripping of topsoil	To decrease the loss of topsoil	<ul style="list-style-type: none"> Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The upper loose and highly organic topsoil should be stripped and stockpiled to be tested for suitability for use in hydroseeding areas. This stockpiled material shall be used for the rehabilitation of the site and for landscaping purposes. Strip topsoil at start of works and store in stockpiles no more than 2m high and 4m² footprint in a designated materials storage area. 	Contractor, EO, ECO	To conserve the highly organic / fertile layer of soil	Construction Phase
Maintenance of existing oxidation ponds servicing amps C, D and E	To prevent possible contamination risks to surface and groundwater resources	<ul style="list-style-type: none"> Trees to be removed from embankments which could cause walls to collapse; Animal access to the ponds must be prohibited; Reed bed is to be planted with additional reeds 	Department of Public Works, Project engineer	No reports of non compliance Photographic record of maintenance to be included in audit reports	Construction phase
Management of non hazardous construction waste		<ul style="list-style-type: none"> Waste skips to be provided for building waste. This skip must be placed at a centralised collection point and frequently removed by a licensed waste contractor and disposed of at a municipal waste site. Domestic waste skips are currently kept near the existing residential area near the 	Contractor, EO, and ECO	No reports of non compliance	Construction phase

		<p>Administration Camp and at the Bravo Camp. All construction waste skips must be kept at these two locations as there is ample space. An additional construction waste storage area must be established at the location of the New E Camp, within the boundary of the New E Camp as per Lay out 3. A letter must be obtained from the Municipal waste site beforehand which confirms that they have capacity. Smaller construction waste skips may be located at all the construction sites but these skips must be situated away from the 1:100 year floodline, on a flat gradient identified by the ECO. Skip areas must be provided with temporary fencing which will hamper access by animals. All skips must contain a lid and should be kept closed at all times to avoid raiding by animals [e.g monkeys/baboons etc] The EO will be required to check the condition of all waste skips on a daily basis during the construction phase. The areas identified for placement of skips as per specifications above must be provided with an impervious surface with a drain so that any spillage can be collected and so too contaminated run off in a controlled area and disposed off.</p> <ul style="list-style-type: none"> ➤ No material may be dumped in the surrounding region. Written proof of disposal at a registered waste disposal site must be given to the EO on every load of construction waste removed from the site. it is the responsibility of the site manager to keep records of certificates ➤ Solid construction waste not posing a pollution hazard should be used on site as a filling material. Should no filling material 			
--	--	--	--	--	--

		<p>be required this waste should be disposed of.</p> <ul style="list-style-type: none"> Containers shall be emptied once weekly by a licensed waste contractor 			
Management of hazardous construction waste	Prevent contamination of soil , ground and surface water resources	<ul style="list-style-type: none"> Liquid waste to be stored in bunded area. Bunded area to have complete seal and a volume equal to 110% of the total volume of liquid stored in the area. Liquid waste to be disposed of at a class HH site only. Any contaminated soil / substrate must be removed and stored in a skip until it can be disposed of at a permitted disposal site Hazardous construction waste must be segregated from non hazardous and general wastes; Waste from ablution facilities must be regularly removed and care must be taken to ensure that there is no spillage which would result in possible soil or water contamination; Hazardous waste disposal must be undertaken by an approved waste contractor; Safe disposal certificates for any hazardous waste removed from the site must be kept on file on site. Hazardous waste such as bitumen, tar, oils etc. shall be disposed of at an approved landfill site. Special care shall be taken to avoid spillage of oils and other hazardous waste products to avoid water- soluble phenols from entering the ground or contaminating water. Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and sent back to the supplier. Water 	Contractor, EO, and ECO	No reports of non compliance	Construction phase

		<p>and oil should be separated in an oil trap. Oils collected in this manner, should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by mobile servicing unit should be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.</p> <p>➤ Adequate on-site chemical sanitation systems (one toilet for every 8 workers) must be provided within walking distance to all construction workers. Strict penalties in re-numeration must be applied for workers that use other surrounding open areas for this purpose.</p> <p>➤ Containers shall be emptied once weekly by a licensed waste contractor</p>			
Waste Management for general waste	To ensure the responsible disposal of waste generated by the contractor and to prevent the accumulation of litter and waste on site and in the surrounding area	<p>➤ A sufficient amount of litter bins with scavenge proof lids and waste skips with lids should be provided for the disposal of general waste.</p> <p>➤ Domestic waste skips are currently kept near the existing residential area near the Administration Camp and at the Bravo Camp. Additional waste skips for general waste must be kept at these two locations as there is ample space. An additional general waste storage area must be established at the location of the New E Camp, within the boundary of the New E Camp as per Lay out 3. A letter must be obtained from the Municipal waste site beforehand which confirms that they have capacity to deal with the disposal of this</p>	Contractor, EO, and ECO	No reports of non compliance	Construction phase


		<p>waste. Scavenger proof litter bins must be provided at all the construction sites. These bins must be emptied on a daily basis and litter disposed of at skip sites. Skip areas must be provided with temporary fencing which will hamper access by animals. All skips must contain a lid and should be kept closed at all times to avoid raiding by animals [e.g monkeys/baboons etc] The EO will be required to check the condition of all waste skips on a daily basis during the construction phase.</p> <ul style="list-style-type: none"> ☛ The areas identified for placement of skips as per specifications above must be provided with an impervious surface with a drain so that any spillage can be collected and so too contaminated run off in a controlled area and disposed off. ☛ General Waste Skips shall be emptied once weekly by a licensed waste contractor 			
Management of dangerous goods including fuel storage and storage of hazardous substances.	To prevent possible soil, stormwater and groundwater contamination and provide measures for dealing with a spill	<ul style="list-style-type: none"> ☛ Storage requirements of hazardous materials must be verified by the ECO prior to any storage taking place on site. Combined storage capacity may not exceed 30m³ without receiving formal approval by the DEA; ☛ All hazardous materials i.e. bitumen binders will be stored in a secured, appointed area that is fenced and has restricted entry. A walled, concrete platform or dedicated store with adequate flooring must be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas. Storage of bituminous products shall only take place using suitable containers to the approval 	Contractor, ECO	No incidents reported	Construction Phase Continuous

		<p>of the ECO</p> <ul style="list-style-type: none"> Warning signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected the Contractor shall furnish the ECO with details of the preventative measures he proposes to install in order to mitigate against pollution of the surrounding environment from leaks or spillage Storage of hazardous materials should adhere to all requirements by the Department of Water Affairs Other identified hazardous substances shall only be stored under controlled conditions. Gas welding cylinders and LPG cylinders should be stored in a secure, well-ventilated area. 			
Use of spill kits and decontamination procedure	To prevent possible soil, stormwater and groundwater contamination and provide measures for dealing with a spill	<ul style="list-style-type: none"> Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewerage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and tar or bituminous products. In the event of a large spill the Contractor will be liable to arrange for professional service providers to clear the affected area. Responsibility for spill treatment lies with the Contractor. In all cases the immediate response shall be to contain the spill. All spill incidents must be reported to the ECO by the EO to determine required treatment and magnitude of spill. In the event of small spills a spill kit must be available on site. 	Contractor, Engineer, ECO	No incidents reported	Construction Phase Continuous

		<ul style="list-style-type: none"> ➤ Should an accidental spill occur such spills should be cleaned up with approved absorbent material such as 'Drizit' or 'Spillsorb'. These should be kept in sufficient quantities on site to deal with small spills [as part of the spill kit]. ➤ Spill kits must be available in all vehicles that transport hydrocarbons for dispensing to other vehicles on the site. The dispensing devices (pump heads) must be compatible with the vehicles to which they are dispensing. In addition the dispensing devices must be fitted with the necessary valves/ apparatus that will ensure that the nozzles do not drip fuel after pumping has stopped. ➤ In the event of spills from vehicles, the area should be cleaned immediately using a bioremediation product. The absorbent and soil must be placed in a bin and removed from the site by a certified company and disposed of as a hazardous waste at a licensed commercial facility. ➤ Should water downstream of a spill be polluted and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input will be agreed between the ECO and the engineer. The cost of containment and rehabilitation shall be for the contractor's account, including the cost for specialist input. ➤ Spills must be reported to the DEA, and DWA. 			
--	--	--	--	--	--

Vehicle Maintenance	To prevent possible contamination of soil and groundwater as well as stormwater	<ul style="list-style-type: none"> ✱ The maintenance of vehicles and equipment used for any purpose during the development will take place only in the maintenance yard, location of such area to be agreed by the ECO ✱ Equipment used in the development process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid. ✱ Machinery or equipment used on the site must not constitute a pollution hazard in respect of the above substances. The main contractor or ECO shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable. ✱ Vehicle maintenance must take place on an impermeable surface where a drain / or trap is provided to deal with contaminated runoff from the maintenance area. Vehicle maintenance may not take place on bare soil. 	ECO, Contractor	No incidents reported	Construction Phase continuous
Sanitation (toilet facilities)	<p>To maintain the construction area in a hygienic condition and prevent the spread of disease</p> <p>To prevent pollution of surface or groundwater</p>	<ul style="list-style-type: none"> ✱ Adequate on-site chemical sanitation systems, at least one toilet for every 8 workers, must be provided ✱ Toilets must be located along the alignment of construction activities outside sensitive no go areas specified by ECO and at the construction camp ✱ Toilets shall be serviced once a week to prevent spillages ✱ Under no circumstances may ablutions occur outside of the provided facilities 	Contractor, EO and ECO	No incidents of non compliance reported	Construction phase
Unsupervised and misuse of fire on site could impact negatively on the environment	To reduce risk of fire on site	<ul style="list-style-type: none"> ✱ No fires will be allowed within the site camp or construction areas. ✱ The ECO is to be informed as to the type of cooking facilities that will be used prior to construction. 	Contractor, EO and ECO		Construction phase

		<ul style="list-style-type: none"> It is proposed that gas cookers be provided. Heavy smoke may not be released into the air. Any fire that is ignited must be extinguished immediately. Fire extinguishers and/or fire fighting equipment must be provided at the site camp and construction area, where it is easily accessible. Fire extinguishers and/or fire fighting equipment must be serviced, full and in good working order. The contractor's Health and Safety Plan must include particulars in terms of fire fighting and training. 			
OPERATIONAL PHASE					
BENEFICIAL IMPACTS					
Biophysical					
Rehabilitation: Removal of exotic plant species and establishment of indigenous veldgrass, trees, shrubs in degraded areas, which will increase biodiversity and visual quality of these areas.	Enhancement of biodiversity and visual quality of degraded areas.	<ul style="list-style-type: none"> Rehabilitation of disturbed areas should commence as soon as possible as per the approved rehabilitation plan; During the operational phase the following maintenance measures relating to the removal of weeds will be applicable, All Classified Invader Species in terms of the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) must be identified, eradicated and controlled (i.e. Black Wattle, Blue Gum, Poplar, etc.). Eradication of weeds and exotic invader plant species must take place manually to avoid water quality deterioration from the use of chemicals. Dead weeds/ exotic invader plant species must be discarded and disposed of. 	<p>The National Department of Public Works is responsible for appointing a rehabilitation specialist to implement the rehabilitation plan.</p> <p>The SAPS Verdrag Training Facility's maintenance team will be responsible for the upkeep of the rehabilitated areas</p>	Regular monitoring Findings to be recorded in bi annual audit reports	Operation phases
Regular maintenance of stormwater infrastructure	To prevent culverts and outlets from becoming blocked and	<ul style="list-style-type: none"> Regular inspections of culverts and outlets should be undertaken throughout the 	The SAPS Verdrag Training Facility's	Regular monitoring	Operation phases

	floods resulting due to obstruction of stormwater; To prevent water quality deterioration from pollutants washed through the stormwater system; To prevent erosion and depositing of sediments which could result in weed infestations	facility. As a minimum, all culverts should be cleared of debris at the start of the rainy season and during the middle of the rainy season. In addition inspections and if required maintenance should be undertaken after every significant flood event.	maintenance team appointed by the Department of Public Works will be responsible for the upkeep of stormwater infrastructure	Findings to be recorded in bi annual audit reports No evidence of erosion	
Preparation of an emergency response plan	To contain spillages of hazardous substances Provide measures for dealing with floods and fires	 An emergency response to deal with spillages, fires and flooding should also be well defined and tested regularly to ensure rapid response to, containment of, and neutralisation of spillages as well as to deal with flood situations and control of fires.	National Department of Public Works in conjunction with SAPS Verdrag representatives who will be responsible for compiling a response plan	No incidents of non compliance reported	Operational phase
WASTE MANAGEMENT					
Hazardous Waste Management Waste could impact on soil & ground water	Limit contamination risk	<ul style="list-style-type: none"> Storage areas for hazardous waste may not be located within 100m of any watercourse. Access to storage areas must be controlled Certain hazardous wastes, including used oil, batteries and light bulbs, can be recycled through reputable agents. Where possible, all hazardous wastes, including hydrocarbon wastes such as oils, should be recycled either by a recognised recycling company or returned to the supplier. No burning of waste is permitted on site; Hazardous waste removal must be undertaken by an approved waste contractor, and waste must be disposed of at a permitted hazardous waste disposal facility. Safe disposal certificates for any hazardous waste removal from site must be kept on site including volumes of waste 	National Department of Public Works in conjunction with SAPS Verdrag management	Findings to be recorded in bi annual audit reports	Operational phase

		disposal.			
PROCEDURES FOR HANDLING AND STORAGE OF HAZARDOUS WASTE					
Waste	Handling and storage				
Used oil and Oil contaminated material	<ul style="list-style-type: none">● Used oil should be stored away from drains or watercourses in bunded roofed and sealed areas● Used materials must be clearly marked e.g. 'Used Oil Waste'. The storage area must be bunded with an impermeable surface such as concrete. The bunded area must be able to contain 110% of the total volume of the largest used oil waste container being stored. Storage areas must be protected from sun and rain and be located far away from open flames. A fire break should be provided around the storage area of flammable materials. Access for removal truck must be available.● Sufficient absorbent spill clean up kits should be kept near the storage area;● Oil contaminated waste should be disposed in good quality wheelie bins which are clearly labelled and fitted with sealable lids.				
Used cooking oil	<ul style="list-style-type: none">● All used cooking oil generated from the various kitchens must have a designated area for the storage of used cooking oil waste. This area should be clearly marked 'Cooking oil waste'● Storage areas must be protected from sun and rain and be located far away from open flames. A fire break should be provided around the storage area of flammable materials. Access for removal truck must be available.				
Chemicals	<ul style="list-style-type: none">● Chemical waste [this includes chemicals from the purification plant] should stored in labelled, sealable containers away from watercourses;● Storage areas must have an impermeable floor and controlled access;● Chemicals should be stored in non corrosive containers which are clearly marked;● A fire break should be provided around the storage area of flammable materials				
Fluorescent bulb waste	<ul style="list-style-type: none">● Used bulbs should be removed from light fixtures and packaged in the same cardboard boxes in which the replacement bulb is packaged to prevent breakage. The Thabazimbi Municipality should be contacted to determine whether they offer a CFL or mercury recycling service. The spent bulbs should then be recycled.				
Battery waste	<ul style="list-style-type: none">● All batteries should be stored in a cool dry place, away from flammable materials and heat sources;● Used batteries must be placed in a plastic bag or have non conducive electrical tape over the terminals. Lead acid batteries should be stored with the terminals on top to prevent spillage.● Batteries should be sorted according to their chemistry/supplier, disposed in non metal or lined steel containers, and clearly marked 'Used batteries'				
E-Waste	<ul style="list-style-type: none">● E-Waste is waste generated from electronic equipment. Electronics are potentially recyclable but contain lead, which can be harmful to the environment if disposed of improperly;● Before disposing of 'old' electronic equipment it should first be determined if it still has value. It is opften possible to donate usable or repairable items to schools or other foundations;● If donation or reuse of electronic equipment is not practical, then the equipment should be collected by the waste contractor for possible recovery of metals, plastics, glass and other materials.				
PROCEDURES FOR HANDLING AND STORAGE OF GENERAL WASTE					
General waste management Waste could impact on soil & ground water	To ensure the responsible disposal of waste generated on site and to prevent the accumulation of litter and waste on site and in the surrounding area	<ul style="list-style-type: none">● Staff, trainees, visitors and residents should be made aware of the aim to recycle waste by means of posters● Recycling bins should be placed in strategic and convenient places at all Camps in sizes which are suitable to their location. These bins must be scavenger	National Department of Public Works in conjunction with SAPS Verdrag management	Findings to be recorded in bi annual audit reports	Operational phase

	Limit contamination risk	<p>proof and colour coded [Bin #1 recyclables paper, glass, tins and plastic, Bin #2 mixed waste) These bins must be emptied regularly and taken to the Central Waste storage area. The Central Waste storage area should make provision for sorting of waste as per the requirements of the Waste Contractor. Bins at the Central Waste area must be sealed to prevent animals from getting into the bins. The bins at the Central storage area must be removed by the Waste Contractor on a weekly basis.</p> <ul style="list-style-type: none"> ● All general waste that cannot be reused or recycled should be stored temporarily in a designated area and transported to the permitted landfill site on a weekly basis. ● The Central waste storage area should have clear signage for disposal of recyclable waste and area for disposal of general waste. ● Access to the central storage facility must be controlled. ● No burning of waste on site must be allowed. ● Safe disposal waybills for all waste loads removed from site must be kept on file on site. ● A manifest indicating the monthly volume of disposed waste should be kept on file 			
<p>Management of submerged media reactor sewerage treatment plants at Camp B, Camp C and at the new shooting range; Management of treated effluent for use as fire and irrigation water</p>	Prevent contamination risks	<p>An operator must be appointed for management of the treatment plants. The main duties of the operator will be to;</p> <ul style="list-style-type: none"> ● Manually rake and clean inlet grid on a daily basis ● Ensure that the pumps are working and are in order and that there are no leakages at the system. ● Monitor chlorine levels 	National Department of Public Works to appoint a dedicated operator for maintenance of the new sewerage treatment facility	No record of incidents; Monthly Water quality monitoring adheres to the standards set by DWA	Operational phase

		<ul style="list-style-type: none"> ● Float switches and pumps must be checked on a regular basis and will be removed for maintenance on a one-three year cycle ● The plants must be fenced and locked to prevent unauthorised entry. All the warning signage for the plants must be erected ● Monitoring data must be kept on file on site and must be readily available for inspection by DWA or DEA; ● Records must be kept of any pipe ruptures, pump and mechanical failures including record of remedial action. ● The use of treated effluent for irrigation is required to comply with the Department of Water Affairs South African Water Quality Guidelines/ Volume 4 – Agriculture, Irrigation 			
<p>Open Space Management</p> <p>Loss of potential natural habitat and fragmentation of mammalian and avi-faunal habitat.</p>	<p>Prevention of loss of natural habitat.</p> <p>Minimal disturbance to fauna and avi-faunal species</p> <p>Management of Open Spaces</p>	<ul style="list-style-type: none"> ● A Fire Management Plan should be prepared for the management of the Open Spaces the plan is to be approved by DWA (Working on Fire). ● 4x4 and quad bikes should be strictly prohibited in open spaces and may only be allowed on dedicated existing roads; ● Appropriate signage to indicate rules for use of open space areas to residents/visitors/trainees; ● Vegetation should be rehabilitated in Open Spaces and remain natural. No removal of natural vegetation should be allowed; ● Erosion in these areas should be prevented. Erosion control measures implemented should be maintained and their effectiveness monitored, especially during the rainy season; ● No hunting of birds, mammals, reptiles etc should be allowed; 	National Department of Public Works, SAPS Verdrag Management, ECO	<p>These actions are to be audited by the ECO during the 1st year operational phase on a bi-monthly basis</p> <p>DWA approved fire management plan</p>	<p>Planning, construction and operational phase</p>

		<ul style="list-style-type: none"> ● Dwelling houses bordering on open spaces, must implement fencing which allows for the movement of small mammals [palisade fencing] 			
--	--	--	--	--	--

SECTION 9: ENVIRONMENTAL IMPACT STATEMENT

9 ENVIRONMENTAL IMPACT STATEMENT

[Regulation 31 (2) (f) &(o)]

9.1 SUMMARY OF EIA PROCESS FOLLOWED UP TO DATE

Since registration of the project with the GDARD the appropriate environmental process as specified in terms of Section 24 and 24D of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended, and the Environmental Impact Assessment (EIA) Regulations promulgated 18 June 2010 as read with Government Notices R 543 (Regulations 26-35), R544, R545 and R546 as amended for the construction of the proposed dual carriageway has been followed..

Up to date the following actions have formed part of the EIA process:

- Issues raised during the scoping phase have been addressed;
- Issues raised during the EIA Phase have been addressed;
- Alternatives for the proposed development were considered and investigated;
- Environmental issues identified during the environmental scoping exercise were ranked through application of a methodology for the determination of significance, based on the Guidelines compiled by the Department of Environmental Affairs and Tourism ;
- Relevant biophysical environmental components of the site were assessed to an appropriate level of detail. This includes the physical, biological, and socio-economic components; and
- A draft Environmental Management Programme has been compiled describing specific measures to be implemented to address significant impacts associated with construction of the dual carriageway.

9.2 SUMMARY OF KEY FINDINGS

During the scoping and EIA phase up to date the following specialist investigations were undertaken:

- Vegetation Assessment;
- Mammal Assessment;
- Bird Assessment;
- Hydrogeological evaluation;
- Geotechnical feasibility investigation;
- Dolomite Assessment; and a
- Heritage Impact Assessment.

From the findings of the above investigations the following can be concluded.

Impacts to ecological integrity of the site and associated biodiversity

The intended developments will be restricted and the footprint of the development sites will be insignificant measured against the total size of the approximately 7500 hectares site. In most instances development and alterations will be on sites already developed, and these therefore do not qualify for serious consideration with regard to the biodiversity. Wetlands are considered as sensitive, but none of the proposed developments will affect this habitat type. The intended development will not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species. Care should be taken to avoid encroaching into riparian zones or mountain slopes. There are no need for buffer zones at or near of any of the development sites. From a mammal perspective, no compelling reason can be offered why the proposed developments and improvements cannot proceed.

The main conservation objectives for birds on the SAPS Academy property at Thabazimbi are to retain as much as possible of the savanna habitats of woodland and bushveld, protect the sensitive drainage lines and associated riparian vegetation, and minimize the footprints and impacts of the small scattered developments across the property. Keeping the footprints of the developments as small as possible, during both construction and operation, making every effort to avoid removal of larger trees and associated ground cover, and controlling rainwater runoff to prevent erosion, especially along the network of roads interconnecting the developments, should be the principal environmental goals. The property has special potential, due to the quality of its broad-leaved woodlands, low human impact and high-than-expected local rainfall, to provide an important patch of conserved habitat in the region for a wide variety of large and small animals and plants. This potential could best be realised if an all-inclusive environmental management plan was developed for the

property to secure its ecological services in collaboration with neighbouring conservation areas.

During the geotechnical feasibility investigation no fatal flaws were identified which would hamper the safe and successful construction of the upgrades.

The hydrogeological investigation together with the engineering services investigation proposed that the existing sewerage treatment facilities be decommissioned and replaced with a newer technology.

The Heritage Impact Assessment identified the location of sites which are to be conserved, or which require permits should they be demolished.

Preferred proposal: Alternative 3

Based on the findings of the above specialist investigation a proposal has been recommended which will result in limited impacts to the biophysical environment and the surrounding socio economic environment.

The proposal entails the upgrades to the SAPS facility as per the specifications of Lay out 3.

This lay out includes a developable area footprint as follows *[as the final Site Development Plan is not yet available these sizes are the maximum as it was calculated on the Camp boundary and not actual hard footprint of structures within Camp boundaries]*:

- Developable area for upgrade of existing Camps and construction of new A and E Camp = ± 64 hectares
- Installation of new infrastructure consisting of submerged media reactors and water reservoirs = 4,400m²
- Area of disturbance associated with installation of new pipelines [a disturbance width of 10m has been allowed for] = ± 6 hectares
- Total area therefore measures 70,44 hectares.

This lay out makes provision for placement of the new shooting range and ammunition safe in locations which will limit impacts to indigenous vegetation and protected trees.

No development is proposed below the 1:100 year floodline, with the exception of installation of additional water and sewerage pipelines and upgrades required to existing culverts where roads cross watercourses.

The proposals also entails the phased decommissioning of the existing oxidation ponds and the installation of submerged media reactors at Camp B, below Camp C and at the new shooting range. The areas to be rehabilitated where infrastructure will be decommissioned [oxidation ponds, shooting ranges] measure approximately 14 hectares.

The proposal recommends the preparation and implementation of a formal rehabilitation plan which will contribute to the conservation of Open Space within the confines of the property. Furthermore with implementation of a stormwater management plan which utilises sustainable design principles, impacts such as erosion and sedimentation of waterways can be curbed while providing movement corridors for small species and pollinators..

A site specific Environmental Management Programme has been prepared for consideration and approval by the DEA. The programme provides measures for Waste Management on site during the operational phase. It is anticipated that with strict adherence to this EMP current impacts associated with operation of the facility can be reversed. Mitigation measures have been provided for construction of the upgrades. It is anticipated that most of the impacts will result during the construction phase. The construction phase however is temporary and with implementation of the required rehabilitation, integrity of areas disturbed by construction can be restored. The site provides an opportunity for the conservation of a large open space area. It is therefore recommended that the Environmental Authorisation stipulate that the Open Space area be formalised and that a Open Space Plan be prepared by a landscape architect with the inputs from an ecologist to ensure the long term sustainability of the Open Spaces within the property boundary. It is therefore also recommended that the Applicant consider the formal proclamation of the property as a protected area as provided for in Section 21 (1) (a) of the Limpopo Environmental Management Act (Act 7 of 2003).

9.3 NEED AND DESIRABILITY

- The existing training facilities on the site have been in existence for 20 year, due to the limited development footprint the land use has contributed to the conservation of Open Space on the remainder of the property;
- The proposed development areas to be rezoned affect only a very limited area of the farm portions, i.e. approximately 5%, and the

remaining 95% of the farm portions remains under an "Agricultural" zoning. A large portion of the property will therefore continue to be conserved;

- The location of the subject property in a remote rural area with very limited development makes it ideal for the purposes of the SAPS Training Institute, which requires a secluded and private setting. The nature of the training facilities for the SAPS furthermore requires that the respective camps on the site must be situated well apart and in dense vegetation, in order to prevent visual contact between the camp areas. The site is therefore extremely desirable in terms of its size, locality and nature for purposes of the SAPS training facilities;
- The proposed expansion and upgrading of the existing training facilities will lead to the creation of a limited number of employment opportunities that will aid in addressing unemployment, and contribute towards poverty alleviation within the grass-roots community. The development will furthermore contribute towards broadening the economic base of the region;
- The operation of the training institute for purposes of training the SAPS Special Forces is in national interest, and the need is undisputed;
- Considering the enhancing factors including the favourable location, size and nature of the site, together with the desirability and need for the proposed development the subject properties are well suited for the proposed uses and the application.

9.4 RECOMMENDATION

It is therefore recommended that the proposal as per Alternative 3 be implemented with strict adherence to the EMPr. The Applicant will be required to implement the following during the next stage of the project planning:

Appoint specialists to prepare the following as per the specifications of the EMPr:

- Site Development Plan;
- Rehabilitation Plan and plan for management of Open Spaces
- Stormwater Management Plan [approval by DWA required];
- Method statement for decommissioning [approval by DWA required]

The above plans must be submitted to DEA prior to construction on any of the activities commencing. Furthermore all the licenses as specified in this EIA Report required in terms of the National Water Act, 1998 must be issued by DWA prior to construction commencing.